APPLICATION TO PARTICIPATE IN AN IODP EXPEDITION

ESSAC Office ECORD Science Support & Advisory Committee
GEOMAR | Helmholtz Centre for Ocean Research Kiel
Wischhofstrasse 1-3
24148 Kiel, Germany
Hanno Kinkel (ESSAC Science Coordinator):
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Web Page: http://www.essac.ecord.org Email: essac@geomar.de

Please type information

Apply to Sail Application Form

Expedition Number 373: Antarctic Paleoclimate and Ice History

1. PERSONAL INFORMATION

Family name: AGHIB

First name: Fulvia S.

Current Position: Researcher

Institution: CNR (National Research Council), IDPA (Institute for the Dynamics of the Environmental Processes)

Address: Via Mario Bianco, 9

City, Postcode, Country: Milano, 20131 Italy

Tel. work: 0039 02 5031 5592
Tel. home: mobile: 0039 335 6670950
Fax: ----
Email: fulvia.aghib@idpa.cnr.it
fulvia.aghib@unimi.it

Country of citizenship: Italy/USA

Place of birth/date of birth: New York, NY, USA

Gender: Female

Education (highest degree, including year PhD was received / is expected):
Laurea in Geological Sciences at University of Milan (Italy), 1988
Student Fellowship at Woods Hole Oceanographic Institution, MA, USA, 1989-1990.

Are you currently a student? NO Expected Graduation Date: ---

2. EXPEDITION INFORMATION

Summary of proposed SHORE-BASED participation, including area of scientific interest, current research and participation plan (maximum 250 characters with space – more detail should be included in the Letter of Interest):

Extensive sediment characterization, terrigenous vs biogenic sedimentation, facies description and related depositional setting, sediment composition (biogenic vs non-biogenic components), early diagenesis of cements and carbonate micro/macrofossils.

Prior involvement with DSDP/ODP/IODP and nature of involvement (expedition number, shipboard/shore-based participation, co-chief, etc):

1990-92: ESCO (ESF Science Committee for ODP) Science Coordinator, University of Milan, Italy, and Maria Bianca Cita ESCO Chair.

On-ice sedimentologist during CRP2 (1998) and CRP3 (1999) drilling seasons.

Shipboard sedimentologist in several oceanographic cruises for a total of 251 days at sea.

Post-cruise science support to achieve the proposed scientific objectives 1) future funding scheme and 2) support from host institution (e.g. staff, facilities)

1- If I am selected, CNR ensures my research funding to take part to the shore-based activities.

2- At my home institution, CNR-IDPA, I have labs for performing studies of sediment composition, early diagenesis and provenance using REE trends. Lab facilities include a microscopy Lab (petrographic microscope coupled with Cathodoluminescence probe (CL), a Scanning electron microscope Lab (SEM coupled with an X-ray energy dispersive, EDS microprobe) and REEs geochemistry Lab.

Staff includes 2-3 researchers and one technician.

Three scientific and/or personal references:

Carlo Barbante, University of Venice, Italy

Larry Krissek, Ohio State University, Columbus, OH, USA

Isabella Premoli Silva, University of Milan, Italy

3. SCIENTIFIC EXPERTISE

For Scientist Jobs Descriptions visit: http://iodp.tamu.edu/participants/scientist_jobs.html

Please indicate your area(s) of expertise (maximum 3)

Discipline	Mark with X	Speciality
microbiologist		
organic and inorganic geochemist/biogeochemist		
physical properties specialist		
sedimentologist	X	Core logging, facies analysis, early diagenesis, sediment composition
structural geologist		
paleontologist		
paleomagnetist		
petrologist		
hydrogeologist		
Other	X	Early Diagenesis

4. ADDITIONAL DOCUMENTS

Please, provide the following documents:

- Letter of interest, including details about area of scientific interest, current research, expedition participation plan and post-cruise research
- CV and Publication list
- Letter of recommendation (for PhD students)
- See also: http://www.essac.ecord.org/flyer/Guidelines_for_Applying_to_sail.pdf

Please, send your application form as *a MS Word document* and the additional documents in *PDF format* (preferably as one file) by email to Jan Behrmann and Hanno Kinkel at the ESSAC office: essac@geomar.de.

In addition to the ESSAC application, all applicants ***must inform their national office*** (if applicable) ***and national delegate*** and send a copy of the application documents. ECORD does not provide funds for participation; the national offices or national delegates can provide information regarding travel support, post-cruise funding opportunities, etc.

See http://www.essac.ecord.org/index.php?mod=about&page=ESSAC for a list of the national contact persons.

IODP Expedition 373: Antarctic Cenozoic Paleoclimate

Sedimentary records from IODP Expedition 373 may provide a unique opportunity to better constrain crucial paleoclimate events along the George V and Adelie Land (GVAL) continental shelf of the East Antarctica during Cenozoic time. Drilling along two transects are planned in order to document the Antarctic paleoclimate and its evolution from "greenhouse" to "icehouse", in particular from the Eocene warmth to the subsequent Oligocene-Pliocene glacial ice-sheet dynamics.

An extensive sedimentological study comprising an early diagenesis characterization is then the first crucial approach for the interpretation of the sedimentary record. On the basis of my previous experiences of sedimentary records from the Antarctic continental margin, I am familiar with facies from marine ice-proximal setting where sedimentation reflects a complex interplay of marine sedimentation and glacial input with a large variety of marine/glacimarine/interglacial/glacial sediments. In the late nineties, I was on-ice sedimentologist during CRP drilling seasons, and the study of the CRP records allowed to improve the knowledge of the climate and tectonic evolution of the Victoria Land Basin. Recently I have performed studies on sediment cores recovered from the Coulman High area during the cruise of R/V N.B.Palmer 94-01. This study allowed to reconstruct the interactions between marine and glacial input on the basis of the sediment composition during the Last Glacial Maximum.

Aim of the Expedition 373 is to recover sediment cores along two different transects in the GVAL region where the ocean input, the glacial dynamics and the sea level changes may have played a significant role on sedimentation. The specific intervals to be investigated are:

a) the Eocene greenhouse target intervals: records from the early Eocene climatic optimum.
b) the Oligocene-Pliocene icehouse target intervals: strata above and below regional erosional surfaces to recover direct records of the ice sheet extent on the shelf, in order to characterize glacial advance and retreat in crucial time intervals: Eocene/Oligocene glacial advance (34ma); mid-Miocene climate transitions (14 ma); Pliocene warmth and climate fluctuations (5ma).

Herewith I propose shore-based activities that comprise a multi-proxy sedimentological study: a) lithostratigraphy and facies analysis to reconstruct the original depositional setting and the advances/retreats of the grounding line along the continental shelf in the last 34 Ma; b) investigation of the sedimentary input from different sources (marine with biogenic and terrigenous components, glacimarine with Ice-Rafted Debris (IRD), proglacial sediments, subglacial till, ice distal record of glacial/interglacial cycles) to define the fluctuations of the ice sheets along the GVAL continental shelf through time; c) sediment characterization (terrigenous/biogenic input in sediment composition); c) early diagenesis, studying the main macroscopic diagenetic features vs depth (cementation, authigenic minerals..) and the preservation/dissolution/cementation of biogenic components (eventual carbonate micro/macrofossils).

In the labs of my home institution I can therefore performe the following studies:

- revision of lithostratigraphy and main facies;
- sediment composition of the biogenic vs non-biogenic components to be determined using SEM coupled with an EDS microprobe;

- early diagenesis with the aim to describe the various stages of preservation of the biogenic tests (etching and pitting on skeletal grains due to alteration/dissolution), as reflected by microfabric and mineralogy under SEM coupled with an EDS microprobe;
- early diagenesis with the aim to clarify the subsequent carbonate cement generations of biogenic/non-biogenic carbonates and using a petrographic microscope attached to a cathodoluminiscence probe (CL);
- sediment source areas to be identified in cooperation with researchers from my institution (CNR-IDPA) using REEs patterns.

The data collected with this research proposal may contribute to the objectives of the IODP Expedition 373 in order to clarify: A) The sedimentary processes, and especially to evaluate the advance/retreat of the East Antarctic Ice Sheet during past glacial-interglacial climate optima on the basis of facies characterizations (Paleoclimate and Ice sheet dynamic Objective). B) The terrigenous vs biogenic sedimentation to document the ocean/ice-sheet interactions in the last few million years (Paleoclimate and Ice sheet dynamic Objective). C) The discrimination of major unconformities to better define the age model and major climate events (Paleoclimate and Ice sheet dynamics and seismic stratigraphic/tectonic Objectives).

Milano, August 31st, 2016

Fulvia S. Aghib

Born in NewYork City, NY (U.S.A.), February 24, 1961.
Italian and U.S. citizenships.
Fluent English, written and spoken.
Address: Piazza Firenze 21, I-20149 Milano, Italy
e-mail: fulvia.aghib@idpa.cnr.it; fulvia.aghib@unimi.it

Present position

Researcher at CNR-IDPA (Instituto per le Dinamiche dei Processi Ambientali), via Mario Bianco, 9, I-20131 Milano, Italy.

Educational background

Laurea in Geological Sciences*,* 1988. University of Milano, Italy.

Student Fellowship (1989-1990) awarded by the Woods Hole Oceanographic Institution, MA, USA.

Research interests

With a background in marine geology and sedimentology, I study marine/glacimarine sedimentation on continental margins with special interest to polar regions in order to reconstruct the original depositional environment (marine vs glacial; glacial vs interglacial) related to the global climate changes. I also investigate the diagenesis of the sediments using a multi-proxy methodological approach, consisting of standard sedimentological techniques and investigations under petrographic microscope attached to a Cathodoluminescence probe, under SEM/SE/BS coupled with EDS microprobe, to be integrated with geochemical C, O isotope and REE proxies.

My main research interest can be summarized as follows:

- Paleoclimate implications of the marine Cenozoic successions in the Ross Sea area as reflected by facies analysis.
- Cenozoic marine sediment processes in the Ross Sea area, with special focus on sedimentary processes along the continental margins and the related ice sheet dynamics.
- Sediment composition and paleoclimate implications in marine ice-proximal settings.
- Formation of carbonates at high latitudes and relationship between the occurrence of biogenic carbonates and early diagenesis.
- Early diagenesis of calcareous and silica biogenic components from marine ice-proximal settings.
- Evaluation of glacial melting vs marine waters as reflected by early diagenesis and REEs trend.
- Early diagenesis of pelagic carbonates in the Mediterranean Sea and Atlantic Ocean.
- Geological setting of anoxic basins within the Mediterranean Ridge and their relationships with sedimentation and deep-seated hypersaline brines.

Previous Experiences as team sedimentologist

- **Participation to Antarctic drillings**

Cape Roberts Project. Participation as on-ice sedimentologist in 2 drilling seasons: CRP-2 (1998) and CRP-3 (1999).

- **Participation to oceanographic cruises**

Participation as shipboard sedimentologist in several oceanographic cruises on Italian and foreign research vessels in the North Atlantic and Mediterranean Sea. Total of 251 days of shipboard experience.

Main international research projects

- **Co-proponent** of the **PNRA Project** *"Climate and tectonic forcings in the West Antarctic Rift System of the South Victoria Land: a source to sink, multi-proxy study"* (2013-2016).
- **Short-Term Mobility CNR Grant 2014,** *"Study of LGM marine ice-proximal sediments from the Coulman High are, Ross Sea, Antactica".* I have spent a month at the Antarctic Marine Research Facility of Florida State University, FL, USA. December 2014.
- **Sedimentologist** on **PNRA/CLITEITAM Project** *(CLimatic-TEctonics Interactions along the TransAntarctic Mountains Front and comparison with the Arctic record in the Greenland-Svalbard region"* , PNRA 2009-2011.
- Sedimentologist on **CNR-FISR-CLIMAVAR** project. "Variazioni climatiche", PNRA 2004.
- **Proponent** of the **PNRA/CRISP** "**C**enozoic **RI**ft-related **S**ediment **P**rocesses:a *tool to paleoclimatic and tectonic histories, Ross Sea region, Antactica"* , PNRA, 2002-2003.
- **Proponent** of the **PNRA/Post-CRP project: Sedimentology and Diagenesis** "*Sedimentation and diagenesis of the Cenozoic sedimentary successions recovered at CRP site, Ross Sea, Antarctica",* PNRA 2000-2001.
- **Proponent** of the **PNRA/CRP project: "***Sedimentology and Diagenesis"* (1997-1999).
- **Science Coordinator** of the Italian Steering Commitee of the **Cape Roberts Project** (1997-2001).
- **Co-investigator** (Partner) of the **EEC-MAST II project** *"Marine biogenic and non-biogenic fluxes in the Mediterranean Ridge"* (MARFLUX), 1993-1996.
- **Co-investigator** (Partner) of the **EEC-MAST-I project** "*An Integrated Investigation of the Fluid Flow Regime of the Mediterranean Ridge"* (MEDRIFF), 1989-1992.
- **Science Coordinator** at the **ESCO** (ESF Scientific Consortium for the ODP) Secretariat, Dipartimento di Scienze della Terra, Universita' di Milano, 1990- 1992.

Recent Abstracts submitted to Science Conferences

- **Aghib, F.S**., Turetta C., Ferretti P., 2016. "Paleoclimate implications during LGM from cores collected off Coulman High, Ross Sea, Antarctica". *SCAR Open Science Conference 2016*, August 10-20, Kuala Lumpur, Malaysia.

- **Aghib, F.S.**, Turetta C., Ferretti P., Barbante, C., 2016. "Ice-proximal marine sedimentation in the Ross Sea during LGM: Ice-sheet and ocean interactions". *AGU Fall Meeting 2016,* December 12-16. American Geophysical Union, San Francisco.

Publications

20 on peer-reviewed international journals, 3 in preparation.

Selected publications

- **Aghib, F.S**., Bernoulli, D. & Weissert, H., 1991. "Hardground formation in the Bannock Basin (eastern Mediterranean)". *Marine Geology*, v. 100, 103-113, Amsterdam.
- Staffini, F., Spezzaferri, S., & **Aghib, F**., 1993. "Mud diapirs of the Mediterranean Ridge: sedimentological and micropaleontological study of the mud breccia". *Riv. It. Paleont. Strat*., v. 99, n.2, 225-254, Milano.
- **Aghib, F.S**., 1997. "Anoxic versus oxic sedimentation in the Bannock Basin area, 35,000 YRS B.P. to present". *Riv. It. Paleont. Strat*., v.102, (2), 293-302, Milano.
- Claps M. & **Aghib F. S**., 1998. "Carbonate diagenesis in Miocene Sediments from CRP-1, Victoria Land Basin, Antarctica". *Terra Antartica*, v.5, n.3, pp.655-660, Siena.
- **Aghib F.S.**, Alberti M., Anderson J., Armienti P., Askin R., Bannister S. et al,1999. "Initial Report on CRP-2/2A, Ross Sea, Antarctica". *Terra Antartica*, v. 6, n.1/2, 1-171, Siena.
- **Aghib F.S.**, Alberti M., Anderson J., Armienti P., Askin R., Bannister S. et al, 2000. "Initial Report on CRP-3, Ross Sea, Antarctica". *Terra Antartica*, v. 7, n.1/2, 1-209, Siena.
- **Aghib F. S**., Claps M.& Sarti M., 2000. "Preliminary report on the diagenetic features on the Oligocene Strata from CRP-2/2A core, Ross Sea, Antarctica". *Terra Antartica*, 7(3), 393-400, Siena.
- Wise, S. W. Jr., Smellie J., **Aghib F**., Jarrard R., Krissek L. 2001."Authigenic smectite clay coats as a possible indicator of fluid flow in CRP-3, Antarctica: A progress report". *Terra Antartica*, v.8, n.3, pp.281-298, Siena.
- Wallmann, K, **Aghib, F.S**., Castradori, D., Cita, M.B., Suess, E., 2002. "Sedimentation and formation of secondary minerals in the hypersaline Discovery Basin, eastern Mediterranean". *Marine Geology*, v.186, pp.9-28, Amsterdam.
- **Aghib F. S.**, Fielding C. R. & Frank T. D. 2003."Diagenesis of the Cenozoic sedimentary succession from the CRP-3 core, Ross Sea, Antarctica". *Terra Antartica*, **10**, 27-37, Siena.
- Bellanca A., **Aghib F. S.**, Neri R. & Sabatino N., 2005. "Bulk carbonate isotope stratigraphy from CRP-3 core (Victoria land Basin, Antarctica): evidence for Eocene-Oligocene paleoclimatic evolution". *Global and Planetary Change*, v. 45, 237-247, Amsterdam.
- Giorgetti G., **Aghib F. S.**, K. J. T. Livi, A.-C. Gaillot & Wilson T., 2007. "Newly-formed phyllosilicates in sediments and basement rocks from CRP-3 core (Antarctica): An electron microscopy study". *Clay Minerals*, v. 42, 21-43, London.

Milano, August 15th, 2016

APPLICATION TO PARTICIPATE IN AN IODP EXPEDITION

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Wischhofstrasse 1-3
24148 Kiel, Germany
Hanno Kinkel (ESSAC Science Coordinator):
Tel: +49 431 600 2418
Fax:+49 431 600 2922
Web Page: http://www.essac.ecord.org Email: essac@geomar.de

Please type information

Apply to Sail Application Form

Expedition Number 373: Antarctic Paleoclimate and Ice History

1. PERSONAL INFORMATION

Family name: Bijl

First name: Peter

Current Position: Assistant Professor

Institution: Utrecht University

Address: Heidelberglaan 2

City, Postcode, Country: Utrecht, 3584 CS, the Netherlands

Tel. work: +31 30 253 9318
Tel. home: +31 6 4497 4474
Fax: +31 30 253 5096
Email: p.k.bijl@uu.nl

Country of citizenship: Netherlands

Place of birth/date of birth: Hoogeveen/21-10-1983

Gender: Male

Education (highest degree, including year PhD was received / is expected): PhD

Are you currently a student? NO Expected Graduation Date: n/a

2. EXPEDITION INFORMATION

Summary of proposed participation, including area of scientific interest, current research and participation plan (maximum 250 characters with space – more detail should be included in the Letter of Interest):

Scientific interest: Cenozoic Climatic/oceanographic evolution of Antarctica/Southern Ocean

Participation plan: Sail as palynologist to provide shipboard biostratigraphic constraints, subsequent postcruise research on dinocysts and biomarkers

Prior involvement with DSDP/ODP/IODP and nature of involvement (expedition number, shipboard/shore-based participation, co-chief, etc):

- Shipboard palynologist onboard Expedition 318, including postcruise research (on-going)
- Shore-based scientist for IODP expedition 342
- Involved in post-moratorium research on many sediment cores from the IODP and its predecessors, including from expedition 28, 29, 71, 113, 120, 159, 171, 177, 182, 188, 189.

Post-cruise science support to achieve the proposed scientific objectives 1) future funding scheme and 2) support from host institution (e.g. staff, facilities)

I have a tenured position at Utrecht University with a 0.4 fte research position. I will apply for more PhD/postdoc positions to help carry out the postcruise research, in addition to those already working in my lab. Should these proposals not be funded, postcruise research can be carried out by myself with help of supporting staff available here, to comply with the commitment of shipboard scientists to conduct postcruise research.

Three scientific and/or personal references

Prof. Dr. Henk Brinkhuis henk.brinkhuis@nioz.nl (PhD supervisor and co-chief on IODP Leg 318)

Prof. Dr. Jörg Pross joerg.pross@geow-uni-heidelberg.de (other palynologist onboard 318)

Prof. Dr. Appy Sluijs a.sluijs@uu.nl (head of my research group at Utrecht University)

3. SCIENTIFIC EXPERTISE

For Scientist Jobs Descriptions visit: http://iodp.tamu.edu/participants/scientist_jobs.html

Please indicate your area(s) of expertise (maximum 3)

Discipline	Mark with X	Speciality
microbiologist		
organic and inorganic geochemist/biogeochemist	3	Lipid extraction, chromatography, organic biomarker detection
physical properties specialist		
sedimentologist	2	Basic marine Antarctic sedimentological knowledge and skills
structural geologist		
paleontologist	1	Expert in dinoflagellate cyst biostratigraphy/paleoecology, notably of the Cenozoic Southern Ocean. Basic terrestrial palynostratigraphy
paleomagnetist		
petrologist		
hydrogeologist		
Other		

4. ADDITIONAL DOCUMENTS

Please, provide the following documents:

- Letter of interest, including details about area of scientific interest, current research, expedition participation plan and post-cruise research
- CV and Publication list
- Letter of recommendation (for PhD students)
- See also: http://www.essac.ecord.org/flyer/Guidelines_for_Applying_to_sail.pdf

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ECCAC Office ECORD Science Support and Advisory Committee

GEOMAR – Hemholz Centre
Wischhofstrasse 1-3
24148 Kiel, Germany

Peter K. Bijl, PhD
Marine Palynology and
Paleoceanography

Visitors address
Heidelberglaan 2
3584 CS Utrecht
The Netherlands

Your reference	
Our reference	Application Bijl Exp373
Phone	030 253 9318
Fax	030 253 5096
E-mail	p.k.bijl@uu.nl
Website	www.uu.nl/staff/pkbijl
Date	16-08-2016
Subject	Letter of Interest to sail onboard Exp. 373
Pages	3
Appendices	Application Form and Curriculum Vitae

Dear members of the ESSAC Office, dear staff scientists, dear co-chiefs,

In this letter I happily substantiate my interest to be involved in Integrated Ocean Discovery Program (IODP) Expedition 373 as shipboard scientist. I would also like to explain how my area and level of expertise are indispensible on-board and greatly contributes to post-cruise research.

Scientific Interest

The objectives of Expedition 373, to drill and recover marine sediments spanning the broader 'Greenhouse-Icehouse transition' from the Antarctic continental margin, lie at the heart of my scientific interest. From my MSc research until today as Assistant Professor at the Utrecht University, my primary research focus has been the climatic and oceanographic evolution of Antarctica and the Southern Ocean during the Cretaceous-Cenozoic. Specifically, I am curious to understand how tectonic changes on the Southern Hemisphere affected Antarctic climate deterioration in the Eocene and to what extent it influenced the inception, and subsequent stability of the ice sheets on Antarctica. My specific research expertise is the study of organic-walled dinoflagellate cysts for biostratigraphic constraints as well as for paleoceanographic reconstructions. I particularly conduct this research on marine sediment cores provided by the IODP and its predecessors. For biostratigraphy of deep-time Southern Ocean sediments, dinocysts are usually the only microfossils preserved, which makes my expertise an essential skillset for new drilling in the region. I was able to stratigraphically calibrate Paleocene-Oligocene sedimentary dinocyst records throughout the Southern Ocean (Earth-Science Reviews). The resulting dinocyst zonation scheme greatly helps to date hitherto poorly dated sediments, but also enabled accurate climatic and oceanographic reconstructions in the region (papers in Nature, Science and Nature Geoscience). For paleoceanographic reconstructions, I have reviewed all Southern Ocean Paleocene-Eocene dinocyst records to evaluate the surface ocean current configuration changes (paper in Paleoceanography). The dinoflagellate cyst analyses were, where possible, paired with organic geochemical biomarker analyses for quantitative environmental reconstructions (e.g., Nature, Science). This powerful combination of toolsets enabled quantification of the climate changes as a result of the opening of the Tasmanian Gateway 50 Million years ago (PNAS). Dinocysts were also crucial to get first insights in the marine biotic (Science) and sea level changes (Nature Geoscience) close to the Antarctic

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continent as a response of the onset of Antarctic glaciation. These studies and many more have developed my scientific expertise in Cenozoic Southern Ocean dinoflagellate cyst biostratigraphy and circum-Antarctic paleoclimate evolution. The long-term aims of Expedition 373 specifically target gaps in our common understanding of the climatic evolution of Antarctica, therefore my past performance fits tightly with the expeditions objectives.

Current Research

My current research expands my past research. I am lead PI in a project to better understand temperature and sea level fluctuations during the mid-Paleocene, to evaluate the potential presence of continental ice on Antarctica at this time (3 papers in prep). I lead a study on the Oligocene-Miocene dinoflagellate cyst assemblages and biomarkers of Site U1356, which for the first time allow us to develop a calibrated dinocyst zonation scheme for these time intervals, and for the first time portray oceanographic (and sea ice) conditions along side a very dynamic Antarctic ice sheet (3 papers in prep). I also start to apply these stratigraphic constraints to hitherto poorly calibrated ODP/DSDP records (e.g., DSDP Site 269). I contribute to a reassessment of the Eocene-Oligocene sedimentary records from Prydz Bay. I conduct biostratigraphic analyses on material from Site Survey Cruises to the Antarctic Margin (NBP1402), allowing a first age assessment at the drill sites of Expedition 373. The results from Eocene sediments from IODP Leg 318 made me realize that two key regions lack data: southern Australia and Drake Passage. In order to reconcile this, I designed and conducted two field campaigns to southeast Australia and to Southern Patagonia. I am currently working out the results with international colleagues and an internal postdoc. The aims of Expedition Leg 373 would form a timely and natural continuation of my current research, and allow me to start new collaborations.

Expedition Participation Plan

My proposal for shipboard participation is to sail as palynologist. My unique expertise on dinocyst biostratigraphy of this particular region is in my view indispensable for optimal steering of operations during Leg 373, as it has been for IODP Leg 318. I am already greatly involved in the preparations for Leg 373 through my post-cruise involvement in palynological analyses on dredge sediments from the proposed drill sites obtained during expedition NBP1402. Furthermore, I have provided the co-chief scientists with logistical advice to prepare the drillship for safe and effective shipboard palynological sample processing using HF. I have experience with shipboard palynology (including working with HF) through my shipboard participation in Leg 318. I understand the risks involved, yet past expeditions have shown that shipboard palynology is crucial when drilling the Antarctic shelf, notably for age control. Alternatively, I have sufficient sedimentological skills to join the onboard science party as sedimentologist.

Post-cruise Research

My involvement in post-cruise research is financially secured by my tenured position, full support from my institute as well as from the LPP Foundation. I aim to submit several proposals to Dutch and European funding agencies for post-cruise research assistants. Post-cruise, I will propose to perform marine palynology and organic geochemical marine and terrestrial biomarker analyses (e.g., TEX86, MBT/CBT, $\delta^{13}C$ on alkenones and n-alkanes). With these analyses, I can improve the shipboard age models, and provide quantitative paleoceanographic/ paleoenvironmental reconstructions. I am happy to collaborate and share samples, post-cruise work and data in any way with members from the Sample Party. I led collaborative efforts to maximize output and minimize use of core material during IODP Leg 318; I appreciate the added value of collaboration.

In summary, my past performance shows my level of expertise and ability to deliver, my current research focus reflects my independence and suitability for the job, my involvement in the expeditions preparations shows my eagerness to take part and my post-cruise research plan ventilates I am an excellent team player. Most importantly, my level and area of expertise are indispensable on-board and a crucial skillset in order to meet the objectives of the expedition.

I hope this letter provides the desired information; should any additional information be required, please do not hesitate to contact me.

Universiteit Utrecht

With best regards,

Dr. Peter K. Bijl
Assistant Professor 'Applied Biostratigraphy'
Marine Palynology and Paleoceanography

Curriculum Vitae

Personal details

Dr. Peter Kristian Bijl
Place of residence: Bunnik, the Netherlands
E-mail: p.k.bijl@uu.nl; info@lpp-foundation.nl
Website: www.uu.nl/staff/pkbijl; www.lpp-foundation.nl/people

Current employment

Position	Since	FTE	Type of position
Assistant Professor	01/12/2015	0.8	Permanent
Director *LPP* Foundation	01/10/2013	0.2	Permanent

Work experience since graduation

Position	Period	FTE	Type of position
Director *LPP* Foundation	01/01/2012-30/04/2012	1.0	Fixed term
Postdoc NWO polar call	01/05/2012-30/09/2013	0.6	Fixed term
Postdoc NWO-VENI	01/10/2013-31/6/2017	0.8	Fixed term
Director *LPP* Foundation	01/05/2012-30/09/2013	0.4	Fixed term

Education

PhD
Biology, Faculty of Science, Utrecht University
Start date: 01/01/2008
Completion date: 30/11/2011
Supervisors: Promotors: Prof. Dr. Henk Brinkhuis, Prof. Dr. ir. Stefan Schouten. Co-promotor Dr. Appy Sluijs
Title: Environmental and Climatological Evolution of the Paleogene Southern Ocean

MSc
Earth Sciences, Faculty of Geosciences, Utrecht University
Completion date: 31/08/2007
Thesis title: Late Paleocene to early Eocene paleoenvironments in the southwest Pacific. Thesis advisors: Dr. Henk Brinkhuis, Dr. Appy Sluijs, Dr. Stefan Schouten. External reviewer: Dr. Gert-Jan Reichart

Academic activities

Research

- Successfully applied for a NWO VENI research grant (250 keuro granted July 2013). The primary goal of my Veni research is to give more context to the climate evolution of the Paleocene in comparison to the Eocene. Specifically I try to assess whether the Paleocene featured considerable Antarctic ice caps.
- Successful application to participate in Integrated Ocean Drilling Program Leg 318
- Active contribution to 15 published, accepted, submitted, or nearly submitted manuscripts associated with this expedition, while research is still on-going;

- Participation in drilling proposals, reviews of IODP proposals and active involvement in working out site survey research, which signals that my expertise is highly appreciated within the community;
- Further broadening of expertise, network and research curriculum through my postdoctoral research on the Oligocene Southern Ocean and my Veni research on paleoclimate dynamics of the Paleocene;
- Development of follow-up research from the first set of high-impact papers portraying the results of Leg 318, e.g., with physical oceanographers on the Eocene-Oligocene Paleoceanography of the Southern Ocean (UU Physics, univ. of Sydney).
- I designed and conducted 2 field work campaigns in 2016 to southern Patagonia and southeast Australia as follow-up research projects from my PhD and postdocoral research. Results are now being produced by a postdoctoral researcher.
- Following up on our exciting findings of regionally varying sea level fluctuations around the Eocene-Oligocene transition. These efforts are done in collaboration with physicists at the NIOZ;
- Collaborations are on-going with the tectonics group in our department to improve tectonic reconstructions of the Scotia Sea, and the development of a comprehensive web-based tool to calculate paleolatitude for paleoclimate studies (v. Hinsbergen et al., 2015);
- A PhD student I co-supervise is now following up on the first results of my NWO polar call postdoctoral research;
- Improvement and application of dinoflagellate cyst stratigraphy in the Southern Ocean particularly because of the importance of this organic microfossil group as stratigraphic and facies indicator. This update will feature in the new GTS.

Other activities

- As director I revived the commercial activities of the *LPP* Foundation from January 1st 2012 onwards. The *LPP* Foundation is a Utrecht University-embedded consultancy in Earth Sciences, biostratigraphy, energy and sustainability;
- Designing the digital presence of the *LPP* Foundation, with web-presence, social media appearances and a new layout;
- Broadening of the commercial network of the *LPP* Foundation; Setup new aims and directions of the *LPP* Foundation, and sought market opportunities;
- Organisation and further development of the "Advanced course in organic-walled dinoflagellate cysts" 2012, 2015 and 2018.
- Coordination of a consortium, which aims to develop the fresh-water fern *Azolla* into an economically viable crop.
- Leading a project together with TNO to update all published and in-house dinocyst biostratigraphic data into a comprehensive database PALSYS.org, which will be partly open-access for public use, partly licenced for commercial use.
- Lead sponsoring committee and member of the core organisation committee of the 12th International Conference on Paleoceanography, held September 2016 in Utrecht.

Teaching and student supervision

- Co-promotor of PhD candidates Margot Cramwinckel, MSc. and Julian Hartman, MSc;
- Primary supervisor of 15 Master's researches, and informally co-supervised many others;
- Primary supervisor of several BSc student theses in Biology and Earth Sciences
- Certified academic teacher since 2016
- Certified First Aid assistant since 2016
- Coordinator of the MSc minor Geo-Resources within UU-GEO since 2016
- Design and execution of the advanced course 'Applied Biostratigraphy' within the '*m*-

profile geo-resources'. The course is set up in close collaboration with Shell biostratigraphy and will run for the first time in 2016;
- BSc teaching; parts of several Bachelor's courses, practicals and field trips, including courses in "Marine Sciences" (Biology), 1st year's fieldwork (Belgian Ardennes, GEO) and 2nd year's fieldwork (Tremp, GEO);
- Development and teaching an 'Antarctic paleoclimate' component in the MSc course 'Introduction in the marine science';
- Tutor for Bachelor students in Biology in 2008/2009, in which I gave a course on academic skills (presentation, writing, reading).

Outreach

- Annually ~4 guest lectures each year at junior high schools, geological societies and museums since 2008;
- I kept a video-blog for the VPRO (www.pooljaar.nl/broeikaswereld) during Expedition 318. I use these video blogs in my classes
- A documentary made by ScienceMedia.nl on my field campaigns of this year is in process.

Conference Sessions convened

- Presented my academic and consultancy work on numerous international conferences, special meetings and symposia;
- Invited talks at EGU2014 in recognition of my Arne Richter Award and at DINO10 (2013);
- Co-convener of a session on "Cenozoic Greenhouse Climates and Carbon Cycle Dynamics" EGU2012, 'Deciphering the Polar greenhouse: Geochemical reconstructions of temperature, weathering, and ice volume in the Cretaceous and early Paleogene' in Goldschmidt conference, Montreal, June 2012;
- (Co-)convenor of a session on Antarctic paleoclimate dynamics in warm icehouse climates-marrying data and models for EGU 2015 and 2016 (to be continued).

Memberships

- Active member of the Past Antarctic Ice Sheets (PAIS) programme of the Scientific Committee of Antarctic Research (SCAR), particularly involved in activities related to (bio)stratigraphy);
- Member of the American Association of Stratigraphic Palynology (AASP).
- European Geophysical Union (EGU) member since 2007;
- Petroleum Geologische Kring (PGK) member since 2012;

Awards

- EGU 2014 Arne Richter Award for outstanding young scientist;
- NWO-Veni grant 2013 (250.000 euro);
- IODP-NL person of the year 2009;
- As student, I was part of 'Team Beneker' that won the 'Academische Jaarprijs 2007': an (100.000 euro) award for the best plan to translate fundamental scientific discoveries to the general public.

Publications

In review, submitted

1. Sangiorgi, F., Bijl, P.K., Passchier, S., Salzmann, U., Schouten, S., Pross, J., Bohaty, S.M., McKay, R., Flierdt, T., Levy, R., Williams, T. Escutia, C.E., Brinkhuis, H. Ocean warmth and the loss of marine-terminating East Antarctic ice sheets during the mid-Miocene Climate Optimum. in review for Nature Communications

2. Bijl, P.K., Brinkhuis, H., Egger, L., Eldrett, J., Frieling, J., Grothe, A., Houben, A.J.P., Pross, J., Śliwińska, K., Sluijs, A. Comment to "Wetzeliella and its allies – the 'hole' story: a taxonomic revision of the Paleogene dinoflagellate subfamily Wetzelielloideae. Palynology, DOI: 3 10.1080/01916122.2014.993888. in review for Palynology.
3. Christopher J. Hollis, Catherine E. Stickley, Peter K. Bijl, Poul Schiøler, Christopher D. Clowes, Xun Li And Hamish Campbell. The age of the Takatika Grit, Chatham Islands. In review for Alcheringa.

Accepted for publication (not yet on Scopus)

1. Baatsen, M., van Hinsbergen, D.J.J., von der Heydt, A.S., Dijkstra, H.A., Sluijs, A., Abels, H.A., Bijl, P.K. A generalised approach to reconstructing geographical boundary conditions for paleoclimate modelling. In review Climate of the Past.
2. Passchier, S., Ciarletta, D.J., Miriagos, T.E., Bijl, P.K., Bohaty, S.M. An Antarctic stratigraphic record of ephemeral ice sheets and abrupt warm events prior to the onset of major Oligocene glaciation. In review GSA bulletin

SCOPUS export date: August 9th, 2016
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1. Fensome, R.A., Bijl, P.K., Grothe, A., Head, M., Sangiorgi, F., Williams, G. (2450–2451) Proposals to conserve the names *Selenopemphix* against *Margosphaera*, and *S. nephroides* against *M. velata* (dinophyceae) (2016) Taxon, 65 (3), pp. 636-637.
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2. Sijp, W.P., Von Der Heydt, A.S., Bijl, P.K. Model simulations of early westward flow across the Tasman Gateway during the early Eocene (2016) Climate of the Past, 12 (4), pp. 807-817.
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3. Bijl, P.K., Brinkhuis, H. A new genus and two new species of dinoflagellate cysts from lower Eocene marine sediments of the Wilkes Land Margin, Antarctica (2015) Review of Palaeobotany and Palynology, 220, pp. 88-97.
DOI: 10.1016/j.revpalbo.2015.05.004

4. Van Hinsbergen, D.J.J., De Groot, L.V., Van Schaik, S.J., Spakman, W., Bijl, P.K., Sluijs, A., Langereis, C.G., Brinkhuis, H. A paleolatitude calculator for paleoclimate studies (2015) PLoS ONE, 10 (6), art. no. e0126946, . Cited 10 times.
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2014

5. Contreras, L., Pross, J., Bijl, P.K., O'Hara, R.B., Raine, J.I., Sluijs, A., Brinkhuis, H. Southern high-latitude terrestrial climate change during the Palaeocene-Eocene derived from a marine pollen record (ODP Site 1172, East Tasman Plateau) (2014) Climate of the Past, 10 (4), pp. 1401-1420.
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APPLICATION TO PARTICIPATE IN AN IODP EXPEDITION

ESSAC Office ECORD Science Support & Advisory Committee
GEOMAR | Helmholtz Centre for Ocean Research Kiel
Wischhofstrasse 1-3
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Hanno Kinkel (ESSAC Science Coordinator):
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Web Page: http://www.essac.ecord.org Email: essac@geomar.de

Please type information

Apply to Sail Application Form

Expedition Number 373: Antarctic Paleoclimate and Ice History

1. PERSONAL INFORMATION

Family name: Bohaty

First name: Steve Michael

Current Position: Lecturer

Institution: University of Southampton

Address: Ocean and Earth Science
National Oceanography Centre
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Email: S.Bohaty@noc.soton.ac.uk

Country of citizenship: USA

Place of birth/date of birth: Lincoln, Nebraska, USA / 16 October 1972

Gender: Male

Education (highest degree, including year PhD was received / is expected): PhD (2006)

Are you currently a student? NO

2. EXPEDITION INFORMATION

Summary of proposed participation, including area of scientific interest, current research and participation plan (maximum 250 characters with space – more detail should be included in the Letter of Interest):

I am applying to be a shorebased participant on IODP Exp. 373. My main research interest is in the reconstruction of Antarctic climate and glacial history across major climate shifts and transient excursions during the Paleogene, particularly during the Middle Eocene to Early Oligocene time interval. I am particularly excited about obtaining new cores spanning the Middle to Late Eocene, which is key interval of Cenozoic climate change that is poorly represented in previous drilling efforts on the Antarctic margin.

In post-cruise analysis of the cores recovered on Exp. 373, I would like to be involved in collaborative work related to age model development of the Paleogene sequences, contributing diatom biostratigraphic data, foraminiferal carbon and oxygen isotope chemostratigraphic data, and/or insight from other Antarctic and Southern Ocean records. I have worked extensively on pelagic records from the Southern Ocean, and I can make a useful contribution in correlating between the Exp. 373 shelf records and existing records from the deep sea.

My main research interest is the analysis of the detrital silicate fraction of shelf sediments to decipher weathering history of the Antarctic continent. Techniques I would like to apply include (1) clay mineral assemblage analysis, (2) clay mineral isotope analysis, and (3) determination of detrital silt mineralogy. These data can provide important information on transient Eocene warming events (such as the MECO) and insight on whether ice sheets existed in the Middle or Late Eocene time interval.

Prior involvement with DSDP/ODP/IODP and nature of involvement (expedition number, shipboard/shore-based participation, co-chief, etc):

ODP Leg 188 (Prydz Bay), shipboard scientist, diatom micropaleontologist

IODP Exp. 318 (Wilkes Land), shipboard scientist, sedimentologist

My research primarily is based around DSDP/ODP/IODP materials, and I have participated in many expeditions as shorebased investigator. Most recently I have been heavily in post-cruise research on IODP Exp. 342 (Newfoundland margin) cores.

I am also currently an ECORD representative on the IODP Science Evaluation Panel (3 year term, 2015-2107)

Post-cruise science support to achieve the proposed scientific objectives 1) future funding scheme and 2) support from host institution (e.g. staff, facilities)

(1) I have available funding and access to laboratory facilities to perform pilot studies and instigate small-scale projects in the immediate post-cruise phase. A larger study will require funding, and, depending on cores recovered during IODP Exp. 373, I will seek funding through the Natural Environment Research Council. As stated in my application letter, I am particularly interested in development of novel climate proxies using detrital silicates. I intend to design a PhD project around this theme to include in the next recruitment round of the NERC SPITFIRE Doctoral Training Program. This student would be well placed to incorporate Exp. 373 materials into his/her project following the cruise in 2018.

(2) The Ocean and Earth Science department is based at the National Oceanography Centre and operates state-of-the-art laboratories and instrumentation to perform geochemical analysis (multiple Isotope Geochemistry labs and Clean Chemistry labs). Each of the laboratories has a dedicated technician for instrument maintenance and training of users. I am a co-manager of the recently established SEAPORT Carbon Laboratory, which houses and maintains several isotope ratio mass spectrometers. This facility has recently been refurbished with installation of several new instruments (Fall 2015). These instruments are capable of high-throughput isotope analysis of many different samples substrates, including carbonates, bulk organic carbon, and organic biomarkers.

Three scientific and/or personal references:

Prof. James Zachos
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Prof. Heiko Päike
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Prof. David Harwood
University of Nebraska, Lincoln
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3. SCIENTIFIC EXPERTISE

For Scientist Jobs Descriptions visit: http://iodp.tamu.edu/participants/scientist_jobs.html

Please indicate your area(s) of expertise (maximum 3)

Discipline	Mark with X	Speciality
microbiologist		
organic and inorganic geochemist/biogeochemist		
physical properties specialist		
sedimentologist	X	core description, smear slide analysis
structural geologist		
paleontologist	X	diatom micropaleontology, biostratigraphy, Paleogene age model development
paleomagnetist		
petrologist		
hydrogeologist		
Other	X	stable isotope ratio geochemistry, chemostratigraphy

4. ADDITIONAL DOCUMENTS

Please, provide the following documents:

- Letter of interest, including details about area of scientific interest, current research, expedition participation plan and post-cruise research
- CV and Publication list
- Letter of recommendation (for PhD students)
- See also: http://www.essac.ecord.org/flyer/Guidelines_for_Applying_to_sail.pdf

Please, send your application form as *a MS Word document* and the additional documents in *PDF format* (preferably as one file) by email to Jan Behrmann and Hanno Kinkel at the ESSAC office: essac@geomar.de.

In addition to the ESSAC application, all applicants ***must inform their national office*** (if applicable) ***and national delegate*** and send a copy of the application documents. ECORD does not provide funds for participation; the national offices or national delegates can provide information regarding travel support, post-cruise funding opportunities, etc.

See http://www.essac.ecord.org/index.php?mod=about&page=ESSAC for a list of the national contact persons.

UNIVERSITY OF
Southampton
School of Ocean and
Earth Science

28th August 2016

RE: IODP Expedition 373 application letter

Dear Exp. 373 Staffing Panel,

Please accept this application to be part of the shorebased science team for IODP Expedition 373: 'Antarctic Paleoclimate and Ice History from George V Land and Adélie Land Sediments.' I have attached the application form, a publication list, and my CV.

Research Background & Interest

My general area of research is within the field of paleoceanography, and I utilize marine sediments from a variety of environments to reconstruct past changes in temperature, ocean chemistry, ocean biology, global ice volume, and atmospheric carbon dioxide levels. I have worked in several different intervals of geologic time, but the majority of my work to date has been focused on climate evolution in the Paleogene time interval between ~23 and 56 Ma. My primary skill set involves development of geochemical records from deep-sea drillcores, use of plankton microfossils for dating of marine sediments and paleoecological interpretations, and integrated correlation of deep-sea drillcores.

An important component of my research approach is examining connections/correlation between Paleogene marine records from the Antarctic margin and pelagic records from the deep sea. To the end, I have worked extensively on both Antarctic shelf clastic sediments and Southern Ocean pelagic ooze sections. For example, I have been involved in several projects that attempt to reconstruct Late Eocene-Early Oligocene climate history using drillcores from Prydz Bay and the Kerguelen Plateau (Scher et al., 2011; Bohaty et al., 2012; Scher et al., 2014; Passchier et al., 2016, in press). In a similar vein, I currently have an ongoin NERC-funding project that is focused on interglacial-glacial variations in the mid Oligocene, utilizing core material from IODP Exp. 318 (Wilkes Land) and ODP Leg 113 (Maud Rise). This work aims to assess the degree of waxing and waning of Oligocene ice sheets on both the Wilkes Land and Queen Maud Land margins of East Antarctica.

Most recently, I have been working extensively with Eocene and Oligocene deep-sea drift sections from the Newfoundland margin in the North Atlantic. These expanded sediment archives are providing much new insight into Paleogene climate events, such as the Eocene-Oligocene climate transition. The timing and impact of Antarctic glaciation can be examined in proxy climate reconstructions, even in distant records such as these from the North Atlantic.

With regard to Exp. 373, my main research interest is in the reconstruction of Antarctic climate and glacial history across major shifts and transient excursions in climate during the Paleogene. Of particular interest to me are pronounced Eocene and Oligocene climate events that have sparse stratigraphic records from the Antarctic margin, including the Middle Eocene Climate Optimum (MECO), Late Eocene cooling episodes (i.e. the 'PrOM' event), the Eocene-Oligocene climate transition, and Early Oligocene glacial-interglacial cycles. Recovery of drillcores from the George V Land/Adélie Land margin would add significantly to our knowledge of these climate events, and I would like to be directly involved in the post-cruise research of core records spanning these events.

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Planned Research

It is difficult to predict what age of sediments will be recovered on Exp. 373 and what sort of studies will be possible on the recovered core material. Therefore, subject to modification following the expedition, I would like to propose three areas/projects in which to contribute to study of the Paleogene strata recovered on the cruise.

(1) Stratigraphy & Age Model Development

Antarctic margin sections are notoriously difficult to date. This is particularly true in the Paleogene time interval where few reference sections exist from the southern high latitudes. Therefore, I would like to work with the shipboard biostratigraphers and paleomagnetists to help assemble robust age models for the Paleogene successions recovered on the cruise. I have a great deal of prior experience in diatom biostratigraphy for Antarctic shelf sections and in the development of age models in the deep-sea sections from the Southern Ocean. I would like to apply this knowledge, through comparison and correlation with other Paleogene sections, to contribute to collaborative effort to develop robust Paleogene age models core the George V Land and Adélie Land cores.

(2) Carbonate Stable Isotope Stratigraphy

If the Wilkes Land cores are any guide, very little carbonate-bearing sediments will be recovered on Exp. 373. However, in the event that cores containing foraminifera are recovered from Paleogene strata, I propose to generate high-resolution carbon and oxygen stable isotope stratigraphies within these intervals. Presumably, foraminiferal occurrence will be restricted to narrow intervals, so it will not be possible to develop continuous long-term records. Even in restricted intervals, though, foraminiferal stable isotope records could provide stratigraphic control and help identify important events, such as the earliest Oligocene Oi-1 event (~34 Ma) – thus tying Wilkes Land shelf sites to well-studied deep-sea sites in the Southern Ocean. I consider this area primarily something I would contribute to collaborative research efforts.

(3) Novel weathering proxies from detrital sediments
[clay mineral assemblage & clay isotope analysis; detrital silt mineralogy]

My primary research interest in working on Exp. 373 cores is the development of proxy datasets that provide an indication of weathering conditions and erosional changes on Antarctica. Specifically, I would like to use clay mineral assemblage and silt fraction mineralogical records to trace weathering changes in the terrestrial environment on East Antarctica. Both the long-term and short-term signals within these records can provide important information on transient Eocene warming events (such as the MECO) and insight as to whether small-to-medium size ice sheets existed in the middle-to-late Eocene time interval. If ice sheets were present in East Antarctica prior to early Oligocene glacial expansion, they most likely did not reach the coast, but would have caused changes in the weathering products delivered to the Antarctic margin through either fluvial or aeolian transport.

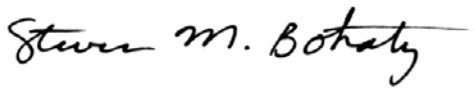
Research Connections & Questions

I most recently sailed on IODP Exp. 318 to Wilkes Land, Antarctica. I have been heavily involved in research on the Paleogene cores recovered on this cruise, and I am keen to follow up on the Eocene-Oligocene studies resulting from Site U1356 with the recovery of additional core material on the George V and Adélie Land margins. Although much new information was obtained on the nature of peak warmth the Early Eocene from Site U1356, the late middle to late Eocene interval (~45 to 35 Ma) was not recovered in Wilkes Land cores and is poorly represented in all drillcore records from around the Antarctic margin. Recovery of cores of this age on Exp. 373 would help answer a fundamental question regarding Cenozoic climate history: *What is the state of Antarctic glaciation prior to major glacial expansion in the early Oligocene?* At the present time, although suggested in some deep-sea proxy

datasets, it is not known if large Antarctic ice sheets were present prior to the Eocene-Oligocene transition. Furthermore, it is important to determine the magnitude, timing, and variability of these early ice sheets if indeed present. This information is critical to more fully understanding the climatic changes and responsible mechanisms for the Cenozoic Greenhouse to Icehouse transition.

I look forward to hearing from you regarding my application, and, in any event, hope for a successful drilling campaign on Exp. 373!

Sincerely,



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STEVEN M. BOHATY — CURRICULUM VITAE

CONTACT DETAILS

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ACADEMIC POSITIONS

2013–present **SMMI Lecturer**
Southampton Marine and Maritime Institute, hosted by Ocean and Earth Science
University of Southampton, UK

2007–2012 **Postdoctoral Researcher**
School of Ocean and Earth Sciences
University of Southampton, UK

2004 **Interim Laboratory Manager**
Light Stable Isotope Laboratory, Earth and Planetary Sciences Department
University of California, Santa Cruz

2000–2006 **Graduate Research & Teaching Assistant**
Earth and Planetary Sciences Department
University of California, Santa Cruz

EDUCATION

2006 **Ph.D.** **University of California**, Santa Cruz
Dissertation: "*Middle Eocene to Early Oligocene Paleoceanography of the Southern Ocean: Critical Events in the Greenhouse to Icehouse Transition*"
Advisor: James C. Zachos

1999 **M.S.** **University of Nebraska**, Lincoln
Thesis: "*Integrated Biostratigraphy for the Eocene-Oligocene Southern Ocean*"
Advisor: David M. Harwood

1996 **B.S.** **University of Nebraska**, Lincoln.
Honors Thesis: "*Southern Ocean Pliocene Paleotemperature Variation from High-Resolution Silicoflagellate Biostratigraphy*"

RESEARCH EXPERIENCE & CURRENT PROJECTS

My research is broadly focused on the reconstruction of ocean chemistry and climate variability across many different time intervals of the Cenozoic (past 66 million years). Using a diverse set of proxy tools and geographically wide-ranging set of study sites, one major goal of my research is to examine the links between polar glaciation and associated changes in ocean temperature, ocean chemistry, and atmospheric CO_2 levels. I am particularly interested in examining these connections during periods of rapid or transient climate change in the geological past. Current research projects include:

- Glacial–interglacial dynamics during the Oligocene from Antarctic margin drillcores: foraminiferal stable isotope stratigraphy, detrital isotope geochemistry, and XRF core scanning
- Eocene–Oligocene palaeoceanography of the Northwest Atlantic, IODP Exp. 342 (Newfoundland margin): high-resolution foraminiferal and organic biomarker geochemical proxy analysis
- Antarctic climate & glacial history during the Paleogene, IODP Exp. 318 (Wilkes Land margin): clay mineralogy, sedimentology, and detrital provenance analysis
- Reconstruction of deep-water carbonate chemistry in the Late Paleogene using a global multi-site approach and application of foraminiferal trace metal proxies
- Cyclostratigraphy and astronomical tuning of Eocene-Oligocene Climate Transition through correlation of an array of deep-sea core sections from the Atlantic Ocean

Research Grants

Leadership or significant contributions to the design, planning, & writing of these funded grant proposals:

2015 Natural Environment Research Council: *Paleogene Climate and Deep-water Evolution in the SW Atlantic: Seismic Reflection and Coring Investigations in Support of IODP Proposal 862-Pre*
UK-IODP Directed Call for Site Survey Investigations Award: £155,510 (PI: Bohaty)

2014 Natural Environment Research Council: *Dynamics of the Oligocene cryosphere: mid-to-high latitude climate variability and ice sheet stability*
Standard Grant Award: £476,686 (PI: Bohaty)

2012 UK Integrated Ocean Drilling Program / Natural Environment Research Council: *Antarctic Weathering and Hydrologic Cycling through the Paleogene Greenhouse to Icehouse Transition (IODP Expedition 318, Wilkes Land)*
Post-cruise postdoctoral support: £40,277

2010 Natural Environment Research Council: *Antarctic Deep Water Circulation and Continental Weathering from the Eocene Greenhouse to the Oligocene Icehouse (IODP Exp. 318, Wilkes Land)*
Small Grant Award: £50,941 (PI: van de Flierdt, Researcher Co-I: Bohaty)

2008 Natural Environment Research Council: *Testing and Modeling a Transient Episode of Ocean Acidification Prior to the Eocene-Oligocene Onset of the Cenozoic Icehouse*
Standard Grant Award: £253,415 (PI: Pälike; Co-PI: Lear, Researcher Co-I: Bohaty)

Scientific Service

2016–2017 Scientific steering committee, Climatic and Biotic Events of the Paleogene 2017 meeting

2015–present International Ocean Discovery Program (IODP) Science Evaluation Panel
European representative, Oceans & Climate theme

2013–2015 Antarctic Science Drilling (Andrill) Science Committee, UK representative

Selected Publications

Pascher, K.M., Hollis, C.J., **Bohaty, S.M.,** Cortese, G., McKay, R.M., Seebeck, H., Suzuki, N., and Chiba, K., 2015. Expansion and diversification of high-latitude radiolarian assemblages in the late Eocene linked to a cooling event in the southwest Pacific. *Climate of the Past*, 11: 1599–1620, doi:10.5194/cp-11-1599-2015.

Scher, H.D., **Bohaty, S.M.,** Smith, B.W, Munn, G.H., 2014. Isotopic interrogation of a suspected late Eocene glaciation. *Paleoceanography*, 29, doi:10.1002/2014PA002648.

Cook, C.P., van de Flierdt, T., and 20 other co-authors including **Bohaty, S.M.,** 2013. Dynamic behaviour of the East Antarctic ice sheet during Pliocene warmth. *Nature Geoscience*, 6: 765-769.

Zhang, Y.G., Pagani, M., Liu, Z., **Bohaty, S.M.,** & DeConto, R., 2013. A 40-million-year history of atmospheric CO2. *Philosophical Transactions of the Royal Society A*, 371, 20130096.

Bijl, P.K., Bendle, J.A., **Bohaty, S.M.,** Pross, J., and 10 other co-authors, 2013 Eocene cooling linked to early flow across the Tasmanian Gateway. *Proceedings of the National Academy of Sciences,* 110(24): 9645-9650.

Sluijs, A., Zeebe, R.E., Bijl, P.K., & **Bohaty, S.M.,** 2013. A middle Eocene carbon cycle conundrum. *Nat Geo*, 6: 429-434.

Houben, A.J.P., Bijl, P.K., Pross, J., **Bohaty, S.M.,** and 12 other co-authors, 2013. Reorganization of Southern Ocean plankton ecosystem at the onset of Antarctic glaciation. *Science*, 340: 341-344.

Edgar, K.M., **Bohaty, S.M.,** Gibbs, S.J., Sexton, P.F., Norris, R.D., & Wilson, P.A., 2013. Symbiont 'bleaching' in foraminifera during the Middle Eocene Climatic Optimum. *Geology*, 41:15-18.

Pross, J., Contreras, L., Bijl, P.K., Greenwood, D.R., **Bohaty, S.M**., and 13 other co-authors, 2012. Persistent near-tropical warmth on the Antarctic continent during the early Eocene epoch. *Nature*, 488: 73-77.

Bohaty, S.M., Zachos, J.C., & Delaney, M.L., 2012. Foraminiferal Mg/Ca evidence for Southern Ocean cooling across the Eocene-Oligocene transition. *Earth and Planetary Science Letters,* 318: 251-261.

Pagani, M., Huber, M., Liu, Z., **Bohaty, S.M.,** Henderiks, J., Sijp, W., Krishnan, S., & DeConto, R.M., 2011. The role of carbon dioxide during the onset of Antarctic glaciation. *Science*, 334: 1261-1264.

Scher, H.D., **Bohaty, S.M.,** Zachos, J.C., & Delaney, M.L., 2011. Two-stepping into the icehouse: East Antarctic weathering during progressive ice-sheet expansion at the Eocene–Oligocene Transition. *Geology*, 39: 383-386.

Bijl, P.K., Houben, A.J.P., Schouten, S., **Bohaty, S.M.,** Sluijs, A., Reichart, G.-J., Sinninghe Damsté, J.S., & Brinkhuis, H., 2010. Transient middle Eocene atmospheric CO2 and temperature variations. *Science*, 330: 819-821.

Bohaty, S.M., Zachos, J.C., Florindo, F., & Delaney, M.L., 2009. Coupled greenhouse warming and deep sea acidification in the middle Eocene. *Paleoceanography*, 24, PA2207.

PEER-REVIEWED ARTICLES

Passchier, S., Ciarletta, D.J., Miriagos, T.E., Bijl, P.K., and Bohaty, S.M., 2016, *in press*. An Antarctic stratigraphic record of step-wise ice growth through the Eocene-Oligocene transition. ***GSA Bulletin*.**

Galeotti, S., DeConto, R., Naish, T., Stocchi, P., Florindo, F., Pagani, M., Barrett, P., Bohaty, S.M., Lanci, L., Pollard, D., Sandroni, S., Talarico, F.M., and Zachos, J.C., 2016. An Antarctic stratigraphic record of step-wise ice growth through the Eocene-Oligocene transition. ***Science,*** 10.1126/science.aab0669.

Huck, C.E., van de Flierdt, T., Jiménez-Espejo, F.J., Bohaty, S.M., Röhl, U., and Hammond, S.J., 2016. Robustness of fossil fish teeth for seawater neodymium isotope reconstructions under variable redox conditions in an ancient shallow marine setting. ***Geochemistry Geophysics Geosystems***, doi:10.1002/2015GC006218.

Pascher, K.M., Hollis, C.J., Bohaty, S.M., Cortese, G., McKay, R.M., Seebeck, H., Suzuki, N., and Chiba, K., 2015. Expansion and diversification of high-latitude radiolarian assemblages in the late Eocene linked to a cooling event in the southwest Pacific. ***Climate of the Past***, 11: 1599–1620, doi:10.5194/cp-11-1599-2015.

Westerhold, T., Röhl, U., Frederichs, T., Bohaty, S.M., and Zachos, J.C., 2015. Astronomical calibration of the geological timescale: closing the middle Eocene gap. ***Climate of the Past***, 11: 1181–1195, doi:10.5194/cp-11-1181-2015.

Savian, J.F., Jovane, L., Frontalini, F., Trindade, R.I.F., Coccioni, R., Bohaty, S.M., Wilson, P.A., Florindo, F., Roberts, A.P., Catanzariti, R., and Iacoviello, F., 2014. Enhanced primary productivity and magnetotactic bacterial production in response to middle Eocene warming in the Neo-Tethys Ocean. ***Palaeogeography, Palaeoclimatology, and Palaeoecology***, 414: 32–45, doi:10.1016/j.palaeo.2014.08.009.

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Witkowski, J., Bohaty, S.M., Edgar, K.M., and Harwood, D.M., 2014. Rapid fluctuations in mid-latitude siliceous plankton production during the Middle Eocene Climatic Optimum (ODP Site 1051, western North Atlantic). ***Marine Micropaleontology***, 106: 110-129, doi:10.1016/j.marmicro.2014.01.001.

Florindo, F., Farmer, R.K., Harwood, D.M., Cody, R.D., Levy, R., Bohaty, S.M., Carter, L., and Winkler, A., 2013. Paleomagnetism and biostratigraphy of sediments from Southern Ocean ODP Site 744 (southern Kerguelen Plateau): Implications for early-to-middle Miocene climate in Antarctica. ***Global and Planetary Change***, 110: 434-454, doi:10.1016/j.gloplacha.2013.05.004.

Cook, C.P., van de Flierdt, T., Williams, T., Hemming, S.R., Iwai, M., Kobayashi, M., Jimenez-Espejo, F.J., Escutia, C., González, J.J., Khim, B.-K., McKay, R.M., Passchier, S., Bohaty, S.M., Riesselman, C.R., Tauxe, L., Sugisaki, S., Lopez Galindo, A., Patterson, M.O., Sangiorgi, F., Pierce, E.L., Brinkhuis, H. and IODP Expedition 318 Scientists, 2013. Dynamic behaviour of the East Antarctic ice sheet during Pliocene warmth. ***Nature Geoscience***, 6: 765-769, doi:10.1038/NGEO1889.

Roberts, A.P., Sagnotti, L., Florindo, F., Bohaty, S.M., Verosub, K.L., Wilson, G.S., and Zachos, J.C., 2013. Environmental magnetic record of paleoclimate, unroofing of the Transantarctic Mountains, and volcanism in late Eocene to early Miocene glaci-marine sediments from the Victoria Land Basin, Ross Sea, Antarctica. ***Journal of Geophysical Research: Solid Earth***, 118: 1845–1861, doi:10.1002/jgrb.50151.

Zhang, Y.G., Pagani, M., Liu, Z., Bohaty, S.M., and DeConto, R., 2013. A 40-million-year history of atmospheric CO_2. ***Philosophical Transactions of the Royal Society A***, 371, 20130096, doi:10.1098/rsta.2013.0096.

Bijl, P.K., Bendle, J.A., Bohaty, S.M., Pross, J., Schouten, S., Tauxe, L., Stickley, C.E., McKay, R.M., Röhl, U., Olney, M., Sluijs, A., Escutia, C., Brinkhuis, H., and Exp. 318 Scientists, 2013. Eocene cooling linked to early flow across the Tasmanian Gateway. ***Proceedings of the National Academy of Sciences,*** 110(24): 9645-9650, doi:10.1073/pnas.1220872110.

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Passchier, S., Bohaty, S.M., Jiménez-Espejo, F., Pross, J., Röhl, U., van de Flierdt, T., Escutia, C., and Brinkhuis, H., 2013. Early Eocene to middle Miocene cooling and aridification of East Antarctica. ***Geochemistry Geophysics Geosystems*****,** 14(5): 1399-1410, doi:10.1002/ggge.20106.

Houben, A.J.P., Bijl, P.K., Pross, J., Bohaty, S.M., Passchier, S., Stickley, C.E., Röhl, U., Sugisaki, S., Tauxe, L., van de Flierdt, T., Olney, M., Sangiorgi, F., Sluijs, A., Escutia, C., Brinkhuis, H., and the Expedition 318 Scientists, 2013. Reorganization of Southern Ocean plankton ecosystem at the onset of Antarctic glaciation. ***Science,*** 340: 341-344, doi:10.1126/science.1223646.

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Shevenell, A.E., and, Bohaty, S.M., 2012. Southern Exposure: New paleoclimate insights from Southern Ocean and Antarctic margin sediments. ***Oceanography***, 25(3): 106-117, doi:10.5670/oceanog.2012.82.

Pälike, H., Lyle, M.W., Nishi, H., Raffi, I., Ridgwell, A., Gamage, K., Klaus, A., Acton, G., and 57 others, 2012. A Cenozoic record of the equatorial Pacific carbonate compensation depth. ***Nature***, 488: 609-614, doi:10.1038/nature11360.

Pross, J., Contreras, L., Bijl, P.K., Greenwood, D.R., Bohaty, S.M., Schouten, S., Bendle, J.A., Röhl, U., Tauxe, L., Raine, J.I., Huck, C.E., van de Flierdt, T., Jamieson, S.S.R., Stickley, C.E., van de Schootbrugge, B., Escutia, C., Brinkhuis, H., and IODP Expedition 318 Scientists, 2012. Persistent near-tropical warmth on the Antarctic continent during the early Eocene epoch. ***Nature***, 488: 73-77, doi:10.1038/nature11300.

Tauxe, L., Stickley, C.E., Sugisaki, S., and 26 others, 2012. Chronostratigraphic framework for the IODP Expedition 318 cores from the Wilkes Land Margin: constraints for paleoceanographic reconstruction. ***Paleoceanography***, 27, PA2214, doi:10.1029/2012PA002308.

Witkowski, J., Bohaty, S.M., McCartney, K., and Harwood, D.M., 2012. Enhanced siliceous plankton productivity in response to middle Eocene warming at Southern Ocean ODP Sites 748 and 749. ***Palaeogeography, Palaeoclimatology, and Palaeoecology***, 326-328: 78-94, doi:10.1016/j.palaeo.2012.02.006.

Bohaty, S.M., Zachos, J.C., and Delaney, M.L., 2012. Foraminiferal Mg/Ca evidence for Southern Ocean cooling across the Eocene-Oligocene transition. ***Earth and Planetary Science Letters***, 317-318: 251-261, doi:10.1016/j.epsl.2011.11.037.

Pagani, M., Huber, M., Liu, Z., Bohaty, S.M., Henderiks, J., Sijp, W., Krishnan, S., and DeConto, R.M., 2011. The role of carbon dioxide during the onset of Antarctic glaciation. ***Science***, 334: 1261-1264, doi:10.1126/science.1203909.

Bohaty, S.M., Kulhanek, D.K., Wise, S.W., Jr., Jemison, K., Warny, S., and Sjunneskog, C., 2011. Age assessment of Eocene–Pliocene cores recovered during the SHALDRIL II Expedition, Antarctic Peninsula. *In*, Anderson, J.B., Wellner, J.S. (eds.), *Tectonic, Climatic, and Cryospheric Evolution of the Antarctic Peninsula*, American Geophysical Union, Special Publication 063, 63-113.

Roberts, A.P., Florindo, F., Villa, G., Chang, L., Jovane, L., Bohaty, S.M., Larrasoaña, J.C., Heslop, D., and Fitz Gerald, J.D., 2011. Magnetotactic bacterial abundance in pelagic marine environments is limited by availability of dissolved iron and organic carbon flux. ***Earth and Planetary Science Letters***, 310: 441-452, doi:10.1016/j.epsl.2011.08.011.

Anderson, J.B., Warny, S., Askin, R.A., Wellner, J.S., Bohaty, S.M., Kirshner, A., Livsey, D.L., Simms, A., Smith, T.R., Ehrmann, W., Lawver, L.A., Barbeau, D., Wise, S.W., Kulhanek, D.K., Weaver, F.M., and Majewski, W., 2011. Progressive Cenozoic cooling and the demise of Antarctica's last refugium. ***Proceedings of the National Academy of Sciences***, 108(28): 11356-11360, doi:10.1073/pnas.1014885108.

Scher, H.D., Bohaty, S.M., Zachos, J.C., and Delaney, M.L., 2011. Two-stepping into the icehouse: East Antarctic weathering during progressive ice-sheet expansion at the Eocene–Oligocene Transition. ***Geology***, 39: 383-386, doi:10.1130/G31726.1.

Bijl, P.K., Houben, A.J.P., Schouten, S., Bohaty, S.M., Sluijs, A., Reichart, G.-J., Sinninghe Damsté, J.S., and Brinkhuis, H., 2010. Transient middle Eocene atmospheric CO_2 and temperature variations. ***Science***, 330: 819-821, doi:10.1126/science.1193654.

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APPLICATION TO PARTICIPATE IN AN IODP EXPEDITION

ESSAC Office ECORD Science Support & Advisory Committee
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Wischhofstrasse 1-3
24148 Kiel, Germany
Hanno Kinkel (ESSAC Science Coordinator):
Tel: +49 431 600 2418
Fax:+49 431 600 2922
Web Page: http://www.essac.ecord.org Email: essac@geomar.de

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Expedition Number 373: Antarctic Paleoclimate and Ice History

1. PERSONAL INFORMATION

Family name: BORDIGA

First name: MANUELA

Current Position: Researcher in Marine Micropaleontology at Uppsala University

Institution: Department of Earth Sciences, University of Uppsala (Sweden)

Address: Villavägen 16

City, Postcode, Country: Uppsala, 752 36, Sweden

Tel. work: +46 184713890
Tel. home: +46 765831321
Fax:
Email: bordiga.manuela@gmail.com

Country of citizenship: Italy

Place of birth/date of birth: Brescia (Italy) / 1984 - 12 - 13

Gender: Female

Education (highest degree, including year PhD was received / is expected): PhD (degree achieved in 2012)

Are you currently a student? NO Expected Graduation Date:

2. EXPEDITION INFORMATION

Summary of proposed participation, including area of scientific interest, current research and participation plan (maximum 250 characters with space – more detail should be included in the Letter of Interest):

My study fits well with Exp.373 by focusing on the relationships between calcareous nannoplankton and climate changes during the EO Transition. I plan to extend my research to MECO and PETM to reconstruct the shift from greenhouse to icehouse world.

Prior involvement with DSDP/ODP/IODP and nature of involvement (expedition number, shipboard/shore-based participation, co-chief, etc):

I participated as calcareous nannofossil specialist onboard of IODP Expedition 350 Izu-Bonin Mariana Rear Arc-Philippine Sea. That expedition required the knowledge of the biostratigraphy from recent to early Eocene.

For my research I always used samples from IODP/ODP/DSDP expeditions (Sites 1209, 1263, 929, 612, 707, and U1436/7). I personally sampled the cores from legs 208, 104 and 154 at the IODP Bremen repository.

Post-cruise science support to achieve the proposed scientific objectives 1) future funding scheme and 2) support from host institution (e.g. staff, facilities)

1) Research funding possibilities: possible research position at Uppsala University or Florence University. Travel funding: Helge Ax:son Johnsons foundation (Sweden). 2) Host institution/s will provide access to laboratory facilities for sample preparation and analyses (Zeiss/Olympus and SEM microscopes).

Three scientific and/or personal references

Prof. Jorijntje Henderiks: Department of Earth Sciences, University of Uppsala (Sweden). Email: jorijntje.henderiks@geo.uu.se

Prof. Giuliana Villa: Department of Physics and Earth Sciences, University of Parma (Italy). Email: giuliana.villa06@gmail.com; giuliana.villa@unipr.it

Prof. Miriam Cobianchi: Department of Earth and Environmental Sciences, University of Pavia (Italy). Email: miriam@unipv.it

3. SCIENTIFIC EXPERTISE

For Scientist Jobs Descriptions visit: http://iodp.tamu.edu/participants/scientist_jobs.html

Please indicate your area(s) of expertise (maximum 3)

Discipline	Mark with X	Speciality
microbiologist		
organic and inorganic geochemist/biogeochemist		
physical properties specialist		
sedimentologist		
structural geologist		
paleontologist	X	Calcareous nannofossils
paleomagnetist		
petrologist		
hydrogeologist		
Other		

4. ADDITIONAL DOCUMENTS

Please, provide the following documents:

- Letter of interest, including details about area of scientific interest, current research, expedition participation plan and post-cruise research
- CV and Publication list
- Letter of recommendation (for PhD students)
- See also: http://www.essac.ecord.org/flyer/Guidelines_for_Applying_to_sail.pdf

Please, send your application form as *a MS Word document* and the additional documents in *PDF format* (preferably as one file) by email to Jan Behrmann and Hanno Kinkel at the ESSAC office: essac@geomar.de.

In addition to the ESSAC application, all applicants ***must inform their national office*** (if applicable) ***and national delegate*** and send a copy of the application documents. ECORD does not provide funds for participation; the national offices or national delegates can provide information regarding travel support, post-cruise funding opportunities, etc.

See http://www.essac.ecord.org/index.php?mod=about&page=ESSAC for a list of the national contact persons.

Manuela Bordiga, Ph.D.
Nannofossil Micropaleontologist

To ESSAC office: ECORD Science Support & Advisory Committee

Object: letter of interest in IODP Expedition 373

I am a Marine Micropaleontology researcher at Uppsala University (Sweden) working on calcareous nannofossil with Prof. J. Henderiks. I am specialized on calcareous nannofossil paleoecology and biostratigraphy. My research focuses on significant paleoceanographic and paleoclimatic linkages across important boundaries in the Cenozoic. I would like to participate in Expedition 373 as the drilling sites will complement well my recent studies on the Eocene-Oligocene transition. Below is a brief description of my research experience and interests, and the goals I propose for Exp. 373. For cited references, see the publication list in the CV.

Specific expertise

Through my current research and my Ph.D., I acquired a very good working knowledge of calcareous nannofossil taxonomy and biostratigraphy from the Pleistocene to the early Eocene time interval. During my scientific career, the detection of nannofossil bioevents was the starting point for all subsequent studies, such as unravelling the response of nannoplankton to different paleoceanographical and paleoclimate scenarios. To asses that, I have also used statistical analyses for assemblage studies (e.g., Principal Component, Permanova, and Canonical analyses) and time series analyses (Spectral and Wavelet analyses). To study the nannofossil assemblage, I apply different sample preparation techniques (smearing, drop (Bordiga et al., 2015a), filtration, settling, and spraying techniques), which I both personally developed and learnt in several European laboratories, and I use both optical and scanning electron microscopes. I have also acquired skills on sample preparation and analyses for the collection of geochemical data (O and C isotopes and Sr/Ca) on both nannofossil and planktonic-benthic foraminiferal assemblages.

Previous involvement in DSDP/ODP/IODP expeditions

I have been involved as calcareous nannofossil specialist on board during IODP Exp. 350 Izu-Bonin Mariana Rear Arc - Philippine Sea (April-May 2014). The time interval of expertise required for Exp. 350 was from recent to early Eocene. This experience made me really appreciate work conducted offshore and the great opportunities of research and collaboration provided by an expedition. My research studies have always utilized DSDP/ODP/IODP materials (Pleistocene portion of Site 1209; Eocene-Oligocene portion of Sites 929, 1263 and 612).

Manuela Bordiga, Ph.D.
Nannofossil Micropaleontologist

Research interest

My recent studies on the Eocene-Oligocene transition (EOT) aim to clarify the relationships among calcareous nannoplankton distribution/evolution and climate changes.

I analyzed the calcareous nannofossil assemblages from different sites in the Atlantic Ocean (Sites ODP 929-1263, and DSDP 612) and collaborated in the interpretation of the data of sites from the Southern Ocean (SO) such us Sites 689 and 1090. I studied the nannoplankton assemblage evolution and morphometric variations along a pole-equator transect in relation to the major climatic changes during the EO transition. So far, this study has shown how nannoplankton recorded a marked decrease in absolute abundance (N g^{-1}) and mean coccolith size at Site 1263 prior the EO boundary, suggesting the ecological success of small vs large sized species. A comparison with alkenone-derived pCO_2 and benthic assemblage data revealed how the response of nannoplankton was linked to fast-changing conditions (enhanced-pulsed nutrient supply), or to threshold in pCO_2 decline, cooling and ocean circulation (Bordiga et al., 2015b). Furthermore, I underlined the relationships between coccolithophores' abundance/cell size and pCO_2 decline during the Eocene-Oligocene transition, which is characterized by an intense decreasing trend of pCO_2. The comparison of these data from low-latitudinal cores with previous data collected from the SO suggests the occurrence of a meridional trend in the response of coccolithophores to the EOT cooling, with the equatorial regions responding earlier than the high-latitudinal areas to the climate change (Bordiga et al., in prep.).

Research goals for Exp. 373 and post-cruise research

I am very interested in participating to Exp. 373 because my recent studies complement well the goals of the expedition. The study of the nannofossil assemblages in the Southern Ocean would add important information to my study on the response of calcareous nannoplankton during interval of intense climatic changes and on the timing of mechanisms that affected the nannofossil distributions. In fact, the study of the SO cores represents a wonderful opportunity to deepen the mechanisms that drove the intense warm time interval preceding the subsequent cooling and the formation of the current oceanographic settings. The calcareous marine biota are a powerful tool to investigate surface temperatures, oceanic circulation changes, and organic carbon production/export. I aim to focus on the following time intervals:

1) MECO and PETM: the greenhouse world.

Both MECO and PETM represent significant hyperthermal events which can provide a useful analogous to unravel the global warming recently affecting our planet. During these time intervals, the conditions of the SO were completely different from the current ones. Through the study of the calcareous nannofossils, I aim to identify the climatic and oceanographic conditions through the study of the distribution of different taxa and, possibly, through the geochemical analyses on fine fraction.

I will firstly focus on the MECO interval because only few data are available for calcareous nannofossils. Thus, Exp. 373 will be a great opportunity to expand the knowledge of the nannoplankton response during the MECO. This strategy, of course, is strictly dependent on the recovered material

during the expedition. For this reason and for the possibility of recovering a highly dissolved MECO record (in fact, the MECO has also been associated with acidification of deep waters), I would also include the PETM time interval in my study of hyperthermal intervals.

2) Eocene-Oligocene Transition (EOT): the shift towards an icehouse world.

Nannofossil records provide precious information on important nodes of the climate changes during EOT, when the global climate shifted from 'greenhouse' to 'icehouse' conditions. On this time interval, I aim to investigate, in particular, the response of calcareous nannoplankton to the gradual cooling during the EOT by identifying diversity changes in the assemblages and by calculating cool/warm taxa ratio and eutrophic/oligotrophic ratio. In this way, it would be possible to correlate the biota response to the fluctuations of the ice sheet, as the melting or growth of the ice sheet affects the SST and the paleoproductivity by modifying upwelling and nutrient supply conditions.

The results achieved from Exp. 373 samples will be compared and correlated with my results for the equatorial and mid-latitudinal studied sites (ODP 929 and 1263) and to previous available studies in the SO and other latitudes (i.e, Tanzania cores, NW Atlantic Ocean, equatorial Pacific and Indian oceans) in order to identify possible similarities/differences in the response of the biota at different latitudes. Comparison of nannofossil with diatoms will provide insights on paleoproductivity of the area, while the comparison with benthic/planktonic foraminiferal assemblages will provide a complete dataset to better reconstruct the paleoceanography of the studied area and the evolution of the paleoclimate.

All the samples will be prepared using the standard technique for calcareous nannofossil (Bordiga et al., 2015a) and quantitatively analyzed to assess both relative (%) and absolute (N g^{-1}) abundances. The absolute abundances will allow: i) studying the evolution and adaptation of calcareous nannoplankton to the key climate changes occurred during the Eocene and Oligocene, ii) investigating the role of calcareous nannoplankton in the carbonate accumulation into sediments through time and in the primary productivity in the SO (i.e., comparison with siliceous plankton productivity). If the material will be of good quality, also $\delta^{18}O$, $\delta^{13}C$, and Sr/Ca analyses will be carried on to assess the paleotemperature and paleoproductivity from nannofossils. These data will potentially provide a good tool for comparison with data derived from other proxies.

Opportunity of financial support

My current and potential (VR grant) position as researcher at Uppsala University (Sweden) and Florence University (Italy) will allow me to pursue the studies outlined above. Samples from Exp. 373 would give me a great opportunity to write a strong proposal for research funding (i.e. Marie Curie and ERC fellowships). I can receive funding from the Swedish foundation Helge Ax:son Johnsons to cover my travel expenses for the expedition. Micropaleontological laboratories and materials for post-cruise sample preparation and analysis (light microscopes and SEM) will be provided by host institution/s and other potential collaborators (cf. CV).

Manuel a Bordiga, Ph.D.
Nannofossil Micropaleontologist

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EDUCATION

Ph.D. in Geology and Marine Micropaleontology, University of Pavia, Italy (14/12/2012)
Dissertation: “Calcareous nannofossils and carbon cycle in the NW Pacific Ocean (Shatsky Rise) during the Middle-Late Pleistocene”. Supervisors Prof. M. Cobianchi and Dr C. Lupi.

MS in Geological Sciences, University of Pavia, Italy (20/02/2009)
Thesis: “Biostratigraphy and paleoecology of Pleistocene calcareous nannofossils in the Shatsky Rise area (NW Pacific)”. Supervisors Prof. M. Cobianchi and Dr C. Lupi. Grade: 110/110 cum laude.

BS in Geology and Environmental Sciences, University of Pavia, Italy (22/09/2006)
Thesis in structural geology: “Analysis of extensional tectonic structures by laboratory’s modeling”. Supervisor Prof. C. Perotti. Grade: 110/110 cum laude.

EMPLOYMENT EXPERIENCE

- Researcher (May 2015 – May 2016) in Marine Micropaleontology, Department of Earth Sciences, University of Uppsala, Sweden.
  - Lecturer on “Dynamics of the Earth systems” and “Origin and early evolution of life” within the master program in Palaeobiology, and “Sedimentology, Stratigraphy and Palaeobiology” for undergraduate students (August-October, 2015; September 2016)
  - Scientific collaboration and laboratory cross-training of visiting international students (mentoring) and a Ph.D. student.
  - Reviewer for the journal Palaeogeography, Palaeoclimatology, Palaeoecology

- Postdoctoral Researcher (April 2013-March 2015) in Marine Micropaleontology, Department of Earth Sciences, University of Uppsala, Sweden.
  - Calcareous nannofossil biostratigrapher in IODP Expedition 350 Izu-Bonin Mariana Rear Arc (Philippine Sea) aboard the R/V JOIDES Resolution (April-May 2014).
  - Mentor and scientific support/collaboration for a Ph.D. student and two master students.
  - Invited speaker within the Ph.D. students’ program at University of Pavia. Seminar title “All on board of the JOIDES Resolution”. (16 January 2015).

- Tutor for the course “Micropaleontology” at the Pavia University (2009-2012). Microscopy exercises and insights on foraminifer taxonomy, biostratigraphy, paleoecology and environmental reconstructions.
- Lecturer at Pavia University within the master program (2010-2012). Topics of the lectures: “Carbon biogeochemical cycles” and “Calcareous nannofossils and paleoclimate”.

SCIENTIFIC COLLABORATIONS

- Kochi University (Japan) - Center for Advanced Marine Core Research,
- Southampton University (UK) - Department of Ocean and Earth Science
- Massachusetts-Amherst University (USA) - Department of Geoscience
- Yale University (USA) - Department of geology and Geophysics
- Parma University (Italy) - Department of Earth Sciences
- ICTA, Barcelona University (Spain) - Department of Earth Sciences
- Aix-Marseille University (France) - CEREGE
- Oviedo University (Spain) - Department of Earth Sciences
- Florence University (Italy) - Department of Earth Sciences
- CNR, Naples (Italy) - Coastal Marine Environment Institute
- Pavia University (Italy) - Department of Earth and Environmental Sciences

TECHNICAL SKILLS

- Deep knowledge of samples preparation techniques for calcareous nannofossils analyses (smearing, filtration, settling and spraying techniques).
- Very good use of both optical light microscopy and scanning electron microscopy.
- Good use of automatic light microscope and the software SYRACO (Système de Reconnaissance Automatique de Coccolithes) for the automatic recognition of coccoliths.
- Good knowledge of sample preparation techniques for foraminiferal analyses.
- Geochemical measurements of isotopes and $CaCO_3$ (wt%) on both nannofossils and foraminifers .
- Knowledge of the procedures in geochemical laboratories.
- Software: proficient in analytical programs for paleontology (AnalySeries, PAST, ImageJ) and other analytical software (MS Office, Vector, ArcGis). Proficient in drafting programs, such as Corel Draw, Illustrator and Photoshop.

PROFESSIONAL AFFILIATION

International Nannoplankton Association (INA): 2012 - Present

FELLOWSHIPS AND GRANTS

- Three years fellowship for Ph.D. project at the Department of Earth Sciences of the Pavia University. (2009-2012).
- Research Grant from Helge Ax.Son Johnsons Stiftelse, Stockholm. (2014-2016).

INTERNATIONAL INTERNSHIPS

- Oviedo (Spain), Department of Earth Sciences of Oviedo University. Guest of Prof. H. Stoll for training and isotope analyses on coccolithophores (July 2012).
- Barcelona (Spain), Department of Earth Sciences of Barcelona University. Guest of Prof. P. Ziveri for lab training (sample preparation and coccolith separation) and research on carbonate fluxes (October–December 2011).
- Aix en Provançe (France), CEREGE (Centre Européen de Recherche et d'Enseignement des Géosciences de L'Environnement). Guest of Prof. L. Beaufort for training on SYRACO and research. (September 2011).
- CNR, Naples (Italy) - Coastal Marine Environment Institute. Training and analysis of stable isotopes on foraminiferal shells. (May 2011).

OTHER SPECIALIZATION COURSES

- USSP, Urbino Summer School in Paleoclimate, Urbino University. 9-25 July 2014.
- Ph.D. School "Biomineralization: from atom to atoll" Prof. J. Stolarski at the Department of Earth Sciences, Modena and Reggio Emilia University. 15-17 July 2011.
- Summer School "Biological and climate processes: couplet dynamics and scales of interaction" at the Istituto Veneto di Scienze Lettere ed Arti di Venezia (Venice). 11-18 July 2010.
- Course on "Chemical Oceanography" Prof. P. Rivaro (Department of Chemistry and Industrial Chemistry, University of Genoa, Italy). March-May 2010.
- Course on "Geostatistics" Prof. F. Felletti (University of Milan, Italy). 18-22 January 2010.

PUBLICATIONS

- Publications in peer reviewed journals

1. Lupi C, Bordiga M, Sacchi R, Galinetto P, Beaufort L, Cobianchi M, 2016. Can the sample preparation techniques affect the relative abundance of Florisphaera profunda? Marine Micropaleontology, 127, 42-49, doi:10.1016/j.marmicro.2016.07.007.
2. Bordiga M, Henderiks J, Tori F, Monechi S, Fenero R, Legarda-Lisarri A, Thomas E, 2015. Microfossil evidence for trophic changes during the Eocene-Oligocene transition in the South Atlantic (ODP Site 1263, Walvis Ridge). Climate of the Past, 11, 1-22, doi:10.5194/cp-11-1-2015.
3. Bordiga M, Bartol M, Henderiks J, 2015. Absolute nannofossil abundance estimates: quantifying the pros and cons of different techniques. Revue de Micropaléontologie, http://dx.doi.org/10.1016/j.revmic.2015.05.002.
4. Cobianchi M, Mancin N, Lupi C, Bordiga M, Bostock HC, 2015. Effects of oceanic circulation and volcanic ash-fall on calcite dissolution in bathyal sediments from the SW Pacific Ocean over the last 550 ka. Palaeogeography, Palaeoclimatology, Palaeoecology, 429, 72-82.

5. Bordiga M, Cobianchi M, Lupi C, Pelosi N, Sprovieri M, Ziveri P, 2014. Coccolithophore carbonate during the last 450 ka in the NW Pacific Ocean (ODP site 1209B, Shatsky Rise). Journal of Quaternary Sciences, 29, 57-69.
6. Bordiga M, Cobianchi M, Lupi C, Mancin N, Luciani V, Pelosi N, Sprovieri M, 2013. Calcareous plankton and geochemistry from the ODP Site 1209B in the NW Pacific Ocean (Shatsky Rise): New data to interpret calcite dissolution and paleoproductivity changes of the last 450 ka. Palaeogeography, Palaeoclimatology, Palaeoecology, doi:10.1016/j.palaeo.2012.12.021.
7. Cobianchi M, Luciani V, Lupi C, Mancin N, Lirer F, Pelosi N, Trattenero I, Bordiga M, Hall IR, Sprovieri M, 2012. Pleistocene biogeochemical record in the SW Pacific Ocean (IMAGES Site MD97-2114, Chatham Rise). Journal of Quaternary Science, ISSN 0267-8179. doi:10.1002/jqs.2542.
8. Lupi C, Bordiga M, Cobianchi M, 2012. Gephyrocapsa distribution and its biostratigraphical meaning during the MPT in the Northern Pacific Ocean (Shatsky Rise). Geobios, 45, 209-217.

- Publications in no-peer reviewed journals

– Tamura Y, Barker AK, Busby CJ, Berger JLR, Blum P, Bongiolo EM, Guèrin G, Bordiga M, et al., 2014. Izu-Bonin-Mariana Rear Arc-The missing half of the subduction factory, 30 March-30 May 2014. International Ocean Discovery Program, Expedition 350 Preliminary Report, doi:10.14379/iodp.pr.350.2014.
– Lupi C, Cobianchi M, Luciani V, Bordiga M, 2011. Statistical analysis of Pleistocene calcareous microplanktonic assemblages: an attempt for understanding the variations of environmental parameters. Italian Journal of Quaternary Sciences, 24 (Special Number).

- Publications submitted and in preparation for peer reviewed journals

– Kars M, Musgrave RJ, Kodama K, Jonas A-S, Bordiga M, Bauersachs T, Vautravers M, in prep for Palaeogeography, Palaeoclimatology, Palaeoecology. Paleoenvironmental impact on the magnetic minerals assemblage in marine sediments from the Izu rear arc over the last 1 Ma, NW Pacific Ocean.
– Bordiga M, Henderiks J, Sulas C, 2016. Submitted to Geobios. Reticulofenestra daviesii biostratigraphy and paleoecology across the Eocene-Oligocene boundary.
– Bordiga M, Henderiks J, Bohaty S, Villa G, in prep for Nature Geoscience. New insights on Eocene-Oligocene cooling from calcareous nannofossils.
– Bordiga M, in prep. Coccolithophore cell size variations across the Plio-Pleistocene boundary (Site U1437, NW Pacific Ocean).
– Bordiga M, Kars M, Vautravers M, Jonas A-S, in prep. Paleocurrent reconstructions during the Pleistocene: the Kuroshio Current and its links with ENSO patterns.
– Bordiga M, Lupi C, Cobianchi M, Pelosi N, Venti N, in prep for Earth and Planetary Science. The response of middle-low latitudes (NW Pacific Ocean) to the orbital forcing during the Middle Pleistocene Transition.
– Bordiga M , Lupi C, Cobianchi M, Pelosi N, Venti N, in prep for Marine Micropaleontology. Calcareous nannoplankton response during the Middle Pleistocene Transition in the NW Pacific Ocean (ODP Site 1209, Shatsky Rise).

- Legarda A, Bordiga M , Henderiks J, Mancin N, Coxall H, Arenillas I, Molina E, in prep for Paleoceanography. The response of calcifying marine biota during the Eocene-Oligocene transition at DSDP Site 612 (NW Atlantic Ocean).

- Conference abstracts

- Bordiga M, Henderiks J, Bohaty S, Villa G, 2016. Calcareous nannofossils reveal new insights on Eocene-Oligocene cooling. International Conference on Paleoceanography, ICP 12th, Utrecht (The Netherlands).
- Legarda-Lissari A, Bordiga M, Mancin N, Coxall H, Henderiks J, Arenillas I, Molina E, 2016. Disentangling Eocene/Oligocene ocean changes in the Western North Atlantic margin using three different micropaleontological groups and foraminiferal stable isotopes (DSDP Site 612). International Conference on Paleoceanography, ICP 12th, Utrecht (The Netherlands).
- Bordiga M, Lupi C, Sacchi R, Cobianchi M, 2016. Climate and environmental factors controlling coccolithophores in the NW Pacific during the Middle Pleistocene Transition. International Conference on Paleoceanography, ICP 12th, Utrecht (The Netherlands).
- Bordiga M, Lupi C, Cobianchi M, 2016. Orbital cycle variability as chronological tool for constraining the Middle Pleistocene Transition: new insights from the NW Pacific Ocean. Geocronologia e Cronostratigrafia del Quaternario, AIQUA 2016, Bologna (Italy).
- Lupi C, Cobianchi M, Bordiga M, 2016. Gephyrocapsa: the queen of Pleistocene. An overview of the usefulness of the acme intervals. Geocronologia e Cronostratigrafia del Quaternario, AIQUA 2016, Bologna (Italy).
- Bazzicalupo P, Franceschetti G, Maiorano P, Bordiga M, Monechi S, 2016. Calcareous nannofossil total abundance: a comparison of methodologies. XVI Giornate di Paleontologia, Faenza (Italy).
- Bordiga M, Bartol M, Henderiks J, 2015. Another drop in the ocean … how to determine absolute coccolith abundance? Journal of Nannoplankton Research, INA15th, Bohol (Philippines), 35, 23.
- Bordiga M, Henderiks J, Tori F, Monechi S, Fenero R, Thomas E, 2015. Eocene-Oligocene shifts in calcareous nannofossil assemblages at ODP Site 1263 (Walvis Ridge, Atlantic Ocean). Journal of Nannoplankton Research INA15th, Bohol (Philippines), 35, 24.
- Henderiks J, Bordiga M, Bartol M, Šupraha L, 2014. Paleolatitudinal gradients in marine phytoplankton composition and cell size. AGU Fall Meeting 2014, PP11A-1330.
- Bordiga M, Henderiks J, 2014. Variations in calcareous nannofossil assemblages during the Eocene-Oligocene transition at mid-latitude: Walvis Ridge ODP Site 1263 (Atlantic Ocean). Rendiconti online della Societá Geologica Italiana, 31, 33-34 (doi: 10.3301/ROL.2014.31).
- Bordiga M, Cobianchi M, Lupi C, Henderiks J, Ziveri P, 2013. Calcareous nannofossils contribution to the carbonate export during the last 450 ka in the NW Pacific Ocean (Shatsky Rise). INA 14th Meeting, Reston (Virginia, USA).
- Bordiga M, Cobianchi M, Lupi C, 2013. Paleoceanographic changes in the NW Pacific Ocean over the last 450 ka: evidences from statistical analysis on calcareous nannofossil assemblages. INA 14th Meeting, Reston (Virginia, USA).

- Lupi C, Bordiga M, Cobianchi M, Beaufort L, 2013. Occurrence and abundance of Florisphaera profunda: could the sample preparation techniques affect the results? INA 14th Meeting, Reston (Virginia, USA).
- Lupi C, Cobianchi M, Bordiga M, Beaufort L, 2013. Occurrence and abundance of Florisphaera profunda: could the sample preparation techniques affect the results? Annual TMS Foram-Nannofossil Group Meeting, Prague, Chez Republic.
- Lupi C, Manicin N, Cobianchi M, Bordiga M, 2013. Carbonate production and preservation in the SW Pacific Ocean over the last 120ky. Annual TMS Foram-Nannofossil Group Meeting, Prague, Chez Republic, Abstract, 26-27.
- Cobianchi M, Bordiga M, Lupi C, Manicin N, Pelosi N, Ziveri P, 2013. Calcareous nannofossils and carbonate dynamics during the last 450 ka in the NW Pacific Ocean (ODP core 1209B, Shatsky Rise). Giornate di Paleontologia XIII edizione, Perugia, 23-25 May 2013, Volume dei Riassunti, 26.
- Bordiga M, Cobianchi M, Lupi C, Ziveri P, 2012. Calcareous nannoplankton contribution and export during the last 450 ky in the NW Pacific Ocean (ODP site 1209B, Shatsky Rise). Giornate di Paleontologia XII edizione, Catania (Italy).
- Bordiga M, Lupi C, Cobianchi M, 2011. Middle-Late Pleistocene calcareous nannofossils as preservation and primary productivity proxies in the North West Pacific Ocean (Shatsky Rise). “MIKRO-2011” and Annual TMS Foram-Nannofossil Group Meeting, Cracow. Integrating microfossil records from oceans and epicontinental seas, Grzybowski Foundation, 76-77.
- Bordiga M, Lupi C, Cobianchi M, Mancin N, Luciani V, Sprovieri M, 2011.Microfossil and geochemical evidences in reconstructing Pleistocene paleoceanography of the South West Pacific (MD 97-2114 Chatham Rise). “MIKRO-2011” and Annual TMS Foram-Nannofossil Group Meeting, Cracow. Integrating microfossil records from oceans and epicontinental seas, Grzybowski Foundation, 77-78.
- Bordiga M, Lupi C, Cobianchi M, 2011. Middle-Late Pleistocene calcareous nannofossils as preservation and primary productivity proxies in the North West Pacific Ocean (Shatsky Rise). Geoitalia 2011, Epitome 4, 10.1474, Turin (Italy).
- Bordiga M , Lupi C, Cobianchi M, 2011. Calcareous nannofossil distribution and climate variability during the Mid-Pleistocene Transition interval at the Site ODP 198-1209B (Shatsky Rise, Northwestern Pacific Ocean). Geophysical Research Abstracts, Vol. 13, EGU2011-1375-1, EGU General Assembly 2011, Wien (Austria).
- Lupi C, Trattenero I, Mancin N, Bordiga M, Abbiate E, Cobianchi M, 2009. Calcareous nannofossil and benthic foraminiferal assemblages to asses water parameters of the NW Pacific Ocean during the Mid-Pleistocene Transition. Geoitalia, 2009, Epitome 3, 03.1119, 301.

APPLICATION TO PARTICIPATE IN AN IODP EXPEDITION

ESSAC Office ECORD Science Support & Advisory Committee
GEOMAR | Helmholtz Centre for Ocean Research Kiel
Wischhofstrasse 1-3
24148 Kiel, Germany
Hanno Kinkel (ESSAC Science Coordinator):
Tel: +49 431 600 2418
Fax:+49 431 600 2922
Web Page: http://www.essac.ecord.org Email: essac@geomar.de

Please type information

Apply to Sail Application Form

Expedition Number 373: Antarctic Paleoclimate and Ice History

1. PERSONAL INFORMATION

Family name: CLARKE

First name: Leon

Current Position: Senior Lecturer in Environmental Analytical Chemistry

Institution: School of Science and the Environment, Manchester Metropolitan University

Address: Faculty of Science and Engineering, Chester Street

City, Postcode, Country: Manchester, M1 5GD, UK

Tel. work: +44(0)161-247-1412
Tel. home: +44(0)1663-611196
Fax: N/A
Email: l.clarke@mmu.ac.uk

Country of citizenship: United Kingdom

Place of birth/date of birth: Honiton, Devon (UK) / 13th April 1972

Gender: Male

Education (highest degree, including year PhD was received / is expected):

DPhil (Earth Sciences; University of Oxford, UK; 2002)

Are you currently a student? NO Expected Graduation Date: N/A

2. EXPEDITION INFORMATION

Summary of proposed participation, including area of scientific interest, current research and participation plan (maximum 250 characters with space – more detail should be included in the Letter of Interest):

I seek to participate as a shipboard or shore-based scientist (*inorganic geochemist*, *physical properties specialist* or *sedimentologist*). I plan to generate greenhouse world (Eocene and/or Cretaceous) biogeochemical palaeoceanographic records.

Prior involvement with DSDP/ODP/IODP and nature of involvement (expedition number, shipboard/shore-based participation, co-chief, etc):

My DPhil in Earth Sciences (University of Oxford, UK, 2002) utilised DSDP and ODP core samples that spanned the mid- to Late Cretaceous. My thesis entitled "*Stable-isotopic evidence for mid- to Late Cretaceous climatic and oceanographic change*" demonstrates that my research background and interests are directly relevant to the IODP Expedition 373 scientific objectives, i.e. studies of past greenhouse climates. Most significantly, two of my publications focused on mid- to Late Cretaceous sediments recovered from the southern hemisphere, i.e. Exmouth Plateau (off northwest Australia) and so are directly relevant, in both time period and geographical location, to planned IODP 373 coring activities to recover the sedimentary record of past greenhouse worlds, i.e. the Eocene and especially Early Cretaceous. I do have a particular interest in IODP 373's possible recovery of Aptian sediments (as well as any other Early to mid-Cretaceous stages), because Clarke and Jenkyns (1999) demonstrated a significant negative shift in $\delta^{18}O$ values across the Aptian to Albian stage boundary, of comparable magnitude to the $\delta^{18}O$ change at the Eocene to Oligocene transition (albeit in the opposite direction). The former Aptian to Albian negative shift in $\delta^{18}O$ values is possibly interpretable as a cold late Aptian climate and subsequent warming and/or melting of a mid-Cretaceous Antarctic cryosphere. IODP 373 recovery of Aptian sediments could facilitate further testing of that hypothesis.

Francesca F., Petrizzo M.R., Clarke L.J., MacLeod K.G. and Jenkyns H.C., in press, Long-term Late Cretaceous oxygen- and carbon-isotope trends and planktonic foraminiferal turnover: A new record from the southern midlatitudes, *Geological Society of America Bulletin* [available online as formatted pre-issue publication articles]

Clarke L.J. and Jenkyns H.C. (1999) New oxygen isotope evidence for long-term Cretaceous climatic change in the Southern Hemisphere, *Geology*, 27 (8), 699-702.

I have previously sailed as a shipboard *physical properties specialist* on ODP Legs 171B (Blake Nose Palaeoceanographic Transect) and 198 (Shatsky Rise).

Previously, I was a member of the NERC UK-IODP steering committee (11/03–09/06).

As PI I submitted, to the April 2014 IODP expeditions proposal deadline, an unsuccessful IODP Ancillary Program Letter (858-APL) entitled "*Mid-Cretaceous to early Palaeogene palaeoceanography in the eastern Indian Ocean: recovery of a complete stratigraphic section from OPD Hole 766A*". I am also a co-proponent of IODP proposal 708 "*Arctic Ocean Paleoceanography: Towards a Continuous Cenozoic Record from a Greenhouse to an Icehouse World (ACEX2)*" now tentatively scheduled as IODP Expedition 377 for operations during mid/late 2018. Involvement as an active proponent in both of these IODP proposals confirms my ongoing research interests in the palaeoceanographic and palaeoclimatic reconstruction of past greenhouse climate worlds, as is the intention of IODP Expedition 373 "*Antarctic Cenozoic Paleoenvironment*" to which I am applying to participate as a shipboard or shore-based scientist.

Post-cruise science support to achieve the proposed scientific objectives 1) future funding scheme and 2) support from host institution (e.g. staff, facilities)

The UK Natural Environmental Research Council (NERC) makes available to UK IODP shipboard scientists a "post-cruise moratorium award" for completion of research during the immediate post-cruise moratorium period. Subsequent to that award, follow-up proposals would be submitted to the main NERC standard grants round, which could make use of the recently instigated NERC-NSF Directorate for Geosciences (GEO) bi-lateral agreement, in order to formalise links with IODP Expedition 373 scientists based in the USA, including co-chief Dr Trevor Williams. Other potential sources of funding within the UK include the UK's Leverhulme Trust.

My analytical biogeochemistry research benefits greatly from being based within the *School of Science and the Environment* at MMU, including being within the *Division of Chemistry and Environmental Science*. The department is extremely well equipped with diverse analytical chemistry equipment that will be used to achieve the proposed Expedition 373 scientific objectives. These items include ICP-MS, ICP-OES and XRF for elemental concentration determinations (such as in foraminiferal tests and diatom frustules and bulk sediments), as well as UV-vis spectrophotometers used in biogenic opal determination (i.e the wet chemistry method). XRD and SEM also are available for mineralogical characterisation and visual imaging of samples, as required for provenancing of materials and assessment of physical versus chemical weathering via clay mineralogy studies. GC, GC-MS and LC-MS instrumentation required for the identification and quantification of organic biomarkers extracted from sediments, for TEX_{86}, alkenone, CBT and MBT temperature proxies all are available in-house. My department also has a particle-size counter. All instrumentation is supported by a very strong MMU technical support team and I am not charged to access and utilise any of this instrumentation. Furthermore, I would be very willing to host collaborative Expedition 373 scientists at MMU if they had a need to utilise any of our equipment.

Furthermore, UK scientists benefit greatly from being able to access central geochemistry facilities funded by the UK NERC, including the NERC Isotope Geosciences Laboratory (hosted by the British Geological Survey in Nottingham, including carbonate $\delta^{13}C$ and $\delta^{18}O$, as well as being one of the leading international laboratories for diatom silica silicon- and oxygen- isotope ratios analyses) and the NERC Life Sciences Mass Spectrometry (one node hosted by the University of Bristol, including organic biomarker identification and compound-specific stable-isotope-ratio analyses). As an established senor university academic within the UK, I am eligible to apply to both of these NERC-funded facilities and have done so in the past, with considerable success, as summarised in my CV. As required, it would be my intention to apply to access these facilities to achieve IODP Expedition scientific objectives.

Three scientific and/or personal references

Prof Mark Leckie (University of Massachusetts, Amherst, USA) – mleckie@geo.umass.edu

Prof Dick Kroon (University of Edinburgh, UK) – D.Kroon@ed.ac.uk

Prof Hugh Jenkyns (University of Oxford, UK) – hugh.jenkyns@earth.ox.ac.uk

3. SCIENTIFIC EXPERTISE

For Scientist Jobs Descriptions visit: http://iodp.tamu.edu/participants/scientist_jobs.html

Please indicate your area(s) of expertise (maximum 3)

Discipline	Mark with X	Speciality
microbiologist		
organic and inorganic geochemist/biogeochemist	X	Inorganic geochemistry and biogeochemistry
physical properties specialist	X	Previously shipboard PP specialist on ODP 171B and ODP 198
sedimentologist	X	
structural geologist		
paleontologist		
paleomagnetist		
petrologist		
hydrogeologist		
Other		

4. ADDITIONAL DOCUMENTS

Please, provide the following documents:

- Letter of interest, including details about area of scientific interest, current research, expedition participation plan and post-cruise research
- CV and Publication list
- Letter of recommendation (for PhD students)
- See also: http://www.essac.ecord.org/flyer/Guidelines_for%20Applying_to_sail.pdf

Please, send your application form as *a MS Word document* and the additional documents in *PDF format* (preferably as one file) by email to Jan Behrmann and Hanno Kinkel at the ESSAC office: essac@geomar.de.

In addition to the ESSAC application, all applicants ***must inform their national office*** (if applicable) ***and national delegate*** and send a copy of the application documents. ECORD does not provide funds for participation; the national offices or national delegates can provide information regarding travel support, post-cruise funding opportunities, etc.

See http://www.essac.ecord.org/index.php?mod=about&page=ESSAC for a list of the national contact persons.

School of Science and the Environment
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31st August 2016

IODP Expedition 373 – Antarctic Cenozoic Paleoenvironment

To whom it may concern,

I am applying to participate as either a full shipboard scientist or shore-based participant on IODP Expedition 373, as either an *inorganic geochemist*, *physical properties specialist* or *sedimentologist*.

If selected for involvement in IODP Expedition 373 it is my plan that immediate post-cruise moratorium period research will be supported by a UK NERC IODP post-cruise moratorium period award (value up to £25,000) that is now made available to all UK scientists sailing on IODP expeditions. Furthermore, my university department is extremely well equipped with analytical chemistry instrumentation, as detailed in my application form and below, which as a senior Faculty academic I can access at no cost, enabling me to complete diverse biogeochemistry measurements that will directly contribute to the IODP Expedition 373 scientific objectives. Such instrumentation also could be made available to shipboard scientist colleagues on a collaborative basis, including the hosting of research visits to MMU. Furthermore, I am currently the Co-Director of Manchester Metropolitan University's *Environmental Science Research Centre*, which also has competitive funding schemes to which I would submit (a) proposal(s) for additional research support. My *Faculty of Science and Engineering* also runs annual summer student project placement and PhD student competitions, which also could support post-cruise research activities. Beyond these short- to medium-term opportunities, it would be my intention to apply for follow-up research grants from major UK funding bodies including the NERC (perhaps in collaboration with shipboard scientist colleagues based in the USA by making use of the recently instigated NERC-NSF bilateral funding arrangement) and the UK's Leverhulme Trust, both funders of Earth and environmental science research.

Having participated on two ODP expeditions (171B during 1997 and 198 during 2001, both as physical properties specialist), I am very well aware that post-cruise research activities are entirely dependent on the nature (and age) of the materials recovered during coring, as well as on the research skills and interests possessed by shipboard scientist colleagues. Consequently, I describe below my research interests and skills that directly relate to IODP 373 scientific objectives. Furthermore, compared to my previous participation on two ODP expeditions, I now hold a senior UK Faculty position, within a department that grants me access to the instrumentation that I will require to complete my proposed post-cruise research.

My primary research focus and interest is the application of biogeochemical proxies to palaeoceanographic and palaeoclimatic studies. As such, I believe that I am very able to contribute to key scientific objectives targeted by IODP Expedition 373, as follows:

1. *Reconstruction of Cretaceous and Eocene greenhouse climates*

Since completion of my DPhil in Earth Sciences (University of Oxford, 2002), thesis entitled *Stable-isotopic evidence for mid- to Late Cretaceous oceanographic and climatic change,* reconstruction of mid- to Late Cretaceous and Palaeogene palaeoceanography and palaeoclimatology has been a primary research interest. I have published two of the key long-term mid- to Late Cretaceous palaeoceanographic records based on bulk sediments and planktonic and benthonic foraminifera (Clarke and Jenkyns, 1999, *Geology*, and Falzoni et al., in press, *Geological Society of America Bulletin*; full citation details included within application form and CV). Most significantly, these two records are for ODP Leg 122 and 123 sediments

recovered from the Exmouth Plateau, northwestern Australia, and thus are the mid- to Late Cretaceous isotope records that are geographically closest to the area of IODP Expedition 373 operations (stable-isotope data also exist that extend these records through the Paleogene). I do have a particular interest in IODP 373's possible recovery of Aptian sediments (as well as other Early to mid-Cretaceous stages), because Clarke and Jenkyns (1999) demonstrated a significant negative shift in $\delta^{18}O$ values across the Aptian to Albian stage boundary, of comparable magnitude to the $\delta^{18}O$ change at the Eocene to Oligocene transition, albeit in the opposite direction. The former Aptian to Albian negative shift in $\delta^{18}O$ values is possibly interpretable as a cold late Aptian climate and subsequent warming and/or melting of a mid-Cretaceous Antarctic cryosphere. IODP 373 recovery of Aptian (and other Early and mid-Cretaceous) sediments could facilitate testing of that hypothesis.

I foresee that I can contribute to this IODP 373 scientific objective by one, or more, of the following:

- Measurement of glycerol dialkyl glycerol tetraethers (GDGTs) for determination of the TEX_{86}, CBT and MBT indices, as well as alkenone, palaeotemperature proxies, as is applied to organic-rich sediments including those anticipated to be recovered during IODP Expedition 373. Within my department I have no-cost access to the necessary LC-MS and GC instrumentation required to undertake these organic geochemistry measurements and have previously set-up TEX_{86} and alkenone Uk'37 protocols at MMU via a summer student's placement. As an alternative, for example if MMU LC-MS/GC instrument downtime occurs, it is also possible to secure grant-in-kind TEX_{86} and alkenone Uk'37 measurements via the UK's NERC Life Sciences Mass Spectrometry Facility node at Bristol University. I have previously secured TEX_{86} measurements via this route and have a, as yet unpublished, TEX_{86} dataset for mid-Cretaceous OAE1b organic-rich sediments recovered from ODP 171B Site 1049.

- Completion of bulk sediment geochemical analyses, as well as determination of carbonate and opal content, using our XRF and UV-vis spectrophotometer instrumentation and, if required, ICP-OES and ICP-MS instrumentation following acid digestion protocols.

- Undertaking of XRD measurements, including clay mineralogy, for provenancing of sedimentary materials and assessment of chemical versus physical weathering processes within the Antarctic continental hinterland.

- Should well enough preserved foraminiferal tests be included within recovered sediments, contributing to the generation of traditional $\delta^{13}C$ and $\delta^{18}O$ records for foraminiferal samples, as have been included within the two isotope records cited above. One means of my securing these analyses, beyond payment from the NERC UK-IODP post-cruise moratorium award and/or collaboration with shipboard scientists, will be via securing grant-in-kind access to the NERC Isotope Geoscience Laboratory, the UK's central analytical centre for measurements of this type. This same laboratory also has the capability of measuring Sr-isotope ratios in marine carbonates, which could be used to assist with generation of site depth–age models, e.g. if any macrofossil (e.g. mollusc shell) carbonate were to be recovered. I have had considerable success with securing access to this laboratory previously, for both stable carbon- and oxygen- and radiogenic Sr-isotope ratio analyses. If selected for shipboard participation on IODP Expedition 373 and suitable materials are recovered I will apply to this facility asap after identification of suitable materials. The same is true if suitable diatoms are recovered that could be used for silica silicon- and oxygen-isotope ratio analyses.

I very much look forward to learning the outcome of my application to participate as either a full shipboard or shore-based scientist on the upcoming IODP Expedition 373, *Antarctic Cenozoic Paleoenvironment*.

Dr Leon J. Clarke

Senior Lecturer in Environmental Analytical Chemistry

DR LEON JOHN CLARKE

PERSONAL DETAILS

Name: Dr Leon John Clarke

Address: 50 Godward Road
New Mills
High Peak
Derbyshire
SK22 3BU, UK

Tel: +44(0)1663-611196

Date of Birth: 13th April 1972

Age: 44

Place of Birth: Honiton, Devon, UK

Nationality: British

EMPLOYMENT HISTORY

08/12–present *Senior Lecturer in Environmental Analytical Chemistry*, School of Science and the Environment, Faculty of Science and Engineering, Manchester Metropolitan University, Manchester, M1 5GD, UK. E-mail: l.clarke@mmu.ac.uk.

Co-Director of MMU's *Environmental Science Research Centre* (from July 2016; deputy Director from spring 2015).

MMU Future RKE Leader (inaugral cohort; 2015 to present).

01/10–07/12 *Lecturer in Environmental Science* and *Director of the Bradford Stable Light Isotope Facility*, School of Applied Sciences, School of Life Sciences, University of Bradford, Bradford, West Yorkshire, BD7 1DP, UK.

04/00–03/09 *Lecturer in Sediment Geochemistry*, School of Ocean Sciences, College of Natural Sciences, Bangor University, Askew Street, Menai Bridge, Isle of Anglesey, Wales, LL59 5AB, UK.

09/99–03/00 *Non-Stipendiary Visiting Fellow*, School of Environmental Sciences, University of East Anglia, Norwich, Norfolk, UK.

09/97–08/99 *Research Associate*, NERC ICP-MS Facility, Imperial College at Silwood Park, UK.

QUALIFICATIONS

2002 DPhil in Earth Sciences, Department of Earth Sciences, University of Oxford, UK.

Thesis entitled: *Stable-isotopic evidence for long-term mid- to Late Cretaceous oceanographic and climatic change*

1993 BSc (Hons.) Upper Second Class, *Environmental Sciences*, School of Environmental Sciences, University of East Anglia, UK.

PROFESSIONAL AFFILIATIONS AND EXTERNAL ACTIVITIES

Fellow of the *Geological Society of London* and member of the *American Geophysical Union*, *Geological Society of America*, *European Association of Geochemistry* and *Royal Society of Chemistry*. Past committee member of the *Geological Society of London Marine Studies Group*; elected vice-chairperson during 11/02 and group chair 2005–2009.

Member of the UK Natural Environment Research Council (NERC) IODP directed programme steering committee (11/03–09/06). Member of the UK NERC Peer Review College between 06/04 and 05/08 and rejoined during summer 2009; remain an ongoing member and have reviewed grant applications, attended moderation and grading panels and sat on Fellowship interview panels. Reviewer for grant proposals for British Council Newton Fund, as well as other international funding bodies, e.g. the German DFG.

Peer reviewer for *Cretaceous Research*, *Chemical Geology, Geological Magazine*, *Geology*, *Journal of the Geological Society of London*, *Paleoceanography*, *Palaeogeography, Palaeoclimatology and Palaeoecology*, *PlusONE* and *Proceedings of the Ocean Drilling Program*. Guest (co-)editor for a thematic set "*Annually banded records in the Quaternary*" published in the *Journal of Quaternary Science*.

SELECTED RELEVANT PUBLICATIONS (reverse chronological order)

Kennedy H.A., Libertinova J., **Clarke L.J.**, Richardson C.A. and Dando P. Carbon- and oxygen-isotope ratio variation within shells of *Bathymodiolus* sp. bivalve molluscs from five hydrothermal vent fields on the Mid-Atlantic Ridge, in preparation for submission for *Geochimica et Cosmochimica Acta*.

Clarke L.J., Dennis P.F., Marca A. and Probert I, Clumped isotope temperature calibration for coccolithophore calcite using the MIRA IRMS, for future submission to *Earth and Planetary Science Letters*.

Clarke L.J., Dennis P.F., Marca A., Petrizzo D.A., Petrizzo D.A. and Henkes G.A., Revised marine mollusc shell clumped isotope thermometry calibration using the MIRA IRMS, in preparation for submission to *Earth and Planetary Science Letters*.

Clarke L.J., Finch A.A., Foster L.C., Huthwelker T., Kennedy H.A. and Richardson C.A., Magnesium structural state in *Mytilus edulis* and *Pecten maximus* (bivalvia): implications for Mg/Ca palaeothermometry, in preparation for submission for *Geochimica et Cosmochimica Acta*.

Clarke, L.J., Brand U. and Farkas J., Li/Ca palaeotemperature equation for brachiopod calcite, in preparation for submission to *Chemical Geology*.

Clarke L.J., Oka S. and Hussey N., Partitioning of Sr and Ba between seawater and shark teeth apatite: the role of temperature, in preparation for submission to *Geochimica et Cosmochimica Acta*.

Clarke L.J., Witbaard R., Newville M. and Lanzirotti T., Bromine distribution and coordination within the aragonite bivalve mollusc *Arctica islandica*, in preparation for submission to *Earth and Planetary Science Letters*.

Clarke L.J., Wanamaker Jr. A.D., Kreutz K.J., Borns Jr. H.W. and Introne D.S., Li/Ca in the outer calcite layer of cultured *Mytilus edulis* shells (bivalvia): a new marine paleotemperature proxy, in revision for submission for *Geochimica et Cosmochimica Acta*.

García-Escárzaga A., **Clarke L.J.**, & Gutiérrez-Zugasti I., Mg/Ca and Sr/Ca ratios in top shells *Phorcus lineatus* (Da Costa, 1778): a suitable environmental proxy to reconstruct environmental conditions? in preparation for *The Holocene*.

Gutiérrez-Zugasti I., Suárez-Revilla R., **Clarke L.J.**, Schöne B.R., Bailey G.N., González-Morales M.R., Shell oxygen-isotope values and sclerochronology of the limpet *Patella vulgata* Linnaeous 1758 from northern Iberia: implications for the reconstruction of past seawater temperatures, in preparation for submission to *Palaeogeography, Palaeoclimatology, Palaeoecology*.

García-Escárzaga A., **Clarke L.J.**, Gutiérrez-Zugasti I., González-Morales R., López-Higuera J.M. and Cobo A., Mg/Ca ratios from ancient marine shell biogenic carbonate using Laser Induced Breakdown Spectroscopy (LIBS) and Inductively Coupled Plasma-Optical Emission Spectrometry (ICP-OES), in review for *Journal of Analytical Atomic Spectroscopy*.

Freitas P.S., **Clarke L.J.**, Kennedy H. and Richardson C.A., Manganese in the shell of the bivalve *Mytilus edulis*: Seawater Mn or physiological control? in revision following review for *Geochimica et Cosmochimica Acta*.

Vihtakar M., Ambrose Jr, W.G., Renaud P.E., Locke W.L., Carroll M.L., Berge J., **Clarke L.J.**, Cottier F. and Hop H., A key to the past? Element ratios as environmental proxies in two Arctic bivalves, resubmitted following review and revisions to *Palaeogeography, Palaeoclimatology, Palaeoecology*.

Francesca F., Petrizzo M.R., **Clarke L.J.**, MacLeod K.G. and Jenkyns H.C., Long-term Late Cretaceous oxygen- and carbon-isotope trends and planktonic foraminiferal turnover: A new record from the southern midlatitudes, in press for *Geological Society of America Bulletin*.

Vihtakari M., Renaud P.E., **Clarke L.J.**, Whitehouse M.J., Hop H., Carroll M.L. & Ambrose W.G., (2016) Decoding the oxygen isotope signal for seasonal growth patterns in Arctic bivalves, *Palaeogeography, Palaeoclimatology, Palaeoecology*, 446: 263–283.

Wendler I., Wendler J.E. & **Clarke L.J.** (2016) Sea-level reconstruction for Turonian sediments from Tanzania based on integration of sedimentology, microfacies, geochemistry and micropaleontology, *Palaeogeography, Palaeoclimatology, Palaeoecology*, 441: 528–564.

Frei K.M., Mannering U., Kristiansen K., Allentoft M.E., Wilson A.S., Skals I., Tridico S., Nosch M.E., Willerslev E., **Clarke L.** & Frei R., (2015) Tracing the dynamic life story of a Bronze Age Female, *Scientific Reports*, 5: 10431.

Robson H.K., Andersen S.H., **Clarke L.**, Craig O.E., Gron K.J., Jones, A.K.G., Karsten P., Milner N., Price T.D., Ritchie K., Zabilska-Hunek M. & Heron C. (2015) Carbon and nitrogen stable isotope values in freshwater, brackish and marine fish bone collagen from Mesolithic and Neolithic sites in central and northern Europe, *Environmental Archaeology*, 151221104737005.

Craig O.E., Saul H., Lucquin A., Nishida Y., Tache K., **Clarke L.**, Thompson A., Altoft D.T., Uchiyama J., Ajimoto M., Gibbs K., Isaksson S., Heron C.P., & Jordan P., 2013, Earliest evidence for the use of pottery, *Nature*, 496: 351–453.

Freitas P.S., **Clarke L.J.**, Kennedy H. & Richardson C.A., 2012, The potential of combined Mg/Ca and $\delta^{18}O$ measurements within the shell of the bivalve *Pecten maximus* to estimate seawater $\delta^{18}O$ composition, *Chemical Geology*, 291: 286–293.

Freitas P.S., **Clarke L.J.**, Kennedy H. & Richardson C.A., 2009, Ion microprobe assessment of the heterogeneity of Mg/Ca, Sr/Ca and Mn/Ca ratios in *Mytilus edulis* and *Pecten maximus* (bivalvia) shell calcite precipitated at constant temperature, *Biogeosciences*, 6: 1209–1227.

Robinson S.A., **Clarke L.J.**, Nederbragt A. & Wood I.G., 2008, Mid-Cretaceous oceanic anoxic events in the Pacific Ocean revealed by carbon-isotope stratigraphy of the Calera Limestone, California, U.S.A, *Geological Society of America Bulletin*, 120: 1416–1427.

Freitas P.S., **Clarke L.J.**, Kennedy H. & Richardson C.A., 2008, Inter- and intra-specimen variability masks reliable temperature control on shell Mg/Ca ratios in laboratory cultured *Mytilus edulis* and *Pecten maximus*, *Biogeosciences*, 5: 1245–1258.

Greaves M., Caillon N., Rebaubier H., Bartoli G., Bohaty S., Cacho I., **Clarke L.**, Cooper M., Daunt C., Delaney M., deMenocal P., Dutton A., Eggins S., Elderfield H., Garbe-Schoenberg D., Goddard E., Green D., Groeneveld J., Hastings D., Hathorne E., Kimoto K., Klinkhammer G., Labeyrie L., Lea D.W., Marchitto T., Martinez-Boti M.A., Mortyn P.G., Ni Y., Nuernberg D., Paradis G., Pena L., Quinn T., Rosenthal Y., Russell A., Sagawa T., Sosdian S., Stott L., Tachikawa K., Tappa E., Thunell R. & Wilson P.A., 2008, Interlaboratory comparison study of calibration standards for foraminiferal Mg/Ca thermometry, *Geochemistry, Geophysics, Geosystems*, 9: Q08010, doi:10.1029/2008GC001974.

Foster L.C., Finch A.A., Allison N., Andersson C. & **Clarke L.J.**, 2008, Mg in aragonitic bivalve shells: seasonal variations and mode of incorporation in *Arctica islandica*, *Chemical Geology*, 254: 113–119.

Freitas P.F., **Clarke L.J.**, Kennedy H., Richardson C. & Abrantes F., 2006, Environmental and biological controls on elemental (Mg/Ca, Sr/Ca and Mn/Ca) ratios in shells of the king scallop *Pecten maximus*, *Geochimica et Cosmochimica Acta*, 70: 5119–5133.

Freitas P.F., **Clarke L.J.**, Kennedy H., Richardson C. & Abrantes F., 2005, Mg/Ca, Sr/Ca, and stable-isotope ($\delta^{18}O$ and $\delta^{13}C$) ratio profiles from the fan mussel *Pinna nobilis*: Seasonal records and temperature relationships, *Geochemistry, Geophysics, Geosystems*, 6: doi:10.1029/2004GC000872.

Brassell S.C., et al., (inc. **Clarke, L.J.**), 2004, Recognition of alkenones in a lower Aptian porcellanite from the westcentral Pacific, *Organic Geochemistry*, 35: 181–188.

Craig C.-A., Jarvis K.E. & **Clarke L.J.**, 2000, An assessment of calibration strategies for the quantitative and semiquantitative analysis of calcium carbonate matrices by laser-ablation inductively coupled plasma-mass spectrometry (LA-ICP-MS), *Journal of Analytical Atomic Spectrometry*, 15: 1001–1008.

Clarke L.J., & Jenkyns H.C., 1999, New oxygen-isotope evidence for long-term Cretaceous climatic change in the Southern Hemisphere, *Geology*, 27: 699–702.

Price G.D., Sellwood B.W., Corfield R M. **Clarke, L.** & Cartlidge, J., 1998, Isotopic evidence for palaeotemperatures and depth stratification of Middle Cretaceous planktonic foraminifera from the Pacific Ocean, *Geological Magazine*, 135: 183–191.

Bellier J.-P., et al. (including **Clarke L.J.**), 1997, The Blake Nose CretaceousPaleogene (Florida Atlantic margin, ODP Leg 171B): an exemplar record of the Maastrichtian -Danian transition, *Comptes Rendu de la Academie des Sciences de Paris*, 325: 499–504.

SELECTED RELEVANT RESEARCH GRANT AWARDS

Dr Igor Gutiérrez Zugasti (various funding sources, including the Spanish Government), "*Climate change and coastal settlement in northern Spain during the Pleistocene-Holocene transition*", ca. £15K income to the *Bradford Stable Isotope Facility* and £12K income to MMU. [2012–2015]

NERC Small Grant, "*Calibrating novel palaeotemperature proxies in laboratory aquaria cultured long-lived Arctica islandica mollusc shells*" – NE/J012866/1, £42,915 awarded – plus £8,250 additional funding awarded direct to the NERC Isotope Geosciences Laboratory, British Geological Survey, Nottingham. [September 2011]

NERC Small Grant, "*Testing the veracity of the Mg/Ca palaeotemperature proxy in cultured marine molluscan calcite*" – NE/E009875/1, £74,280 awarded. [January 2007]

NERC CASE PhD studentship "*Secular and short-term variation in mid-Cretaceous to Palaeogene ocean chemistry*" (NER/S/A/2005/13425) awarded to Tom Broadbent, in collaboration with co-supervisor Prof Melanie Leng at the NERC Isotope Geosciences Laboratory, British Geological Survey, Nottingham, UK. [October 2005]

EU Marie Curie Research Training Network, "*Monitoring deep seafloor hydrothermal environments on the Mid-Atlantic Ridge; specifically, records of environmental change in the shells of the hydrothermal vent mussel Bathymodiolus azoricus*" – €203,314 (£116,179) awarded to Prof Paul Dando and Drs Hilary Kennedy, Chris Richardson and Leon Clarke. [September 2004]

Royal Society Conference Grant, in support of attendance at the April 2003 EGS-AGU-EUG Joint Assembly, Nice, France – £630. [April 2003]

NERC New Investigators Competition, "*Did a glacioeustatic mechanism operate during the mid- to Late Cretaceous 'super-greenhouse'*?" – grant NER/M/S/2002/00072; £49,983 requested and £27,075 awarded. [May 2002]

NERC UK-ODP Thematic Programme, travel and subsistence funding to support attendance and oral presentation "*Globally synchronous long-term climate changes during the mid- to Late Cretaceous?*" at the 4th European ODP Forum – £1,280. [April 2002]

Royal Society Conference Grant, in support of attendance at the July 2002 "*Workshop on Cretaceous Climate and Ocean Dynamics*" – £1,220. [April 2002]

NERC UK-ODP Thematic Programme, Rapid Response Grant, "*High-resolution Late Cretaceous palaeoceanographic study: Shatsky Rise (Leg 198)*" – £2,000. [November 2001]

NERC UK-ODP Thematic Programme, "ODP Leg 198 cruise participation travel and subsistence support funding" – £875. [November 2001]

Royal Society Research Grant, "*Reassessing Cretaceous greenhouse temperatures*" – £9,905. [August 2001]

NERC UK-ODP Thematic Programme, travel funding to attend the European APLACON workshop – £600. [May 2001]

NERC UK-ODP Thematic Programme, Rapid Response Grant, "*Porewater study of samples from Leg 171B*" – £1,990 (in collaboration with Dr Julian Andrews and Paul Dennis, University of East Anglia, UK). [1997]

NERC UK-ODP Thematic Programme, "ODP Leg 171B cruise participation travel and subsistence support funding". [1997]

SELECTED RELEVANT GRANT-IN-KIND ANAYTICAL FACILITY AWARDS

NERC Life Sciences Mass Spectrometry Facility, "*Pleistocene ocean-climate system interactions in the northwest Pacific Ocean*" – BRIS/062/0413, grant-in-kind equivalent to £62,693 awarded, grade 7. [In support of PhD student Marise Gorton; June 2012; for alkenone Uk'_{37} SST and n-alkane determinations on ODP Leg 198 sediments]

ASSEMBLE, an EU FP7 research infrastructure initiative that comprises a network of marine research stations (http://www.assemblemarine.org/), travel and subsistence support to facilitate a two-week duration visit, during summer 2013, to the *Roscoff Culture Collection* (*RCC*) at the *Station Biologique de Roscoff* (*SBR*), Brittany, France, to receive training from Dr Ian Probert (curator of coccolithophores) in successful laboratory culturing of coccolithophores, including sterilised seawater culturing medium preparation. A follow-up proposal also was successful and supported, via travel and subsistence funding, a return visit to Roscoff during summer 2014.

Soleil synchrotron light source, "*Completion of a census of magnesium structural state in mollusc shell carbonate: implications for Mg/Ca palaeothermometry and palaeoclimate reconstructions*" – Experiment 20110697; 15 8-hour shifts of LUCIA beamline time allocated to facilitate micro-XRF and XAS analyses of Mg in marine mollusc shells. [September 2011]

Swiss Light Source, "*Sulphur distribution and speciation in a calcite marine mollusc shell: implications for the Mg/Ca palaeotemperature proxy*" – Experiment 20110176; 15 8-hour shifts of PHOENIX beamline time allocated to facilitate micro-XRF and XAS analyses of S in marine mollusc shells. [May 2011]

Soleil synchrotron light source, "*Magnesium structural state in mollusc shell carbonate: implications for Mg/Ca palaeothermometry and palaeoclimate reconstructions*" – Experiment 20100800; 9 (of 18 requested) 8-hour shifts of LUCIA beamline time awarded to facilitate micro-XRF and XAS analyses of Mg in marine mollusc shells. [December 2010]

Soleil synchrotron light source, "*Magnesium structural state in mollusc shell carbonate: implications for Mg/Ca palaeothermometry and palaeoclimate reconstructions*" – Experiment 20090512; 12 8-hour shifts of LUCIA beamline time awarded to facilitate micro-XRF and XAS analyses of Mg in marine mollusc shells. [December 2009]

Diamond synchrotron light source, "*Sulphur distribution and speciation in calcite marine mollusc shells: implications for the Mg/Ca palaeotemperature proxy*" – Experiment SP2931; 15 8-hour shifts of i18 beamline time awarded to facilitate micro-XRF and XAS analyses of S in cultured marine mollusc shells. [December 2009]

Diamond synchrotron light source, "*Sulphur distribution and speciation in calcite marine mollusc shells: implications for the Mg/Ca palaeotemperature proxy*" – Experiment SP1042; 15 8-hour shifts of i18 beamline time awarded to facilitate micro-XRF and XAS analyses of S in cultured marine mollusc shells. [December 2008]

NERC Ion Microprobe Facility, "*Calcium isotope fractionation in cultured marine mollusc shell calcite: a novel palaeotemperature proxy?*" – IMF 340/0508, grant-in-kind equivalent to £22,500 awarded, grade α4. [Project relates to NERC small grant NE/E009875/1; June 2008; NOTE: ANALYSES NOT YET COMPLETED, DUE TO ONGOING METHOD DEVELOPMENT AT THE NERC IMF]

NERC Isotope Geosciences Laboratory, "*Secular and short-term change in mid-Cretaceous to Palaeogene ocean chemistry*" – IP/1053/0508, grant-in-kind equivalent to £4,500 awarded, grade α3high. [In support of PhD student Tom Broadbent; May 2008]

Swiss Light Source, Paul Scherrer Institute, Switzerland, "*Testing the veracity of the Mg/Ca palaeotemperature proxy in cultured marine molluscan calcite*" – 17 8-hour shifts of LUCIA beamline time awarded to facilitate micro-XRF and XAS analyses of Mg in cultured marine mollusc shells. (Ranking: 9.33; compared to maximum: 9.33 and average: 7.44.) [In support of NERC small grant NE/E009875/1; September 2007]

NERC Ion Microprobe Facility, University of Edinburgh, "*Further testing of the veracity of palaeotemperature proxies in cultured marine molluscan shells*" – additional support to include analysis of Li within supported NERC Ion Microprobe Facility proposal IMF301/0507. [August 2007]

NERC Ion Microprobe Facility, University of Edinburgh, "*Testing the veracity of the Mg/Ca palaeotemperature proxy in cultured marine molluscan calcite*" – IMF301/0507, grant-in-kind equivalent to £21,250 awarded, grade α4. [In support of NERC small grant NE/E009875/1; August 2007]

NERC Organic Geochemistry Facility, University of Bristol, "*Causes and consequences of enhanced organic-carbon burial during mid-Cretaceous (early Albian) oceanic anoxic event 1b*" – LSMSBRIS019_20/04/07, grant-in-kind equivalent to £16,074 awarded, grade α4. [Application supports TEX_{86} palaeotemperature proxy analyses; April 2007]

NERC Isotope Geosciences Laboratory, "*Secular and short-term variation in mid-Cretaceous to Palaeogene ocean chemistry*" – IP/961/0507, grant-in-kind equivalent to £35,875 awarded, grade α3high. [In support of PhD student Tom Broadbent; April 2007]

NERC Ion Microprobe Facility, "*Vent mussel shells as indicators of environmental conditions at hydrothermal vents*" – no assigned monetary value, one day pilot-study access granted. [In support of PhD student Jitka Libertinova; February 2007]

NERC ICP Facility, "*Vent mussel and limpet shells as indicators of environmental conditions at hydrothermal vents*" – OSS/332/1206, grant-in-kind equivalent to £17,400 awarded, grade α4high. [In support of PhD student Jitka Libertinova; December 2006]

NERC ICP Facility, "*Further assessment of geochemical temperature proxies in calcite marine mollusc shells*" – OSS/331/1206, grant-in-kind equivalent to £9,500 awarded, grade α4high. [December 2006]

NERC ICP Facility, "*Vent mussel and limpet shells as indicators of environmental conditions at hydrothermal vents*" – OSS/320/0506, grant-in-kind equivalent to £5,900 awarded, grade α5. [In support of PhD student Jitka Libertinova; August 2006]

NERC ICP Facility, "*Stable isotopes and minor element records from marine bivalve shells: accurate tracers of environmental conditions?*" – OSS/319/0506, grant-in-kind equivalent to £7,250 awarded, grade α4mid. [In support of PhD student Pedro Freitas; August 2006]

NERC ICP Facility, "*Elemental and stable-isotope composition of extent shark teeth for water-mass reconstructions*" – OSS/318/0506, grant-in-kind equivalent to £4,350 awarded, grade α4high. [August 2006]

NERC ICP Facility, "*Secular and short-term variation in mid-Cretaceous to Palaeogene ocean chemistry*" – OSS/310/0206, grant-in-kind equivalent to £23,200 awarded, grade α4high. [In support of PhD student Tom Broadbent; August 2006]

NERC ICP Facility, "*Did a glacioeustatic mechanism operate during the mid- to Late Cretaceous 'super-greenhouse'?*" – OSS/309/0206, grant-in-kind equivalent to £14,500 awarded, grade α5. [August 2006]

NERC Ion Microprobe Facility, "*Stable isotopes and minor element records from marine bivalve shells: accurate tracers of environmental conditions?*" – no assigned monetary value, one day pilot-study access granted. [In support of PhD student Pedro Freitas; December 2005]

NERC ICP Facility, "*Stable isotopes and minor element records from marine bivalve shells: accurate tracers of environmental conditions?*" – OSS/273/1104, no assigned monetary value, support for 800 ICP-AES elemental analyses granted, grade α5. [In support of PhD student Pedro Freitas; December 2004]

NERC Isotope Geosciences Laboratory, "*Secular variation in the temperature and composition of Cretaceous oceans*" – IP/796/1103; grant-in-kind equivalent to ca. £44,000 awarded in support of $^{87}Sr/^{86}Sr$ analyses, grade α4 low. [December 2003]

NERC ICP-AES Facility, "*Stable isotopes and minor element records from marine bivalve shells: accurate tracers of environmental conditions?*" – ICP/196/1201; no assigned monetary value, support for 500 ICP-AES elemental analyses granted. [In support of PhD student Pedro Freitas; March 2003]

NERC Isotope Geosciences Laboratory, "*Strontium-isotope stratigraphy (dating and correlation) of deep-sea cores recovered by the Ocean Drilling Program to facilitate Cretaceous palaeoceanographic studies*" IP/769/0902; grant-in-kind equivalent to ca. £10,000 awarded in support of $^{87}Sr/^{86}Sr$ analyses, grade: α3 high. [November 2002]

NERC ICP-MS Facility, "*Application of novel palaeoceanographic proxies to Cretaceous palaeoceanographic studies*" – ICP/196/1201; no assigned monetary value, grade: α5; priority: high; Committee comment: "*Very exciting project with a multitude of uses for the data. At the forefront of palaeo-climate research.*" [June 2002]

EU Access to Research Infrastructure Activity of the Human Potential Programme of the European Community, 'Paleostudies Initiative', Faculty of Geosciences, University of Bremen, "*Testing multiple deep-water sources and transient ocean–climate system events during the Late Cretaceous (Campanian): a palaeohydrographic reconstruction of the (sub-)tropical Pacific Ocean (ODP Leg 198 – Shatsky Rise)*" – no assigned monetary value, award of 2.5 weeks stable-isotope-ratio analytical support. [February 2002]

SELECTED RELEVANT PhD STUDENT SUPERVISION

Gorton, Marise: "*Neogene palaeoceanographic evolution of the north-west Pacific Ocean*". [2011–present; School of Applied Sciences, University of Bradford; part-time student; utilizing ODP Leg 198 sediments]

Broadbent, Tom: "*Low latitude Pacific palaeoceanographic change across the Eocene/Oligocene boundary*" [2005–10; NERC-funded CASE PhD (with the NERC Isotope Geosciences Laboratory), School of Ocean Sciences, Bangor University; utilized ODP Leg 198 sediments]

Libertinova, Jitka: "*Vent mussel and limpet shells as indicators of environmental conditions at hydrothermal vents*" [2005–10; EU-funded PhD, School of Ocean Sciences, Bangor University]

Freitas, Pedro: "*Stable isotopes and minor element records from marine bivalve shells: accurate tracers of environmental conditions?*" [2003–07; Portuguese Government-funded PhD, SOS, Bangor University]

APPLICATION TO PARTICIPATE IN AN IODP EXPEDITION

ESSAC Office ECORD Science Support & Advisory Committee
GEOMAR | Helmholtz Centre for Ocean Research Kiel
Wischhofstrasse 1-3
24148 Kiel, Germany
Hanno Kinkel (ESSAC Science Coordinator):
Tel: +49 431 600 2418
Fax:+49 431 600 2922
Web Page: http://www.essac.ecord.org Email: essac@geomar.de

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Expedition Number 373: Antarctic Paleoclimate and Ice History

1. PERSONAL INFORMATION

Family name: Dalla Valle

First name: Giacomo

Current Position: Researcher

Institution: CNR-ISMAR

Address: Via Gobetti 101

City, Postcode, Country: Bologna, 40120, Italy

Tel. work: +390516398894
Tel. home: +393337953883
Fax:
Email: giacomo.dalla.valle@bo.ismar.cnr.it

Country of citizenship: Italy

Place of birth/date of birth: Ravenna, 26/10/1977

Gender: Male

Education (highest degree, including year PhD was received / is expected): PhD in Earth Sciences (University of Bologna, 2007)

Are you currently a student? NO Expected Graduation Date:

2. EXPEDITION INFORMATION

Summary of proposed participation, including area of scientific interest, current research and participation plan (maximum 250 characters with space – more detail should be included in the Letter of Interest):

Since the kick-off of my career I devoted myself to marine geology, participating in several oceanographic cruises focussed both on scientific purposes and offshore exploration.

I have been involved in a number of scientific projects aimed at the collection and interpretation of multibeam, sidescan sonar, multichannel seismics data and seafloor sampling (dredge, box-corer and cores, both gravity and piston cores). I have experience in core visual description, sedimentary facies analysis, x-ray and magnetic susceptibility interpretation.

I would apply as offshore-onshore participant.

Prior involvement with DSDP/ODP/IODP and nature of involvement (expedition number, shipboard/shore-based participation, co-chief, etc):

No.

Post-cruise science support to achieve the proposed scientific objectives 1) future funding scheme and 2) support from host institution (e.g. staff, facilities)

Instituion facilities: Refrigerated storage room for cores with temperature (5°C) and umidity constant. Cold room (-20 °C) for sediment samples for environmental studies. There is also an area for sediment and rock samples dry storage. Operations: Susci Analysis, X-ray images, XRF analysis, Forams analisys.

Three scientific and/or personal references.

Lucilla Capotondi

Annamaria Correggiari

Federica Foglini.

3. SCIENTIFIC EXPERTISE

For Scientist Jobs Descriptions visit: http://iodp.tamu.edu/participants/scientist_jobs.html

Please indicate your area(s) of expertise (maximum 3)

Discipline	Mark with X	Speciality
microbiologist		
organic and inorganic geochemist/biogeochemist		
physical properties specialist	X	texture, sorting analysis
sedimentologist	X	Lithology, facies description, X-ray facies analysis
structural geologist		
paleontologist		
paleomagnetist	X	Susci interpretation
petrologist		
hydrogeologist		
Other		

4. ADDITIONAL DOCUMENTS

Please, provide the following documents:

- Letter of interest, including details about area of scientific interest, current research, expedition participation plan and post-cruise research
- CV and Publication list
- Letter of recommendation (for PhD students)
- See also: http://www.essac.ecord.org/flyer/Guidelines_for_Applying_to_sail.pdf

Please, send your application form as *a MS Word document* and the additional documents in *PDF format* (preferably as one file) by email to Jan Behrmann and Hanno Kinkel at the ESSAC office: essac@geomar.de.

In addition to the ESSAC application, all applicants ***must inform their national office*** (if applicable) ***and national delegate*** and send a copy of the application documents. ECORD does not provide funds for participation; the national offices or national delegates can provide information regarding travel support, post-cruise funding opportunities, etc.

See http://www.essac.ecord.org/index.php?mod=about&page=ESSAC for a list of the national contact persons.

ISMAR
Istituto di Scienze Marine

ISMAR-CNR BOLOGNA, Via Gobetti 101, Bologna ITALY.

Candidate to IODP Expedition n. **373: Antarctic Paleoclimate and Ice History**

Dr. Giacomo Dalla Valle (ISMAR-CNR, Bologna)

Laurea in Geological Sciences, 2003, University of Bologna
PhD in Earth Sciences, 2007, University of Bologna

Research scientist at the Institute of Marine Sciences (ISMAR) of the National Research Council since 2009. I've been involved in several projects aimed at the collection of multibeam, side-scan sonar, multichannel seismic data and seafloor sampling along the modern continental margins.

My main research interests are focussed on the evolution of continental margins, studied by integrating stratigraphy, sediment core analysis, multichannel seismic interpretation, and paleoclimate reconstructions. I began investigating the evolution of the rifted margin of the Eastern Sardinia in the Tyrrhenian sea by integrating multibeam and seismic data. The work was particularly focused on the definition and characterization of the syn-and-post-rift submarine sedimentary process, through the study of silicoclastic deep sea depositional systems, and their linkage with tectonics, sea level variations and basin topography.
I also carried out studies aimed at the definition of the impact of fluid migration on subsurface sediment deformation, seafloor instability and landslide processes along the continental margin.
More recently, I began to study Pliocene to Quaternary depositional systems in the Adriatic Sea by using industrial-derived 3D seismic in order to perform an architectural element and geomorphological analysis of turbidite systems.
I am currently involved in an industry-funded research project aimed at defining the main drivers of the continental margin growth and evolution by the analysis of geophysical data integrated with long-piston sedimentary cores and paleontological analysis focused on the reconstruction of the sedimentary environments.
I am interested to apply for the 373 Expedition in order to further apply my knowledge of sedimentary core interpretation through a multi-disciplinary approach in order to obtain a definition of the geological processes involved during the margin evolution as well as to obtain a reconstruction of the evolution of the different sedimentary environments through time.

I propose to examine and interpret sedimentary samples collected in the expedition by visual inspection, X-ray facies analysis, granulometric analysis, and SUSCI analysis. My institute can also performs additional analysis as XRF analysis and geochimical analysis as organic carbon (OC), total nitrogen (TN), and OC stable isotope (C^{13}), and biomarker analyses

Giacomo Dalla Valle

CV

2003 **Degree** in Geological Sciences at "Università degli Studi di Bologna"
2007 **Ph.D**. in Earth Sciences (Stratigraphic Geology and Sedimentology) at "Università degli Studi di Bologna".

ACTIVITY

His research interests are focussed on the study of modern clastic turbidite systems in Adriatic and Tyrrhenian sea. He is now studying submarine sedimentary process, including the study of modern shallow and deep water depositional systems, and their linkage with sea level variations and basin topography. He is also working on the interpretation of 3D seismic data set along continental margins, using seismic geomorphology methodologies. He carrying out researches aimed at the definition of the impact of fluid migration on subsurface sediment deformation, seafloor instability and landslide processes on the modern environment. He has experience in interpretation of multibeam bathymetric and side-scan sonar data, seismic data (single and multichannel, sub-bottom chirp) and in lithofacies analisys on sedimentary cores.

Selected Publications:

Dalla Valle G., **Gamberi, F., Foglini, F., Trincardi F**., 2015. The Gondola Slide: A mass transport complex controlled by margin topography (South-Western Adriatic Margin, Mediterranean Sea). Marine Geology, 366. DOI: 10.1016/j.margeo.2015.05.001

Dalla Valle, G., Campiani, E., Foglini, F., Gamberi, F., Trincardi, F., 2014. Mass transport complexes from contourite and shelf-edge deposits along the South-western Adriatic margin (Italy). In: Krastel, S., Behrmann, J.H., Völker, D., Stipp, M., Berndt, C., Urgeles, R., Chaytor, J., Huhn,

K., Strasser, M., Harbitz, C.B., (Eds). Submarine Mass Movements and Their Consequences, Advances in Natural and Technological Hazards Research 37, 447-457. Springer, The Netherlands.

Dalla Valle G., Gamberi, F., Trincardi, F., Rocchini, P., Errera, A., Baglioni, L. *(*2012) Contrasting slope channel styles on a prograding mud-prone margin. Marine and Petroleum Geology, Special Issue on: "Internal Architecture, Bedforms and Geometry of Turbidite Channels".

Dalla Valle G. and Gamberi, F. (2011) "Slope channel formation, evolution and backfilling in a wide shelf, passive continental margin" (Northeastern Sardinia slope, Central Tyrrhenian Sea). Marine Geology 286, 95-105.

Dalla Valle G., and Gamberi F. (2011) "Pockmarks and seafloor instability in the Olbia continental slope (Northeastern Sardinian margin, Tyrrhenian sea). Marine Geophysical Research (Special Volume on "Seafloor Mapping for Geohazard Assessment"

Dalla Valle G. and Gamberi F. (2010) "Erosional sculpting of the Caprera confined deep-sea fan as a result of distal basin-spilling processes (eastern Sardinian margin, Tyrrhenian Sea)" Marine Geology 268, 55-66.

Gamberi F. and **Dalla Valle G.** (2009) "The impact of margin-sharping processes on the architecture of the Sardinian and Sicilian margin deep sea depositional system within the Tyrrhenian Sea". In: Ben Kneller, Ole J. Martinsen and Bill McCaffrey (Eds.) "External Controls on Deep-Water Depositional Systems", 396 pp.

APPLICATION TO PARTICIPATE IN AN IODP EXPEDITION

ESSAC Office ECORD Science Support & Advisory Committee
GEOMAR | Helmholtz Centre for Ocean Research Kiel
Wischhofstrasse 1-3
24148 Kiel, Germany
Hanno Kinkel (ESSAC Science Coordinator):
Tel: +49 431 600 2418
Fax:+49 431 600 2922
Web Page: http://www.essac.ecord.org Email: essac@geomar.de

Please type information **Apply to Sail Application Form**

Expedition Number 373: Antarctic Paleoclimate and Ice History

1. PERSONAL INFORMATION

Family name: Gebhardt

First name: Andrea Catalina

Current Position: Senior Scientist

Institution: Alfred Wegener Institute Helmholtz Centre of Polar and Marine Research, Bremerhaven

Address: Van-Ronzelen-Str. 2

City, Postcode, Country: Bremerhaven, 27568, Germany

Tel. work: +49-471-4831 2040
Tel. home: +49-4182-809116
Fax: +49-471-4831 1977
Email: catalina.gebhardt@awi.de

Country of citizenship: Germany

Place of birth/date of birth: Chur (CH), 30 April 1975

Gender: female

Education (highest degree, including year PhD was received / is expected): PhD, 2004

Are you currently a student? YES/NO Expected Graduation Date:

2. EXPEDITION INFORMATION

Summary of proposed participation, including area of scientific interest, current research and participation plan (maximum 250 characters with space – more detail should be included in the Letter of Interest):

I would like to participate as expert for physical properties (pp). I plan to use pp along with downhole and geochemical data for core correlation, for petrophysical characterization, and to reconstruct high-resolution fluctuations of the ice sheet.

Prior involvement with DSDP/ODP/IODP and nature of involvement (expedition number, shipboard/shore-based participation, co-chief, etc):

IODP 364 Chicxulub, onshore scientific member

Post-cruise science support to achieve the proposed scientific objectives 1) future funding scheme and 2) support from host institution (e.g. staff, facilities)

Post-cruise science support of my own (permanent) position will be covered by the Alfred Wegener Institute Bremerhaven; a proposal for a PhD student shall be submitted to the German Science Foundation after drilling operations were successfully finished.

Three scientific and/or personal references

Prof. Dr. Wilfried Jokat, Alfred Wegener Institute Helmholtz Centre of Polar and Marine Research, Bremerhaven, Germany wilfried.jokat@awi.de

Dr. Jens Matthiessen, Alfred Wegener Institute Helmholtz Centre of Polar and Marine Research, Bremerhaven, Germany jens.matthiessen@awi.de

Prof. Dr. Martin Melles, University of Cologne, Germany, mmelles@uni-koeln.de

3. SCIENTIFIC EXPERTISE

For Scientist Jobs Descriptions visit: http://iodp.tamu.edu/participants/scientist_jobs.html

Please indicate your area(s) of expertise (maximum 3)

Discipline	Mark with X	Speciality
microbiologist		
organic and inorganic geochemist/biogeochemist		XRF Scanning (inorganic geochemistry only)
physical properties specialist		Multi-sensor core logger
sedimentologist		
structural geologist		
paleontologist		
paleomagnetist		
petrologist		
hydrogeologist		
Other		

4. ADDITIONAL DOCUMENTS

Please, provide the following documents:

- Letter of interest, including details about area of scientific interest, current research, expedition participation plan and post-cruise research
- CV and Publication list
- Letter of recommendation (for PhD students)
- See also: http://www.essac.ecord.org/flyer/Guidelines_for%20Applying_to_sail.pdf

Please, send your application form as *a MS Word document* and the additional documents in *PDF format* (preferably as one file) by email to Jan Behrmann and Hanno Kinkel at the ESSAC office: essac@geomar.de.

In addition to the ESSAC application, all applicants ***must inform their national office*** (if applicable) ***and national delegate*** and send a copy of the application documents. ECORD does not provide funds for participation; the national offices or national delegates can provide information regarding travel support, post-cruise funding opportunities, etc.

See http://www.essac.ecord.org/index.php?mod=about&page=ESSAC for a list of the national contact persons.

ALFRED-WEGENER-INSTITUT
HELMHOLTZ-ZENTRUM FÜR POLAR- UND MEERESFORSCHUNG

Alfred-Wegener-Institut, Postfach 12 01 61, 27515 Bremerhaven

ESSAC Office
ECORD Science Support & Advisory Committee
Geomar Helmholtz Centre for Ocean Research Kiel
Wischhofstraße 1-3
24148 Kiel, Germany

Application as physical properties scientist, IODP Expedition 373: Antarctic Cenozoic Paleoclimate

Dr. Catalina Gebhardt

Alfred-Wegener-Institut
Helmholtz-Zentrum für Polar- und Meeresforschung
Van-Ronzelen-Str. 2
27568 Bremerhaven
☏ 0471-4831 2040
@ catalina.gebhardt@awi.de

August 30, 2016

Alfred-Wegener-Institut
Helmholtz-Zentrum für
Polar- und Meeresforschung
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Stiftung des öffentlichen Rechts

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Direktorium:
Prof. Dr. Dr. h.c. Karin Lochte
(Direktorin)
Dr. Karsten Wurr
(Verwaltungsdirektor)
Dr. Uwe Nixdorf
(Stellvertretender Direktor)
Prof. Dr. Karen H. Wiltshire
(Stellvertretende Direktorin)

Bankverbindung:
Commerzbank AG,
Bremerhaven
BIC/Swift COBADEFF292
IBAN DE12292400240349192500
UST-Id-Nr. DE 114707273

Dear Sir, dear Madam,

It is with enthusiasm that I read the call for IODP Expedition 373 to the George V and Adélie Land continental shelf – my main research interest is on glaciated margins, and on the waxing and waning of ice sheets in both hemispheres. I would hence like to take the opportunity to apply as a physical properties scientist.

During the past years, my research mostly concentrated on the reconstruction of paleoclimate history of the northern hemisphere, namely on the evolution of the large northern ice sheets. I worked on the high-resolution paleoclimate record of 3.6 Ma old Lake El'gygytgyn (Siberia, Russia) that was drilled in 2009. Here, I combined physical properties, downhole logging and geochemical data to characterize the lithological succession, and to reconstruct the paleoclimate history of this area. A large part of my current research concentrates on glaciated margins such as the shelf north of Spitsbergen and east of Greenland, i.e. on the dynamics of the Scandinavian and Greenland Ice Sheets. Additionally, I recently started work inland (lakes) and offshore Canada in order to characterize the waxing and waning of the Laurentide Ice Sheet during the past glacial cycles. In winter 2017, I will participate in a Polarstern expedition to the Amundsen Sea where the seafloor drilling rig MeBo will be used to retrieve shallow cores from formerly glaciated sites. My overall scientific interest concerns the paleoclimate evolution since the Oligocene with special emphasis on glaciations, but also on the transition from a greenhouse to an icehouse world. Additionally, I recently became a member of the Chicxulub drilling community and started working on paleoclimate records from a warm greenhouse world, with special emphasis on the early Eocene hyperthermals.

Participation in expedition 373 would greatly expand my knowledge on the paleoclimate evolution of Antarctica. My main interests are threefold: (a) in the early Eocene evolution of Antarctica, namely the hyperthermals and possibly cyclic paleoclimate patterns, in comparison to other records from around the world; (b) in the subsequent cooling and transition to an icehouse world, and (c) in the high-frequency fluctuations of the Antarctic ice sheet in the Miocene and Pliocene. Having worked in the Arctic more than in Antarctica during the past decade, I am especially interested in comparison with data from the Arctic, mainly from IODP expedition 302 (ACEX).
In order to reach my scientific goals, I plan to use physical properties (PP) measurements along with downhole logging data for correlation between the

ALFRED-WEGENER-INSTITUT
HELMHOLTZ-ZENTRUM FÜR POLAR- UND MEERESFORSCHUNG

different cores along the planned transect. PP and borehole data together with geochemical proxies (XRF scanning data) shall be used for a petrophysical characterization of the drill cores using a statistical approach. The petrophysical character of the sediments is likely driven by different environmental conditions, as was the case in the former ANDRILL cores. Identification of the specific facies types in each core can hence be used to reconstruct the change in environmental conditions at each drill site and to determine similarities and dissimilarities between the sites. Additionally, these continuous, high-resolution datasets are perfect for the reconstruction of high-frequency paleoclimate change that likely dominated both the early Eocene and the younger part of the record. I plan to use statistical means to reconstruct Milankovich-type fluctuations of the ice sheet. I am looking forward to many fruitful cooperation projects with other scientists, namely those working on seismic data (for correlation between the different sites), with downhole logging scientists as this is the complimentary dataset to PP, and with inorganic geochemists working on XRF scanning data.

During the past decade, I was involved in several drilling projects and gained ample expertise in carrying out PP measurements. In 2006, I joined the ANDRILL MIS expedition as a PP technician. After ANDRILL was successfully accomplished, I became an active member of the community that tried to establish a project at Coulman High. In 2008, I was involved in the PASADO drilling project by the International Continental Scientific Drilling Program (ICDP) in Patagonia, Argentina. Only 6 months later, I participated in the ICDP El'gygytgyn drilling project in Siberia, Russia. In both cases, I was fully responsible for the respective on-site laboratory (including PP), and also conducted additional high-resolution PP measurements in our institute's laboratory. In case of El'gygytgyn, I was also involved in the acquisition of downhole logging measurements. After the expeditions, I worked on a combination of PP, downhole logging and geochemical data and used them for a lithological characterization of the sediments as well as for paleoclimate reconstructions.
During these three and several other shorter campaigns, I acquired the necessary skills to run the Geotek Multi-Sensor Core Logger and the line scan camera logger, and to subsequently process and interpret the data.

I would greatly appreciate if you were to take my application into consideration.

Yours faithfully,

C. Gebhardt

Dr. Catalina Gebhardt

Enclosures:
- Curriculum vitae
- Publication list

Curriculum vitae | Catalina Gebhardt

Alfred Wegener Institute,
Helmholtz Centre of Polar and Marine Research
Van-Ronzelen-Straße 2
27568 Bremerhaven
Germany
☎ +49-471 4831 2040
e-mail: catalina.gebhardt@awi.de

Name	Dr. Andrea Catalina Gebhardt
Date and Place of Birth	30 April 1975, Chur (Schweiz)
Nationalities	Swiss, German
Professional Background	Diploma in Natural Sciences (ETH Zurich, Switzerland)
Specialization	Earth Sciences, Sedimentology; Inorganic Geochemistry; Geophysics

Scientific career

since 01/2014	Senior Scientist at Alfred Wegener Institute Helmholtz Centre Bremerhaven, Geophysics Group
05/2004 to 12/2013	PostDoc at Alfred Wegener Institute Helmholtz Centre Bremerhaven at Geophysics Group; several projects (including 3x „Eigene Stelle DFG“)
12/2003 to 04/2004	PhD student at Alfred Wegener Institute Helmholtz Centre Bremerhaven, Geophysics Group
05/2001 to 11/2003	PhD student at University of Hamburg, Institute for Biogeosciences and Marine Sciences. Advisors: Dr. B. Gaye, Prof. Dr. K.-C. Emeis

Education

04/2004	PhD (Dr. rer. nat): „Modern Sedimentation Processes in the Kara Sea“, University of Hamburg. Advisors: Dr. B. Gaye, Prof. Dr. K.-C. Emeis
05/2001	Diploma in Natural Sciences, ETH Zurich, Switzerland. Specialization: Earth Sciences, Sedimentology. Advisors for Diploma thesis: Prof. Dr. H. Weissert (ETH Zurich, Switzerland), Prof. Dr. Gert de Lange (University of Utrecht, The Netherlands)
10/1996 to 04/2001	Studies of Earth Sciences, ETH Zurich, Switzerland
09/1999 to 06/2000	Exchange year („Erasmus“) to University of Utrecht (The Netherlands), member of the „Inorganic Geochemistry“ working group
Languages	German, English, French, Dutch (all fluent)

Curriculum vitae | Catalina Gebhardt

Experience in the field of physical properties

Expeditions

07/2015
Maria S. Merian expedition MSM44
Head of Hydroacoustic group, and part of Geology group
Including acquisition and processing of physical properties data

08/2013 to 09/2013
Maria S. Merian expedition MSM31
Head of Geology group
including acquisition and processing of physical properties data

02/2009 to 04/2009
El'gygytgyn deep drilling project, Siberia (ICDP)
Head of on-site laboratory
Acquisition and processing of physical properties (~500 m core), preliminary on-site core correlation; Acquisition and processing of downhole logging measurements

09/2008 to 11/2009
PASADO deep drilling project, Argentina (ICDP)
Head of on-site laboratory
Acquisition and processing of physical properties (~700 m core), preliminary on-site core correlation

07/2007 to 10/2007
R/V Polarstern, Cruise ARKXXII/2
Acquisition and processing of physical properties and color scans

10/2006 to 12/2006
ANDRILL MIS deep drilling campaign, Antarctica
Acquisition of physical properties (~1200 m core)

08/2004 to 10/2004
R/V Polarstern, Cruise ARKXX/3
Acquisition and processing of physical properties and color scans

Home laboratory

05/2009 to 08/2009
PASADO logging campaign during extended sampling party
Acquisition and processing of physical properties (~500 m core in 1 cm steps), core splicing

10/2009 to 01/2011
El'gygytgyn logging campaign during extended sampling party
Acquisition and processing of physical properties and core images (~500 m core logged in high-resolution 2 mm steps)

2003 to 2016
several logging campaigns of short cores (lacustrine, marine)

Publications | Catalina Gebhardt

IN REVIEW

Gebhardt, A. C., Naudts, L., De Mol, L., Klerkx, J., Abdrakhmatov, K., Sobel, E. R., De Batist, M., in review. An extended history of high-amplitude lake-level changes in tectonically active Lake Issyk-Kul (Kyrgyzstan), as revealed by high-resolution seismic reflection data. Climate of the Past Discussions, doi:10.5194/cp-2016-3.

IN PRESS

Wennrich, V., Andreev, A. A., Tarasov, P. E., Gedorov, G., Zhao, W., **Gebhardt, A. C.,** Meyer-Jacob, C., Snyder, J. A., Nowaczyk, N. R., Schwamborn, G., Chapligin, B., Anderson, P. M., Lozhkin, A. V., Minyuk, P. S., Koeberl, C., Melles, M., in press. Impact processes, permafrost dynamics, and climate and environmental variability in the terrestrial Arctic as inferred from the unique 3.6 Myr record of Lake El'gygytgyn, Far East Russia – A review. Quaternary Science Reviews, doi:10.1016/j.quascirev.2016.03.019.

PUBLISHED

Stein, R., Fahl, K., Schreck, M., Knorr, G., Niessen, F., Forwick, M., **Gebhardt, C.**, Jensen, L., Kaminski, M., Kopf, A., Matthiessen, J., Jokat, W., Lohmann, G., 2016. Evidence for ice-free summers in the late Miocene central Arctic Ocean. Nat Commun 7, 11148.

Mosher, D.C., Courtney, R.C., Jakobsson, M., **Gebhardt, A.C.**, Mayer, L.A., 2015. Mapping the surficial geology of the Arctic Ocean: A Layer for the IBCAO, Arctic Technology Conference. Offshore Technology Conference, Copenhagen, Denmark, p. OTC 25561.

Dorschel, B., Gutt, J., Huhn, O., Bracher, A., Huntemann, M., Huneke, W., **Gebhardt, A.C.**, Schröder, M., Herr, H., 2015. Environmental information for a marine ecosystem research approach for the northern Antarctic Peninsula (RV Polarstern expedition PS81, ANT-XXIX/3). Polar Biology.

Lisé-Pronovost, A., St-Onge, G., Gogorza, C., Haberzettl, T., Jouve, G., Francus, P., Stoner, J., Ohlendorf, C., **Gebhardt, A. C.**, Zolitschka, B., and the PASADO Science Team, 2015. Rock-magnetic proxies of wind intensity and dust since 51,200 cal BP from lacustrine sediments of Laguna Potrok Aike, southeastern Patagonia. Earth and Planetary Science Letters 411:72-86

Gebhardt, A. C., Geissler, W., Matthiessen, J., and Jokat, W., 2014. Changes in current patterns in the Fram Strait at the Pliocene/Pleistocene boundary, **Quaternary Science Reviews**, 92: 179-189. doi: 10.1016/j.quascirev.2013.07.015.

Geissler, W. H., Pulm, P. V., Jokat, W., **Gebhardt, A. C.**, 2014. Indications for the occurrence of gas hydrates in the Fram Strait from heat flow and multichannel seismic reflection data. Journal of Geological Research, 2014(582424), 1-12. doi: 10.1155/2014/582424.

Meyer-Jacob, C., Vogel, H., **Gebhardt, A. C.** , Wennrich, V. , Melles, M. , and Rosén, P., 2013. Biogeochemical variability during the past 3.6 million years recorded by FTIR spectroscopy in the sediment record of Lake El'gygytgyn, Far East Russian Arctic. Climate of the Past, 10, 209-220. doi: 10.5194/cp-10-209-2014.

Brigham-Grette, J., Melles, M., Minyuk, P. S., Andreev, A. A., Tarasov, P., DeConto, R. M., König, S., Nowaczyk, N. R., Wennrich, V., Rosén, P., Haltia-Hovi, E., Cook, T. L., **Gebhardt, A. C.,** Meyer-Jacob, C., Snyder, J., and Herzschuh, U., 2013. Pliocene warmth, extreme polar amplification, andz Climate of the Past 10 (1), 209-22 stepped Pleistocene cooling recorded in NE Russia. Science 340:1421-1427. doi: 10.1126/science.1233137

Gebhardt, A.C., Francke, A., Kück, J., Sauerbrey, M., Niessen, F., Wennrich, V., and Melles, M., 2013. Petrophysical characterization of the lacustrine sediment succession drilled in Lake El'gygytgyn, Far East Russian Arctic. Climate of the Past, 9:1933-1947. doi: 10.5194/cp-9-1933-2013.

Publications | Catalina Gebhardt

Sauerbrey, M., Juschus, O., **Gebhardt, A.C.**, Wennrich, V., Nowaczyk, N., and Melles, M., and the El'gygytgyn Scientific Party, in review. Mass movement deposits in the 3.6. Ma sediment record of Lake El'gygytgyn, Chukotka, NE Russia: classification, distribution and preliminary interpretation. Climate of the Past, 9: 1949–1967. doi: 10.5194/cp-9-1949-2013.

Niessen, F., **Gebhardt, A. C.,** Kuhn, G., Magens, D., and Monien, D., 2013. Porosity and Density of the AND-1B sediment core, McMurdo Sound Region, Antarctica: Field consolidation enhanced by grounded ice. Geosphere, ANDRILL theme special issue, 9:489-509, doi: 10.1130/GES00704.1.

Buylaert, J.-P., Murray, A.S., **Gebhardt, A. C.**, Sohbati, R., Ohlendorf, C., Thiel, C., and Zolitschka, B., 2013. Luminescence dating of the PASADO core 5022-1D from Laguna Potrok Aike (Argentina) using IRSL signals from feldspar. Quaternary Science Reviews, PASADO special issue, doi: 10.1016/j.quascirev.2013.03.018.

Ohlendorf, C., Fey, M., **Gebhardt, A. C.**, Haberzettl, T., Lücke, A., Mayr, C., Schäbitz, F., Wille, M., and Zolitschka, B., 2013. Mechanisms of lake-level change at Laguna Potrok Aike (Argentina) - Insights from hydrological balance calculations. Quaternary Science Reviews, early online, doi:10.1016/j.quascirev.2012.10.040.

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Gebhardt, A. C. (2004): Modern sedimentation processes in the Kara Sea (Siberia) = Moderne Sedimentationsprozesse in der Karasee (Sibirien). Berichte zur Polar und Meeresforschung (Reports on Polar and Marine Research), Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 490, 98 pp., ISSN: 1618 3193 (PhD thesis).

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APPLICATION TO PARTICIPATE IN AN IODP EXPEDITION

ESSAC Office ECORD Science Support & Advisory Committee
GEOMAR | Helmholtz Centre for Ocean Research Kiel
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Hanno Kinkel (ESSAC Science Coordinator):
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Fax:+49 431 600 2922
Web Page: http://www.essac.ecord.org Email: essac@geomar.de

Please type information

Apply to Sail Application Form

Expedition Number 373: Antarctic Paleoclimate and Ice History

1. PERSONAL INFORMATION

Family name: Kotthoff

First name: Ulrich

Current Position: Curator and scientific researcher

Institution: Center of Natural History/Institute of Geology, Hamburg University

Address: Bundesstraße 55

City, Postcode, Country: Hamburg, D-20146, Germany

Tel. work: ++40/(0)40 42838 5009
Tel. home: ++40/(0)40 23800149
Fax: ++40/(0)40 42838 5007
Email: ulrich.kotthoff@uni-hamburg.de

Country of citizenship: Germany

Place of birth/date of birth: Meschede/November 12th, 1975

Gender: male

Education (highest degree, including year PhD was received / is expected): PhD 2008

Are you currently a student? NO Expected Graduation Date:

2. EXPEDITION INFORMATION

Summary of proposed participation, including area of scientific interest, current research and participation plan (maximum 250 characters with space – more detail should be included in the Letter of Interest):

I apply as palynologist for the Exp. 373 Onshore Science Party to do palynomorph-based research. My current research deals with palaeontology-based ecosystem/climate reconstructions for the Cenozoic of North America and Europe.

Prior involvement with DSDP/ODP/IODP and nature of involvement (expedition number, shipboard/shore-based participation, co-chief, etc):

I have been involved in the onshore science parties of IODP Expedition 313 (New Jersey shallow shelf) as palynologist (focusing on terrestrial palynomorphs) and of IODP Expedition 347 (Baltic Sea) as palynologist.

Post-cruise science support to achieve the proposed scientific objectives 1) future funding scheme and 2) support from host institution (e.g. staff, facilities)

1) I plan to apply for funding of Expedition 373-related research in the framework of the International Ocean Discovery Program priority program of the German Research Foundation (DFG). I have already several times applied for funding in this program in relation to IODP Expeditions 313 and 347 (compare CV). In addition, internal funds from Hamburg University can be used to palynologically prepare and analyse at least a part of the material recovered during Expedition 373.

2) I am in charge of the palynology laboratory at the Faculty of Geoscience at Hamburg University and have access to the micropalaeontology laboratories (incl. freeze-dryer, micro-optical laboratory). Furthermore, as curator of the geological/palaeontological collections of Hamburg University, I have access to storing facilities. Thus, appropriate sample preparation and storing is provided.

Three scientific and/or personal references

Professor Dr. Jörg Pross
Institut für Geowissenschaften, Universität Heidelberg
Im Neuenheimer Feld 234-236, 69210 Heidelberg, Germany
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Professor Dr. Gerhard Schmiedl
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3. SCIENTIFIC EXPERTISE

For Scientist Jobs Descriptions visit: http://iodp.tamu.edu/participants/scientist_jobs.html

Please indicate your area(s) of expertise (maximum 3)

Discipline	Mark with X	Speciality
microbiologist		
organic and inorganic geochemist/biogeochemist		
physical properties specialist		
sedimentologist		
structural geologist		
paleontologist	x	palynology, palaeoentomology
paleomagnetist		
petrologist		
hydrogeologist		
Other		

4. ADDITIONAL DOCUMENTS

Please, provide the following documents:

- Letter of interest, including details about area of scientific interest, current research, expedition participation plan and post-cruise research
- CV and Publication list
- Letter of recommendation (for PhD students)
- See also: http://www.essac.ecord.org/flyer/Guidelines_for_Applying_to_sail.pdf

Please, send your application form as *a MS Word document* and the additional documents in *PDF format* (preferably as one file) by email to Jan Behrmann and Hanno Kinkel at the ESSAC office: essac@geomar.de.

In addition to the ESSAC application, all applicants ***must inform their national office*** (if applicable) ***and national delegate*** and send a copy of the application documents. ECORD does not provide funds for participation; the national offices or national delegates can provide information regarding travel support, post-cruise funding opportunities, etc.

See http://www.essac.ecord.org/index.php?mod=about&page=ESSAC for a list of the national contact persons.

A) Reason for interest

General expertise and motivation

One of my major motivations is to identify vegetation reactions to climate change under different frame conditions. I have broad experience on the palynology-based reconstruction of environment and climate parameters for the Cenozoic. A focus of my work has been on the analysis of palynomorph records from Quaternary sediment cores in order to reconstruct the response of terrestrial and marine ecosystems to abrupt climate forcing and short-term sea-level change (e.g. Kotthoff et al., 2008) and to provide quantitative temperature and precipitation reconstructions (e.g. Kotthoff et al., 2011). With my works related to IODP Expedition (Exp.) 313 (New Jersey Shallow Shelf), I have extended my expertise in palynomorph-based paleoclimate and paleoenvironment reconstructions into the Paleogene and Miocene (e.g. Kotthoff et al., 2014), since these intervals of higher atmospheric CO_2-levels and global temperatures can to some degree be seen as analogues for the present-day situation of increasing atmospheric CO_2 and global warming.

Reason for interest in Expedition 373 and research questions moratorium period

The participation in Exp. 373 would allow me to extend my research to the high latitudes of the southern hemisphere. I am eager to get better acquainted with the southern hemisphere vegetation types during the Cretaceous and Cenozoic. The proposed site selection is well-suited to address questions connected to my personal research interests and plans. A few specific research questions I would like to address based on material from IODP Exp. 373 during and after the 12-month moratorium period are:

- What is the nature of changes in terrestrial ecosystems during the Early Cretaceous, and the Eocene? Do these changes occur in a cyclical pattern?
- Can changes in the terrestrial ecosystems, as identifiable via pollen and spore assemblages, be put in context with changes in marine ecosystems? What was the reaction of vegetation in the hinterland of George V- and Adélie Land region to sea-level fluctuations and what are the magnitudes of these changes?
- How has the diversity and disparity of Paleogene vegetation in the research region developed compared to other regions of Antarctica and Australia, New Zealand and Tasmania (e.g. Lee et al. 2012) in context of large-scale Antarctic ice sheet growth (e.g. Liu et al., 2009). Were taxa like *Nypa* (e.g. Pole & MacPhail 1998) more diverse during the Eocene? How is ecosystem development tied to ice advance?
- How is the cooling phase after the MMCO reflected in palynomorphs at sites which might contain this interval (e.g. GVAL-11-14, 22-27)? In case that the transition from the MMCO into the cooling phase is drilled: How did the cooling trend develop compared to lower latitudes? Are there abrupt changes as found in sediments from the neighboring Ross Sea (Warny et al. 2009) for the MMCO?
- Obliquity has a strong impact in Arctic regions, resulting, among other effects, in long phases of polar darkness, which should influence vegetation (e.g. Pross et al. 2012). Do Milankovich cycles thus have an intensified impact on vegetation in the coastal areas of Antarctica via light intensity and length of dark phases? Can such a “polar night effect” hamper vegetation-based climate calculations using the next-living relative approach? Comparison of records from Expedition 373, from the Wilkes Land Coast (IODP Exp. 318) and from the high latitudes of the northern hemisphere (e.g.

Greenwood et al., 2010) with a) vegetation-independent climate indicators and b) records from the lower latitudes should allow to address these questions.

Most of the questions above are closely linked to the expedition objectives. Which questions can be addressed already during the moratorium period is, naturally, dependent on the drilling success at the respective sites and other factors like palynomorph preservation or development of age models.

B) Expertise related to the objectives of IODP Expedition 373

My expertise in quantitative pollen-based climate reconstructions may be helpful in deciphering the magnitude and character of ecosystem and climate change in the George V- and Adélie Land region. For pollen-based quantitative climate reconstructions, I would apply a modified 'coexistence approach' (e.g. Kotthoff et al. 2014) to the marine pollen assemblages. My following expertises may also be of interest regarding Expedition 373:

a) Palynological processing and laboratory work:

I am in charge of the palynological laboratory at the Department of Geosciences at Hamburg University and am experienced in different preparation processes related to various sediment types. I can guarantee fast preparation of palynological samples (e.g., from core catchers) directly after the offshore portion of the expedition, in order to allow the establishment of a low-resolution pollen and dinocyst dataset during the onshore science party. During the onshore science party of Expedition 347, I became also accustomed to the preparation protocols at the palynology laboratory at the Faculty of Geoscience in Bremen.

b) Schools and special courses:

I regularly joined GESEP and ECORD schools and courses like the Utrecht Dinocourse 2012 to become familiar with fund raising, project organization, drilling techniques, and scientific methods like time series analysis, statistical methods, and dinocyst-based stratigraphy.

c) Public relations:

As curator at the Center of Natural History at Hamburg University, I am experienced with different aspects of public relations work. I would be interested to present results from IODP expedition 373 to a broad community, for example in the framework of special exhibitions or scientific events, as I did similarly for IODP expeditions 313 and 347.

C) Previous DSDP/ODP/IODP involvement and nature of involvement

I participated in IODP Expeditions 313 and 347 as palynologist during the onshore science parties in Bremen in 2009/2013. In the framework of IODP Exp. 313, I could contribute to the identification of sea-level changes via the combined analyses of marine and terrestrial palynomorph ratios, sediment and foraminifer data (e.g. McCarthy et al., 2013). For both expeditions I could contribute to pollen-/dinocyst-based biostratigraphy and to reconstructions of the site-shoreline distances/water depths/ecosystem and climate development. I am familiar with the proceedings during IODP onshore-science parties and the equipment to be used at the Marum Core repository. I enjoy the atmosphere during onshore parties and the collaboration with scientists using different scientific approaches.

D) Post cruise science support to achieve the proposed scientific objects in the future

1) Funding scheme

I plan to apply for funding, including a PhD-position, through the IODP special program of the German Research Foundation (DFG) for post-cruise research, regarding the proposed scientific objects and the research questions mentioned above. Some palynology-related

research topics can probably also be partly addressed in the framework of MSc theses. I have already successfully applied for funding in the framework of IODP Expeditions 313 and 347, and material from Expedition 347 has been used for several BSc and MSc theses.

2) Support from host institution

Prof. Christian Betzler, director of the Institute of Geology, and Prof. Matthias Glaubrecht, director at the Center of Natural History, both Hamburg University, where I have a permanent position, will fully support the research. Being in charge of the palynological laboratory at the institute, I can personally organize the proceeding of palynological samples. I have also access to the micro-optical laboratory and the scanning-electron microscope of the Institute of Geology. Prof. Gerhard Schmiedl, who is in charge of these facilities, has already assured his full support. As curator of the Geological and Palaeontological collections, I can also personally organize appropriate storage of samples and slides.

Literature

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Liu, Z., Pagani, M., Zinniker, D., DeConto, R., Huber, M., Brinkhuis, H., Shah, S. R., Leckie, R. M., Pearson, A. (2009): Global cooling during the Eocene-Oligocene climate transition. Science, 323, 1187-1190.

Kotthoff, U., Müller, U.C., Pross, J., van de Schootbrugge, B., Schmiedl, G., Schulz, H. (2008): Lateglacial and Holocene vegetation dynamics in the Aegean region: An integrated view based on pollen data from marine and terrestrial archives. The Holocene 18, 1019-1032.

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Pole, M.S., McPhail, M.K. (1995). Eocene *Nypa* from Regatta Point, Tasmania. Review of Palaeobotany and Palynology 92. 55-67.

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Warny, S., Askin, R., Hannah, M., Mohr, B., Raine, J.I., Harwood, D.M., Florindo, F., the SMS Science Team (2009). Palynomorphs froma sediment core reveal a sudden remarkably warm Antarctica during the middle Miocene. Geology 37, 955–958.

Curriculum vitae

Ulrich Kotthoff
Born 12th November 1975 in Meschede, Germany
Married, two children

Appointments

since 2008 — Research associate at the Institute for Geology and at the Center for Natural History, University of Hamburg
- palynological analyses
- paleoclimatic reconstructions
- evolution of eusocial insects
- teaching
- curator of the palaeontological collection
- in charge of the palynology laboratory

2004 – 2008 — Research associate/technical assistant at the Institute of Geosciences, University of Frankfurt
- palynological analyses (Quaternary palynomorphs)
- paleoclimatic reconstructions
- PhD thesis

2003 – 2004 — Research associate at the Institute of Geosciences, University of Tübingen
- sedimentological and palynological analyses

Education

2003 – March 31st, 2008 PhD, University of Tübingen/University of Frankfurt, Germany
Title: Climate Dynamics and Biotic Response in the Aegean Region during the Late Glacial and the Holocene: A palynological approach; graded ‘magna cum laude’

December 31st, 2002 Geology Diploma, University of Tübingen, Germany; graded 1.3
Title of diploma thesis: Fossil Honeybees and other Holometabola from the Randeck Maar
Title of diploma mapping: Geological mapping of the northeast of Eastern Elba

1997 – 2002 Study of Geology/Palaeontology, University of Tübingen, Germany

Scientific expeditions

- IODP Expedition 347 “Baltic Sea” (2014) as palynologist and entomologist (onshore)
- FS Poseidon (2011) Gulf of Genoa (coring)
- IODP Expedition 313 “New Jersey Shallow Shelf” (2009) as palynologist (onshore)
- FS Poseidon (2003) Canares - Azores - Portugal (plankton analyses)

Awards

- Best oral presentation at the ECORD Summer School on Paleoceanography, August 13-24, 2007, Bremen

Publications (detailed list below)

- Twenty peer-reviewed scientific publications listed in the Web-of-Knowledge Core Collection, h-index 12
- Two additional publications in not-peer-reviewed journals; two IODP-Expedition reports
- "Katalog der Naturwissenschaftlichen Museen und Sammlungen Hamburg (VNHS"), ISBN: 978-3-00-031816-0 as co-author and co-editor

Acquired funding

- "Palynomorph- and chironomid-based analyses of Eemian, Weichselian, and Holocene ecosystem- and climate dynamics in the Baltic Sea region"; DFG proposal KO3944/6-1: ~21 000 € raised
- "Miocene vegetation dynamics at the New Jersey Atlantic margin (MioDyNJAm)"; DFG proposal KO 3944/5-1 and KO 39445-2: ~190 000 € raised
- "Vegetation dynamics, climate and sea-level changes at the New Jersey Atlantic margin during the Eocene, Oligocene, and Miocene (DYNJOM)"; DFG proposal KO 3944/3-1 (SPP 527/30): ~40 000 € raised
- „Digitale Erfassung und überregionale Vernetzung geowissenschaftlicher Spezialsammlungen der Universität Hamburg im digiCULT-Verbund eG (digiPalMi)"; DFG proposal KO 3944/4-1: ~20 000 € raised
- "Geosciences to the schools"; collection-related, internal proposal to Hamburg University in the framework of the "Hamburg treasures" project: ~40 000 € raised

Current co-operations

- Members of the IODP-Expedition-347 science party: late Pleistocene/Holocene ecosystem and climate development in the Baltic Sea region
- Frank Wieland, Geoskop Thallichtenberg: morphology of fossil Mantodea
- Working group of Joerg Pross, Institute of Earth Sciences, Heidelberg University: Pleistocene/Holocene climate development in Central and Southern Europe
- Working groups of David R. Greenwood, Brandon University, and of Francine M. G. McCarthy, Brock University, Canada: IODP-Expedition-313-related analyses of sediments from the New Jersey shallow shelf

Synergistic activities

- Reviewer for Geo-Marine Letters, Climate of the Past, Marine Micropaleontology, Quaternary Science Reviews, Journal of Quaternary Science, Palaeontology, Palaeo3
- Member of the EGU, IODP, the Paläontologische Gesellschaft, the Geologische Vereinigung

Languages

- English (very good)
- Spanish, French (basic knowledge)
- Graecum, Latinum

Publications in peer-reviewed journals

- Pross, J., Koutsodendris, A., Christanis, K., Fischer, T., Fletcher, W,J,m Hardiman, M., Kalaitzidis, S., Knipping, M., **Kotthoff, U.,** Milner, A.M., Müller, U.C., Schmiedl, G., Siavalas, G., Tzedakis, P.C., Wulf, S. (2015): The 1.35-Ma-long terrestrial climate archive of Tenaghi Philippon, northeastern Greece: Evolution, exploration, and perspectives for future research. Newsletters on Stratigraphy 48, 253-276. doi: 10.1127/nos/2015/0063.
- Triantaphyllou, M.V., Gogou, A., Bouloubassi, I., Dimiza, M., Kouli, K., Rousakis, G., **Kotthoff, U.**, Emeis, K.C., Papanikolaou, M., Athanasiou, M., Parinos, C., Ioakim, C., Lykousis, V. (2014): Evidence for a warm and humid Mid-Holocene episode in the Aegean and northern Levantine Seas (Greece, NE Mediterranean). Regional Environmental Change 14, 1697-1712. doi: 10.1007/s10113-013-0495-6.
- **Kotthoff, U.,** Greenwood, D.R., McCarthy, F.M.G., Müller-Navarra, K., Prader, S., Hesselbo, S.P. (2014): Late Eocene to middle Miocene (33 to 13 million years ago) vegetation and climate development on the North American Atlantic Coastal Plain (IODP Expedition 313, Site M0027). Climate of the Past 10, 1523-1539. doi: 10.5194/cp-10-1523-2014.
- McCarthy, F.M.G., Katz, M.E., **Kotthoff, U.**, Browning, J.V., Miller, K.G., Zanatta, R., Williams, R.H., Drljepan, M., Hesselbo, S.P., Bjerrum, C.J., Mountain, G.S. (2013): Sea level control of New Jersey margin architecture: palynological evidence from IODP Expedition 313. Geosphere 9, 1457-1487. doi:10.1130/GES00853.1.
- Fang, L., Bjerrum, C.J., Hesselbo, S.P., **Kotthoff, U.**, McCarthy, F.M.G., Huang, B., Ditchfield, P.W., (2013): Carbon-isotope stratigraphy from terrestrial organic matter through the Monterey Event, Miocene, New Jersey margin (IODP Expedition 313). Geosphere 9, 1303-1318.
- **Kotthoff, U.**, Wappler, T., Engel, M.S. (2013): Greater past disparity and diversity hints at ancient migrations of European honey bee lineages into Africa and Asia. Journal of Biogeography 40, 1832-1838. DOI: 10.1111/jbi.12151.
- Peyron, O., Goring, S., Dormoy, I., **Kotthoff, U.**, Pross, J.**,** de Beaulieu, J.-L., Drescher-Schneider, R., Vannière, B., Magny, M. (2011): Holocene seasonality changes in the central Mediterranean region reconstructed from the pollen sequences of Lake Accesa (Italy) and Tenaghi Philippon (Greece). The Holocene 21, 131–146.
- Müller, U.C., Pross, J.**,** Tzedakis, P.C., Gamble, C., **Kotthoff, U.**, Schmiedl, G., Wulf, S., Christanis, K., (2011): The role of climate in the spread of modern humans into Europe. Quaternary Science Reviews 30, 273-279.
- **Kotthoff, U.**, Wappler, T., Engel, M.S. (2011b): Miocene honey bees from the Randeck Maar of southwestern Germany (Hymenoptera, Apidae). Zookeys 96, 11-37.
- **Kotthoff, U.**, Koutsodendris, A., Pross, J., Schmiedl, G., Bornemann, A., Kaul, C., Marino, G., Peyron, O., Schiebel, R. (2011a): Impact of late glacial cold events in the Northern Aegean region, reconstructed from integrated marine and terrestrial proxy data. Journal of Quaternary Science 26, 86-96.
- Schmiedl, G., Kuhnt, T., Ehrmann, W., Emeis, K.-C., Hamann, Y., **Kotthoff, U.**, Dulski, P., Pross, J. (2010): Climatic forcing and regional differentiation of eastern Mediterranean deep-water formation and benthic ecosystems during the past 22 000 years. Quaternary Science Reviews 29, 3006-3020.

- Koutsodendris, A., Müller, U.C., Pross, J., Brauer, A., **Kotthoff, U.**, Lotter, A.F. (2010): Vegetation dynamics and climate variability during the Holsteinian interglacial based on a pollen record from Dethlingen, North Germany. Quaternary Science Reviews 29, 3298-3307.
- Pross, J., Houben, A.P.J., van Simaeys, S., Williams, G.L., **Kotthoff, U.**, Coccioni, R., Wilpshaar, M., Brinkhuis, H. (2010): Umbria-Marche revisited: A refined magnetostratigraphic calibration of dinoflagellate cyst events for the Oligocene of the Western Tethys. Review of Palaeobotany and Palynology 158, 213-235.
- Pross, J., **Kotthoff, U.**, Schmiedl, G., Müller, U.C., Peyron, O., Tzedakis, C., Christanis, K., Emeis, K.-C. (2009): Massive perturbation in terrestrial ecosystems of the Eastern Mediterranean region associated with the 8.2 kyr climatic event. Geology 37, 887-890.
- Mertens, K.N., Ribeiro, S., Bouimetarhan, I., Caner, H., Combourieu-Nebout, N., Dale, B., De Vernal, A., Ellegaard, M., Filipova, M., Godhe, A., Goubert, E., Grøsfjeld, K., Holzwarth, U., **Kotthoff, U.**, Leroy, S.A.G., Londeix, L., Marret, F., Matsuoka, K., Mudie, P.J., Naudts, L., Peña-Manjarrez, J.L., Persson, A., Popescu, S.-M., Pospelova, V., Sangiorgi, F., Van Der Meer, M.T.J., Vink, A., Zonneveld, K.A.F., Vercauteren, D., Vlassenbroeck, J., Louwye, S. (2008). Process length variation in cysts of a dinoflagellate, *Lingulodinium machaerophorum*, in surface sediments investigating its potential as a salinity proxy. Marine Micropaleontology 70, 54-69.
- Combourieu Nebout, N., Peyron, O., Dormoy, I., Desprat, S., Beaudouin, C., **Kotthoff, U.**, Marret, F. (2009). Rapid climatic variability in the west Mediterranean during the last 25 000 years from high resolution pollen data. Climate of the Past 5, 503-521.
- Dormoy, I., Peyron, O., Combourieu Nebout, N., Goring, S**., Kotthoff, U.**, Magny, M., Pross, J. (2009). Terrestrial climate variability and seasonality changes in the Mediterranean region between 15 000 and 4000 years BP deduced from marine pollen records. Climate of the Past 5, 615-632.
- **Kotthoff, U.**, Müller, U.C., Pross, J., van de Schootbrugge, B., Schmiedl, G., Schulz, H. (2008a): Lateglacial and Holocene vegetation dynamics in the Aegean region: An integrated view based on pollen data from marine and terrestrial archives. The Holocene 18, 1019-1032.
- **Kotthoff, U.**, Pross, J., Müller, U.C., Peyron, O., Schmiedl, G., Schulz, H., Bordon, A. (2008b): Climate dynamics in the borderlands of the Aegean Sea during formation of Sapropel S1 deduced from a marine pollen record. Quaternary Science Reviews 27, 832-845.
- **Kotthoff, U.** & Schmid, U. (2005): A new fossil hoverfly (Insecta, Diptera: Syrphidae) from the Randeck Maar (Early Miocene, SW Germany). Palaeontology 48, 1091-1096.

Popular/not-peer-reviewed science publications

- Andrén, T., Jørgensen, B.B., Cotterill, C., Green, S., and the Expedition 347 Scientists (2015): Baltic Sea Paleoenvironment. Proceedings of Integrated Ocean Drilling Program, 347, College Station, TX (Integrated Ocean Drilling Program), 2015.
- Mountain, G. S., Proust, J.-N., McInroy, D., Cotterill, C, and the Expedition 313 scientists (2010): New Jersey Shallow Shelf. Proceedings of Integrated Ocean Drilling Program, 313, Tokyo (Integrated Ocean Drilling Program Management International, Inc.), 2010.
- Brandt, A., **Kotthoff, U.** & Kranz, G. (2010): Naturwissenschaftliche Museen und Sammlungen der Universität Hamburg. ISBN: 978-3-00-031816-0, 68 Seiten.
- Pross, J., Tzedakis, P., Schmiedl, G., Christanis, K., Hooghiemstra, H., Müller, U.C., **Kotthoff, U.**, Kalaitzidis, S., Milner, A. (2007): Tenaghi Philippon Re-Visited: Drilling a Continuous Lower-Latitude Terrestrial Climate Archive of the Last 250,000 Years. Scientific Drilling 5, 30-32.
- **Kotthoff, U.** (2005): Über einige Hymenoptera (Insecta) aus dem Unter-Miozän des Randecker Maars (Schwäbische Alb, Südwestdeutschland). Stuttgarter Beiträge zur Naturkunde Serie B 355, 25 pp.

Conferences Contributions (since 2008)

I contributed to the following conferences with oral or poster presentations as first author:

- International Congresses of Paleoceanography 2016/2013, Utrecht/Barcelona.
- European Geoscience Union annual meetings 2016, 2015, 2013, 2011, 2009, Vienna.
- 2nd post-cruise meeting of IODP Expedition 347 and subsequent Baltic Sea Colloquium 2015, Stockholm.
- German IODP/ICDP Kolloquia 2009-2016.
- General Assembly of the Deutsche Geologische Gesellschaft and Geologische Vereinigung, and of the Paläontologische Gesellschaft, 2014, Frankfurt/Main.
- The 12th Colloquium on Baltic Sea Marine Geology, 2014, Warnemünde.
- German meeting of Palaeoentomologists 2012, Bonn.
- Annual meetings of the Geologische Vereinigung 2012/2009, Hamburg/Göttingen.
- 44th meeting of the American Association of Stratigraphic Palynologists, 2011, Southampton.
- 2nd post-cruise meeting of IODP Expedition 313, 2011, Salt Lake City.
- International symposium on foraminifera (“FORAMS”) 2010, Bonn.
- IMAGES workshop 2009, Tübingen.
- INTERDYNAMIC thematic workshop on vegetation dynamics, 2009, Hamburg.
- 12th International Palynological Congress, 2008, Bonn.

APPLICATION TO PARTICIPATE IN AN IODP EXPEDITION

ESSAC Office ECORD Science Support & Advisory Committee
GEOMAR | Helmholtz Centre for Ocean Research Kiel
Wischhofstrasse 1-3
24148 Kiel, Germany
Hanno Kinkel (ESSAC Science Coordinator):
Tel: +49 431 600 2418
Fax:+49 431 600 2922
Web Page: http://www.essac.ecord.org Email: essac@geomar.de

Please type information

Apply to Sail Application Form

Expedition Number 373: Antarctic Paleoclimate and Ice History

1. PERSONAL INFORMATION

Family name: Kuhn

First name: Gerhard

Current Position: Senior Research Scientist

Institution: Alfred-Wegener-Institut Helmholtz-Zentrum für Polar- und Meeresforschung

Address: Am Alten Hafen 26

City, Postcode, Country: Bremerhaven, 27568, Germany

Tel. work: +4947148311204
Tel. home: +49471803548
Fax: +4947148311923
Email: gerhard.kuhn@awi.de

Country of citizenship: German

Place of birth/date of birth: Paderborn 1955

Gender: male

Education (highest degree, including year PhD was received / is expected): PhD 1984

Are you currently a student? NO Expected Graduation Date:

2. EXPEDITION INFORMATION

Summary of proposed participation, including area of scientific interest, current research and participation plan (maximum 250 characters with space – more detail should be included in the Letter of Interest):

East Antarctica's greenhouse to icehouse transition indicated by sedimentation processes, bulk content of terrigenous (XRD) and organic components (TOC, TN, Ba_{ex}, biog. opal), provenances (XRF-core scanner) and chemical index of alteration (CIA; XRF)

Prior involvement with DSDP/ODP/IODP and nature of involvement (expedition number, shipboard/shore-based participation, co-chief, etc):

Participation as sedimentologist at ODP Leg 101, and as physical property specialist at 177,

Participation at ANDRILL AND-1 and AND-2 as inorganic geochemist, XRF-core scanning and XRF, bulk geochemistry and CIA calculations on single samples.

Post-cruise science support to achieve the proposed scientific objectives 1) future funding scheme and 2) support from host institution (e.g. staff, facilities)

Application for a PhD student (DFG) and support from host institution with staff and facilities to do all proposed analytics.

Three scientific and/or personal references

Prof. Dr. Timothy Naish, Victoria Univ. Wellington, New Zealand; Timothy.Naish@vuw.ac.nz

Prof. Dr. Heinrich Villinger, Bremen University, Germany; vill@uni-bremen.de

Prof. Dr. Ralf Tiedemann, Alfred-Wegener-Institut, Germany; ralf.tiedemann@awi.de

3. SCIENTIFIC EXPERTISE

For Scientist Jobs Descriptions visit: http://iodp.tamu.edu/participants/scientist_jobs.html

Please indicate your area(s) of expertise (maximum 3)

Discipline	Mark with X	Speciality
microbiologist		
organic and inorganic geochemist/biogeochemist	X	XRF core scanner and single sample bulk analytics, biog. opal, TOC, CIA
physical properties specialist	X	magn. susc., density and N-Gamma together with gamma spec. downhole
sedimentologist	X	provenances and sed. processes
structural geologist		
paleontologist		
paleomagnetist		
petrologist		
hydrogeologist		
Other		

4. ADDITIONAL DOCUMENTS

Please, provide the following documents:

- Letter of interest, including details about area of scientific interest, current research, expedition participation plan and post-cruise research
- CV and Publication list
- Letter of recommendation (for PhD students)
- See also: http://www.essac.ecord.org/flyer/Guidelines_for_Applying_to_sail.pdf

Please, send your application form as *a MS Word document* and the additional documents in *PDF format* (preferably as one file) by email to Jan Behrmann and Hanno Kinkel at the ESSAC office: essac@geomar.de.

In addition to the ESSAC application, all applicants ***must inform their national office*** (if applicable) ***and national delegate*** and send a copy of the application documents. ECORD does not provide funds for participation; the national offices or national delegates can provide information regarding travel support, post-cruise funding opportunities, etc.

See http://www.essac.ecord.org/index.php?mod=about&page=ESSAC for a list of the national contact persons.

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HELMHOLTZ-ZENTRUM FÜR POLAR- UND MEERESFORSCHUNG

Alfred Wegener Institute, PO Box 12 01 61, 27515 Bremerhaven, Germany

ESSAC Office ECORD Science Support & Advisory Committee
GEOMAR | Helmholtz Centre for Ocean Research Kiel
Wischhofstrasse 1-3
24148 Kiel, Germany
Hanno Kinkel (ESSAC Science Coordinator)

Hier können Sie hier Ihre persönlichen Kontakt-informationen eintragen.

This place can be used for your personal contact information.

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HELMHOLTZ ASSOCIATION

31.08.2016
Application for Expedition Number 373

With my application as an onshore scientist I would like to work on the: "Paleoenvironmental reconstruction and sedimentation processes at East **Ant**arctica's **g**reenhouse to **i**cehouse **t**ransition investigated by high resolution bulk component and element concentration analytics on Georges V and Adélie Land shelf sediments" (ANT-GIT).
Eocene sediments from these continental margin should show a signal from preferred geochemical weathering and fluvial transport in a warm and humid climate, that gradually changed during the Eocene/Oligocene boundary when East Antarctica grows up its ice sheet. Physical weathering and ice transport became more dominant. The history of ice sheet variability, sea ice coverage and open marine interplay is documented in sediment composition. I would like to analyse and interpret the sedimentation processes, bulk content of terrigenous (XRD, clay mineral composition), and organic components (TOC, TN, Ba_{ex}, biog. opal), provenances (XRF-core scanner), and chemical index of alteration (CIA, XRF on samples). I would like to put the results into the context of our former work on the ANDRILL cores and expectations for the Coulman-High Project that I co-prepared as a national representative within the ANDRILL Science Committee.

Sediment whole-rock composition is generally considered to reflect cumulatively the climatic conditions in the entire sediment routing system. Therefore, changes in sediment composition may be good indicators of climate change (e.g., CIA; Monien et al. 2012; Niessen et at. 2014; Levy et al., 2016). However, different parameters such as changing source rock lithology, changing proportions in the intensity of physical vs. chemical weathering, and hydrodynamic sorting exert significant control on the whole-rock composition of sediments and sedimentary rocks. This implies that similar types and degrees of processes may generate different

sediments (due to different starting materials), or different processes may generate quite similar signals with respect to whole-rock composition. Consequently, whole-rock mineralogical and chemical analysis of sand- and mudstones may serve as a valuable evaluation of general trends, but often fails in providing an unambiguous solution to the question of controlling processes, especially in proximal settings (i.e., climate vs. provenance control). This was, for example, the case in some CRP projects, where changes in provenance could not definitely be separated from climatic changes, because both affected the trends of the calculated chemical weathering index CIA based on mudstone compositions. Meanwhile we are able to provide better compositional indicators for both, provenance and CIA, and marine productivity in addition (Monien et al., 2012).

B. Research Description

Environmental changes will have an impact on and will be documented in sediment compositional variations. In particular in this region at the boundary of glaciated land with large ice streams and sea ice covered marine scenery, the history and behaviour of the Wilkes Subglacial Basin during past climate changes and its terrestrial sediment input to the marine environment will be overarching targets of our investigation. During evolution of the environment from a Paleogene warm, polythermal fluvial and glacial regime with valley glaciers, ice shelf absence and open marine conditions to a modern cold, polar glacial regime with high amplitudes glacial/interglacial fluctuations different sediment sources were contributing material to the drill sites. Lithogene material mainly from the Transantarctic Mountains, volcanic components and marine biogenic sediments were accumulated and will provide useful information for paleoenvironmental reconstruction. Whole rock compositional changes could either be the result of changing sources or be provoked by changing the type and intensities of processes like grain-size sorting or physical versus chemical alteration. Whole rock elemental composition from downhole and XRF-core logging (Hunze et al., 2015) together with detailed geochemical off-ice investigations on specific lithogene components and size fractions should help us to discriminate between provenance and climate signals.

The impact of the opening of the Tasmanian gateway and advancing glaciation should let to an increasing amount of terrigenous material input into the oceans surrounding Antarctica. Increasing Antarctic Bottom Water production and influence - the Ross Sea with its floating ice shelves as one of the most important areas for cold bottom water production today - on Southern Ocean sediments has been scientifically proven (Diekmann et al. 2000, Kuhn & Diekmann 2003) and investigated at various spatial and temporal resolution. The drill sites now provide opportunities for study the relations between Eastern Antarctica continental margin system and the environmental signals recorded in the Southern Ocean from a very proximal viewpoint during times of climate changes.

I wish to carry out the study to cover both, the long term Cenozoic environmental evolution, and as well the faster Neogene glacial/interglacial changes that might be present in sediment sections. To put these investigations into praxis my preferred research location is as onshore

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scientist, use data and provide instruments (MSCL if needed) for core logging and XRF-core scanning (incl. imaging and spectrophotometer measurements).

The elemental composition of the split cores will be analysed with a XRF core scanner at a high downcore resolution (1 cm) and a spot size of 1 cm. Elements from up Mg could be detected and results will be available shortly after the measurement. If time allows a second run with smaller spot size or different resolution could be undertaken and may provide a homogeneity factor for the drilled sediments (matrix to clast ratio). After calibration with standards and geochemical analyses on individual samples (preferred physical property samples) the relative counts per second (cps) could be changed to quantitative values. These methods could provide indicators for sub-oxic pore water conditions and could be undertaken by combining the magnetic susceptibility measurements with XRF element concentrations (Fe, Mn, Ti). This may indicate periods of high organic production under open marine conditions and oxidation of organic carbon in the sediment. Variations of other elements like Ca, Ba, Sr, V, Cu, Ni, Zn could be indicative for biogenic, Fe, Ti, Mg and especially Nb (Levy et al., 2015) for volcanic and Al, Si, K, Fe, Mg, and Ti for terrestrial input fluctuations.

C. Sample Requirements

To calibrate the relative element concentrations given by the XRF core scanner individual samples will be investigated for chemical analysis and bulk petrographical composition (XRD). Depending on detectable cyclic patterns and expected sedimentation rates, approx. 5 to 10 samples per meter (sampling volume 20cm3) will be required. On these samples we as well will determine organic carbon, calcite, biogenic silica, sulphur, nitrogen and dry bulk density (essential for biogenic flux and accumulation rate calculations), these analyses on the samples could be undertaken at AWI.

D. Scientific Equipment and Facilities

An Avaatech XRF core scanner, several MSCL and analytical systems (XRF, XRD, element and auto-analysers) are available at our institute. Support by dedicated technicians will be assured.

E. Student Support

I will write a DFG proposal for a PhD student after successful nomination. After the sampling party she/he will work on defining and interpret multi-proxy parameters from the multi-element XRF, downhole and other core measurements and for a Doctoral thesis.

F. Education and Public Outreach

At AWI we have a strong EPO group, that will be informed and that could arrange different types of EPO activities. POLMAR, a AWI graduation school and HIGHSEA, a high-school project could be associated to our research.

attached: CV, Publications and web application forms

Curriculum vitae Dr. Gerhard Kuhn

Personal information:

Born:	31.07.1955
Nationality:	German
Marital status:	married, one son and one daughter

Contact: Alfred-Wegener-Institut Helmholtz-Zentrum
für Polar- und Meeresforschung
Am Alten Hafen 26
27568 Bremerhaven
Phone: +49 (0)471 4831 1204
Email: gerhard.kuhn@awi.de

Degrees:	1984	PhD, Göttingen University, Germany (m.c.l.)
	1979	Diploma in Geology-Palaeontology, Göttingen University, Germany (passed with distinction)
Positions:	1985 - present	Senior Research Scientist, Marine Geology and Palaeontology at AWI
	1979 - 1985	Research Assistant, Göttingen University, Dept. of Geology

Professional Activities:

2008 - present	National representative D-ANDRILL, LA-SCAR
2008 - present	National representative ASC ANDRILL Science Committee,
2014	Convener of SCAR-OS Session "Antarctica's Gateway to Lower Latitudes"
2012	Co-Chair IPY2012-Montreal Session "Evolving coastal near-shore and shelf processes"
2004 - 2009	M-ASIC (McMurdo ANDRILL Science Implementation Committee, secretary)
1990 - 1993	Editor "Nachrichten Deutsche Geologische Gesellschaft"

Activities as reviewer for international journals and funding agencies:

Geology, Global and Planetary Change, Geol. Soc. Spec. Publ., Intern. Jour. Earth Science, IRSN Oceanography, Journal of Applied Geophysics, Marine Geology, Paleoceanography, Palaeo3, Polar Research, Polar Science, Quaternary Research, and Sedimentology;

American Chemical Society - Petroleum Research Found, DFG, PNRA, NCN, NERC, IRF, NWO, Eurofleets2, and Marsden Fund proposals,

Field experience:

Participation in more than 34 seagoing expeditions (2 as Chief Scientist) with research vessels: *Polarstern* (28), *Meteor* (1), *Marion Dufresne* (1), *Boris Petrov* (1), *Araon* (1), *Joides Resolution* (2).
October to December 2007 for 3 month at McMurdo Station as on ice scientist (XRF-core scanner, geochemistry) for ANDRILL "Southern McMurdo Sound (SMS)" drillcore ANT-2A
October 2006 to January 2007 at McMurdo Station as on ice scientist (XRF-core scanner, geochemistry) for ANDRILL "McMurdo Ice Shelf (MIS)" drillcore ANT-1B

Cruises of the last 5 years and future cruises (as proponent)

2018 *RV Polarstern* PS111, Weddell Sea, Dec.2017-Febr.2018
2017 *RV Polarstern* PS104, MeBo, Amundsen Sea Embayment, Febr.-March
2016 *RV Polarstern* PS98, Hydroacoustic Student Course, May
2016 *RV Polarstern* PS97, Drake Passage, Febr.-April
2014 *RV Polarstern* PS88.1, Hydro-Acoustics-Student Course, Oct.-Nov.
2013 *RV Polarstern* ANT-XXIX/4, South Georgia, March-April
2011 *RV Polarstern* ANT-XXVII/4, Parasound-Student Course

External funding:

EU MSCA-ITN-ETN "Frontal" in prep., WP3 Leader;
Helmholtz Postdoc Project PD-201 Klages, 2015-2018, 146 T€;
EU-FP7-IRSES IMCONet, 2014-2016, WP5 Leader, 132 T€;
From 1989 to 2014 I wrote together with university partners 16 DFG proposals, from which more than halve have been successfully funded, one with 408 T€ (Ku 683/9, "Subclimate", 2007-2010).

Awards:

2011 "Antarctic Service Medal of the USA" from the National Science Foundation

Patent:

Dunker, E., Kuhn, G. (1993). "Anordnung zur Probennahme in Gewässern". Patent, DE 43 18 347.6

10 (at least for me) most important publications; all presentations and publications at:

http://www.awi.de/en/about-us/organisation/staff/gerhard-kuhn.html

Klages, J. P., **Kuhn, G.**, Graham, A. G. C., Hillenbrand, C. D., Smith, J. A., Nitsche, F. O., Larter, R. D., Gohl, K., (2015). Palaeo-ice stream pathways and retreat style in the easternmost Amundsen Sea Embayment, West Antarctica, revealed by combined multibeam bathymetric and seismic data. *Geomorphology* 245, 207-222.

Klages, J. P., **Kuhn, G.**, Hillenbrand, C. D., Graham, A. G. C., Smith, J. A., Larter, R. D., Gohl, K. & Wacker, L. (2014). Retreat of the West Antarctic Ice Sheet from the western Amundsen Sea shelf at a pre- or early LGM stage. *Quaternary Science Reviews* 91, 1-15.

Kuhn, G. (2013). Don't forget the salty soup: Calculations for bulk marine geochemistry and radionuclide geochronology. *Mineralogical Magazine* 77, 1519.

Kuhn, G. & Diekmann, B. (2002). Late Quaternary variability of ocean circulation in the southeastern South Atlantic inferred from the terrigenous sediment record of a drift deposit in the southern Cape Basin (ODP Site 1089). *Palaeogeography, Palaeoclimatology, Palaeoecology* 182, 287-303.

Kuhn, G. & Gaedicke, C., 2015. A plan for interdisciplinary process-studies and geoscientific observations beneath the Ekström Ice Shelf (Sub-EIS-Obs). Polarforschung 84, 99-102.

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Bremerhaven, 31.08.2016

APPLICATION TO PARTICIPATE IN AN IODP EXPEDITION

ESSAC Office ECORD Science Support & Advisory Committee
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Hanno Kinkel (ESSAC Science Coordinator):
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Web Page: http://www.essac.ecord.org Email: essac@geomar.de

Please type information

Apply to Sail Application Form

Expedition Number 373: Antarctic Paleoclimate and Ice History

1. PERSONAL INFORMATION

Family name: Kuhn

First name: Gerhard

Current Position: Senior Research Scientist

Institution: Alfred-Wegener-Institut Helmholtz-Zentrum für Polar- und Meeresforschung

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Tel. work: +4947148311204
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Fax: +4947148311923
Email: gerhard.kuhn@awi.de

Country of citizenship: German

Place of birth/date of birth: Paderborn 1955

Gender: male

Education (highest degree, including year PhD was received / is expected): PhD 1984

Are you currently a student? NO Expected Graduation Date:

2. EXPEDITION INFORMATION

Summary of proposed participation, including area of scientific interest, current research and participation plan (maximum 250 characters with space – more detail should be included in the Letter of Interest):

East Antarctica's greenhouse to icehouse transition indicated by sedimentation processes, bulk content of terrigenous (XRD) and organic components (TOC, TN, Ba_{ex}, biog. opal), provenances (XRF-core scanner) and chemical index of alteration (CIA; XRF)

Prior involvement with DSDP/ODP/IODP and nature of involvement (expedition number, shipboard/shore-based participation, co-chief, etc):

Participation as sedimentologist at ODP Leg 101, and as physical property specialist at 177,

Participation at ANDRILL AND-1 and AND-2 as inorganic geochemist, XRF-core scanning and XRF, bulk geochemistry and CIA calculations on single samples.

Post-cruise science support to achieve the proposed scientific objectives 1) future funding scheme and 2) support from host institution (e.g. staff, facilities)

Application for a PhD student (DFG) and support from host institution with staff and facilities to do all proposed analytics.

Three scientific and/or personal references

Prof. Dr. Timothy Naish, Victoria Univ. Wellington, New Zealand; Timothy.Naish@vuw.ac.nz

Prof. Dr. Heinrich Villinger, Bremen University, Germany; vill@uni-bremen.de

Prof. Dr. Ralf Tiedemann, Alfred-Wegener-Institut, Germany; ralf.tiedemann@awi.de

3. SCIENTIFIC EXPERTISE

For Scientist Jobs Descriptions visit: http://iodp.tamu.edu/participants/scientist_jobs.html

Please indicate your area(s) of expertise (maximum 3)

Discipline	Mark with X	Speciality
microbiologist		
organic and inorganic geochemist/biogeochemist	X	XRF core scanner and single sample bulk analytics, biog. opal, TOC, CIA
physical properties specialist	X	magn. susc., density and N-Gamma together with gamma spec. downhole
sedimentologist	X	provenances and sed. processes
structural geologist		
paleontologist		
paleomagnetist		
petrologist		
hydrogeologist		
Other		

4. ADDITIONAL DOCUMENTS

Please, provide the following documents:

- Letter of interest, including details about area of scientific interest, current research, expedition participation plan and post-cruise research
- CV and Publication list
- Letter of recommendation (for PhD students)
- See also: http://www.essac.ecord.org/flyer/Guidelines_for_Applying_to_sail.pdf

Please, send your application form as *a MS Word document* and the additional documents in *PDF format* (preferably as one file) by email to Jan Behrmann and Hanno Kinkel at the ESSAC office: essac@geomar.de.

In addition to the ESSAC application, all applicants ***must inform their national office*** (if applicable) ***and national delegate*** and send a copy of the application documents. ECORD does not provide funds for participation; the national offices or national delegates can provide information regarding travel support, post-cruise funding opportunities, etc.

See http://www.essac.ecord.org/index.php?mod=about&page=ESSAC for a list of the national contact persons.

APPLICATION TO PARTICIPATE IN AN IODP EXPEDITION

ESSAC Office ECORD Science Support & Advisory Committee
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Web Page: http://www.essac.ecord.org Email: essac@geomar.de

Please type information

Apply to Sail Application Form

Expedition Number 373: Antarctic Paleoclimate and Ice History

1. PERSONAL INFORMATION

Family name: **Pross**

First name: **Jörg**

Current Position: Professor of Palynology and Paleoenvironmental Dynamics

Institution: Institute of Earth Sciences, Heidelberg University, Germany

Address: Im Neuenheimer Feld 234-236

City, Postcode, Country: D-69120 Heidelberg, Germany

Tel. work: +49 (0)6221 546055
Tel. home: +49 (0)711 2805370
Fax: +49 (0)6221 545503
Email: joerg.pross@geow.uni-heidelberg.de

Country of citizenship: Germany

Place of birth/date of birth: Stuttgart, Germany; 02.03.1964

Gender: male

Education (highest degree, including year PhD was received / is expected):
Professor; PhD received in 1997

Are you currently a student? No Expected Graduation Date: ---

2. EXPEDITION INFORMATION

Summary of proposed participation, including area of scientific interest, current research and participation plan (maximum 250 characters with space – more detail should be included in the Letter of Interest):

I apply as shorebased scientist (palynologist) to reconstruct Antarctic paleoenvironments and -climates based on pollen/spores and aided by organic geochemistry (MBT/CBT paleo-thermometry). This approach was highly successful for Exp. 318, and I foresee its successful application to Exp. 373 material. *(See attached Letter of Interest for details)*

Prior involvement with DSDP/ODP/IODP and nature of involvement (expedition number, shipboard/shore-based participation, co-chief, etc):

- Participation as shipboard scientist (palynologist) in ODP Leg 210 ('Newfoundland Rifted Margin'; 2003)
- Participation as shipboard scientist (palynologist) in IODP Expedition 318 ('Wilkes Land Glacial History'; 2010)
- Participation as shorebased scientist (palynologist) in IODP Expedition 342 ('Paleogene Newfoundland Sediment Drifts'; 2012)

Post-cruise science support to achieve the proposed scientific objectives 1) future funding scheme and 2) support from host institution (e.g. staff, facilities)

1) I will apply for post-cruise research funding via the German IODP priority program. Chances to obtain funding via this program are relatively high for scientists directly involved (i.e., shipboard or shorebased) in the respective expedition. I will apply for at least one PhD student project dedicated to work on Expedition 373 material.

2) The laboratories (including HF lab) and technical equipment (including XRF core scanner, scanning electron and optical microscopy) of my research group at the Institute of Geosciences, Heidelberg University, will be fully available for research on Expedition 373 material, as will supporting staff (including lab technician and office management).

Three scientific and/or personal references (in alphabetical order)

- Prof. Henk Brinkhuis
  Royal Netherlands Institute for Sea Research (NIOZ), Texel, The Netherlands
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- Prof. Heiko Pälike
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3. SCIENTIFIC EXPERTISE

For Scientist Jobs Descriptions visit: http://iodp.tamu.edu/participants/scientist_jobs.html

Please indicate your area(s) of expertise (maximum 3)

Discipline	Mark with X	Speciality
microbiologist		
organic and inorganic geochemist/biogeochemist	X	MBT/CBT terrestrial paleothermometry
physical properties specialist		
sedimentologist		
structural geologist		
paleontologist	X	Palynology (pollen and spores, dinocysts)
paleomagnetist		
petrologist		
hydrogeologist		
Other		

4. ADDITIONAL DOCUMENTS

Please, provide the following documents:

- Letter of interest, including details about area of scientific interest, current research, expedition participation plan and post-cruise research
- CV and Publication list
- Letter of recommendation (for PhD students)
- See also: http://www.essac.ecord.org/flyer/Guidelines_for_Applying_to_sail.pdf

Please, send your application form as *a MS Word document* and the additional documents in *PDF format* (preferably as one file) by email to Jan Behrmann and Hanno Kinkel at the ESSAC office: essac@geomar.de.

In addition to the ESSAC application, all applicants ***must inform their national office*** (if applicable) ***and national delegate*** and send a copy of the application documents. ECORD does not provide funds for participation; the national offices or national delegates can provide information regarding travel support, post-cruise funding opportunities, etc.

See http://www.essac.ecord.org/index.php?mod=about&page=ESSAC for a list of the national contact persons.

Reasons for interest in participating in IODP Expedition 373 ('Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments') as shorebased scientist

– Jörg Pross –

Motivation:

My main motivation for applying to participate in IODP Expedition 373 as a shorebased scientist (palynologist) is that I am convinced that a palynological approach can significantly contribute to the scientific goals of this mission.
This has been demonstrated for Expedition 318 (Wilkes Land Glacial History; 2010), which I have participated in as shipboard scientist (palynologist) and subsequently was involved with during postcruise research. The palynological approach applied notably to the Paleogene material retrieved during Expedition 318 has provided unprecedented, quantitative insight into the evolution of terrestrial (i.e., Antarctic) paleoclimates during the Eocene; through the analysis of pollen and spores in the Wilkes Land cores and supported by organic geochemical data (MBT/CBT paleothermometry), it has documented for the first time the existence of paratropical conditions on parts of Antarctica during the early Eocene and also the prevalence of temperate rainforests during the middle Eocene (Pross et al. 2012, *Nature*; Contreras et al. 2013, *Review of Paleobotany and Palynology*). Based on the evaluation of marine palynomorphs (notably dinoflagellate cysts), and partially again supported by organic geochemistry (TEX_{86} paleothermometry), it also yielded novel insight into the striking reorganization of marine plankton ecosystems in the high southern latitudes across the Eocene-Oligocene transition (Houben et al. 2013, *Science*) and the early opening of the Tasmanian Gateway (Bijl et al. 2013, *PNAS*). The notion that palynology will provide a powerful research tool for the cores to be retrieved during Expedition 373 is further substantiated through my involvement in terrestrial climate reconstructions derived from marine pollen assemblages for the Paleocene and Eocene of SE Australia (based on material from ODP Leg 189; Contreras et al. 2014, *Climate of the Past*) and New Zealand (Pancost et al. 2013, *GGG*).
Beyond the potential of paleoclimatic reconstructions, a palynological approach to marine successions of the high southern latitudes also allows establishment of high-quality biostratigraphic age control; again, this has been recently demonstrated both during ship-based and post-cruise research for Expedition 318 (e.g., Tauxe et al. 2012, *Paleoceanography*).

Personal Scientific Background:

The paleoenvironmental/paleoclimatic and biostratigraphic analysis of palynomorph assemblages from Late Cretaceous to Pleistocene marine sediments has been in the center of my research (and later of my research groups at Frankfurt University and, since 2013, at Heidelberg University) for more than 20 years. Because these assemblages comprise both marine (dinocysts) and terrestrial (pollen and spores) components, their analysis provides an integrated view of paleoenvironmental and paleoclimatic change both on land and in the

ocean. Due to this direct land/sea correlation, leads and lags between signals in the terrestrial and marine realms can be identified.

Over the past 15 years or so, paleoenvironmental and paleoclimatic reconstructions based on pollen and spores in marine sediments have increasingly shifted into the focus of my research. During the recent past, they have also involved the integration with organic geochemical data (MBT/CBT paleothermometry). These efforts have also included the development, refinement and application of quantitative techniques that yield numerical information on different climate parameters such as mean temperatures of the coldest and warmest months (Paleocene – e.g., Pancost et al. 2013, Contreras et al. 2014; Eocene – e.g., Pross et al. 2012; Contreras et al. 2013; Oligocene – e.g., Pross et al. 2001; Pliocene and Pleistocene – Pross et al. 2000, Pross and Klotz 2002).

This expertise in marine-based, pollen-derived terrestrial paleoclimate reconstructions is against a long-standing background in dinocyst-based biostratigraphic and marine paleoenvironmental analyses. I have carried out dinocyst-based biostratigraphic and paleoenvironmental analyses on material from the Late Cretaceous to Miocene, with regional foci on the North Atlantic, Tethyan and high-southern-latitude realms (e.g., Pross 2001, Pross and Schmiedl 2002, van Simaeys et al. 2005, Urquhart et al. 2007, Coccioni et al. 2008, Pross et al. 2010, Bijl et al. 2011, Houben et al. 2013).

Research questions for IODP Expedition 373 to be tackled in post-cruise research:

Based on the analysis of terrestrial palynomorphs to be retrieved during IODP Expedition 373, I propose to tackle the following research questions in order to contribute towards deciphering climate dynamics on the Antarctic continent from the early Paleocene (and possibly Late Cretaceous) onwards:

- *What was the tempo and magnitude of terrestrial climate and ecosystem change on the Antarctic continent from the early Paleogene (or late Cretaceous) to late Neogene?*

  Our present understanding of climate and ecosystem change on the Antarctic continent during the late Mesozoic and Cenozoic is yet based on relatively short, 'snapshot-like' records. As a consequence, the nature of terrestrial climate and ecosystem change with regard to its development through time (i.e., gradual vs. stepwise) has remained unknown. Longer pollen and spore records to be potentially recovered during Expedition 373 could hence provide new, unprecedented insight into the tempo and characteristics of terrestrial climate and ecosystem change on Antarctica during the early Paleogene (or late Cretaceous) to late Neogene.

  Quantitative pollen-based climate reconstructions can allow numerical estimates of temperature and humidity variations, which then can be compared with marine-based information and the results of available model simulations. The differentiation between 'indigenous' and reworked pollen taxa, which has notoriously hindered the paleoenvironmental and paleoclimatic interpretation of Antarctica-derived pollen (notably *Nothofagus*) records notably from the Oligocene onwards, can greatly benefit from a comparison with the allochthonous, dinocyst-based climate signals derived from the same samples; alternatively, our present, yet unpublished work on material from

Expedition 318 shows that fluorescence may provide a tool for discerning between reworked and 'fresh' pollen grains.

- *How did terrestrial ecosystems on Antarctica respond to transient warming events of the early Paleogene?*
  Due to a lack of suitable archives, it has yet remained completely unknown how Antarctic ecosystems developed during transient warming events of the early Paleogene. Expedition 318 drilling at Site U1356 had to stop shortly before hyperthermals were reached. If Expedition 373 drilling will recover hyperthermal events, the study of pollen and spores from these cores will provide the first opportunity to unravel the response of terrestrial ecosystems on Antarctica to rapid, transient warming and subsequent cooling.

- *How representative are the findings of extremely warm climate conditions on Antarctica during the early Paleogene greenhouse world for the Antarctic continent as a whole?*
  The discovery of paratropical forests thriving along the Wilkes Land margin of Antarctica during the early Eocene as they emerged in the wake of Expedition 318 have repeatedly been questioned as "unbelievably warm", although this finding is firmly rooted in different and independent lines of evidence both from the terrestrial and the marine realm. New palynological data from the cores to be retrieved during Expedition 373 would be instrumental for further refining our understanding of early Paleogene warmth on Antarctica. Specifically, they could provide further evidence for such paratropical conditions, or they could allow the establishment of climatic gradients between different parts of the Antarctic continent.

- *How did Antarctic climates and ecosystems change across the Eocene-Oligocene transition?*
  The Eocene/Oligocene transition marks arguably the most pronounced step in Cenozoic climate evolution. To date, there are no stratigraphically complete records of this transition from circum-Antarctic settings due to the effects of glacially induced sea-level rise in proximal (i.e., near-Antarctic) settings. If Expedition 373 recovered a complete Eocene/Oligocene transition section, the analysis of pollen and spores would not only allow to quantitatively constrain the terrestrial climate change on Antarctica associated with this event, but also to document the vegetation change associated with it.

- *How did the structure of terrestrial ecosystems (i.e., vegetation units) change along with the climate development on Antarctica, and can the changes in vegetation units be connected to specific climatic thresholds?*
  The study of pollen and spores in the Expedition 373 cores will allow unprecedented insight into the development of vegetation units in dependence of climate conditions. Although the general characteristics of this development (with a replacement of high-diversity paratropical rainforests by cool rainforests and ultimately by shrublands and tundra have long been known, the transitions (and underlying climate conditions) between these units are yet unknown due to the incompleteness of the available archives.

Post-cruise research:

To address the research questions outlined above, I will apply for post-cruise research funding via the German IODP priority program directly after the expedition. Chances to obtain funding via this program are relatively high for scientists directly involved (i.e., shipboard or shorebased) in the respective expedition. I will apply for at least one PhD student project dedicated to work on Expedition 373 material. I will also be fully available for sampling and core processing within the framework of the shorebased science party at MARUM Bremen.

The laboratories (including HF lab) and technical equipment (including XRF core scanner, scanning electron and optical microscopy) of my research group at the Institute of Geosciences, Heidelberg University, will be fully available for research on Expedition 373 material, as will supporting staff (including lab technician and office management).

Own publications relevant for the scientific goals of IODP Expedition 373:

Bijl, P.K., Bendle, J.A., Bohaty, S.M., **Pross, J.**, Schouten, S., Tauxe, L., Stickley, C.E., McKay, R.M., Röhl, U., Olney, M., Sluijs, A., Escutia, C., Brinkhuis, H., Expedition 318 Scientists, 2013. Eocene cooling linked to early flow across the Tasmanian Gateway. *Proceedings of the National Academy of Sciences* 110, 9645-9650.

Bijl, P.K., **Pross, J.**, Warnaar, J., Stickley, C.E., Huber, M., Guerstein, R., Houben, A.J.P., Sluijs, A., Visscher, H., Brinkhuis, H., 2011. Environmental forcings of Paleogene Southern Ocean dinoflagellate biogeography. *Paleoceanography* 26, Art. Nr. PA1202.

Coccioni, R., Bellanca, A., Bice, D.M., Brinkhuis, H., Church, N., Deino, A., Lirer, F., Macalady, A., Maiorano, P., Mancin, N., McDaniel, A., Monechi, S., Montanari, A., Neri, R., Nocchi, M., **Pross, J.,** Rochette, P., Sagnotti, L., Sprovieri, M., Tateo, F., Touchard, Y., Williams, G.L., 2008. Integrated stratigraphy of the Oligocene pelagic sequence in the Umbria-Marche Basin (Northeastern Apennines, Italy): A potential GSSP for the Rupelian-Chattian boundary. *Geological Society of America Bulletin* 120, 487-511.

Contreras, L., **Pross, J.**, Bijl, P.K., Koutsodendris, A., Raine, J.I., van de Schootbrugge, B., Brinkhuis, H., 2013. Early to middle Eocene vegetation dynamics at the Wilkes Land Margin (East Antarctica). *Review of Palaeobotany and Palynology* 197, 119-142.

Contreras, L., **Pross, J.**, Bijl, P.K., O'Hara, R.B., Raine, J.I., Sluijs, A., Brinkhuis, H., 2014. Southern high-latitude terrestrial climate change during the Paleocene–Eocene derived from a marine pollen record (ODP Site 1172, East Tasman Plateau). *Climate of the Past* 10, 1-20.

Houben, A.P.J., Bijl, P.K., **Pross, J.**, Bohaty, S.M., Passchier, S., Röhl, U., Tauxe, L., van de Flierdt, T., Sangiorgi, F., Sluijs, A., Escutia, C., Brinkhuis, H., Expedition 318 Scientists, 2013. Reorganization of Southern Ocean plankton ecosystem at the onset of Antarctic glaciation. *Science* 340, 341-344.

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Passchier, S., Bohaty, S.M., Jiménez-Espejo, F., **Pross, J.,** Röhl, U., van de Flierdt, T., Escutia, C., Brinkhuis, H., 2013. Early Eocene to middle Miocene cooling and aridification of East Antarctica. *Geochemistry Geophysics Geosystems* 14, 1399-1410.

Pross, J., 2001. Paleo-oxygenation in Tertiary epeiric seas: Evidence from dinoflagellate cysts. Palaeogeography, Palaeoclimatology, Palaeoecology 166, 369-381.

Pross, J., Brinkhuis, H., 2005. Organic-walled dinoflagellate cysts as paleoenvironmental indicators in the Paleogene; a synopsis of concepts. Paläontologische Zeitschrift 79, 53-59.

Pross, J., Bruch, A.A., Mosbrugger, V., Kvacek, Z., 2001. Paleogene pollen and spores as a tool for quantitative paleoclimate reconstructions: the Oligocene of Central Europe *in* Goodman, D.K. & Clarke, R.T. (eds.), Proceedings of the IX International Palynological Congress, Houston, Texas, 1996. American Association of Stratigraphic Palynologists Foundation, Dallas, 299-310.

Pross, J., Contreras, L., Bijl, P.K., Greenwood, D.R., Bohaty, S.M., Bendle, J.A., Röhl, U., Tauxe, L., Jamieson, S.R., Stickley, C.E., van de Schootbrugge, B., Schouten, S., Escutia, C., Brinkhuis, H., Expedition 318 Scientists, 2012. Persistent near-tropical warmth on the Antarctic continent during the early Eocene epoch. *Nature* 488, 73-77.

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Pross, J., Klotz, S., 2002. Paleotemperature estimates for the Praetiglian/Tiglian (Plio-Pleistocene) pollen sequence of Lieth, northern Germany: Implications for the climate evolution of northwestern Europe. *Global and Planetary Change* 34, 253-267.

Pross, J., Klotz, S., Mosbrugger, V., 2000. Reconstructing palaeotemperatures for the Early and Middle Pleistocene using the mutual climatic range method based on plant fossils. *Quaternary Science Reviews* 19, 1785-1799.

Pross, J., Schmiedl, G., 2002: Early Oligocene dinoflagellate cysts from the northern Rhine Graben (SW Germany): Paleoenvironmental and paleoclimatic implications. Marine Micropaleontology 45, 1-24.

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Van Simaeys, S., Brinkhuis, H., **Pross, J.**, Williams, G.L., Zachos, J.C., 2005. Arctic dinoflagellate migrations mark the strongest Oligocene glaciations. *Geology* 33, 709-712.

CURRICULUM VITAE

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APPOINTMENTS

05/2014 – present	Director, Institute of Earth Sciences, Heidelberg University, Germany
10/2013 – present	Professor of Palynology and Paleoenvironmental Dynamics, Institute of Earth Sciences, Heidelberg University
07/2008 – 12/2013	Adjunct Senior Research Scientist, Lamont-Doherty Earth Observatory, Columbia University, New York, USA
10/2007 – 09/2010	Associate Director, Institute of Geosciences, University of Frankfurt, Germany
10/2005 – 09/2010	Speaker, Paleontology Division, Institute of Geosciences, University of Frankfurt
10/2004 – 09/2013	Professor of Micropaleontology and Paleoceanography, Institute of Geosciences, University of Frankfurt
10/2003 – 06/2004	Visiting Senior Researcher, Institute of Environmental Biology, University of Utrecht, The Netherlands
01/2000 – 09/2004	„Hochschulassistent“, Institute of Geosciences, University of Tübingen, Germany
01/1999 – 12/1999	Postdoctoral Research Fellow, Auburn University, Auburn, Alabama, USA
01/1998 – 12/1998	Postdoctoral Researcher, Institute of Geosciences, University of Tübingen
09/1995 – 12/1997	Co-founder and co-editor, mountaineering periodical "klettern" (www.klettern.de)
09/1992 – 12/1997	Graduate Research Assistant, Institute of Geosciences, University of Tübingen

EDUCATION

11/2002	Habilitation, University of Tübingen; *venia legendi* in Paleontology, Historical Geology and Quaternary Ecology Thesis title: "Paleoenvironmental and paleoclimatic change during the Meso- and Cenozoic: Evidence from marine and terrestrial palynomorphs"
12/1997	Ph.D. (grade: *magna cum laude*), University of Tübingen Thesis title: „Aquatic Palynomorphs from the Rupelian of the Upper Rhine Graben (Oligocene, Germany): Paleoecology, Biostratigraphy and Taxonomy“ Advisors: Prof. H.-P. Luterbacher, Dr. H. Gocht
01/1992	Diploma, Geology/Paleontology (grade: 1.0), University of Tübingen Thesis title: „Palynology of the Opalinuston Formation (Aalenian, Middle Jurassic) in SW Germany: Paleoecological and Biostratigraphical Implications” Advisors: Prof. H.-P. Luterbacher, Dr. H. Gocht
1988 – 1992	Graduate student, Geology/Paleontology, University of Tübingen
1987 – 1988	Graduate student, Geology/Paleontology, University of Oregon, USA
1983 – 1987	Undergraduate student, Geology/Paleontology, University of Stuttgart, Germany

SEAGOING EXPERIENCE

01/2010 – 03/2010	Paleontologist, IODP Expedition 318 "Wilkes Land Glacial History"
07/2003 – 09/2003	Paleontologist, ODP Leg 210 "Newfoundland Margin"
11/2001 – 12/2001	Shipboard Scientist, R.V. *Meteor* Expedition M 51/3 "Eastern Mediterranean Transect"

OTHER PROFESSIONAL EXPERIENCE AND SERVICE

Proposal Peer-Reviewer:	Alexander von Humboldt Foundation (Germany), European Research Council, German Academy of Sciences Leopoldina, German National Academic Foundation, German Research Foundation, Katholike Universiteit Leuven Research Council (Belgium), National Science Foundation (USA), Integrated Ocean Drilling Program, NASA Mars Fundamental Research Program (USA), Natural Sciences and Engineering Research Council of Canada, Natural Environment Research Council (GB), Netherlands Organisation for Scientific Research, Nuffield Foundation (GB)
Paper Peer-Reviewer:	Biogeosciences, Boreas, Climate of the Past, Earth and Planetary Science Letters, Earth-Science Reviews, Facies, Geology, Geological Society of London Special Publications, Global and Planetary Change, International Journal of Earth Sciences, Journal of Biogeography, Journal of the Geological Society of London, Marine Micropaleontology, Micropaleontology, Nature, Neues Jahrbuch für Geologie und Paläontologie, Newsletters on Stratigraphy, ODP Scientific Results, Palaeogeography-Palaeoclimatology-Palaeoecology, Palaios, Paleoceanography, Quaternary Science Reviews, Review of Palaeobotany and Palynology, Science, The Holocene, Zeitschrift der Deutschen Geologischen Gesellschaft
Journal Editor:	Newsletters on Stratigraphy (since 2008; with J. Erbacher)
Co-editor of Special Issue:	Studies on modern and fossil dinoflagellates in honour of Hans Gocht, Neues Jahrbuch für Geologie und Paläontologie, 219 (2001; co-editors: H.-P. Luterbacher, W. Wille)
Memberships:	American Association of Stratigraphic Palynologists (2004–2006 as “Director at Large“)
	American Geophysical Union
	German Paleontological Association
	German Scientific Earth Probing Consortium (founding member; since 2012 as “Vice Chairperson”)
	German Subcommission for Paleogene Stratigraphy

LIST OF PUBLICATIONS

(denotes graduate student or postdoctoral advisee first author; underlined papers are based on DSDP/ODP/IODP material)*

2016:

[100]***** Jakob, K.A., Wilson, P.A., Bahr, A., Bolton, C.T., **Pross, J.**, Fiebig, J., Friedrich, O., 2016. Glacial-interglacial productivity changes in the eastern equatorial Pacific upwelling system and its response to Plio-Pleistocene ice-sheet dynamics. *Paleoceanography* 31, 453-470.

[99] Schemmel, F., Niedermeyer, E.M., Schwab-Lavrič, V., Gleixner, G., **Pross, J.**, Mulch, A., 2016. Plant-wax δD values record changing Eastern Mediterranean atmospheric circulation patterns during the 8.2 ka BP climatic event. *Quaternary Science Reviews* 133, 96-107.

2015:

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[97] Bahr, A., Kaboth, S., Jiménez-Espejo, F.J., Sierro, F.J., Voelker, A.H.L., Lourens, L., Röhl, U., Reichart, G.J., Escutia, C., Hernández-Molina, F.J., **Pross, J.**, Friedrich, O., 2015. Persistent monsoonal forcing of Mediterranean Outflow Water dynamics during the late Pleistocene. *Geology* 43, 951-954.

[96] **Pross, J.**, Koutsodendris, A., Christanis, K., Fischer, T., Fletcher, W.J., Hardiman, M., Kalaitzidis, S., Knipping, M., Kotthoff, U., Milner, A.M., Müller, U.C., Schmiedl, G., Siavalas, G., Tzedakis, P.C., Wulf, S., 2015. The 1.35-Ma-long terrestrial climate archive of Tenaghi Philippon, northeastern Greece: Evolution, exploration and perspectives for future research. *Newsletters on Stratigraphy* 48, 253-276.

[95] Walliser, E.O., Schöne, B.R., Tütken, T., Zirkel, J., Grimm, K.I., **Pross, J.**, 2015. The bivalve *Glycymeris planicostalis* as a high-resolution paleoclimate archive for the Rupelian (early Oligocene) of Central Europe. *Climate of the Past* 11, 653-668.

[94] Friedrich, O., Norris, R.D., Wilson, P.A., Opdyke, B.N., Workshop Participants (including **J. Pross**), 2015. Newfoundland Neogene sediment drifts: transition from the Paleogene greenhouse to the modern icehouse. *Scientific Drilling* 3, 1-4.

[93] van Helmond, N.A.G.M., Sluijs, A., Sinninghe Damsté, J.S., Reichart, G.J., Voigt, S., Erbacher, J., **Pross, J.**, Brinkhuis, H., 2015. Freshwater discharge controlled deposition of Cenomanian-Turonian black shales on the NW European epicontinental shelf (Wunstorf, North Germany). *Climate of the Past* 11, 495-508.

[92] Riding, J.B., Feist-Burkhardt, S., Fensome, R.A., Harding, I.C., **Pross, J.**, 2015. Hans Gocht (1930–2014). *Palynology* 39, 143-144.

[91] Albert, P.G., Hardiman, M., Keller, J., Tomlinson, E.L., Bourne, A.J., Smith, V.C., Wulf, S., Zanchetta, G., Sulpizio, R., Müller, U.C., **Pross, J.**, Ottolini, L., Matthews, I.P., Blockley, S.P.E., Menzies, M.A., 2015. Revisiting the Y-3 tephrostratigraphic marker: new diagnostic glass geochemistry, improved age estimate and climatostratigraphical context. *Quaternary Science Reviews* 118, 105-121.

[90]* Koutsodendris, A., Brauer, A., Putyrskaya, V., Klemt, E., Zacharias, I., Sangiorgi, F., **Pross, J.**, 2015. Ecosystem response to human- and climate-induced environmental stress on an anoxic coastal lagoon (Etoliko, Greece) over the last century. *Journal of Paleolimnology* 53, 255-270.

[89] Kim, J.-H., Schouten, S., Rodrigo-Gámiz, M., Rampen, S., Marino, G., Huguet, C., Helmke, P., Buscail, R., Hopmans, E.C., **Pross, J.**, Sangiorgi, F., Middelburg, J.J., Sinninghe Damsté, J.S., 2015. Influence of deep-water derived isoprenoid tetraether lipids on the TEX^{H}_{86} paleothermometer in the Mediterranean Sea. *Geochimica et Cosmochimica Acta* 150, 125-141.

[88] Herb, C., Appel, E., Voigt, S., Koutsodendris, A., **Pross, J.**, Zhang, W., Fang, X., 2015. Orbitally tuned age model for the late Pliocene–Pleistocene lacustrine succession of drill core SG-1 from the western Qaidam Basin (NE Tibetan Plateau). *Geophysical Journal International* 200, 35-51.

2014:

[87]* Koutsodendris, A., **Pross, J.**, Zahn, R., 2014. Exceptional Agulhas leakage prolonged interglacial warmth during MIS 11c in Europe. *Paleoceanography* 29, 1062-1071.

[86]* Contreras, L., **Pross, J.**, Bijl, P.K., O'Hara, R.B., Raine, J.I., Sluijs, A., Brinkhuis, H., 2014. Southern high-latitude terrestrial climate change during the Paleocene–Eocene derived from a marine pollen record (ODP Site 1172, East Tasman Plateau). *Climate of the Past* 10, 1-20.

[85] Bechtel, A., Movsumova, U., **Pross, J.**, Gratzer, R., Ćorić, S., Sachsenhofer, R.F., 2014. The Oligocene Maikop series of Lahich (eastern Azerbaijan): Paleoenvironment and oil–source rock correlation. *Organic Geochemistry* 71, 43-59.

[84] Escutia, C., Brinkhuis, H., IODP Expedition 318 Scientists (including **J. Pross**), 2014. From greenhouse to icehouse at the Wilkes Land Antarctic Margin: IODP Expedition 318 synthesis of results *in* Stein, R., Blackman, D., Inagaki, F., Larsen, H.-C. (eds), *Developments in Marine Geology, Volume 7, Earth and Life Processes Discovered from Subseafloor Environments*, Elsevier, Amsterdam, pp. 295-328.

2013:

[81]* Fletcher, W.J., Müller, U.C., Koutsodendris, A., Christanis, K., **Pross, J.**, 2013. A centennial-scale record of vegetation and climate variability from 312 to 240 ka (Marine Isotope Stages 9c-a, 8 and 7a) from Tenaghi Philippon, NE Greece. *Quaternary Science Reviews* 78, 108-125.

[80] Regnery, J., Püttmann, W., Koutsodendris, A., Mulch, A., **Pross, J.**, 2013. Comparison of the paleoclimatic significance of higher land plant biomarker concentrations and pollen data: A case study of lake sediments from the Holsteinian interglacial. *Organic Geochemistry* 61, 73-84.

[79] Houben, A.P.J., Bijl, P.K., **Pross, J.**, Bohaty, S.M., Passchier, S., Röhl, U., Tauxe, L., van de Flierdt, T., Sangiorgi, F., Sluijs, A., Escutia, C., Brinkhuis, H., Expedition 318 Scientists, 2013. Reorganization of Southern Ocean plankton ecosystem at the onset of Antarctic glaciation. *Science* 340, 341-344.

[78] McAnena, A., Flögel, S., Hofmann, P., Herrle, J.O., Griesand, A., **Pross, J.**, Talbot, H.M., Rethemeyer, J., Wallmann, K., Wagner, T., 2013. Atlantic cooling associated with marine biotic crisis during the mid-Cretaceous period. *Nature Geoscience* 6, 558-561.

[77] Bijl, P.K., Bendle, J.A., Bohaty, S.M., **Pross, J.**, Schouten, S., Tauxe, L., Stickley, C.E., McKay, R.M., Röhl, U., Olney, M., Sluijs, A., Escutia, C., Brinkhuis, H., Expedition 318 Scientists, 2013. Eocene cooling linked to early flow across the Tasmanian Gateway. *Proceedings of the National Academy of Sciences* 110, 9645-9650.

[76] Passchier, S., Bohaty, S.M., Jiménez-Espejo, F., **Pross, J.,** Röhl, U., van de Flierdt, T., Escutia, C., Brinkhuis, H., 2013. Early Eocene to middle Miocene cooling and aridification of East Antarctica. *Geochemistry Geophysics Geosystems* 14, 1399-1410.

[75]* Koutsodendris, A., Lotter, A.F., Kirilova, E., Brauer, A., **Pross, J.**, 2013. Evolution of a Holsteinian (MIS 11) paleolake ecosystem based on a 12-kyr-long diatom record from Dethlingen (northern Germany). *Boreas* 42, 714-728.

[74]***** Contreras, L., **Pross, J.**, Bijl, P.K., Koutsodendris, A., Raine, J.I., van de Schootbrugge, B., Brinkhuis, H., 2013. Early to middle Eocene vegetation dynamics at the Wilkes Land Margin (East Antarctica). *Review of Palaeobotany and Palynology* 197, 119-142.

[73] Milner, A.M., Müller, U.C., Roucoux, K.H., Collier, R.E.L., **Pross, J.**, Kalaitzidis, S., Christanis, K., Tzedakis, P.C., 2013. Environmental variability during the Last Interglacial: A new high-resolution pollen record from Tenaghi Philippon, Greece. *Journal of Quaternary Science* 28, 113-117.

2012:

[72] **Pross, J.**, Contreras, L., Bijl, P.K., Greenwood, D.R., Bohaty, S.M., Bendle, J.A., Röhl, U., Tauxe, L., Jamieson, S.R., Stickley, C.E., van de Schootbrugge, B., Schouten, S., Escutia, C., Brinkhuis, H., Expedition 318 Scientists, 2012. Persistent near-tropical warmth on the Antarctic continent during the early Eocene epoch. *Nature* 488, 73-77.

[71]* Richoz, S., van de Schootbrugge, B., **Pross, J.**, Püttmann, W., Heunisch, C., Fiebig, J., Schouten, S., Wignall, P.B., 2012. Hydrogen sulphide poisoning of shallow seas following the end-Triassic extinction. *Nature Geoscience* 5, 662-667.

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APPLICATION TO PARTICIPATE IN AN IODP EXPEDITION

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Expedition Number 373: Antarctic Paleoclimate and Ice History

1. PERSONAL INFORMATION

Family name: Salzmann

First name: Ulrich

Current Position: Professor of Palaeoecology

Institution: Department of Geography, Northumbria University Newcastle

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Email: ulrich.salzmann@unn.ac.uk

Country of citizenship: Germany

Place of birth/date of birth: Wuppertal / 14.05.1963

Gender: male

Education (highest degree, including year PhD was received / is expected): PhD, 1998

Are you currently a student? NO Expected Graduation Date:

2. EXPEDITION INFORMATION

FULL

Summary of proposed participation, including area of scientific interest, current research and participation plan (maximum 250 characters with space – more detail should be included in the Letter of Interest):

My research focusses on Paleogene to Neogene Antarctic and Arctic vegetation change, climate variability, ecosystem response and land-ocean interaction. I am specialised on terrestrial Palynology with additional knowledge of marine dinoflagellate cysts.

Prior involvement with DSDP/ODP/IODP and nature of involvement (expedition number, shipboard/shore-based participation, co-chief, etc):

- Co-Proponent on **IODP 379** (2019-20) proposal "Drilling in the Amundsen Sea Embayment: Reconstructing West Antarctic Ice Sheet dynamics"
- Shore based participation on IODP Wilkes Land expedition **IODP 318**, Antarctica, (2010-2011)
- Collaborative project with Bjerkness Center and PhD ECORD Research Grant on **IODP 642**, Norway (2013-2014)
- Principal Investigator on NERC Grant (2010-2014): "Southern High Latitude Vegetation and Climate Change"; incl. **IODP 189** "Tasman Gateway" and **IODP 318** Wilkes Land

Post-cruise science support to achieve the proposed scientific objectives 1) future funding scheme and 2) support from host institution (e.g. staff, facilities)

Future Funding scheme: I will apply for a NERC IODP Moratorium Award application for participating expedition plus post-doctoral researcher for post-cruise moratorium period. I am also planning to submit a NERC Standard Grant for further support.

Support from host institute:

- Fully funded 3-year PhD position
- Sabbatical for PI during post-cruise moratorium period
- Technician support for palynological sample processing
- Use of lab facilities, incl. fully equipped palynological labs and microscopes

Three scientific and/or personal references

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3. SCIENTIFIC EXPERTISE

For Scientist Jobs Descriptions visit: http://iodp.tamu.edu/participants/scientist_jobs.html

Please indicate your area(s) of expertise (maximum 3)

Discipline	Mark with X	Speciality
microbiologist		
organic and inorganic geochemist/biogeochemist		
physical properties specialist		
sedimentologist		
structural geologist		
paleontologist	X	Palynology (with terrestrial focus)
paleomagnetist		
petrologist		
hydrogeologist		
Other	x	data model comparison

4. ADDITIONAL DOCUMENTS

Please, provide the following documents:

- Letter of interest, including details about area of scientific interest, current research, expedition participation plan and post-cruise research
- CV and Publication list
- Letter of recommendation (for PhD students)
- See also: http://www.essac.ecord.org/flyer/Guidelines_for_Applying_to_sail.pdf

Please, send your application form as *a MS Word document* and the additional documents in *PDF format* (preferably as one file) by email to Jan Behrmann and Hanno Kinkel at the ESSAC office: essac@geomar.de.

In addition to the ESSAC application, all applicants ***must inform their national office*** (if applicable) ***and national delegate*** and send a copy of the application documents. ECORD does not provide funds for participation; the national offices or national delegates can provide information regarding travel support, post-cruise funding opportunities, etc.

See http://www.essac.ecord.org/index.php?mod=about&page=ESSAC for a list of the national contact persons.

Letter of Interest IODP 373 – Ulrich Salzmann

1. My research expertise and interests

I am a Palynologist and Geoscientist with more than twenty years of research experience in the palynology and biogeography of tropical, temperate and polar regions. I have a track record in the reconstruction of Earth's past environments using proxy data and climate models. I have published over 60 peer-reviewed works and am contributing author for the 5th Assessment Report of the Intergovernmental Panel on Climate Change. My palynological expertise includes the taxonomy and morphology of Cenozoic pollen and spores, with some additional experience in identifying Antarctic dinoflagellates. My research focusses on high-latitude terrestrial climate and vegetation change.

The polar regions play a key role in our understanding of environmental change in a warmer-than-present world. I am particularly interested in the forcing and feedback mechanisms controlling polar glaciation throughout the past Greenhouse to Icehouse transition. One of my projects quantifies regional differences and magnitude of Pliocene polar amplification in the Arctic region (offshore Norway). In Antarctica, my research assesses vegetation change and the role of greenhouse gases vs. plate tectonics, and the sensitivity of the West Antarctic ice sheet to past climate change. To do this, I am working with sediment material from both terrestrial outcrops (e.g. New Zealand and Antarctic Peninsula), and marine sediment cores drilled by the International Ocean Discovery Programme IODP. My research projects comprise all geological Epochs from the late Cretaceous to the Holocene. Examples include the reconstruction of a) Holocene wind changes on sub-Antarctic South Georgia, b) Pliocene and Cretaceous environments of the Antarctic Peninsula, and c) Eocene to Miocene vegetation and climate change of East Antarctica and the Tasmanian Sea.

2. Primary research goals and plan

The design and site selection of the proposed Antarctic IODP expedition 373 is ideal for terrestrial palynology. The reconstruction of terrestrial vegetation using pollen records from marine sediment cores taken several 100 kms offshore is often hampered by low taxa diversity, overrepresentation of wind-dispersed long-distance palynomorphs and low pollen concentration. The IODP 373 coring sites are located very close to the Antarctic mainland and therefore provide a unique opportunity to generate a detailed high resolution reconstruction of vegetation and climate on land. However, the close proximity of the sites to the continents has the disadvantage that it strongly increases the chance of coring reworked sediments, microfossils and hiatuses. By using red fluorescence on sample material from Site U1356 (East Antarctica, Wilkes Land Leg 318) my former PhD student Stephanie Strother has developed an essential new tool required to quantify reworking and to accurately reconstruct Cenozoic terrestrial climate change on Antarctica using fossil pollen and spores. I am planning to apply this method on the proposed Antarctic IODP expedition 373. This will allow us to tackle fundamental research questions related to the expeditions objectives. **My research goals and interests in this IODP 373** expedition include the following questions:

a) When did Cenozoic climate cooling start on East Antarctica which led to a stepwise change from a subtropical lush early Eocene forest to an impoverished Miocene tundra vegetation? What is the role of the Eocene-Oligocene transition, which is widely considered to be the biggest step in Cenozoic climate evolution? Most recent results from Wilkes Land suggest that major vegetation change started well before the onset of the Oligocene.

b) How did vegetation respond to orbital cyclicity and potentially associated waxing and waning of glaciers during the Oligocene? Do we see a continuous decline in plant diversity? What are the mechanism of postglacial vegetation recolonisation? When did the transition from *Nothofagus*-dominated forests to *Nothofagus*-dominated tundra vegetation take place? How uniform was the vegetation composition on Antarctica during the Cenozoic? Our current knowledge of Antarctic vegetation may be biased by the low temporal and spatial resolution of existing records.

c) If Miocene record will be cored, I am particular interested in reconstructing the Oligocene-Miocene transition. How important was the Mi1 glacial expansion? The Wilkes Land record suggest that temperate, woody vegetation disappeared after Mi1. When did Antarctic tundra vegetation disappear following the Miocene Climate Optimum?

3. Opportunities for financial support and facilities at home institution

Over the last 6 years the Department of Geography at Northumbria University Newcastle and its "**Cold and Palaeoenvironment Research Group**" (www.northumbria.ac.uk/cape) has realised a greater than six-fold growth in research staff, and multi-million-pound funding has been secured competitively through multiple grants and facilities awards. The **well-equipped palaeoenvironmental laboratories** include HF-fume hoods, a microscope suite (light, polarized, fluorescence, SEM) and pollen reference collections.

If invited to the 373-expedition, my University will support me with a **fully funded PhD student** to work on the core material. I will further receive a **6-months research sabbatical** to be able to fully focus on the expedition tasks during the post-moratorium period. My department will also support me with t**echnical support** for sample processing and I have access to all lab facilities, including fully equipped HF labs and microscopes.

I will also apply for a **NERC IODP Moratorium Award** for participating in the expedition plus a **post-doctoral researche**r for the post-cruise moratorium period. If the samples and initial results are promising, I am also planning to submit a full **NERC Standard Grant** for postdoctoral funding to allow further 3-years palynological research on the core material.

4. Previous involvement in DSDP/ ODP/ IODP or other scientific expeditions

I participate in several IODP led research projects and am co-Proponent on the successful **IODP 379** (2019-20) proposal "Drilling in the Amundsen Sea Embayment: Reconstructing West Antarctic Ice Sheet dynamics". I have been shore based researcher on the IODP Wilkes Land expedition **IODP 318**, East Antarctica (2010-2011). I have worked on Miocene palynology and my former PhD student Stephanie Strother successfully finished her PhD last year, investigating Oligocene vegetation and climate change at Wilkes Land. I have also been Principal Investigator on the NERC-funded project (2010-2014) "Southern High Latitude Vegetation and Climate Change", which included analysis of Eocene to Oligocene pollen and spores from **IODP Leg 189** "Tasman Gateway". I also have an ongoing research project with the Bjerkness Center in Bergen, Norway, on Arctic climate change, with my PhD student Sina Panitz working (with support from ECORD Research Grant) on palynological records (pollen and dinoflagellates) from **IODP 642**, offshore Norway. I conducted both marine and terrestrial research in Brazil and Africa for several years and am therefore experienced in participating in and leading scientific expeditions under difficult environmental conditions.

CURRICULUM VITAE

Ulrich Salzmann

Northumbria University, Department of Geography, Faculty of Engineering & Environment, Newcastle upon Tyne, NE1 8ST, UK; e-mail: ulrich.salzmann@unn.ac.uk

Research Expertise

- Palynology (Paleogene, Neogene and Quaternary)
- Palaeoecology, Palaeoclimatology and Biogeography
- Data-model comparison and climate model validation
- Vegetation History and Climate Change
- Projects: Antarctica, Africa, Australia, Brasil, China, New Zealand, Norway

Academic Appointments

since 2014 **Professor of Palaeoecology,** Northumbria University, Newcastle, UK

2010-2013 **Northumbria University, Geography, Newcastle upon Tyne, UK**
Reader and Senior Lecturer in Physical Geography

2005-2010 **British Antarctic Survey, Geological Division, Cambridge, UK**
Senior Palynologist, Project: *Icehouse Earth - Stability or Dynamism* (NERC)

2003-2005 **Center for Tropical Marine Ecology, Bremen, Germany & UFPA, Belém, Brazil**
Research Fellow, Project: *Mangrove Dynamics and Management* (MADAM)

1994-2002 **Institute for Archaeology & Archaeobotany, University Frankfurt, Germany**
PhD/PDRA, Project: *West African Savanna* Collaborative Research Centre (DFG)

1992-1994 **Department of Geography, University of Würzburg, Germany**
Research Assistant, Project: *Environmental History of the Tunisian semi-desert*

Academic Qualifications

12/1998 **Dr. rer. nat.** (~ **PhD) in Natural Sciences** (University of Würzburg, Germany)
Title: *The Holocene Vegetation and Climate History of the West African Savanna*

02/1994 **Diplom (~ MSc) in Physical Geography**, **Botany** & **Geology** (Univ. of Würzburg)

Research Grants and Projects

- NERC Large Grant (pending, outline-proposal approved) "*SWEET: Super-Warm Early Eocene Temperatures and climate: understanding the response of the Earth system to high CO_2 through integrated modelling and data*" (Co-Investigator)
- Royal Society International Grant (2015-2017); *"The Pliocene of Northwest China: Understanding aridification in a warmer world";* £ 11,411 + PhD student; (Principal Investigator)
- International Ocean Discovery Program, **IODP 379** (2019-20) *"Drilling in the Amundsen Sea Embayment: Reconstructing West Antarctic Ice Sheet dynamics"* (Co-Proponent; approved)
- NERC Grant (2011-2012): "*Late Pliocene soils and lakes: A global data set for the analysis of climate feedbacks in a warmer world"* NE/I016287/1, £45,886 (Principal Investigator)
- PhD (Univ. funded) and ECORD Research Grant 2015-16; **IODP 642**, Norway: *"Pliocene Arctic climate and variability of the North Atlantic Current"*
- IODP Wilkes Land expedition **IODP 318**, Antarctica, (2010-2011) Shore-based researcher plus university-funded PhD student on *"Oligocene vegetation and climate change"*
- NERC New Investigator Grant (2010-2014): *"Southern High Latitude Vegetation Response to Rapid Climate Change at the Cenozoic Greenhouse to Icehouse Transition",* NE/H000984/1, £91,863 (Principal Investigator); included **IODP 189** "Tasman Gateway"
- British Antarctic Survey (2012-2013). "*Holocene vegetation and climate history of sub-antarctic Annenkov Island*". (Collaborator).

- NERC-BGS PhD Award BUFI, (2008-2011): "Land *Cover in a Warmer World: Reconstructing Global Late Miocene and Pliocene Vegetation and Climate Distributions"* £66,200, Co-Supervisor.
- VW-Foundation Award (2001-2002): *"The Dahomey Gap: Vegetation History of the Forest/Savanna boundary in Benin and Nigeria",* University of Frankfurt, Germany (~£ 98,000, Co-Investigator, contribution to proposal 90%*****)
- DFG Collaborative Research Centre 268 (1999-2001): "*Vegetation History and Archaeobotany of West Africa*"; University of Frankfurt, Germany, sub-project funded by German Research Council (~£ 520,000, contribution to proposal 60%*****)
- German Academic Exchange Service (DAAD, 11-12.1991), travel award for visiting Monash University, Melbourne and ANU, Canberra, Australia

***** Please note: Until 2007 German funding regulations did not allow applicants to lead proposals when bidding for own salary and position. My contribution to proposal writing in Germany is therefore separately indicated.

■ Teaching Experience

Lecturing at Northumbria University

- Palaeoecology and Biogeography (Module Leader)
- Introduction to Physical Environments
- Cold and Palaeoenvironments (Module Leader)
- Polar Environments
- Dissertations, Tutorials and Laboratory Courses in Physical Geography
- Field excursions to Tenerife, Sierra Nevada (Spain) and UK

PhD /Postdoctoral Supervision (since 2010)

- Calian Hazell (PhD, since 2016): "*Palaeoenvironmental change in the eastern Mediterranean over the last 20 million years"* (Co-Supervisor)
- Adam Bermingham (PhD, since 2016): "*Determining the legacy of long-term anthropogenic impact on biodiversity and ecosystem services in Belize*" (Co-Supervisor)
- Florian Schwarz (PhD, since 2015): "*Pliocene climate and vegetation of Northwest China*" (Principal Supervisor)
- Jack Longmann (PhD, since 2014): *"Tracing the smelting of metals in the Carpathian region throughout the Holocene"* (Co-Supervisor)
- Sina Panitz (PhD, since 2014): *"Pliocene Arctic climate and variability of the North Atlantic Current"* (Principal Supervisor)
- Stephanie Strother (PhD, completed 2015): **"***Cenozoic vegetation and climate change of Antarctica"* (Principal Supervisor)
- Matthew Pound (PhD completed 2011, Postdoc 2012-15): "*Paleogene/Neogene Vegetation and Climate Change*".

■ Professional Activities and Committee Memberships

- Invited contributing author for the Fifth Assessment Report of the *Intergovernmental Panel on Climate Change* (IPCC 2013, AR5)
- Member of *Natural Environment Research Council NERC Peer Review College*
- Terrestrial Data-working group leader of DeepMIP (Paleocene/Eocene) www.deepmip.org.
- Steering Committee member of EPSRC-funded *"Past Earth Network"* (www.pastearth.net)
- Steering committee member of PAGES workgroup *"Pliocene climate variability over glacial-interglacial timescales (PlioVAR)"*
- Advisory Board Member of *Pliocene Model Intercomparison* Project (PlioMIP/PMIP)
- Invited member of the US Geological Survey *PRISM* Paleoclimate Research Group
- Guest Editor for "*Palaeogeography, Palaeoclimatology, Palaeoecology*", 2011
- Member of the *American Association of Stratigraphic Palynologists*, (AASP); *Micropalaeontological Society* (TMS) and *European Geosciences Union* (EGU)

Invited Speaker at Conferences and Workshops (since 2010)

Since 1996 I gave more than 90 conference presentations and have been invited in the last 6 years to the following events:

2016	April	European Geosciences Union General Assembly, Vienna, Austria
	January	Eocene Model Intercomparison (EoMIP), NCAR Boulder Colorado
2015	July	26th International Union of Geodesy & Geophysics (IUGG), Prague, Czech
	April	Visiting Scientist, Bjerknes Center Climate Research, Bergen, Norway
	March	ICDP North Sea drilling workshop CONOSC, Utrecht, Netherlands
	March	Research Seminar, Lausanne University, Switzerland
2014	September	International Union Geologists' Association, University Leicester, UK
	September	Pliocene Workshop, ICREA, Barcelona, Spain, (session chair)
	July	ACACIA Workshop, University College London, UK
	May	GINGKO biodiversity, Senckenberg Museum, Frankfurt, Germany
2013	March	Biodiversity Kolloquium, University Göttingen, Germany
	February	Royal Meteorological Society, National Meeting, London, UK
2012	May	Palaeomodel Intercomparison Conference, PMIP, Crewe, UK
	April	PRISM US Geological Survey workshop, Fort Collins, Denver, USA
2011	October	Research Seminar, School of Biological Science, University Durham, UK
	September	NERC National Centre for Atmospheric Science (NCAS), Birmingham, UK
	August	PlioMIP/PMIP; US Geological Survey - Reston, Virginia, USA
	February	Africa Workshop, Max Planck Institute Meteorology, Hamburg, Germany
2010	December	54th Meeting Palaeontological Association, Ghent University, Belgium
	April	European Geosciences Union, Vienna, Austria (session convener)

Scientific Peer-Reviewing

Nominated referee for:

- Natural Environment Research Council (NERC) – Member of NERC Peer Review College
- European Research Council (ERC)
- Research Foundation-Flanders - Fonds Wetenschappelijk Onderzoek Vlaanderen (FWO)
- ERA-Net BiodivERsA within the European Union's 7th framework programme
- German Research Foundation / Deutsche Forschungsgemeinschaft (DFG)
- National Science Foundation (NSF)
- Natural Sciences and Engineering Research Council of Canada (NSERC)
- French National Research Agency (L'Agence Nationale de la Recherche)
- National Geographic
- Royal Society

Reviewer for scientific journals:

Antarctic Science; Climate of the Past; Earth and Planetary Science Letters; Geobios; Geology; Journal of Biogeography; Journal of Quaternary Science; Naturwissenschaften; Nature Communications; Palaeogeography, Palaeoclimatology, Palaeoecology; Palynology; Philosophical Transactions of the Royal Society A; PNAS; Quaternary Research; Quaternary Science Reviews; Quaternary International; Scientific Reports; Stratigraphy; Vegetation History & Archaeobotany.

Media & Public Outreach

- *New Scientist* article/interviewed on EGU April 2016 on IODP 318 Wilkes Land presentation
- *Natural History Society*, Hancock Museum Newcastle: Invited public talk, February 2015.
- *BBC* Future report on Pliocene Model Intercomparison Project: "Climate change: A Prehistoric window on Earth's Future" (online, 23.4.2013).
- *Natural History Society*, Hancock Museum Newcastle: Invited public talk, February 2011.
- The *Journal*/ *Evening Chronicle* article about my Pliocene NERC grant: "Learning from Past to Learn for Future" (article, page 19, 3.02.2011).

- Interview with *New Scientist* (02/2011) on Pliocene Antarctica article in Palaeo3, 2011.
- *Telegraph* (published 7.12.2009), *Le Monde* (published 7.12.2009), *BILD* (published 6.12.2009), *Frankfurter Allgemeine Zeitung* (published 9.12.2009) about Nature Geoscience 2010.
- *Radio Deutschlandfunk* and *Planet Earth*: "Der Blick zurück nach vorn" (Interviewed on EGU 2009 about my Roy Soc A paper; broadcasted 26.06.2008)

Publications

Google Scholar Citation Index (26.08.2016): 1909 citations, h-index 25, i10-index 32.

Antarctic / Arctic related publications:

Sangiorgi, F., Bijl, P.K., Passchier, S., Salzmann U., Schouten S., Pross, J., Bohaty, S., McKay R., van der Flierdt, T., Levy, R., Williams, T., Escutia C., Brinkhuis H. (in revision): Ocean temperatures and the stability of the East Antarctic ice sheet during the mid-Miocene. *Nature Communications.*

Salzmann, U., Strother, S., Sangiorgi, F., Bijl, P., Pross, J., Woodward, J., Escutia, C., Brinkhuis, H. (2016) Oligocene to Miocene terrestrial climate change and the demise of forests on Wilkes Land, East Antarctica. In: *Geophysical Research Abstracts* Vol. 18: 2717.S

Strother, S., Salzmann U., Sangiorgi, F., Bijl, P., Pross, P., Woodward, J; Pound M.J. (in prep): Identification of reworking in Eocene to Miocene pollen records from offshore Antarctica: a new approach using red fluorescence. *Biogeosciences.*

Panitz, S., Salzmann, U., Risebrobakken, B., De Schepper, S., and Pound, M. J. (2016). Climate variability and long-term expansion of peatlands in Arctic Norway during the late Pliocene (ODP Site 642, Norwegian Sea), *Climate of the Past*, 12, 1043-1060.

Strother, S., Salzmann, U., Roberts, S, Hodgson, D.A., Woodward, Nieuwenhuyze, J., Sterken, M., Verleyen, E., Vyverman, W., Moreton, S. (2015) Changes in Holocene climate and the intensity of southern westerly winds based on a high-resolution pollen record from sub-Antarctic South Georgia. *The Holocene.* Vol. 25(2) 263–279.

Pound MJ, Lowther RI, Peakall J, Chapman RJ, Salzmann U (2015) Palynological evidence for a warmer boreal climate in the Late Pliocene of the Yukon Territory, Canada. *Palynology*. 39 (1): 91-102

De Schepper, S., Gibbard P., Salzmann U. & Ehlers, J. (2014) A global synthesis of the marine and terrestrial evidence for glaciation during the Pliocene Epoch. *Earth Science Reviews* 135: 83–102.

Howell, F. W., Haywood, A. M., Dolan, A. M., Dowsett, H. J., Francis, J. E., Hill, D. J., Pickering, S. J., Pope, J. O., Salzmann, U., and Wade, B. S. (2014). Can uncertainties in sea ice albedo reconcile patterns of data-model discord for the Pliocene and 20th/21st centuries? *Geophysical Research Letters*, doi: 10.1002/2013GL058872.

Houben, AJP., PK. Bijl, J. Pross, S. M. Bohaty, S. Passchier, CE. Stickley, U. Roehl, S. Sugisaki, L. Tauxe, T. van de Flierdt, M. Olney, F. Sangiorgi, A. Sluijs, C. Escutia, H. Brinkhuis, CE Dotti, A. Klaus, A. Fehr, T. Williams, JAP. Bendle, SA. Carr, RB. Dunbar, JA., Flores, JJ. Gonzalez, TG. Hayden, M. Iwai, FJ. Jimenez-Espejo, K. Katsuki, GS. Kong, RM. McKay, M. Nakai, SF. Pekar, C. Riesselman, T. Sakai, U. Salzmann, PK. Shrivastava, S. Tuo, K. Welsh, M. Yamane. (2013) Reorganization of Southern Ocean plankton ecosystem at the onset of Antarctic glaciation. *Science* 340 (6130):341-4.

Salzmann, U., Nelson, A.E., Riding, J.B. Smellie, J. L. (2011) How likely is a green Antarctic Peninsula during warm Pliocene interglacials? A critical reassessment based on new palynofloras from James Ross Island. *Palaeogeography, Palaeoclimatology, Palaeoecology, 309 (1-2): 73-82.*

Nelson, A.E., Smellie, J. L., Hambrey, M.J., Williams, M., Vautravers, M.J, Salzmann, U., Mc Arthur, J. and Regelous, M. (2009) Neogene glacigenic debris flows on James Ross Island,

northern Antarctic Peninsula, and their implications for regional climate history. *Quaternary Science Reviews*. 3138-3160.

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Other publications:

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Pound, Matthew and Salzmann, Ulrich (2016) Global vegetation distribution and terrestrial climate evolution at the Eocene-Oligocene transition. *Geophysical Research Abstracts* Vol. 18: 2724.

Haywood, A. M., Dowsett, H. J., Dolan, A. M., Rowley, D., Abe-Ouchi, A., Otto-Bliesner, B., Chandler, M. A., Hunter, S. J., Lunt, D. J., Pound, M., and Salzmann, U. (2016): Pliocene Model Intercomparison (PlioMIP) Phase 2: scientific objectives and experimental design, *Climate of the Past*, 12, 663–675, 2016

McClymont, Erin, Dekens, Petra, Dowsett, Harry, Dupont, Lydie, Haywood, Alan, Rosell-Melé, Antoni and Salzmann, Ulrich (2015) Pliocene climate variability over glacial-interglacial timescales(PlioVAR) working group. *Past Global Changes Magazine*, 23 (2). p. 82.

Schulz, E., Hachicha, T., Marquer, L., Pomel, S., Salzmann, Ulrich, Abichou, A. (2014) The distant chant. Climate reconstruction and landscape history. The last two millennia in Southeast Tunisia. *Zentralblatt für Geologie und Paläontologie*, Teil I, 2014 (1). pp. 355-386.

Pound, M. J., Tindall, J., Pickering, S. J., Haywood, A. M., Dowsett, H. J., and Salzmann, U. (2014) Late Pliocene lakes and soils: a data-model comparison for the analysis of climate feedbacks in a warmer world. *Climate of the Past* 10: 167-180. doi: 10.5194/cp-10-167-2014.

Salzmann, U., Dolan, A.M., Haywood, A M., Chan W.-L., Hill, D.J., Abe-Ouchi, A., Otto-Bliesner, B., Bragg, F., Chandler, M. A., Contoux, C., Dowsett, H.J., Jost, A., Kamae, Y., Lohmann, Lunt, D. J., Pickering, S.J., Pound M.J., Ramstein, G., Rosenbloom, N.A., Sohl, L., Stepanek, C., Ueda, H, Zhang, Z. (2013): Challenges in reconstructing terrestrial warming of the Pliocene revealed by data-model discord. *Nature Climate Change* 3: 969–974.

Masson-Delmotte, V., M. Schulz, A. Abe-Ouchi, J. Beer, A. Ganopolski, J.F. González Rouco, E. Jansen, K. Lambeck, J. Luterbacher, T. Naish, T. Osborn, B. Otto-Bliesner, T. Quinn, R. Ramesh, M. Rojas, X. Shao and A. Timmermann, 2013 [Salzmann U. contributing author): Information from Paleoclimate Archives. In: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA. Pp. 383 – 464.

Dowsett, H.J., Foley, K.M., Stoll, D.K., Bentsen, M., Otto-Bliesner, B.L., Bragg, F.J., Chan, W., Chandler, M.A., Contoux, C., Jonas, J.A., Jost, A., Kamae, Y., Lohmann, G., Lunt, D.J., Nisancioglu, K.H., Abe-Ouchi, A., Ramstein, G., Riesselman, C.R., Robinson, M.M., Rosenbloom, N.A., Salzmann, U., Sohl, L., Stepanek, C., Strother, S.L., Ueda, H., Ying, Q.,

Zhang, Z. (2013) Sea Surface Temperature of the mid-Piacenzian Ocean: A Data-Model Comparison. *Scientific Reports 3,* doi:10.1038/srep02013.

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Haywood, A.M., Hill, D.J., Dolan, A.M., Otto-Bliesner, B.L., Bragg, F., Chan, W.L., Chandler, M.A., Contoux, C., Dowsett, H.J., Jost, A., Kamae, Y., Lohmann, G., Lunt, D.J., Abe-Ouchi, A., Pickering, S.J., Ramstein, G., Rosenbloom, N.A., Salzmann, U., Sohl, L., Stepanek, C., Ueda, H., Yan, Q., Zhang, Z. (2013) Large-scale features of Pliocene climate: results from the Pliocene Model Intercomparison Project. *Climate of the Past* 9, 191-209.

Haywood, A.M., Dolan, A.M., Pickering, S.J., Dowsett, H.J., Hill, D.J., Lunt, D.J, Salzmann, U., Valdes, P.J. (2013). On the identification of a Pliocene time slice for data-model comparison. *Philosophical Transactions of the Royal Society A*, 371: p. 20120515.

Bradshaw, C. D., Lunt, D. J., Flecker, R., Salzmann, U., Pound, M. J., Haywood, A. M., Eronen, J. T. (2012) The relative roles of CO2 and palaeogeography in determining late Miocene climate: results from a terrestrial model–data comparison, *Climate of the Past*, 8, 1257-1285.

Neumann, K., Bostoen, K., Byer, R., Clist, B., Denham, T., Eggert, M., Eichhorn, B., Hildebrand, E., Höhn, A., Maley, J., de Maret, P., Oslisly, R., Ozainne, S., Salzmann, U., Schwartz, D., Tchiengué, B. (2012). Comment on „Intensifying Weathering and Land Use in Iron Age Central Africa". *Science*. Vol. 337 no. 6098 p. 1040.

Lunt D.J., Haywood, A.M., Schmidt, G.A., Salzmann, U., Valdes, P.J. and Dowsett H.J. (2012). On the causes of mid-Pliocene warmth and polar amplification*. Earth and Planetary Science Letters* 321-322: 128–138. doi: 10.1016/j.epsl.2011.12.042

Pound, M. J., Haywood, A.M., Salzmann, U., Riding J.B. (2012): Global vegetation dynamics and latitudinal temperature gradients during the mid to late Miocene (15.97-5.33 Ma). *Earth-Science Reviews,* 112 (1-2): 1-22.

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Richardson, K., Steffen, W., Liverman, D. and Writing Team (2011) *Climate Change: Global Risks, Challenges and Decisions*. Cambridge University Press. Cambridge. 524 p.

Pound, M. J., Haywood, A.M., Salzmann, U., Riding J.B., Lunt D.J. and Hunter S. (2011) A Tortonian (Late Miocene, 11.61-7.25 Ma) global vegetation reconstruction. *Palaeogeography, Palaeoclimatology, Palaeoecology,* 300 (1-4): 29-45.

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APPLICATION TO PARTICIPATE IN AN IODP EXPEDITION

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Apply to Sail Application Form

Expedition Number 373: Antarctic Paleoclimate and Ice History

1. PERSONAL INFORMATION

Family name: TALARICO

First name: FRANCO MARIA

Current Position: PROFESSOR OF PETROLOGY

Institution: UNIVERSITY OF SIENA (ITALY)

Address: VIA LATERINA 8

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Tel. Work: +39 0577 233812
Tel. Home: +39 340 3161371
Fax: +39 0577
Email: talarico@unisi.it

Country of citizenship: ITALY

Place of birth/date of birth: IVREA (TORINO)/08 DEC 1060

Gender: MALE

Education (highest degree, including year PhD was received / is expected):

POSTGRADUATE GEOLOGICAL SCIENCE

Are you currently a student? NO Expected Graduation Date: NA

2. EXPEDITION INFORMATIO

Summary of proposed participation, including area of scientific interest, current research and participation plan (maximum 250 characters with space – more detail should be included in the Letter of Interest):

Petrology of igneous, sedimentary and metamorphic rocks occurring as granule to boulder grain size clasts, and AFT and microchemical data on detrital apatite in glacial and interglacial sediments, are essential data to improve sedimentological and numerical models for the East Antarctic Ice Sheet, and to unravel the coupled sedimentary-tectonic processes in an extended time window in a key region of the Antarctic continental margin. I have access to over 1000 rock samples and field data collected during previous expeditions in the region including Mertz and Ninnis glaciers. The petrological data can be efficiently integrated with the core physical data to constrain ice dynamic scenarios and improve our knowledge of glacimarine processes in proximal and distal setting. The reconstructed paleogeographic scenarios can be compared and discussed with those documented by provenance studies in the Ross Sea record. Partecipation as either full or shore-based will include clast logging and sampling for a detailed petrographical characterization (including FT and microchemical data on detrital apatite) and contribution to sedimentological modelling.

Prior involvement with DSDP/ODP/IODP and nature of involvement (expedition number, shipboard/shore-based participation, co-chief, etc):

No previous involvement in DSDP/ODP/IODP but full time involvement in the multi-years drilling projects: Cape Roberts CRP1, CRP-2, CRP-3 and ANDRILL MIS and SMS. Acting co-chief in ANDRILL SMS. Petrology discipline leader in ANDRILL SMS. Chair of MASIC (McMurdo Science Implementation Committee)

Post-cruise science support to achieve the proposed scientific objectives 1) future funding scheme and 2) support from host institution (e.g. staff, facilities)

Necessary funds already available at the University of Siena and additional funds provided by the Italian Antarctic Program. Complete support in term of salary and technical facilities in my Department, University of Siena

Three scientific and/or personal references

M. Zattin , D. Pace, B. Andreucci, F. Rossetti, F. Talarico (2014). Cenozoic erosion of the Transantarctic Mountains: A source-to-sink thermochronological study. Tectonophysics 09/2014; DOI:10.1016/j.tecto.2014.05.022

Ellen A. Cowan, Poul Christoffersen, Ross D. Powell, Franco M. Talarico (2014). Dynamics of the late Plio-Pleistocene West Antarctic Ice Sheet documented in subglacial diamictites, AND-1B drill core. Global and Planetary Change 08/2014; DOI:10.1016/j.gloplacha.2014.05.011

F. TALARICO, MCKAY R, POWELL R, S. SANDRONI, NAISH T (2012). 'Late Cenozoic oscillations of Antarctic ice sheets revealed by provenance of basement clasts and grain detrital modes in ANDRILL core AND-1B. GLOBAL AND PLANETARY CHANGE, ISSN: 0921-8181

3. SCIENTIFIC EXPERTISE

Please indicate your area(s) of expertise (maximum 3)

Discipline	Mark with X	Speciality
microbiologist		
organic and inorganic geochemist/biogeochemist		
physical properties specialist		
sedimentologist	X	clastology
structural geologist		
paleontologist		
paleomagnetist		
petrologist	X	Igneous, sedimentary and metamorphic petrology, magnetic petrology, microchemical analysis of detrital apatite
hydrogeologist		
Other		

4. ADDITIONAL DOCUMENTS

As a pdf file the following documents:

- Letter of interest
- CV and Publication list

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Dipartimento di Scienze Fisiche, della Terra e dell'Ambiente

Prot. n. AD/312 Siena, 30/08/16

Expedition Number 373: Antarctic Paleoclimate and Ice History

TALARICO FRANCO MARIA

Letter of interest

Area of scientific interest

Project Title: Clast provenance and variability in Exp 373 cores and their implications for the paleoclimatic and tectonic evolution recorded at the Exp 373 drill sites.

Petrology of igneous, sedimentary and metamorphic rocks occurring as granule to boulder grain size clasts in glacial and interglacial sediments can provide essential data to improve sedimentological and numerical models for the East Antarctic Ice Sheet in the late Eocene-Pleistocene time window, as a well as to provide important constraints for an integrated multidisciplinary study of the interactions between sediment dispersal and tectonic events along the Wilkes Land margin in Cretaceous

The petrological data can efficiently be integrated with the core physical data to constrain ice dynamic scenarios and improve our knowledge of glacimarine processes in proximal and distal setting.

The reconstructed paleogeographic scenarios can be compared and discussed with those documented by provenance studies in the Ross Sea record.

Petrological and distribution data of clast populations in CRP, CIROS and ANDRILL and IODP Leg 318 cores have clearly shown how potentially useful the study of clast (granule- to boulder-grain size class) assemblages is in unraveling the complex interplay between tectonic, volcanic and glaciomarine sedimentary processes during the dynamic evolution of the Antarctic Ice sheets in the Tertiary time. Preliminary petrological and distribution data collected on clasts in IODP Leg318 cores highlight significant downcore modal and compositional variations, which can provide direct information about the potential source regions and evidence of an evolving provenance, most likely as results of variable ice conditions and ice-flow directions during the deposition of the several clast-rich intervals recovered by the drilll-holes.

Within this frame, in the context of the Exp 373 project and following the results achieved during the core characterization phase and a research design similar to that adopted in CRP (Talarico et al., 2011, Global and Planetary Change), we propose to further develop investigations focused on the clast provenance and variability in the Exp 373 cores.

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Current research

I have access to over 1000 rock samples and field data collected during previous expeditions in the region including Mertz and Ninnis glaciers, and adjacent areas in George V Land, Adelie Land, and Oates Land. The rock collection and field data represent a useful reference dataset, an essential tool to allow robust petrographical and geochemical comparison between recovered sediments and their source rock units (including all the lithologies in the East Antarctic Craton, the Ross Orogen and the Ferrar and Beacon Supergroups). All the data will be shared with Exp 373 science members involved in provenance investigations.

My most recent research focus is on sedimentary stratigraphic records recovered by drill-cores on the antarctic continental shelf and, by investigating the source-to-sink relations of the tectonic-sedimentary system, to improve the understanding of the ways in which climate, glaciation, erosion and tectonics interacted in a long-lived and evolving lithosphere-cryosphere system. A detailed outline of my past and recent research is included in the CV and Publications section of this proposal.

Expedition participation plan

In previous projects, the proposed analytical techniques have demonstrated potentiality in revealing direct provenance from source region during glacial maxima and minima, and in providing information about down-core and time-shifting variations which can be ascribed to ice-volume changes and paleoclimate evolution trough time.

Detrital thermochronological analysis such as Apatite Fission Track and U-Pb ages on apatite detrital grains has been applied in ANDRILL and CRP drill cores to unravel tectonic history of large areas of Transantarctic Mountains and Victoria Land Basin, taking into account also provenance patterns trough time.

In the context if this well known spectra of methods, our proposal is to apply a similar multi-analytical approach in the cores which will be drilled during Exp 373. In fact, as previously demonstrated by several authors, petrological and geo-thermochronological analysis are a powerful tool in sediment provenance studies, providing not only indirect ice-flow patterns and their evolution in time (i.e. changes in thermal regime of ice sheets), but also useful information about geologic evolution of source regions, in particular those without rock exposures such as the internal sectors of East Antarctica. Thus, this approach could be easily coupled with the other stratigraphic and chronologic techniques in order to achieve several scientific objectives including: 1. evaluate the contribution of the East Antarctic Ice Sheet to far-field ice volume and sea level estimate; 2. assess the role of oceanic forcing (sea level and temperature) on EAIS stability/instability; 3. contribute new data to constrain interactions between sedimentary and tectonic processes in a key region of the antarctic continental margin.

On board (or onshore, if logistically more appropriate) activities: logging and counting composition and distribution of granules to cobbles sized clasts in drilled cores will be carried out, following the procedure explained in Talarico et al 2011. Where possible, some

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representative clasts will be sampled in order to be analyzed with a petrographic optical microscopy. The entire dataset with lithological and composition data in the whole region including King George V Land, Adelie Land and Oates Coast will be available during the expedition.

Post-cruise research

Logging will be done on the entire lenght of the split cores, so it will be possible a down-core and time-shift mapping of lithological variability, which could provide useful information if coupled with other sedimentological and bio- tephro- and magneto-chronology techniques. Samples of sandstones or unlithified sand fractions located at representative stratigraphic intervals of the drilled cores will be analyzed during post-cruise research by means of geo-chronological and thermochronological analysis; in particular, Apatite Fission Track analysis and triple dating of apatite grains will be carried out following the procedure already applied for the ANDRILL site (Zattin et al. 2010, 2014). Geochemical analysis of single apatite grains will be performed by LA-ICP-MS in order to better constrain the possible source area of sediments. Petrographical analysis will be completed with more detailed microscopic analysis on medium sand fractions by point counting techniques.

The research program will adopt different methodologies that will provide a complete sedimentological and petrological data necessary for a detailed characterisation of samples, to determine their distribution patterns and their provenance. These methodologies include:

1. softwares for statistical analysis/processing of clast distribution patterns in selected intervals of the studied cores/specimens;
2. optical and electron (SEM) microscopy for the petrographic characterisation of all the main lithological groups of clasts;
2. electron microscopy coupled with a microanalytical system (EDS) and/or an electron microprobe (WDS) analysis of the main minerals in the metamorphic, igneous and sedimentary rock-clasts;
3. X-ray fluorescence spectrometry (XRF) to determine major elements and selected trace elements in igneous rock clasts.
4. 5. fiction tracks and LA-ICP-MS analysis of detrital apatite

Available Facilities are at the Department of Physical Sciences, Earth and Environment of University of Siena (Optical and Electronic Microscopy), at the Department of Geosciences of University of Padova (thermochronology and geochronology lab), and at the Department of Physics and Geology of University of Perugia (LA-ICP-MS analysis).

Necessary funds are already available at the University of Siena and additional funds will be provided by the Italian Antarctic Program. Complete support in term of salary and technical facilities in my Department, University of Siena.

Università degli Studi di Siena

Dipartimento di Scienze Fisiche, della Terra e dell'Ambiente

Expedition Number 373: Antarctic Paleoclimate and Ice History

CV and Publication list

TALARICO FRANCO MARIA

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Professional Preparation
Turin University, Turin (Italy) 1985
University of South Australia 1991
University of Tasmania 1990

Appointments

2014: Vice-director and national representative Scientific Committee Italian Antarctic National Museum- Geology Section at the University of Siena

2013: Awarded of the National Scientific Qualification to function as full professor (competition sector 04/01: Geochemistry, Mineralogy, Petrology), in Italian Universities.

2000 - present Associate Professor of Petrology, Università di Siena, Italy

1991-1999 Assistant Professor (Petrography and Metamorphic petrology), Dip. Scienze della Terra, Università di Siena, Italy

1986-1990 Research contracts for the petrographical and geochemical study of the crystalline basement of Northern Victoria Land (P.N.R.A. - University of Siena, Italy).

Research activity in the field of metamorphic and igneous petrology, structural geology and geochronology of crystalline basements of: Western Alps(1985-1990), Antarctica (1986 to present), Australia (2001 to present), Tanzania (2011 to present) and Arctic (Siberia, 2011 to present).

Petrological and provenance studies on glaciomarine sequences (Ross Sea, McMurdo Sound) in the frame of the international Cape Roberts Project and ANDRILL projects (1996 to present).

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Partecipation to 16 geological expeditions in Antarctica and 1 in the Arctic.

Principal investigator (or co-PI) in several projects in the Italian Antarctic Programm (PNRA) (from 1987 to present), or funded by the italian Ministry of Research (MIUR) (PRIN 2008, 2006, 2002,1996) and by the University of Siena (PAR 2002).

2004 - Present MASIC (McMurdo ANDRILL Science Implementation Committee), chair and national representative I-ANDRILL.

1999: winner of the F.Ippolito Prize for Antarctic studies awarded by the Accademia Nazionale dei Lincei, Rome, Italy

Reviewer of papers in: Journal of Metamorphic Geology, Lithos, Precambrian Research, Gondwana Research, Geophysical Research Letters, Bollettino Società Geologica Italiana, Terra Antartica, Terra Antartica Reports, Polarforschung. Reviewer of proposals submitted to the Argentinian, German, USA and French Polar Programs, PRIN and FIRB MIUR programs, and to the European Research Council (ERC).

Publication list FM TALARICO:

http://scholar.google.it/citations?user=55FDLvIAAAAJ&hl=it&oi=ao
https://www.researchgate.net/profile/F_Talarico/publications
https://www.scopus.com/authid/detail.uri?authorId=7004214287

Publications relevant to proposed research

Galeotti, S., DeConto, R., Naish, T., Stocchi, P., Florindo, F., ...Talarico F.M.... et al., 2016. Antarctic Ice Sheet variability across the Eocene-Oligocene boundary climate transition, Science 10.1126/science.aab0669.

Levy, R., Harwood, D., Florindo, F.,...Talarico F.M.,... et al., 2016. Antarctic Ice Sheet sensitivity to atmospheric CO2 variations during the Early to mid-Miocene, Proceedings of the National Academy of Sciences, www.pnas.org/cgi/doi/10.1073/pnas.1516030113

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F. Rugi, R. Udisti, S. Becagli, D. Frosini, G. Giorgetti, G. Kuhn, M. Marconi, D. Monien, S. Nava, M. Severi, F. Talarico, R. Traversi, 2015. One-million year Rare Earth Element stratigraphies along an Antarctic marine sediment core. Microchemical Journal, 122, 164-171

Zattin M, D Pace, B Andreucci, F Rossetti, FM Talarico (2014). Cenozoic erosion of the Transantarctic Mountains: A source-to-sink thermochronological study (2014). Tectonophysics

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630, 158-165.

Galeotti S., Lanci L., Florindo F., Naish T.R., Sagnotti L., Sandroni S., Talarico F.M. (2012). Cyclochronology of the Eocene-Oligocene transition from the Cape Roberts Project-3 core, Victoria Land basin, Antarctica. GLOBAL AND PLANETARY CHANGE, vol. 335, p.84 -94, ISSN: 0921-8181, doi: 10.1016/j.palaeo.2011.08.011

McKay R., Naish T., Powell R., Barrett P., Scherer R., Talarico F., Kyle P., Monien D., Kuhn G., Jackolsk C., Williams T. (2012). Pleistocene variability of Antarctic Ice Sheet extent in the Ross Embayment. QUATERNARY SCIENCE REVIEWS, vol. 34, p. 93 - 112, ISSN: 0277-3791

F. TALARICO, D.Pace , S. Sandroni (2011). Amphibole-bearing metamorphic clasts in ANDRILL AND-2A core: A provenance tool to unravel the Miocene Glacial history in the Ross Embayment (western Ross Sea, Antarctica. GEOSPHERE, vol. 7 , ISSN: 1553-040X

F. TALARICO, Sandroni S (2011). Early Miocene basement clasts in ANDRILL AND-2A core and their implications for paleoenvironmental changes in the McMurdo Sound region (western Ross Sea, Antarctica). GLOBAL AND PLANETARY CHANGE, vol. 78, ISSN: 0921-8181

SANDRONI S, F. TALARICO (2011). The record of Miocene climatic events in AND-2A drill core (Antarctica): Insights from provenance analyses of basement clasts. GLOBAL AND PLANETARY CHANGE, vol. 75, ISSN: 0921-8181, doi: 10.1016/j.gloplacha.2010.10.002

D. MONIEN, KUHN G, H. . VON EYNATTEN, F. TALARICO (2012). 'Provenance Analysis of Ross Embayment Basin Deposits as Evidence for Antarctic IceSheets Growth. GLOBAL AND PLANETARY CHANGE, ISSN: 0921-8181

F. TALARICO, MCKAY R, POWELL R, S. SANDRONI, NAISH T (2012). 'Late Cenozoic oscillations of Antarctic ice sheets revealed byprovenance of basement clastsand grain detrital modes in ANDRILL core AND-1B. GLOBAL AND PLANETARY CHANGE, ISSN: 0921-8181

F. TALARICO, G. KLEINSCHMIDT (2009). Chapter 7: The Antarctic Continent in Gondwanaland: A Tectonic Review and PotentialResearch Targets for Future Investigations. In: F. FLORINDO; M.J. SIEGERT EDS.. Antarctic Climate Evolution (Developments in Earth &Environmental Sciences). vol. 8, p. 257-308, Amsterdam:Elsevier, ISBN: 9780444528476, doi: 10.1016/S1571-9197(08)00007-4

F. TALARICO, S. SANDRONI (2009). Provenance signatures of the Antarctic Ice Sheets in the Ross Embayment during the LateMiocene toEarly Pliocene: the ANDRILL AND-1B core record. GLOBAL AND PLANETARY CHANGE, vol. 69, p. 103-123, ISSN: 0921-8181

G. GIORGETTI, F. TALARICO, S. SANDRONI, A. ZEOLI (2009). Provenance of Pleistocene sediments in the ANDRILL AND-1B drillcore: Clay and heavy mineral data. GLOBAL AND PLANETARY CHANGE, vol. 69, p. 94-102, ISSN: 0921-8181

APPLICATION TO PARTICIPATE IN AN IODP EXPEDITION

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Expedition Number 373: Antarctic Paleoclimate and Ice History

1. PERSONAL INFORMATION

Family name: Di Roberto

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Email: alessio.diroberto@ingv.it

Country of citizenship: Italy

Place of birth/date of birth: Piombino, Italy, 30-04-1978

Gender: M

Education (highest degree, including year PhD was received / is expected):

Are you currently a student? NO Expected Graduation Date:

2. EXPEDITION INFORMATION

Summary of proposed participation, including area of scientific interest, current research and participation plan (maximum 250 characters with space – more detail should be included in the Letter of Interest):

Tephrostratigraphy, tephrochronology, volcano sedimentology, volcanology, petrology. Current studies: volcanic activity in the northern Victoria Land from Late Pleistocene-Holocene marine sediment records of the Ross Sea (Antarctica).

Prior involvement with DSDP/ODP/IODP and nature of involvement (expedition number, shipboard/shore-based participation, co-chief, etc):

Participation (shore-based participation) at the McMurdo Ice Shelf (MIS) and Southern McMurdo Sound (SMS) international ANDRILL (Antarctic Drilling) Projects as expert in the study of volcanic and volcanoclastic rocks.

Post-cruise science support to achieve the proposed scientific objectives 1) future funding scheme and 2) support from host institution (e.g. staff, facilities)

1) Italian Antarctic Research Program (PNRA), Istituto nazionale di Geofisica e Vulcanologia (Italy) 2) Facilities and staff of the Istituto nazionale di Geofisica e Vulcanologia (Italy) (Scanning Electron Microscope, Electron Probe Micro-Analysis, Sedimentology lab, etc.)

Three scientific and/or personal references

Kurt Panter, Bowling Green State University (USA)

Sergio Rocchi, Università di Pisa (IT)

Fabio Florindo, INGV (IT)

3. SCIENTIFIC EXPERTISE

For Scientist Jobs Descriptions visit: http://iodp.tamu.edu/participants/scientist_jobs.html

Please indicate your area(s) of expertise (maximum 3)

Discipline	Mark with X	Speciality
microbiologist		
organic and inorganic geochemist/biogeochemist		
physical properties specialist		
sedimentologist		
structural geologist		
paleontologist		
paleomagnetist		
petrologist	x	
hydrogeologist		
Other	x	Volcanologist expert in tephrochronology and tephrostratigraphy

4. ADDITIONAL DOCUMENTS

Please, provide the following documents:

- Letter of interest, including details about area of scientific interest, current research, expedition participation plan and post-cruise research
- CV and Publication list
- Letter of recommendation (for PhD students)
- See also: http://www.essac.ecord.org/flyer/Guidelines_for_Applying_to_sail.pdf

Please, send your application form as *a MS Word document* and the additional documents in *PDF format* (preferably as one file) by email to Jan Behrmann and Hanno Kinkel at the ESSAC office: essac@geomar.de.

In addition to the ESSAC application, all applicants ***must inform their national office*** (if applicable) ***and national delegate*** and send a copy of the application documents. ECORD does not provide funds for participation; the national offices or national delegates can provide information regarding travel support, post-cruise funding opportunities, etc.

See http://www.essac.ecord.org/index.php?mod=about&page=ESSAC for a list of the national contact persons.

Expedition Number 373: Antarctic Paleoclimate and Ice History

Letter of interest

My main research interest is the application of tephrochronology techniques to create or improve the chronological framework. In this framework all different geologic records (paleoenvironmental, palaeoclimatic, etc.) can be placed enabling their correlation and synchronization at global to regional scales. In addition, my research aims to study the volcanic and volcaniclastic deposit in marine sediment archives to get clues on the activity of Antarctic volcanoes and the possible relation with dynamics of glacial caps.

Marine sediment sequences from the polar regions, in addition to offering the highest potential paleoclimatic and paleoenvironmental archives, may contain deposits produced during large explosive volcanic eruptions e.g. tephra. These materials are usually dispersed over wide areas, as large as thousands of square kilometers. Tephra layers are isochronous marker horizons and can provide important time-stratigraphic information if geochemically fingerprinted and tied to a known, dated eruption, or used as cross-correlated time horizons between natural records, offering an accuracy difficult to achieve with other methods. Especially in Antarctica, where volcanic activity has been intense and recurrent, the tephrochronology can contribute substantially to the improvement of the chronological framework of the area and give a great support to research on local and global paleoclimate changes. In fact here the common techniques (specially for relatively young records) for the radiometric dating of sedimentary series have great methods limits due both to the lack of carbonate material and/or problems connected to the aging behavior of organic matter.

My recent researches have been focused on the tephrostratigraphic, tephrochronologic and volcanologic studies of volcanic deposits (primary and volcaniclastic) identified in marine sediment sequences recovered in gravity cores from Ross Sea (Antarctica) and in particular along the coast of Victoria Land, in an area extending from the Dryglaski Glacier Tongue to Cape Hallet. We provided the full characterization of several primary tephra by means of sedimentological, petrographic and geochemical analysis of clasts. In addition we performed the dating of eruption by means of 40Ar-39Ar radiometric dating of volcanic alkali feldspar grains, whose age has resulted Late Pleistocene and Holocene. Results of this study have been published in Del Carlo et al. (2015).

My interest in the IODP Expedition 373 is very high because:

the area where the IODP Expedition 373 will be performed is very close to those that we have investigated previously; thus, the possibility of identifying the same tephra layers in the two areas is very high which would offer the possibility of a wide-scale correlation;

study of these tephra may provide chronological constrains useful for developing the age models of the cores;

their characterization may provide information on the paleoenvironment during the deposition and possibly clues on the effect of glacial dynamics (loading-unloading) on volcanic activity of the area;

the identification of new tephra layers will improve the dataset of the eruptions known in this area of Antarctica continent.

Expedition participation plan will include these activities and methods:

visual examination of core, logging and evaluation of down-core distribution of tephra and volcanic clasts;

preliminary lithologic description, preliminary grainsize and component analyses;
petrographic observations of thin section (granule to boulder size) or smear slide (silt to sand size) of volcanic material;
sampling for further mineralogical and geochemical analyses;
sampling for dating.

Post-cruise research plan:

further visual examination and sampling of fine-volcanic tephra layers detectable only by XRF analyses of core and magnetic properties measurements (cryptotephra);
textural and sedimentological investigation of main tephra layers (e.g. max size of pumices and lithic clasts, evaluation of the degree of reworking, etc.);
detailed textural investigation and morphoscopy of fine grained clasts by SEM;
detailed petrologic investigation including petrography, mineral and glass chemistry by means of SEM-EDS, EMPA and LA-ICP-MS analyses.

These activities will be performed at laboratories of the Istituto Nazionale di Geofisica e Vulcanologia and/or in collaboration with other national and international laboratories (e.g. IGG-CNR Pavia and Pisa; University of Perugia; University of Oxford).

CURRICULUM VITAE ET STUDIORUM

ALESSIO DI ROBERTO

PERSONAL INFORMATION

Name: Di Roberto Alessio
Address: Pisa, Via Antonio Pesenti n° 23, 56124 (Pi)
Contacts: e-mail: adirobe78@gmail.com
phone: +39 3479792763
Skype ID: alessiodiroberto
Researcher ID: C-3547-2014
ORCID ID: 0000-0003-1167-8290
Nationality: Italian
Date of birth: 30-04-1978
Place of Birth: Piombino, Italy

EDUCATION

01/01/2004 – 07/07/2007: PhD in Physical Modeling for the Environmental Protection, at the Earth Science Department, University of Bologna, Italy with the thesis "Distal turbidity current deposits cogenetic to holocenic landslides of Stromboli volcano (Aeolian islands, Italy): implication for tsunami risk assessment".

24/07/2003: M.Sc. cum laude in Earth Sciences, at the Earth Science Department, University of Pisa, Italy with the thesis "Nature and composition of volcanogenic deposit in the final part of Stromboli Canyon".

CURRENT POSITION

01/08/2016 – present: Post Doc at Istituto Nazionale di Geofisica e Vulcanologia, Sezione di Pisa, Italy;
15/10/2015 – 15/06/2016: Co.Co.CO at Istituto Nazionale di Geofisica e Vulcanologia, Sezione di Pisa, Italy
01/09/2007 - 31/08/2015: Post Doc at Istituto Nazionale di Geofisica e Vulcanologia, Sezione di Pisa, Italy;

MAIN RESEARCH INTERESTS

The research activity of Dr. Alessio Di Roberto is mainly focused on the study of subaerial and underwater volcanic activity and with particular reference to the active volcanoes. In particular he focused his activity in the: i) stratigraphy and sedimentology of the pyroclastic deposits aimed at reconstructing of the eruptive history and dynamics of explosive eruptions, ii) the quantitative reconstruction of recent volcanic activity, iii) petrology of volcanic rocks in order to derive information on the feeding systems of volcanoes.
The Dr. Alessio Di Roberto studied the instability of the slope of the volcanic edifices, analyzing the deposits in order to reconstruct the geological parameters such as recurrence of the events, the volume of products, motion dynamics, trigger.
In addition, the scientific activity of Dr. Alessio Di Roberto has focused on volcanological studies, tephrostratigraphy and tephrochronology of subaerial, marine and lacustrine tephras in the Mediterranean area and in Antarctica used for paleoclimatic and paleoenvironmental reconstructions.

The Dott. Alessio Di Roberto is the author of 21 articles on international journals (Scopus and WebofScience H index = 8; Google Scholar H index = 10) mostly as first author; his expertise has been recognized with a request to carry out reviews for some of the leading international journals of the sector.

SCIENTIFIC SKILLS

- Perfect knowledge of the methods of geological and geomorphological mapping particularly applied to the field of volcanology;
- Perfect knowledge of the methods of analysis and interpretation of volcanic deposits (tephrostratigraphy) within marine, lacustrine and terrestrial sedimentary successions;
- Good knowledge of the methods of interpretation of marine geophysical data;
- Perfect knowledge of the techniques of analysis and preparation of rock samples with particular reference to the volcanic deposits (grain size and components analysis, preparation of thin sections, petrographic analysis by optical microscope);
- Excellent knowledge of SEM-EDS and EPMA microscopy;
- Excellent knowledge of the digital image analysis techniques.

COMPUTER SKILLS

- Excellent command of Microsoft Office applications with particular reference to Excel, Word and Power Point;
- Excellent knowledge of Corel Draw Graphics Suite, Adobe Illustrator, and Photoshop;
- Good knowledge of 3D cartographic suite (Surfer, Didger) and geographic information system (GIS) ArcGIS;
- Excellent knowledge of software for the image analysis (Image J - Photoshop);

PARTECIPATION TO NATIONAL AND INTERNATIONAL RESEARCH PROJECTS

2015: Participant to national project “ARCA-Artico: Cambiamento climatico attuale ed eventi estremi del passato”, LINEA 2 (CNR-INGV-OGS), ambito prevalente ”azioni per il clima” del bando MIUR 2012;

2015: Participant to national project MIUR-PNRA “Origine e dispersione di ceneri vulcaniche nell'emisfero australe: una banca dati per la vulcanologia, la cronostratigrafia e il paleo clima del sistema Terra”;

2014: Participant to international project CORIBAR: “Reconstructing the response of grounded ice sheets and sea ice to climatic changes by coring glacial bedforms and meltwater deposits in the Kveithola trough”;

2014: Participant to national project: “Studies of numerical modeling, fieldwork and probability analysis for the quantification of volcanic hazard of Campi Flegrei and Vesuvius (V1)” in the framework of 2014-2015 INGV-Department of Civil Protection convention;

2012: Participant to national project MIUR-PNRA, PEA 2009/A2.1, CLITEITAM: “CLImate-TEctonics Interactions along the Transantarctic Mountains front”;

2012: Participant to international project: “Reconstructing 2500 years of historical landscape change at the periphery of Rome: Disentangling the role of climate and society” funded by National Science Foundation (NSF);

2011-2012: Participant to national MIUR-PNRA, PEA 2010/A2.12, ROSSTEFRA:: “Multidisciplinary study of the glaciomarine sediments deposited in the Ross Sea (Antarctica) during the last 50 ka:

information on changes in the extent of ice during the glacial-interglacial transition" funded by Italian National Program for Antarctic Research (PNRA);

2010-2011: Participant to international project ANDRILL–SMS: "Antarctic geological Drilling Project – South McMurdo Sound";

2010: Participant to national project AIRPLANE: "Platform for multidisciplinary research on earthquakes and volcanoes" funded by Italian Ministero dell'Istruzione, dell'Università e della Ricerca (Ministry of Education, University and Research);

2008-2009: Participant to national project AIRPLANE: "Platform for multidisciplinary research on earthquakes and volcanoes" funded by Italian Ministero dell'Istruzione, dell'Università e della Ricerca (Ministry of Education, University and Research);

2007-2008: Participant to international project ANDRILL–MIS: "Antarctic geological Drilling Project – 2009 - McMurdo Ice Shelf";

2007-2008: Participant to national project PAROXYSM: "Definition of expected precursors for major explosions, paroxysms and effusive eruptions at Stromboli volcano" in the framework of 2008-2009 INGV-Department of Civil Protection convention;

2005-2007: Participant to national project: "Monitoring and research activity at Stromboli and Panarea" in the framework of 2004-2006 INGV-Department of Civil Protection convention;

2004: Participant to national project: IT826 Integrated action Italy-Spain 2003;

RESEARCH EXPEDITION

September 2002: IGM\CNR Oceanographic cruise VST2002 in the Southern Tyrrhenian Sea on R\V Urania;

August - September 2004: Participant to 4° Leg of oceanographic cruise UNESCO- Intergovernmental Oceanographic Commission "Training – Through-Research - TTR 14" a bordo della motonave R\V Prof. Logachev, Stromboli/Marsili basin;

July - August 2005: Participant to 3° Leg of oceanographic cruise UNESCO- Intergovernmental Oceanographic Commission "Training – Through-Research - TTR 15" a bordo della motonave R\V Prof. Logachev, Stromboli/Marsili basin;

SUPERVISION OF GRADUATE STUDENTS AND POSTDOCTORAL FELLOWS

2005 – today: Supervision of several M.Sc. thesis in Earth Science of University of Pisa, Italy.

TEACHING

Teacher during the field lessons of NEMOH project (FP7 People – Marie Curie Actions – ITN-2011, G.A. n. 289976 "NEMOH - Numerical, Experimental and stochastic Modelling of vOlcanic processes and Hazard: an Initial Training Network for the next generation of European volcanologists), international field school held in Stromboli on 18 – 23 May 2013;

PUBLICATION LIST

1. Salvatici T, DI ROBERTO A, Di traglia F, Bisson M, Morelli S, Fidolini F, Bertagnini A, Pompilio M, Hungr O, Casagli N, (2016). From hot rocks to glowing avalanches: numerical modeling of gravity-induced pyroclastic density currents and hazard maps at Stromboli volcano (Italy). Geomorphology. doi: 10.1016/j.geomorph.2016.08.011

2. Morelli S., Salvatici T., Nolesini T., Di Traglia F., Del Ventisette C., Casagli N., Di Roberto A., M. Bisson M., Pompilio M., Bertagnini A. (2016). Analogue and numerical modeling of the Stromboli hot avalanches. In book: Landslides and Engineered Slopes. Experience, Theory and Practice, pp.1493-1500. doi: 10.1201/b21520-184
3. Del Carlo P, DI ROBERTO A, Di Vincenzo G, Bertagnini A, Landi P, Pompilio M, Colizza E, Giordano G (2015). Late Pleistocene-Holocene volcanic activity in northern Victoria Land recorded in Ross Sea (Antarctica) marine sediments. Bulletin of Volcanology. doi:10.1007/s00445-015-0924-0;
4. Meletlidis S, DI ROBERTO A, Dominguez Cerdena I, Pompilio M, Garcia-Canada L, Bertagnini A, Benito-Saz MA, Del Carlo P, Sainz-Maza Aparicio S, (2015). New insight into the 2011-2012 unrest and eruption of El Hierro Island (Canary Islands) based on integrated geophysical, geodetical and petrological data. Annals of Geophysics. doi:10.4401/ag-6754;
5. Del Moro S, DI ROBERTO A, Meletlidis S, Pompilio M, Bertagnini A, Agostini S, Ridolfi F, Renzulli A (2015). Xenopumices erupted on 15 October 2011 offshore of El Hierro (Canary Islands): a subvolcanic snapshot of the magmatic, hydrothermal and pyrometamorphic processes. Bulletin of Volcanology. doi:10.1007/s00445-015-0940-0
6. DI ROBERTO A, Bertagnini A, Pompilio M, Bisson M (2014), Pyroclastic density currents at Stromboli volcano (Aeolian Islands, Italy): a case study of the 1930 eruption. Bulletin of Volcanology. doi:10.1007/s00445-014-0827-5).
7. Rosi M, Pistolesi M, Bertagnini A, Landi P, Pompilio M, DI ROBERTO A (2013), Stromboli volcano, Aeolian Islands (Italy): present eruptive activity and hazards. Journal of Geological Society of London, in Lucchi F, Peccerillo A, Keller J, Tranne A & Rossi PL (eds), The Aeolian Islands Volcanoes. Geological Society, London, Memoirs, 37, 475–492. doi:10.1144/M37.14.
8. DI ROBERTO A, Giorgetti G, Iacoviello F, Pompilio M, (2013), Alteration of volcanic deposits in the ANDRILL AND-1B core: influence of paleodeposition, eruptive style and magmatic composition. Geosphere, 9(2), p. 1–12, doi:10.1130/GES00812.1.
9. DI ROBERTO A, Del Carlo P, Rocchi S, Panter KS (2012). Early Miocene volcanic activity and paleoenvironment conditions recorded in tephra layers of the AND-2A core (southern McMurdo Sound, Antarctica). Geosphere, 8(6). p. 1–14, doi:10.1130/GES00754.1.
10. Meletlidis S, DI ROBERTO A, Pompilio M, Bertagnini A, Iribarren I, Felpeto A, Torres PA, D'Oriano C (2012). Xenopumices from the 2011–2012 submarine eruption of El Hierro (Canary Islands, Spain): Constraints on the plumbing system and magma ascent. Geophysical Research Letters, vol. 39, ISSN: 0094-8276, doi:10.1029/2012GL052675.
11. Albert PG, Tomlinson EL, Smith VC, DI ROBERTO A, Todman A, Rosi M, Marani MP, Muller W, Menzies MA (2012). Marine-continental tephra correlations: Volcanic glass geochemistry from the Marsili Basin and the Aeolian Islands, Southern Tyrrhenian Sea, Italy. Journal of Volcanology and Geothermal Research, vol. 229-230; p. 74-94, ISSN: 0377-0273, doi:10.1016/j.jvolgeores.2012.03.009.
12. Bertagnini A, DI ROBERTO A, Pompilio M (2011). Paroxysmal activity at Stromboli: lessons from the past. Bulletin of Volcanology, ISSN: 0258-8900, doi:10.1007/s00445-011-0470-3.
13. DI ROBERTO A, Rosi M, Bertagnini A, Marani MP, Gamberi F (2010). Distal Turbidites and Tsunamigenic Landslides of Stromboli Volcano (Aeolian Islands, Italy). Submarine Mass Movements and Their Consequences. p. 719-731, ISBN/ISSN: 978-90-481-3070-2, doi:10.1007/978-90-481-3071-9.

14. DI ROBERTO A, Pompilio M, Wilch T (2010). Late Miocene submarine volcanism in ANDRILL AND-1B drill core, Ross Embayment, Antarctica. Geosphere, vol. 6; p. 1-13, ISSN: 1553-040X, doi:10.1130/GES00537.1.
15. Pompilio M, Bertagnini A, DI ROBERTO A (2010). Present-Day activity of Stromboli: eruptive history and eruptive styles. Acta Vulcanologica, vol. 22; p. 91-96, ISSN:1121-9114.
16. Marani MP, Gamberi F, Rosi M, Bertagnini A, DI ROBERTO A (2008). Deep-sea deposits of the 30 December 2002 Landslide. In: The Stromboli Volcano: An Integrated Study of the 2002-2003 Eruption – S. Calvari, S. Inguaggiato, G. Puglisi, M. Ripepe, and M. Rosi (Eds.), American Geophysical Union, Geophysical Monograph Series, vol. 182, ISSN: 0065-8448 - ISSN: 978-0-87590-447-4. doi:10.1029/182GM14.
17. Pioli L, Rosi M, Calvari S, Renzulli A, DI ROBERTO A (2008). The eruptive activity of 28 and 29 December 2002. In: The Stromboli Volcano: An Integrated Study of the 2002-2003 Eruption, S. Calvari, S. Inguaggiato, G. Puglisi, M. Ripepe, and M. Rosi (Eds.) – American Geophysical Union, Geophysical Monograph Series, vol. 182, ISBN ISSN: 0065-8448 - ISSN: 978-0-87590-447-4. doi:10.1029/182GM10.
18. Marani MP, Gamberi F, Rosi M, Bertagnini A, DI ROBERTO A (2009). Subaqueous sedimentary density flow processes and deposits of an island volcano landslide (Stromboli island, Italy). Sedimentology, doi: 10.1111/j.1365-3091.2008.01043.x.
19. DI ROBERTO A, Bertagnini A, Pompilio M, Marani MP, Gamberi F, Rosi M (2008). Newly discovered submarine flank eruption in the recent activity of Stromboli volcano (Aeolian Islands, Italy). Geophysical Research Letters, vol. 35, ISSN: 0094-8276, doi:10.1029/2008GL034824.
20. DI ROBERTO A, Rosi M, Bertagnini A, Del Principe A, Marani MP, Gamberi F (2008). Deep water gravity core from the Marsili basin (Tyrrhenian sea) records Pleistocenic-Holocenic explosive events and instability of Aeolian archipelago (Italy). Journal of Volcanology and Geothermal Research, vol. 177; p. 133-144, ISSN: 0377-0273, doi: 10.1016/j.jvolgeores.2008.01.009-4.
21. Gamberi F, Marani MP, Landuzzi V, Magagnali A, Penitenti D, Rosi M, Bertagnini A, DI ROBERTO A (2006). Sedimentologic and volcanologic investigation of the deep Tyrrhenian sea: preliminary result of cruise VST02. Annals of Geophysics, doi: 10.4401/ag-3135. Cit. 20

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22. Meletlidis S, DI ROBERTO A, Domínguez Cerdeña I, Pompilio M, García-Cañada L, Bertagnini A, Benito Saz MA, Del Carlo P, Sainz-Maza Aparicio S, Lopez Moreno C, Moure García D, 2014. A new approach to the unrest and subsequent eruption at El Hierro Island (2011) based on petrological, seismological, geodetical and gravimetric data. Geophysical Research Abstracts, Vol. 16, EGU2014-15418-1, 2014, EGU General Assembly 2014;
23. Del Carlo P, Baneschi I, Bertagnini A, Boschi C),Cascella A, Colizza E, DI ROBERTO A, Di Vincenzo G, Finocchiaro F, Landi P, Lirer F, Pompilio M, Sagnotti L, Sangiorgi F, Sprovieri M and Wrinkler A 2012. Multidisciplinary study of sediments deposited in the Ross Sea (Antarctica) during the last 50 ka: information on changes of ice extent during the glacial-interglacial transition, Geophysical Research Abstracts, Vol. 15, EGU2013-9519, EGU General Assembly 2013;
24. Del Carlo P, DI ROBERTO A, Rocchi S, Panter KS 2011. Early to Mid-Miocene tephra in the AND-2A core, ANDRILL Southern McMurdo Sound Project, Antarctica. 11th International Symposium on Antarctic Earth Sciences ISAES 11,Edinburgh 2011, July 10-15th;

25. DI ROBERTO A., Iacoviello F, Pompilio M, Giorgetti G, 2011. Alteration of volcanic glass observed in the ANDRILL AND-1B core: description, paragenesis and implication for palaeoenvironmental reconstruction. 11th International Symposium on Antarctic Earth Sciences ISAES 11, Edinburgh 2011, July 10-15th;
26. Bertagnini A, DI ROBERTO A, Pompilio M, Gamberi F, Marani MP, Rosi M (2008). Newly discovered submarine flank eruption at Stromboli volcano (Aeolian Islands, Italy). In: EOS TRANS., American Geophysical Union, Fall Meeting 2008, 89(53), San Francisco. abstract #V11B-2030;
27. DI ROBERTO A, Pompilio M, Wilch Ti (2008). Miocenic subaqueous volcaniclastic deposits in ANDRILL-MIS core. In: EOS TRANS. American Geophysical Union, Fall Meeting 2008, 89(53), San Francisco. abstract #C21B-0535;
28. Marani M, Bertagnini A, DI ROBERTO A, Gamberi F, Rosi M (2007). Submarine transformation processes of the 30/12/2002 Stromboli tsunamigenic landslide. In: Proceeding of IUGG XXIV General Assembly. Perugia, Italy, 21-23 June 2006;
29. DI ROBERTO A, Rosi M, Bertagnini A, Del Principe A, Marani MP, Gamberi F (2007). Deep water gravity core from the Marsili Basin (Tyrrhenian Sea) records Pleistocenic-Holocenic explosive events and instability of Aeolian archipelago (Italy). In: Proceeding of IUGG XXIV General Assembly. Perugia, Italy, July 2-13;
30. DI ROBERTO A, Del Principe A, Bertagnini A, Rosi M (2006). Composizione e cronologia dei depositi vulcanoclastici accumulati nella porzione centrale del bacino del Marsili. In: Tefrostratigrafia del Quaternario italiano tra vulcanologia e scienze del Quaternario. Roma, 21-23 June 2006, p. 31;
31. Marani M, Gamberi F, DI ROBERTO A, Pirlet H, Ivanov M, Akhmetzhanov A and TTR15 scientific party (2006). Deep-sea transport and deposition of the Stromboli 30/12/2002 landslide – results of the TTR15 cruise. In: International Oceanographic Commission (IOC), TECHNICAL SERIES, vol. 72, p. 47-51:
32. Gamberi F, Marani M, Ivanov M, Akhmetzhanov A, DI ROBERTO A, Hurting N, Lecci R, Leidi E, Moremon R, Morris E, Pirlet H And TTR-15 Scientific Party (2006). Sedimentary processes in the calabrian and sicilian margin (preliminary results of the TTR15 leg 3). In: International Oceanographic Commission (IOC), TECHNICAL SERIES, vol. 72, p. 51-56;
33. Marani MP, DI ROBERTO A, Rasul N, Gamberi F, Kenyon N, Ivanov M, Akmetzhanov A, Solova E, Laberg J-S, Hazmi O, Del Principe A, Distefano S, Firetto M and Benoit H (2006). History of catastrophic slope failures of Stromboli Volcano. In: International Oceanographic Commission (IOC), TECHNICAL SERIES, vol. 70, p. 101-108;
34. Marani MP, Gamberi F, DI ROBERTO A, Pirlet H, and TTR TEAMS (2006). Deep-sea transport and deposition of the Stromboli 30/12/2002 landslide – results of the TTR15 cruise. In: International Oceanographic Commission (IOC), WORKSHOP REPORT, vol. 197, p. 41;
35. DI ROBERTO A, Rosi M, Bertagnini A, Marani M, Gamberi F (2006) Flank failure and volcaniclastic deposition at Stromboli volcano (Aeolian islands, Italy). In: International Oceanographic Commission (IOC), WORKSHOP REPORT, vol. 197, p. 42;
36. Gamberi F, Marani MP, DI ROBERTO A, Hurting N, Lecci R, Leidi E, Moremon R, Morris E and Pirlet H (2006). Sedimentary processes in the calabrian and sicilian margin (preliminary results of the TTR15 leg 3). In: Geological processes on deep-water European margins, International Oceanographic Commission (IOC), WORKSHOP REPORT, vol. 201, p. 18;

37. Marani M, Gamberi F. DI ROBERTO A, Pirlet, H and TTR15 Teams (2006). Deep-sea tran sport and deposition of the Stromboli 30/12/2002 landslide – Results of the TTR15 Cruise. In: International Oceanographic ti, dinamiche di movimento, sorgente, etc. necessari per la modellazione fisica dei processi stessi e per la mitigazione del rischio vulcanico derivante (tsunami).

SYNERGISTIC ACTIVITIES

Scientific reviews:

Scientific reviser for Geology, Geophysical Research Letters, Geochemistry, Geophysics, Geosystems (G-cubed) and Sedimentology;

Session convening:

16-18 September 2013: Convener to session 31 “Paleoclimate – H2. Study the past to understand the future: climate and paleoclimate conditions through recent advances in the study of geological records in polar areas” FIST GEOITALIA 2013 – IX Forum of Earth Sciences, Pisa, Italy;

2015: 3-5 July 2015: Organiztion committee to workshop ANTVOLC-Kickstart meeting of SCAR thematic group on Antarctic volcanism, Catania, Italy.

International collaborations:

University of Pisa, University Siena, University Milano-Bicocca, University Trieste, University Roma Tre, University of Florence, University of Urbino "Carlo Bo", University of Tuscia, IGG-CNR of Pisa, ISMAR-CNR of Bologna and Napoli, OGS-Trieste, Instituto Geográfico Naciónal, Spagna; Bowling Green State University, US; Albion College, US; University of Nevada, US; Royal Holloway, University of London; IPGP-France.

IODP
INTERNATIONAL OCEAN DISCOVERY PROGRAM

APPLICATION TO PARTICIPATE IN AN IODP EXPEDITION

ESSAC Office ECORD Science Support & Advisory Committee
GEOMAR | Helmholtz Centre for Ocean Research Kiel
Wischhofstrasse 1-3
24148 Kiel, Germany
Hanno Kinkel (ESSAC Science Coordinator):
Tel: +49 431 600 2418
Fax:+49 431 600 2922
Web Page: http://www.essac.ecord.org Email: essac@geomar.de

Please type information

Apply to Sail Application Form

Expedition Number 373: Antarctic Paleoclimate and Ice History

1. PERSONAL INFORMATION

Family name: Erdem

First name: Zeynep

Current Position: Post Doc

Institution: NIOZ Royal Netherlands Institute for Sea Research

Address: Landsdiep 4

City, Postcode, Country: 1797 SZ 't Horntje (Texel) the Netherlands

Tel. work: +31 (0)222 369 421
Tel. home: -
Fax: +31 (0)222 319 674
Email: zeynep.erdem@nioz.nl

Country of citizenship: Turkish

Place of birth/date of birth: Kadikoy, Turkey/26.05.1985

Gender: Female

Education (highest degree, including year PhD was received / is expected): PhD, June 2016

Are you currently a student? NO Expected Graduation Date:

2. EXPEDITION INFORMATION

Summary of proposed participation, including area of scientific interest, current research and participation plan (maximum 250 characters with space – more detail should be included in the Letter of Interest):

Experience in sediment core work; splitting, sampling and preliminary work including MSCL
Knowledge in benthic foraminifera taxonomy (late Quaternary, the Peruvian margin)
Special interest in multi proxy paleo-reconstructions using marine sediments. Currently, working with biomarkers.

Prior involvement with DSDP/ODP/IODP and nature of involvement (expedition number, shipboard/shore-based participation, co-chief, etc):

None as part of IODP.
ICDP PaleoVan project both at drilling and sampling party in Bremen.

Post-cruise science support to achieve the proposed scientific objectives 1) future funding scheme and 2) support from host institution (e.g. staff, facilities)

I will be working with marine sediment cores applying different proxies for SST and upwelling reconstructions for different time intervals. This position in the NIOZ, the Netherlands is my first Post Doc for the next 2,5 years.

Three scientific and/or personal references

Prof. Dr. Stefan Schouten
NIOZ Royal Netherlands Institute for Sea Research
Stefan.schouten@nioz.nl

Prof. Dr. Martin Frank
GEOMAR Helmholtz Centre for Ocean Research
mfrank@geomar.de

Dr. Joachim Schoenfeld
GEOMAR Helmholtz Centre for Ocean Research
jschoenfeld@geomar.de

3. SCIENTIFIC EXPERTISE

For Scientist Jobs Descriptions visit: http://iodp.tamu.edu/participants/scientist_jobs.html

Please indicate your area(s) of expertise (maximum 3)

Discipline	Mark with X	Speciality
microbiologist		
organic and inorganic geochemist/biogeochemist	X	Recently started my postdoc position in NIOZ organic biogeochemistry department
physical properties specialist	X	Experience with MSCL measurements: Black and Marmara Sea sediment cores, Lake Van ICDP cores.
sedimentologist	X	Experience with marine (and lacustrine) sediment cores since 2006
structural geologist		
paleontologist		
paleomagnetist		
petrologist		
hydrogeologist		
Other		

4. ADDITIONAL DOCUMENTS

Please, provide the following documents:

- Letter of interest, including details about area of scientific interest, current research, expedition participation plan and post-cruise research
- CV and Publication list
- Letter of recommendation (for PhD students)
- See also: http://www.essac.ecord.org/flyer/Guidelines_for_Applying_to_sail.pdf

Please, send your application form as *a MS Word document* and the additional documents in *PDF format* (preferably as one file) by email to Jan Behrmann and Hanno Kinkel at the ESSAC office: essac@geomar.de.

In addition to the ESSAC application, all applicants ***must inform their national office*** (if applicable) ***and national delegate*** and send a copy of the application documents. ECORD does not provide funds for participation; the national offices or national delegates can provide information regarding travel support, post-cruise funding opportunities, etc.

See http://www.essac.ecord.org/index.php?mod=about&page=ESSAC for a list of the national contact persons.

Zeynep Erdem, Ph.D..
De Potvis 36, 1797 TA Den Hoorn (Texel)
The Netherlands
+49 (0) 176 31438356,
Zeynep.erdem@nioz.nl

30.08.2016

LETTER OF INTEREST

Dear ECORD Science Support & Advisory Committee,

as a marine geologist and paleoceanographer, I would like to express my interest in the opportunity to take part in Expedition 373.

I studied geology as bachelor degree and focused on marine geology and paleoceanography during my masters in Istanbul Technical University, Turkey. Later I moved to Kiel, Germany for Ph.D. in the field of paleoceanography/paleoclimatology. I completed my Ph.D. in June 2016, with focus on paleoenvironmental reconstruction using the sediment cores from the Peruvian margin. My thesis topic and role in the project include the chronostratigraphies of the sediment cores and reconstruction of bottom-water-oxygen conditions using benthic foraminifera taxonomy and different proxies. This Ph.D. position included employment by GEOMAR and studentship in Kiel University. Recently, I started my first postdoc in the NIOZ Royal Netherlands Institute for Sea Research, Texel, the Netherlands. For the next 3 years I will be working with biomarkers in downcore records in order to reconstruct sea surface temperatures and upwelling/high nutrient conditions.

Since my bachelor years, I have been part of various cruises in Black Sea (Turkish R/V Arar and German R/V M.S. Merian), the Marmara Sea (Turkish R/V Yunus and Italian R/V Urania) and latest was in the Caribbean Sea (German R/V Meteor). During these cruises my duty mostly was working with the sediment cores, core description and preliminary investigations and sampling. Additionally, during may master studies, I worked as a student assistant in an ICDP project both in expedition and sampling party (PaleoVan). During the expedition I was part of the MSCL measurement team on land.

My main expertise is late Quaternary paleo reconstructions, in particularly oxygen minimum conditions. My M.Sc. thesis topic included investigating short gravity cores from the Black Sea with focus of history of anoxia using inorganic geochemistry and sedimentological characteristics. I mostly worked with MSCL and ITRAX XRF. During these years, I also had the chance to join various expeditions, both in marine and lacustrine as mentioned above, as a student assistant. Later on during my Ph.D. I worked with marine sediment cores from the Peruvian margin focusing on both sedimentological features and benthic foraminifera downcore distributions. The main focus was to reconstruct the oxygen conditions since the LGM. My special interest is multi proxy application to marine sediments considering different time intervals. For the next 3 years I will be working in NIOZ, the Netherlands working with lipid biomarkers mostly, comparing their response with other well known proxies.

My main aim in applying to this expedition is to take place in IODP community, expeditions and research. At this stage of my career I am willing to be involved in different research questions and different research areas. So far I only worked with late Quaternary in downcore record but for my post doc the overall plan is to investigate older records in the past. At this stage, since I am really new at my post doc topic and it is a relatively new proxy (e.g., long chain diols), I am not exactly sure whether the biomarkers would work in this specific region but I would like to test this proxy at samples I might have access.

For further information, please do not hesitate to contact me. I am looking forward to hearing from you.

Best regards.

Curriculum Vitae

Personal Data

Name:	Zeynep Erdem
Address:	De Potvis 36 1797 TA Den Hoorn, the Netherlands
Tel:	+49 (0) 176 314 38356
E-Mail:	zeynep.erdem@nioz.nl

Nationality:	Turkish
Date of birth:	26.05.1985
Gender:	Female

Summary

- Geologist, PhD in paleoceanography and micropaleontology, interested in multi-proxy approaches in paleoceanography and paleoclimatology.
- Knowledge in the Late Quaternary benthic foraminifera taxonomy from South East Equatorial Pacific (Peru-Ecuador), familiar with Black Sea and Marmara Sea species.
- Experience at sediment studies from both marine and lagunal environments (e.g., radiocarbon dating, physical properties, XRF measurements).
- Basic knowledge and experience on geophysical studies and interpretation (mainly seismic)
- Experienced Microsoft Office and Adobe products user
- Nature lover, amateur photographer with good language skills.

Education and Work Experience

Post Doc

08.2016 – ongoing **Post Doc/Researcher in NIOZ Royal Netherlands Institute for Sea Research**, Texel, the Netherlands

- Part of ERC Project title: DIOLS - Long chain diol sediment records as indicators of past climatological and environmental changes.
- Application of multi proxy approaches to sediment cores for past climate reconstructions

Ph.D.

07.2012 – 06.2016 **Ph.D. Student in Faculty of Mathematics and Natural Sciences**, Christian-Albrechts-University of Kiel, Germany

- Thesis title “Reconstruction of past bottom water conditions of the Peruvian Oxygen Minimum Zone (OMZ) for the last 22,000 years and the benthic foraminiferal response to (de)oxygenation.”
- Part of Integrated School of Ocean Sciences (ISOS) in Kiel.

07.2012 – 06.2016 **Researcher/Project Member** in Paleoceanography department at GEOMAR Helmholtz Centre for Ocean Research Kiel, Germany as part of **SFB754** Phase II subproject B7.

- Chronostratigraphies of sediment cores from the Peruvian margin
- Paleo-environmental reconstructions off Peru; focus on benthic foraminiferal proxies and their downcore distributions.
- Field and lab work assistance to Living Benthic Foraminifera from Tidal Flats; M.Sc. lecture during winter semesters.

11 – 27.03.2013 **Researcher**; German R/V Meteor, Leg M94, Carribbean Sea
- Geophysical studies & Sediment core sampling

06.2011 – 04.2012 **Administrative and Logistic support** for **EU WP7 HYPOX** project at EMCOL (Eastern Mediterranean Centre for Oceanography and Limnology), Istanbul, Turkey

M.Sc.

09.2008 – 06.2011 **M.Sc. Student; Climate and Marine Science program**, Eurasian Institute of Earth Sciences, Istanbul Technical University, Istanbul, Turkey
- Lectures (5 semester) on marine and climate science, earth system, marine geochemistry, paleoceanography
- Thesis title "Sedimentary Record of Mediterranean Inflow Effect on Redox Conditions of the Istanbul Strait Outlet Area of the Black Sea"

Researcher and Student assistant at EMCOL, Istanbul, Turkey.

06.2009 – 06.2011 **Researcher** at **EU WP7 HYPOX** project, at EMCOL, Istanbul, Turkey.
- M.Sc. topic/analysis and data acquisition from Black Sea sediment cores. (Itrax XRF, MSCL and TOC/TIC measurements)
- Attendance to research cruises

08.2010 & 01.2011 **Student assistant** at **ICDP: PALEOVAN** Lake Van, Ahlat, Van, Turkey.
- Multi Sensor Core Logger (MSCL) measurements on ICDP cores.

& part of ICDP:PALEOVAN Scientific party at MARUM, IODP-ICDP Core Repository, Bremen, Germany.
- Laboratory work; Sampling Lake Van ICDP cores

03.2010 & 10.2010 **Student assistant**; part of **EC EMSO/ESONET** European Multidisciplinary Seafloor Observatory project, at Turkish R/V Yunus Sea of Marmara Demo Mission, Istanbul, Turkey.
- Deployment of sea floor monitoring device
- Communication between Italian scientific team – Turkish R/V crew members.

& at URANIA2010 Italian R/V Urania, part of EC EMSO/ESONET European Multidisciplinary Seafloor Observatory Project, in Sea of Marmara, Turkey.
- Geophysical studies and sediment core sampling

11.2009 & 04.2010 **Researcher**, part of **EU WP7 HYPOX project**; Turkish R/V Arar, Black Sea (Bosphorus Outlet Area), Turkey **&** German R/V M.S.Merian, Leg MSM-15/1, Black Sea (Bosphorus Outlet Area), Turkey
- Geophysical Studies and sediment core sampling

B.Sc.

09.2004 – 08.2008 **B.Sc. Student** in Mining Faculty, Department of Geological Engineering Istanbul Technical University, Istanbul, Turkey

- Lectures (8 semester) Geology and Engineering subjects.
- Thesis title "Geology of Kilyos (Northern İstanbul) and the Sedimentological Properties of Sand Dunes in the Region"

06.2007 – 08.2007 **Internship** at DSI (State Hydraulic Works) XIV. Region Headquarters, Istanbul, Turkey

- Regular visits – controls at dam construction in Istanbul, Turkey.
- Geological mapping of the region

06.2006 – 07.2006 **Internship** at Eastern Mediterranean Center for Oceanography and Limnology (EMCOL) laboratories, Istanbul Technical University, Istanbul, Turkey

- Micropaleontological studies on sediment cores from Marmara Sea, Turkey.

Education

09.1996 – 06.2004 **High School**; Kadıköy Anadolu Lisesi, Istanbul, Turkey

09.2002 – 07.2003 **Student exchange program** AFS; Liceo Scientifico Ettore Majorana, Latina, Italy

Language

English - Advanced
German - Intermediate
Turkish - Mother language
Italian - Upper Intermediate
French - Beginner

Training & Certificates

2013 6th Course on Benthic and Planktonic Foraminifera within the International School on Foraminifera, organized by Grzybowski Foundation, in Urbino, Italy.

2012 Molecular Organic Biogeochemistry Summerschool at the NIOZ, Texel, the Netherlands.

Soft skill and technical courses during Ph.D. period at ISOS and Graduate Centre of Christian-Albrechts-University of Kiel, Germany

- Basics of University teaching,
- Scientific poster presentation and design, Adobe InDesign
- Introduction to programming language (R, Matlab, Phyton), Physical oceanography, ODV

Memberships & others

12.2012 – 09.2014 Ph.D. students representation/GEOMAR DokTeam member
05.2007 – 07.2012 Part time librarian in a private collection library
09.2003 – 07.2012 Volunteer at AFS Student Exchange program

Publications

Papers Published in Science Journals

1) **Erdem, Z.,** Schönfeld, J., Glock, N., Dengler, M., Mosch, T., Sommer, S., Elger, J. and Eisenhauer, A. ,2016. Peruvian sediments as recorders of an evolving hiatus for the last 22 thousand years *Quaternary Science Reviews*, 137 . pp. 1-14. DOI 10.1016/j.quascirev.2016.01.029.

2) Schönfeld, J., Kuhnt, W., **Erdem, Z.,** Flögel, S., Glock, N., Aquit, M., Frank, M., Holbourn, A., 2015. Records of past mid-depth ventilation: Cretaceous ocean anoxic event 2 vs. Recent oxygen minimum zones, *Biogeosciences*, 12, 1169-1189. doi:10.5194/bg-12-1169-2015.

3) Friedrich, J., Janssen, F., Aleynik, D., Bange, H.W., Boltacheva, N., Çagatay, N., Dale, A.W., Etiope, G., **Erdem, Z.**, Geraga, M., Gilli, A., Gomoiu, M.T., Hall, P.O.J., Hansson, D., He, Y., Holtappels, M., Kirf, M.K., Kononets, M., Konovalov, S., Lichtschlag, A., Livingstone, D.M., Marinaro, G., Mazlumyan, S., Naeher, S., North, R.P., Papatheodorou, G., Pfannkuche, O., Prien, R., Rehder, G., Schubert, C.J., Soltwedel, T., Sommer, S., Stahl, H., Stanev, E.V., Teaca, A., Tengberg, A., Waldmann, C., Wehrli, B., Wenzhöfer, F., 2014. Investigating hypoxia in aquatic environments: diverse approaches to addressing a complex phenomenon, *Biogeosciences*, 11, 1215-1259. doi:10.5194/bg-11-1215-2014.

Articles, Reports published (not peer-reviewed)

1) Hübscher, C., Nürnberg, D., Al Hseinat, M., Alvarez Garcia, M., **Erdem, Z.,** Gehre, N., Jentzen, A., Kalvelage, C., Karas, C., Kimmel, B., Mildner, T., Ortiz, O., Parker, A. O., Petersen, A., Raeke, A., Reiche, S., Schmidt, M., Weiß, B. and Wolf, D. (2014) Yucatan Throughflow - Cruise No. M94, March 12 – March 26, 2013, Balboa (Panama) – Kingston (Jamaica) . *METEOR-Berichte, M94* . DFG-Senatskommission für Ozeanographie, Bremen, 32 pp. DOI 10.2312/cr_m94.

2) **Erdem, Z**., 2015. Taxonomy Workshop on Recent benthic foraminifera (TMS2015 meeting), Foraminifera group report article in *Newsletter of Micropaleontology*, Number 92, p. 44, ISSN: 0140-6730, August 2015 issue.

Papers Presented in International Conferences (abstracts)

1) **Erdem, Z.,** Schönfeld, J., Rathburn, A.E., Perez., M.E., Cardich, J., Glock, N., Doering, K., 2016. Response of benthic foraminifera to changing bottom-water oxygen levels at the Peruvian Oxygen Minimum Zone since the Last Glacial Maximum. *ICP12 Abstracts* (poster)

2) **Erdem, Z.,** Schönfeld, J., Glock, N., 2015. A 22,000 year record of changing redox conditions from the Peruvian Oxygen Minimum Zone (OMZ): benthic foraminifera approach, *AGU2015 Abstracts* (poster)

3) **Erdem, Z.,** Schönfeld, J., Glock, N., 2015. Benthic foraminifera as indicators of changing redox conditions: a 22,000 year record from the Peruvian margin, *TMS15 Abstracts* (poster)

4) **Erdem, Z.,** Schönfeld, J., Voigt, S., Glock, N., Eisenhauer, A., Dengler, M., 2014. A 22 kyr record of an evolving mid-depth hiatus in sediments at the Peruvian margin, *GeoFrankfurt2014 Abstracts* (talk)

5) **Erdem, Z.,** Schönfeld, J., Voigt, S., Glock, N., Eisenhauer, A., Dengler, M., 2013. SFB754: Sediments of the Peruvian Oxygen Minimum Zone as Records of Mid-Depth Ocean Dynamics*, ICP11 Abstracts* (poster)

6) **Erdem, Z.,** Çağatay, M.N., Damcı, E., Ülgen, U.B., Holtappels, M., Lichtschlag, A., 2012. Holocene History of the Mediterranean Inflow and Its Influence on Formation of the Channel Network Complex and Redox Conditions in the Istanbul Strait Outlet Area of the Black Sea. Geophysical Research Abstracts, Vol. 14, EGU2012-7068, 2012. *EGU General Assembly 2012* (talk)

7) Damcı, E., Çağatay, M.N., Krastel, S., Öğretmen, N., Çukur, D., Ülgen, U.B., **Erdem, Z.**, Litt, T., Anselmetti, F.S., Eriş, K.K., 2012. Lake Level Changes of Lake Van over the Last 400 ka: Evidence from Deltas in Seismic Reflection Data and ICDP Drilling. Geophysical Research Abstracts, Vol. 14, EGU2012-626-3, 2012. *EGU General Assembly 2012*.

APPLICATION TO PARTICIPATE IN AN IODP EXPEDITION

ESSAC Office ECORD Science Support & Advisory Committee
GEOMAR | Helmholtz Centre for Ocean Research Kiel
Wischhofstrasse 1-3
24148 Kiel, Germany
Hanno Kinkel (ESSAC Science Coordinator):
Tel: +49 431 600 2418
Fax:+49 431 600 2922
Web Page: http://www.essac.ecord.org Email: essac@geomar.de

Please type information

Apply to Sail Application Form

Expedition Number 373: Antarctic Paleoclimate and Ice History

1. PERSONAL INFORMATION

Family name: Hernández Almeida

First name: Iván

Current Position: Postdoctoral Researcher

Institution: MARUM-University of Bremen

Address: Leobener Strasse 2

City, Postcode, Country: Bremen, 28359, Germany

Tel. work: 0421 218 - 65975
Tel. home:
Fax:
Email: ihernandez@marum.de

Country of citizenship: Spain

Place of birth/date of birth: Salamanca, Spain/24.10.1981

Gender: Male

Education (highest degree, including year PhD was received / is expected): PhD

Are you currently a student? NO Expected Graduation Date:

2. EXPEDITION INFORMATION

Summary of proposed participation, including area of scientific interest, current research and participation plan (maximum 250 characters with space – more detail should be included in the Letter of Interest):

I intend to study Antarctic ecosystem evolution and reconstruct paleoclimate using radiolarian assemblages, and using radiolarian biostratigraphy to constrain the ages of the sediments.

Prior involvement with DSDP/ODP/IODP and nature of involvement (expedition number, shipboard/shore-based participation, co-chief, etc):

IODP Exp. 349: (Shipboard) I participated as micropaleontologist (radiolarian specialist). Currently working on a project with material recovered during this expedition.

IODP Exp. 344: (Shore-based) I studied of planktonic foraminifera assemblages from Site U1381C, in collaboration with Dr. Paula Diz Ferreiro (PI of the project).

IODP Exp. 306: (Shore-based) I studied material recovered during this expedition as part of my PhD.

Post-cruise science support to achieve the proposed scientific objectives 1) future funding scheme and 2) support from host institution (e.g. staff, facilities)

I am a postdoctoral researcher at the MARUM-University of Bremen, funded by the Swiss National Science Foundation until May 2017. I have just applied for another 20 months of funding within the program (Swiss SNF), until December 2018. Moreover, during the next year I intend to apply for several additional fellowships (DFG, SPP-527 IODP, IF-Marie Curie) to continue my research.

MARUM is an internationally distinguished research institution, with a special focus on the study of Ocean and Climate. The lab infrastructure at MARUM allows performing a variety of highly sophisticated analyses of marine sediments (e.g. micropaleonotology, core scanning and logging, mass spectrometry). Moreover, MARUM hosts the IODP Bremen Core Repository, the IODP Micropaleontological Reference Center (MRC), and the World Data Center for Marine Environmental Sciences (PANGAEA).

Three scientific and/or personal references

Francisco Javier Sierro. Professor at University of Salamanca, Spain (sierra@usal.es)

Michal Kucera. Professor at MARUM-University of Bremen, Germany (mkucera@marum.de)

Gabriel M. Filippelli. Professor at Indiana University-Purdue University of Indianapolis (gfilippe@iupui.edu)

3. SCIENTIFIC EXPERTISE

For Scientist Jobs Descriptions visit: http://iodp.tamu.edu/participants/scientist_jobs.html

Please indicate your area(s) of expertise (maximum 3)

Discipline	Mark with X	Speciality
microbiologist		
organic and inorganic geochemist/biogeochemist		
physical properties specialist		
sedimentologist		
structural geologist		
paleontologist	x	Radiolaria, planktonic foraminifera
paleomagnetist		
petrologist		
hydrogeologist		
Other		

4. ADDITIONAL DOCUMENTS

Please, provide the following documents:

- Letter of interest, including details about area of scientific interest, current research, expedition participation plan and post-cruise research
- CV and Publication list
- Letter of recommendation (for PhD students)
- See also: http://www.essac.ecord.org/flyer/Guidelines_for_Applying_to_sail.pdf

Please, send your application form as *a MS Word document* and the additional documents in *PDF format* (preferably as one file) by email to Jan Behrmann and Hanno Kinkel at the ESSAC office: essac@geomar.de.

In addition to the ESSAC application, all applicants ***must inform their national office*** (if applicable) ***and national delegate*** and send a copy of the application documents. ECORD does not provide funds for participation; the national offices or national delegates can provide information regarding travel support, post-cruise funding opportunities, etc.

See http://www.essac.ecord.org/index.php?mod=about&page=ESSAC for a list of the national contact persons.

Dr. Iván Hernández Almeida
MARUM-University of Bremen
Leobner Strasse, 2
28359 Bremen
Germany
E-mail: ihernandez@marum.de

ESSAC Office
GEOMAR
Helmholtz Centre for Ocean Research Kiel
Ostufer Wischhofstrasse 1-3
24148 Kiel
Germany

Bremen, August 30th, 2016

Dear Dr. Jan H. Behrmann and Dr. Hanno Kinkel,

I am a marine geologist specialized in micropaleontology. During my scientific career, I have been involved in different IODP projects. During my PhD at the University of Salamanca, I studied samples from IODP Exp. 306 (North Atlantic Climate), using a multi-proxy approach, with focus on micropaleontological analysis (radiolarians and planktonic foraminifera). During January-March 2014, I joined the IODP Exp. 349 (South China Sea Tectonics) as **radiolarian specialist**. At present, I hold a Post-doc position at MARUM, at University of Bremen. My current project, funded by the Swiss National Science Foundation (SNSF), focuses on the quantitative reconstruction of sea surface temperatures and productivity in the South China Sea using radiolarian assemblages and geochemical proxies.

My main research interest is the study of radiolarian assemblages and their paleoecological response to oceanographic/climatic changes at millennial and at glacial/interglacial timescales. For this, I develop radiolarian-based transfer functions for its application to fossil assemblages. The consistent and often abundant occurrence of radiolarians in marine sediments in Antarctic continental shelves provides a rare opportunity to undertake quantitative analysis of high-latitude radiolarian population changes through the Neogene and Quaternary. Moreover, radiolarian biostratigraphy is an important tool for synchronizing climate and environmental events at global scale, especially at high latitudes.

My post-expedition research plans include establishing an improved high-resolution Antarctic biostratigraphy using radiolarians that will help to understand the mechanisms controlling East Antarctic Ice Sheet evolution since the Oligocene. In addition, I intend to study qualitatively radiolarian assemblages, and use abundance, diversity and preservation indices as an indicator of paleonvironemntal changes on longer time-scales that evidence the sensitivity of the East Antarctic Ice-Sheet under different boundary conditions. Moreover, radiolarian-based paleoenvironmental

reconstructions will be supported by estimates of marine export productivity derived from sedimentary opal and organic carbon analyses. These datasets will provide clues about the carbon sequestration in the deep ocean and changes in the atmospheric CO_2 through the Cenozoic.

I am currently funded by the SNSF, until May 207. I recently have submitted a follow-up proposal to extend this funding until December 2018 (near 50% of success at the 2015 call). During the next year I also intend to apply for other funding schemes, such as Marie Curie, DFG and Schwerpunktprogramm 527 Bereich Infrastruktur - IODP fellowships. I have access at the MARUM at University of Bremen to all the facilities and instruments I will need for the optimal study of the sediments recovered in this Expedition, and I benefit from my collaboration with other scientists/research groups at my home institution. For all those reasons I consider that sailing on the IOPD 373 Expedition: Antarctic Paleoclimate and Ice History, will be of great benefit to my scientific career.

I hope I have convinced you that I my expertise can be of benefit to IODP Exp. 373. I look forward to hearing from you.

Yours sincerely,

Iván Hernández Almeida

CURRICULUM VITAE
IVÁN HERNÁNDEZ ALMEIDA

MARUM-University of Bremen
Leobener Str. D-28359 Bremen

PERSONAL

E-Mail: ihernandez@marum.de
Phone: +41 78 972 32 33; +49 152 55 618 873
Date of birth: 24/10/1981, Salamanca, Spain

I am a young, active geologist with a strong record of mobility. I have studied and carried out research in Spain, the US, Norway, Switzerland and Germany. Currently I work as a post-doctoral researcher at the Center for Marine and Environmental Sciences (MARUM) at the University of Bremen. My research interest is the understanding of Paleoclimate, Paleoceanography and Paleoenvironmental conditions in both terrestrial and oceanic systems, mainly through the study of Microfossils. I have been involved in several projects related to IODP and participated in the Expedition 349 (South China Sea Tectonics) as the radiolarian especialist. I use biostratigraphy, quantitative methods (transfer functions) and multi-proxy approaches (e.g. biogeochemistry, stable isotopes) to reconstruct past conditions during the Cenozoic, with particular interest in the Climate evolution during the Neogene and Quaternary, forcing factors and feedbacks.

EDUCATION AND RESEARCH

Since 03/2016	Postdoctoral researcher funded by a Swiss National Science Foundation Advance Postdoc Mobility fellowship (P300P2_164634) at the MARUM, University of Bremen, Germany. Project title: Sensitivity of East Asian Winter Monsoon to changes in sea surface temperature and productivity in the South China Sea on millennial time scales.
03/2012-02/2016	Post-doctoral research within the CLIMPOL project (Swiss Contribution to the enlarged EU PSPB-086/2010), Institute of Geography and Oeschger Centre for Climate Change Research, University of Bern, Switzerland.
10/2014-09/2015	M.Sc. in Advanced Statistics. National Distance Education University (UNED), Spain. 60 ECTS credits.
07/2011-01/2012	Research assistant. Department of Geology, University of Salamanca, Spain.
07/2007-06/2011	Ph.D. research at the Department of Geology, University of Salamanca, Spain. Thesis title: *'Orbital and sub-orbital climate variability in the North Atlantic during the Pleistocene (1070-780 ka)'*. (Defended on 10/06/2011) Main supervisor: Prof. Dr. Francisco Javier Sierro Honoured with *Summa Cum Laude* and 'European Doctor' Mention

06/2005-06/2007	M.Sc. in Geology. University of Salamanca, Spain.
01/2005-06/2005	Certificate of Advanced Studies in Higher Education (CAS). University of Salamanca, Spain
09/1999-01/2005	B.Sc. Degree in Geology. University of Salamanca, Spain.

STAYS AT RESEARCH CENTERS

03/2010-06/2010	Natural History Museum-University of Oslo, Norway. Supervisor: Prof. Dr. Kjell R. Bjørklund
03/2009-06/2009	Natural History Museum-University of Oslo, Norway. Supervisor: Prof. Dr. Kjell R. Bjørklund
08/2008-12/2008	Indiana University-Purdue University of Indianapolis (IUPUI), USA. Supervisor: Dr. Gabriel M. Filippelli
09/2007-12/2007	University of Barcelona, Spain. Supervisor: Dr. Isabel Cacho

PARTICIPATION IN RESEARCH PROJECTS

03/2016-present	'Sensitivity of East Asian Winter Monsoon to changes in sea surface temperature and productivity in the South China Sea on millennial time scales' (P300P2_164634) PI:Iván Hernández-Almeida
03/2012-02/2016	'CLIMPOL: Constraining the future with the past' (PSPB-086/2010) PI: Wojtek Tylmann and Martin Grosjean
8/2013-11/2014	'Environment variability in the Eastern Equatorial Pacific (Costa Rica continental margin) during the Pleistocene'' (EM2013/012) PI: Paula Diz Ferreiro
2009-2011	'Abrupt Climate Changes in the North Atlantic during the Plio-Pleistocene' (CGL2009-08651) PI: Francisco Javier Sierro and José-Abel Flores
2007-2011	'GRACCIE: Multidisciplinary Research Consortium on Gradual and Abrupt Climate Changes, and their Impacts on the Environment' (CONSOLIDER-INGENIO CSD 2007-00067) PI: Joan O. Grimalt and Francisco Javier Sierro
2007-2011	'Earth sciences and Society' (CT-09-1402) PI: Mª Ángeles Bárcena Pernía
2005-2008	'Orbital and Suborbital Climate Variability in the North Atlantic and Western Mediterranean during the last 500 ka' (CGL2005-00642/BTE) PI: Francisco Javier Sierro

TEACHING AND SUPERVISING

2014-2015	Teaching and lab assistant for M.Sc. in Climate Sciences, Methods in Paleolimnology (5 hours per semester). University of Bern.
11/2014	Workshop *'Quantitative methods in paleoclimate'*. M.Sc. in Oceanography, University of Vigo, Spain.
05/2014-07/2014	Co-supervisor short research stay by Ph.D student Blanca Ausín, from University of Salamanca, Spain
2014	Co-supervisor M.Sc. project by P.A.J. Pinninghoff, Graduate School of Climate Sciences, University of Bern. Thesis title: *'Climatic and environmental history of the past 1700 years recorded in the sediments of Laguna Espejo (39˚S) south-central Chile.'*
2009-2010	Teaching assistant for B.Sc. Degree in Geology courses: 'Paleobiology and metazoan evolution' (1 hour per week, winter semester), 'Micropaleontology' (2 hours per week, winter semester); and for B.Sc. Degree in Biology course: 'Geology' (1 hour per week, summer semester), University of Salamanca.

GRANTS AND AWARDS

Personal Fellowships and Awards

- Outstanding Doctoral Thesis Award 2011 in Geological Sciences. University of Salamanca, Spain.
- Ph.D. funding from the Spanish Ministry of Education and Science (4 years).
- Scholarship for B.Sc. studies from the Spanish Ministry of Culture, Sport and Education, University of Salamanca (5 years).

Travel Grants

- Travel grant to participate in the 12th International NCCR Climate Summer School. 1- 6 September 2013. Grindelwald, Switzerland (1200 CHF).
- IGBP-PAGES Travel grant to participate in the 2nd Young Scientists Meeting/4th Open Science Meeting. 11-16 February 2013. Goa, India (2000 CHF).
- University of Bern Travel grant to participate in the 12th International Paleolimnology Symposium. 21-24 August 2012. Glasgow, United Kingdom (1000 CHF).
- Spanish Ministry of Education and Science Travel grants for four research stays during PhD. Spanish Ministry of Education and Science (17250 €).
- Marie Curie action-Travel grant to participate in the course 'Proxies in Paleoclimatology: Education and Research. Paleoclimate II: orbital forcing, data and models'. 07-14 October 2005. University of Bratislava, Slovakia (1100 €).

WORKSHOPS AND TRAINING

09/2014	CLIMPOL IV milestone meeting IV and workshop. Gdansk, Poland
06/2014	13th Young Researchers Meeting 'Science and Communication'. Spiez, Switzerland
09/2013	CLIMPOL III milestone meeting IV and workshop. Gdansk, Poland
09/2013	12th International NCCR Climate Summer School, Grindelwald, Switzerland
10/2012	CLIMPOL II milestone meeting IV and workshop. Gdansk, Poland
09/2012	Course 'Analysing Palaeolimnological Data with R', lecturer: Steve Juggins and Gavin Simpson, University of Glasgow, United Kingdom
08/2012	Course 'Multivariate statistical methods in palaeoenvironmental research: ordination, hypothesis testing and quantitative reconstruction', lecturer: Oliver Heiri, University of Bern, Switzerland.
02/2008	Course 'Thematic Mapping and GIS'. Spanish Geographical Institute (online).
02/2007	Course 'Geographic Information Systems (GIS)'. Spanish Geographical Institute (online).
07/2006	Course 'Advanced data analysis with SPSS'. University of Salamanca, Spain
04/2006	Course 'Statistics using SPSS'. University of Salamanca, Spain
10/2005	Course 'Proxies in Paleoclimatology: Education and Research. Paleoclimate II: orbital forcing data and models'. University of Bratislava, Slovakia.

INVITED PRESENTATIONS

18/06/2015	A chrysophyte-based transfer function as a tool for winter severity reconstructions in NE Poland during the past millennium. IGBP-PAGES International Conference on "Climate variability and human impacts in Central and Eastern Europe during the last two millennia", Gdansk, Poland
25/11/2014	'The secrets of the South China Sea: results of IODP Expedition 349'. Faculty of Marine Sciences, University of Vigo, Spain.
02/12/2010	'Research methods in Paleoceanography: a window for understanding the climate change (past, present, and future?)'. Department of Philosophy, University of Salamanca, Spain.

CONFERENCES PRESENTATIONS (only first author)

28-30/09/2015	'Radiolarian-based transfer functions as proxy for reconstruction of East Asian Winter Monsoon in the South China Sea' (poster). 1st Post-cruise meeting IODP Expedition 349, Shanghai, China
09/09/2015	'Sensitivity of East Asian Winter Monsoon to changes in sea surface temperature and productivity in the South China Sea on millennial time scales' (oral). IODP 2nd Swiss Drilling Day, Bern, Switzerland.

17-19/06/2015 'Chrysophyte cyst-inferred variability of warm season lake water chemistry and zonal wind in northern Poland' (poster). IGBP-PAGES International Conference on Climate variability and human impacts in Central and Eastern Europe during the last two millennia, Gdansk, Poland.

17-19/06/2015 'Chrysophyte cysts population dynamics in northern Poland: a two-years sediment trap experiment' (poster). IGBP-PAGES International Conference on Climate variability and human impacts in Central and Eastern Europe during the last two millennia, Gdansk, Poland.

27/02-03/03/2014 'Subsurface warming in the subpolar North Atlantic during rapid climate events in the Early and Mid-Pleistocene' (poster). European Geosciences Union General Assembly, Vienna, Austria.

27/02-03/03/2014 'Chrysophyte cyst-inferred variability of warm season lake water chemistry and climate in northern Poland: training set and downcore reconstruction' (oral); 'Subsurface warming in the subpolar North Atlantic during rapid climate events in the Early and Mid-Pleistocene' (poster). European Geosciences Union General Assembly, Vienna, Austria.

26-28/08/2013 'Coupling of millennial-scale events in surface and deep water in the subpolar North Atlantic during the early and mid-Pleistocene' (oral). UniBern-Pages Open Science Conference on Isotopes of Carbon, Water, and Geotracers in Paleoclimate Research, Bern, Switzerland.

10-19/02/2013 'Developing a chrysophyte-based cold-season temperature transfer function and a calibration-in-time model to reconstruct environmental variables in Polish lakes' (poster); 'Suborbital ice-sheets variability in the subpolar North Atlantic during the Early and Mid-Pleistocene (MIS 31–19) as a response of low-latitude forcing' (poster). PAGES 4th Open Science Meeting & 2nd Young Science Meeting, Goa, India.

21-24/08/2012 'Lake selection and design of a training set to develop climate transfer functions for biological proxies in Polish lakes' (oral). 12th International Paleolimnology Symposium, Glasgow, United Kingdom.

25-29/03/2012 'Pleistocene Radiolarian assemblages as indicators of paleoceaonographic changes in the subpolar North Atlantic (Gardar Drift, IODP Leg 306, Site U1314)' (poster). 13th InterRad. International Conference on Fossil and Recent Radiolarians, Cádiz, Spain.

21-23/04/2011 'Ice-sheet dynamics and ocean circulation variability in the North Atlantic during the Mid-Pleistocene Transition (1069-779 ka)' (oral). 1st Joint RCMNS-RCANS Interim Colloquium, Salamanca, Spain.

19-20/09/2011 'Climate variability at orbital and sub-orbital scale during the Early Pleistocene (1070-779 ka)' (oral). 4th Multidisciplinary Research Consortium on Gradual and

	Abrupt Climate Changes, and their Impacts on the Environment (GRACCIE), Salamanca, Spain.
07-09/09/2011	'Ice-sheet surges in the subpolar North Atlantic during the Pleistocene: Impact on surface circulation patterns' (poster). VIII Symposium of Polar Studies, Mallorca, Spain.
27/05/2011	'Characterization and interpretation of the detrital-rich layers at Site U1314 (North Atlantic) during marine isotope stages (MIS) 21-19 (830-779 ka)' (oral). 50th Meeting of the Geological Society of Spain. Vigo, Spain.
29/08-03/09/2010	'The Middle Pleistocene palaeoclimatic record of North Atlantic deep-sea sediments (IODP Site U1314) revealed by faunal and geochemical Proxies' (poster). 10th International Conference on Paleoceanography. San Diego, USA.
14-18/12/2009	'Glacial/Interglacial Variability in Terrigenous Input and Paleoproductivity in the North Atlantic during the Middle Pleistocene (MIS 19 to MIS 31)' (poster). American Geophysical Union Fall meeting. San Francisco, USA.
14-19/12/2008	'A 220-ka history (MIS 19-31) of ice sheet variability, primary productivity and sea surface temperature in the North Atlantic' (poster). American Geophysical Union Fall meeting. San Francisco, USA.
15-17/05/2008	'North Atlantic Climate Change during the Mid-Pleistocene (MIS 19 to MIS 31) based on foraminifer and isotopes studies in IODP site 1314' (poster). The Micropalaeontological Society's Foraminifera and Nannofossil Groups Joint Spring Meeting. Tübingen, Germany.
28-31/03/2007	'Seasonal variability of biogenic fluxes in the Alboran Sea (Western Mediterranean) as response to global climatic events' (poster). International Symposium in Marine Sciences. Valencia, Spain.
25-28/05/2006	'Materials and techniques in sediment trap analyses: tools for the paleoceanographic record' (oral). 4th Young Researchers on Palaeontology Meeting. Salamanca, Spain.
04-06/10/2005	'Seasonal dynamic of the coccolithophore assemblages in the Albora Sea (Western Mediterranean) and its relationship with the water column structure' (oral). 21th Meeting of the palaeontological society of Spain. Sevilla, Spain.
27/05/2005	'Influence of 1997-98' El Niño Event on the planktonic communities from the Alboran Sea (Western Mediterranean)' (oral). 39th Meeting of the Geological Society of Spain. Ciudad Real, Spain.

FIELD EXPERIENCE

26/01-30/03/2014	Expedition scientist (radiolarian specialist) at the IODP Expedition 349: South China Sea Tectonics
18-29/07/2012	Fieldwork assistant in Poland, sampling lakes and collecting sediment traps, as part of the CLIMPOL project.

LABORATORY AND ANALYTICAL SKILLS

- Experience with the R-language and SPSS software, data analyses and statistics
- Experience with Geographic Information Systems and ArcGIS software
- Optical microscope and scanning electron microscope handling, image analyses
- Microfossil preparation, classification and analyses (foraminifera, radiolarians, coccolithophores, diatoms, chrysophytes)
- Analyses of stable isotopes and trace metals on foraminifers
- Mass spectrometers for elemental and stable isotope ratio analyses, and geochemical analyses (CHNS Analyzer, biogenic silica)

OTHER PROFESSIONAL ACTIVITIES

Organizing committee in scientific events

12-21/11/2010	1st Latin-American Science and Technology Fair; *Empirika*. Salamanca, Spain.
18-23/10/2007	1st Polar Meeting, Salamanca, Spain.
25-28/05/2006	4th Young researchers on palaeontology meeting. Salamanca, Spain.
24-27/10/2005	EUROSTRATAFORM Final Meeting and PROMESS 2nd Annual Meeting, Salamanca, Spain.

Membership and working groups

- European Geoscience Union
- Geological Society of Spain

Refereeing for international scientific journals

- Global and Planetary Change
- Journal of Paleolimnology
- Palaeogeography, Palaeoclimatology, Palaeoecology
- Paleoceanography
- The Holocene

Review editor

- Frontiers in Ecology and Evolution (Paleoecology)

LANGUAGE SKILLS

- Spanish: native
- English: fluent in speaking and writing
- French: basic in speaking and writing

PUBLICATION LIST

PUBLISHED (peer-reviewed journals)

* 1st authored by co-supervised PhD student

- *Postdoctoral*

Witak, M**., Hernández-Almeida, I.**, Grosjean, M., Tylmann, W. Diatom-based reconstruction of past trophic status recorded in varved sediments of Lake Żabińskie, AD 1888-2010 (2016). Accepted in Oceanological and Hydrobiological Studies (on 7th June 2016) *(Data/statistical analyses and interpretation)*

Hernández-Almeida, **I.,** Grosjean, M., Gómez Navarro, J.J., Larocque-Tobler, I., Enters, D., Piotrowska, N, Gabryś, A., Wacnik, A., Witak, M., Bonk, A., Tylmann, W. Land-use changes, climate and ecosystem dynamics of Lake Żabińskie (NE Poland) during the last millennium: the CLIMPOL project (2016). The Holocene , in press. doi: 10.1177/0959683616658529

Sanchez Goñi, M.F., Rodrigues, T., Hodell, D., Polanco, J., Alonso-Garcia, M., **Hernandez-Almeida, I.** Dominant 5-kyr cyclicity in the atmosphere of southwestern Europe during Marine Isotopic Stage 19, a period of low eccentricity modulation (2016). Submitted to Earth and Planetary Science Letters 448, 81-9, doi:10.1016/j.epsl.2016.05.018 *(Data/statistical analyses and interpretation)*

de Jong, R., Schneider, T., **Hernández-Almeida, I.**, Grosjean, M. Recent temperature trends in the south Central Andes reconstructed from sedimentary chrysophyte stomatocysts in Laguna Escondida (1742 m.a.s.l., 38°28 S, Chile) (2016). Global and Planetary Change, 137, 24–34, doi:10.1016/j.gloplacha.2015.12.006 *(Data/statistical analyses and interpretation)*

Ding, W., Lia, J., Clift, P. and IODP Expedition 349 (**Hernández-Almeida, I.** as co-author). Scientists Spreading dynamics and sedimentary process of the Southwest Sub-basin, South China Sea: Constraints from multi-channel seismic data and IODP Expedition 349 (2016). Journal of Asian Earth Sciences 115, 97-113, doi:10.1016/j.jseaes.2015.09.013 *(Biostratigraphy and data analyses)*

* Ausín, B., **Hernández-Almeida, I.**, Flores, J.A., Sierro, F.J., Grosjean, M., Francés, G., Alonso, B. Development of coccolithophore-based transfer functions in the Western Mediterranean Sea: a sea surface salinity reconstruction for the last 15.5 kyr (2015c). Climate of the Past 11, 1635-1651, doi:10.5194/cp-11-1635-2015 *(Supervision of the first author, data/statistical analyses and interpretation)*

Hernández-Almeida, I., Grosjean, M., Tylmann, W., Przybylak, R., (2015b). A chrysophyte-based quantitative reconstruction of winter severity from varved lake sediments in NE Poland during the past millennium and its relationship to natural climate variability, Quaternary Science Reviews, 122:74-88, doi:10.1016/j.quascirev.2015.05.029

Li, C.-F., Li, J., Ding, W., Franke, D., Yao, Y., Shi, H., Pang, X., Cao, Y., Lin, J., Zhu, J., Kulhanek, D. K., Williams, T., Bao, R., Briais, A., Brown, E. A., Chen, Y., Clift, P. D., Colwell, F. S., Dadd, K. A., **Hernández-Almeida, I.**, Huang, X.-L., Hyun, S., Jiang, T., Koppers, A. A. P., Li, Q., Liu, C., Liu, Q., Liu, Z., Nagai, R. H., Peleo-Alampay, A., Su, X., Sun, Z., Tejada, M. L. G., Trinh, H. S., Yeh, Y.-C., Zhang, C., Zhang, F., Zhang, G.-L., and Zhao, X. (2015). Seismic stratigraphy of the central South China Sea basin and implications for neotectonics, Journal of Geophysical Research, 120(3): 1377–1399, doi: 10.1002/2014JB011686 *(Biostratigraphy and data analyses)*

* Ausín, B., Flores, J. A., Sierro, F. J., Cacho, I., **Hernández-Almeida, I.**, Martrat, B., and Grimalt, J. O. (2015b). Atmospheric patterns driving Holocene productivity in the Alboran Sea (Western Mediterranean): A multiproxy approach, The Holocene 25, 1–13, doi: 10.1177/0959683614565952 *(Co-supervision of the first author, design and drafting the article and interpretation of data)*

* Ausín, B., Flores, J. A., Sierro, F. J., Bárcena, M. A., **Hernández-Almeida, I.**, Francés, G., Gutiérrez-Arnillas, E., Martrat, B., Grimalt, J. O., and Cacho, I. (2015a). Coccolithophore productivity and surface water dynamics in the Alboran Sea during the last 25 kyr, Palaeogeography, Palaeoclimatology, Palaeoecology, 418, 126-140, http://dx.doi.org/10.1016/j.palaeo.2014.11.011 *(Co-supervision of the first author, data/statistical analyses and interpretation)*

Hernández-Almeida, I., Sierro, F. J., Cacho, I., and Flores, J. A. (2015a). Subsurface North Atlantic warming as a trigger of rapid cooling events: evidences from the Early Pleistocene (MIS 31–19), Climate of the Past, 11, 687–696, doi: 10.5194/cpd-10-4033-2014.

Li, C.-F., Xu, X., Lin, J., Sun, Z., Zhu, J., Yao, Y., Zhao, X., Liu, Q., Kulhanek, D. K., Wang, J., Song, T., Zhao, J., Qiu, N., Guan, Y., Zhou, Z., Williams, T., Bao, R., Briais, A., Brown, E. A., Chen, Y., Clift, P. D., Colwell, F. S., Dadd, K. A., Ding, W., **Hernández-Almeida, I.**, Huang, X.-L., Hyun, S., Jiang, T., Koppers, A. A. P., Li, Q., Liu, C., Liu, Z., Nagai, R. H., Peleo-Alampay, A., Su, X., Tejada, M. L. G., Trinh, H. S., Yeh, Y.-C., Zhang, C., Zhang, F., and Zhang, G.-L. (2014). Ages and magnetic structures of the South China Sea constrained by deep tow magnetic surveys and IODP Expedition 349, Geochemistry, Geophysics, Geosystems, 15, 4958-4983, doi: 10.1002/2014gc005567 *(Biostratigraphy and data analyses)*

Hernández-Almeida, I., Grosjean, M., Tylmann, W., and Bonk, A. (2014). Chrysophyte cyst-inferred variability of warm season lake water chemistry and climate in northern Poland: training set and downcore reconstruction, Journal of Paleolimnology, 1-16, doi: 10.1007/s10933-014-9812-4

Saavedra-Pellitero, M., Baumann, K. H., **Hernández-Almeida, I.**, Flores, J. A., and Sierro, F. J. (2013). Modern sea surface productivity and temperature estimations off Chile as detected by coccolith accumulation rates, Palaeogeography, Palaeoclimatology, Palaeoecology, 392, 534-545, doi: http://dx.doi.org/10.1016/j.palaeo.2013.10.010 *(Data/statistical analyses, and interpretation)*

- *PhD*

Hernández-Almeida, I., Sierro, F. J., Flores, J.-A., Cacho, I., and Filippelli, G. M. (2013b). Palaeoceanographic changes in the North Atlantic during the Mid-Pleistocene Transition (MIS 31–19) as inferred from planktonic foraminiferal and calcium carbonate records, Boreas, 42, 140-159, doi: 10.1111/j.1502-3885.2012.00283.x

Hernández-Almeida, I., Bjørklund, K. R., Sierro, F. J., Filippelli, G. M., Cacho, I., and Flores, J. A. (2013a). A high resolution opal and radiolarian record from the subpolar North Atlantic during the Mid-Pleistocene Transition (1069–779 ka): Palaeoceanographic implications, Palaeogeography, Palaeoclimatology, Palaeoecology, 391, Part A, 49-70, doi: http://dx.doi.org/10.1016/j.palaeo.2011.05.049

Hernández-Almeida, I., Sierro, F. J., Cacho, I., and Flores, J. A. (2012). Impact of suborbital climate changes in the North Atlantic on ice sheet dynamics at the Mid-Pleistocene Transition, Paleoceanography, 27, PA3214, doi: 10.1029/2011pa002209

Hernández-Almeida, I., Bárcena, M. A., Flores, J. A., Sierro, F. J., Sanchez-Vidal, A., and Calafat, A. (2011). Microplankton response to environmental conditions in the Alboran Sea (Western Mediterranean): One year sediment trap record, Marine Micropaleontology, 78, 14-24, doi: http://dx.doi.org/10.1016/j.marmicro.2010.09.005, 2011.

Hernández-Almeida, I., Sierro, F. J., Suárez, M., Filippelli, G. M., and Flores, J. A. (2011). Characterization and interpretation of the detrital-rich layers at Site U1314 (North Atlantic) during marine isotope stages (MIS) 21-19 (830-779 ka), Geogaceta, 50(2), 157-160.

Rigual-Hernández, A. S., Bárcena, M. A., Sierro, F. J., Flores, J. A., **Hernández-Almeida, I.**, Sanchez-Vidal, A., Palanques, A., and Heussner, S. (2010). Seasonal to interannual variability and geographic distribution of the silicoflagellate fluxes in the Western Mediterranean, Marine Micropaleontology, 77, 46-57, doi: http://dx.doi.org/10.1016/j.marmicro.2010.07.003 *(Acquisition of data and interpretation)*

Hernández-Almeida, I., Bárcena, M. A., Sierro, F. J., Flores, J. A., and Calafat, A. (2005). Influence of 1997-98' El Niño event on the planktonic communities from The Alboran Sea (Western Mediterranean), Geogaceta, 183-186, 2005.

REPORTS

Li, C.-F., Lin, J., Kulhanek, D.K., Williams, T., Bao, R., Briais, A., Brown, E.A., Chen, Y., Clift, P.D., Colwell, F.S., Dadd, K.A., Ding, W., **Hernández Almeida, I.**, Huang, X.-L., Hyun, S., Jiang, T.,

Koppers, A.A.P., Li, Q., Liu, C., Liu, Q., Liu, Z., Nagai, R.H., Peleo-Alampay, A., Su, X., Sun, Z., Tejada, M.L.G., Trinh, H.S., Yeh, Y.-C., Zhang, C., Zhang, F., Zhang, G.-L., and Zhao, X. (2015). Proceedings of the International Ocean Discovery Program (IODP), 349: South China Sea Tectonics. College Station, TX. http://dx.doi.org/10.14379/iodp.proc.349.2015 *(Scientist in IODP Expedition 349 and analyses of radiolarians onboard)*

Expedition 349 Scientists (**Hernández-Almeida**, **I.** as co-author) (2014). South China Sea tectonics: opening of the South China Sea and its implications for southeast Asian tectonics, climates, and deep mantle processes since the late Mesozoic, Preliminary Report Expedition 349. International Ocean Discovery Program, 1-109, doi:10.14379/iodp.pr.349.2014. *(Scientist in IODP Expedition 349 and analyses of radiolarians onboard)*

Sierro, F.J., **Hernandez-Almeida, I.**, Alonso-Garcia, M., Flores, J.A. (2009). Data report: Pliocene–Pleistocene planktonic foraminifer bioevents at IODP Site U1313. In: Channell, J.E.T., Kanamatsu, T., Sato, T., Stein, R., Alvarez Zarikian, C.A., Malone, M.J., the Expedition 303/306 Scientists (Eds.), Proceedings of the Integrated Ocean Drilling Program, Volume 303/306. College Station, TX. doi:10.2204/iodp.proc.303306.205.2009 *(Acquisition of data and interpretation)*

CONTRIBUTION TO BOOKS

Alonso-García, M., Álvarez, M., **Hernández-Almeida, I.**, Saavedra-Pellitero, M. (2009). La paleoclimatología y el Cambio Climático. In: J. A. Flores (Ed.).'Cambio Climático y Sociedad'. International University of Andalusia Ed. pp: 122-141. ISBN 978-84-7993-090-5.

IN PREPARATION

Diz, P., Bernardez, P., Perez-Arlucea, M. and **Hernández Almeida, I**. Paleoceanographic evolution of the East Pacific Equatorial margin off Costa Rica over the last six glacial cycles (Hole U1381C, IODP Expedition 344).

Saunders, K., **Hernández-Almedia, I.**, Hodgson, D., Curran, M., Vance, T., Zawadzki, A., Goralewski, J. and Grojsean, M. High-resolution Southern Hemisphere westerly wind reconstructions using sub-Antarctic lake sediments: an example from Macquarie Island (54°S).

APPLICATION TO PARTICIPATE IN AN IODP EXPEDITION

ESSAC Office ECORD Science Support & Advisory Committee
GEOMAR | Helmholtz Centre for Ocean Research Kiel
Wischhofstrasse 1-3
24148 Kiel, Germany
Hanno Kinkel (ESSAC Science Coordinator):
Tel: +49 431 600 2418
Fax:+49 431 600 2922
Web Page: http://www.essac.ecord.org Email: essac@geomar.de

Please type information

Apply to Sail Application Form

Expedition Number 373: Antarctic Paleoclimate and Ice History

1. PERSONAL INFORMATION

Family name: Huck

First name: Claire

Current Position: Post Doctoral Research Associate

Institution: National Oceanography Centre, University of Southampton

Address: Waterfront Campus, European Way

City, Postcode, Country: Southampton, SO14 3ZH, UK

Tel. work:
Tel. home:
Fax:
Email: c.e.huck@soton.ac.uk

Country of citizenship: UK

Place of birth/date of birth: Winchester, UK/ 21st December 1984

Gender: Female

Education (highest degree, including year PhD was received / is expected):

Ph.D Paleoceanography/Isotope Geochemistry (2014)

Title: *From jungle to ice:The role of changes in weathering and ocean circulation patterns in the onset of Antarctic glaciation.*

Are you currently a student? NO Expected Graduation Date: N/A

2. EXPEDITION INFORMATION

Summary of proposed participation, including area of scientific interest, current research and participation plan (maximum 250 characters with space – more detail should be included in the Letter of Interest):

As an isotope geochemist working on Eocene-Oligocene climate in the Southern hemisphere, I propose to work on reconstructing Eocene shelf water chemistry and continental erosion patterns in response to hyperthermals or potential early glaciations.

Prior involvement with DSDP/ODP/IODP and nature of involvement (expedition number, shipboard/shore-based participation, co-chief, etc):

I have not yet sailed on an IODP cruise, however, in 2011 I participated in the Post-Cruise Meeting of IODP Exp. 318 and have worked extensively on the Eocene and Oligocene sediments recovered during this expedition since. I thoroughly enjoyed the opportunity to work alongside a group of highly experienced and specialised scientists to answer to scientific objectives of the cruise. All of my Ph.D and Postdoctoral research has utilised samples from DSDP/ODP and IODP Sites in the Atlantic, Pacific, Indian and Southern Ocean basins, in particular focussing on IODP Expedition 318, Wilkes Land. I have also visited the Gulf Coast core repository on several occasions for XRF scanning of archive core material from ODP Leg 113 and 119. As such, I have extensive experience of working with IODP to order new material, work on archived material and have made extensive use of the online data resources made available through the JANUS and LIMS databases.

Post-cruise science support to achieve the proposed scientific objectives 1) future funding scheme and 2) support from host institution (e.g. staff, facilities)

1) Future funding: As well as applying for UK-IODP moratorium funding for analytical support following the cruise, I will be actively applying for Research Fellowships over the next 12 months. As the IODP Exp. 373 scientific objectives are so closely aligned to my personal scientific research interests, the Post-Cruise work will fit naturally into my future research direction (and therefore funding applications).
2) Support from host institution: Dr Steve Bohaty and Prof Paul Wilson fully support my application to Expedition 373, and my continued work at the University of Southampton, should I be successful in applying. The support from the University of Southampton includes access to world-class facilities (all those required for my proposed research) and a broad network of scientists in palaeoceanography, physical oceanography, climate modelling and marine biogeochemistry.

Scientific References

Dr Tina van de Flierdt
Imperial College London,
South Kensington Campus,
Prince Consort Road,
London SW7 2AZ, UK
tina.vandeflierdt@imperial.ac.uk

Dr Steven Bohaty
National Oceanography Centre,
Waterfront Campus,
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University of Southampton,
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s.bohaty@noc.soton.ac.uk

Prof Paul Wilson
National Oceanography Centre,
Waterfront Campus,
European Way,
University of Southampton,
Southampton, SO14 3ZH, UK
paul.wilson@noc.soton.ac.uk

3. SCIENTIFIC EXPERTISE

For Scientist Jobs Descriptions visit: http://iodp.tamu.edu/participants/scientist_jobs.html

Please indicate your area(s) of expertise (maximum 3)

Discipline	Mark with X	Speciality
microbiologist		
organic and inorganic geochemist/biogeochemist	X	Radiogenic isotopes, stable oxygen and carbon isotopes
physical properties specialist		
sedimentologist	X	XRF scanning, Cyclostratigraphy
structural geologist		
paleontologist		
paleomagnetist		
petrologist		
hydrogeologist		
Other		

4. ADDITIONAL DOCUMENTS

Please, provide the following documents:

- Letter of interest, including details about area of scientific interest, current research, expedition participation plan and post-cruise research
- CV and Publication list
- Letter of recommendation (for PhD students)
- See also: http://www.essac.ecord.org/flyer/Guidelines_for_Applying_to_sail.pdf

Please, send your application form as *a MS Word document* and the additional documents in *PDF format* (preferably as one file) by email to Jan Behrmann and Hanno Kinkel at the ESSAC office: essac@geomar.de.

In addition to the ESSAC application, all applicants ***must inform their national office*** (if applicable) ***and national delegate*** and send a copy of the application documents. ECORD does not provide funds for participation; the national offices or national delegates can provide information regarding travel support, post-cruise funding opportunities, etc.

See http://www.essac.ecord.org/index.php?mod=about&page=ESSAC for a list of the national contact persons.

Dr. Claire Huck
National Oceanography Centre
University of Southampton
Southampton, SO14 3ZH, UK
c.e.huck@soton.ac.uk

29th August 2016

Re: Application to sail on IODP Expedition 373: *'Greenhouse to Icehouse Antarctic Paleoclimate and Ice History from George V Land and Adélie Land Sediments'.*

Dear Jan Behrmann and Hanno Kinkel,

With this letter, I would like to formally apply to sail as an inorganic geochemist or sedimentologist on IODP Expedition 373. I am a Postdoctoral Researcher currently based at the University of Southampton working with Dr Steven Bohaty. To date, my research has focused on the evolution of Eocene to Oligocene climate on Antarctica and in the surrounding Southern Ocean as recorded in marine sediments. In particular, my PhD and postdoctoral work has utilized material obtained from IODP Expedition 318 (Wilkes Land, Antarctica, 2010) to reconstruct ocean circulation patterns in the Tasman Gateway region and Antarctic weathering and erosional patterns.

Expedition 373 will target unique proximal sediments from the Antarctic shelf seas deposited during the Eocene Greenhouse climate, which will allow reconstruction of Antarctic climate evolution and unprecedented insight into this fascinating, high-pCO_2 climate interval. I believe I would bring a high level of scientific expertise in the target time period and extensive experience of working with shallow marine sediments similar to those targeted for Expedition 373.

Research Interests and Expertise

My research interests and expertise are closely aligned with the scientific objectives of Expedition 373. I have worked extensively on Eocene and Oligocene sediments from the Tasman Gateway region, as well as the Pacific and Indian sectors of the Southern Ocean to address fundamental questions regarding the role of ocean circulation patterns in the Early-Middle Eocene warmth and subsequent cooling and glaciation at the Eocene-Oligocene transition. My research has included both (i) ground-truthing the use of the fossil fish tooth Nd isotope proxy in shallow marine settings (as preserved in Eocene strata drilled during IODP Exp.318; Huck et al., 2016) and (ii) reconstructing circulation patterns and locations of deep-water formation in the Southern Ocean during long-term Eocene cooling Eocene. Eocene seawater records generated across multiple Southern Ocean drill sites (including George V Land IODP Site U1356) suggest an event of increased erosional input from the Antarctic continent to the shelf seas at the end of the EECO (Huck et al., *submitted*). This erosional event interval (~48 Ma) is potentially linked to the onset of global cooling following the EECO, and a better understanding of this event will undoubtedly come from sediments recovered on the George V/Adèlie Land Coast as part of the Early to Middle Eocene climate events targeted for investigation during Expedition 373.

I have coupled studies on Southern Ocean circulation with provenance work on marine sediments using radiogenic isotopes (Nd, Hf, Pb) in order to improve our understanding of the development, growth and subsequent stability of the East Antarctic Ice Sheet (EAIS) at multiple Southern Ocean IODP/ODP Sites across the Eocene and Oligocene. My post-doctoral research investigates the contribution of EAIS volume to the global deep-sea stable oxygen isotope record during the mid-Oligocene on orbital timescales using a combination of stable isotopes generated from benthic foraminifer and Nd isotopes from marine sediments. Applying provenance studies such as this to the George V Land/Adélie Coast sediments would provide a way to investigate the state of Eocene glaciation and the role that changing erosional patterns played in the cooling trend that led to the Eocene-Oligocene Transition.

Previous involvement in IODP

While I have not sailed on an IODP Expedition before, my Ph.D and post-doctoral research has been conducted using IODP, ODP and DSDP samples from the Southern Ocean, Indian, Pacific and Atlantic Oceans. I participated in the Post-Cruise Meeting for IODP Expedition 318 and worked on Eocene and Oligocene samples from this cruise during the moratorium period. The experience of working collaboratively with a large group of shipboard and shore-based scientists to progress the expedition objectives was extremely valuable, both personally and professionally, as I had exposure to excellent scientific discussions and material. I would very much hope to be closely involved in this scientific process again and believe that the skills I have developed during my PhD and post-doctoral research would contribute to the successful fulfilment of the scientific objectives of Expedition 373.

Post-cruise Research

Expedition 373 will provide the opportunity to work on an unparalleled archive of the Antarctic climate during the Eocene, leading to a vastly improved understanding of how Earth's climate evolved in a high pCO_2 world. In line with the scientific objectives for Expedition 373, the main problems that I am interested in investigating during post-cruise research are:

Research Questions:

What was the scale and timing of Eocene glaciation in Antarctica? Provenance records of marine sediments.

I propose to investigate the potential for Eocene glaciations using the Nd and Hf isotopic composition of recovered marine sediments. This combined approach will aim to deconvolve the contributions of changing source regions and weathering regimes to better understand the erosional history of the Eocene and the drivers behind it. If Oligocene sediments are recovered, I would like to extend this record over the Eocene-Oligocene transition and into younger glacial material accordingly. The George V Land/Adélie Coast Land margin is an ideal candidate for a study such as this due to its diverse and fairly well documented geological bedrock.

Continent-Ocean Interaction: How did Eocene hyperthermal events affect shelf seawater chemistry?

In shallow marine settings, fish teeth preserve a record of dissolved Nd inputs from continental erosion mixing with shelf waters. I propose to generate fish tooth Nd

isotope records from the Eocene sediments recovered during Exp. 373 to monitor how changes in the continental environment are recorded in the surrounding shelf waters. I am interested in understanding how well large climatic changes on the Antarctic continent (such as those triggered by permafrost melt events) are expressed in the shallow shelves which surrounded Antarctica during the Eocene, and whether this signal (and associated environmental conditions such as nutrients/temperature etc) was further transmitted to the global deep oceans.

Early to Middle Eocene erosional Event: Defining duration and nature of erosional event.

Significant excursions in seawater Nd isotope records generated from IODP Expedition 318, and additional ODP/DSDP Sites in the surrounding region during my Ph.D, suggest that a significant erosional event occurred on the Antarctic continent at the end of the EECO. The Early-Middle Eocene is an important drilling target for Expedition 373 and if this interval is recovered more completely than previous attempts, I propose generating a high-resolution coupled fish tooth and sediment Nd isotope record over this period. The goal would be to better understand the nature, timing and duration of such an event, to allow it to be correlated more accurately to regional, or possible global data sets and drill sites.

Post-cruise support

If successful in my application to participate in Expedition 373, I would have the ongoing support of Dr Steven Bohaty and Prof Paul Wilson to continue my postdoctoral research at the University of Southampton for the 12-month period following the cruise. As well as applying for UK-IODP moratorium funding for analytical support following the cruise, I will be actively applying for Research Fellowships over the next 12 months. Support from my current institution ensures my access to both world-class analytical facilities and scientists from palaeoclimate, modelling and physical oceanography backgrounds.

Participating in the collaborative scientific process to answer the research questions of Expedition 373 would be an extremely exciting opportunity to develop my career, my professional network, and develop my skills as a palaeoceanographer. The scientific objectives of the cruise are aligned with both my current research experience and future research direction, and I would be fully committed to the timely production of the highest quality data following the expedition.

Thank you for considering my application and I look forward to hearing from you.

Sincerely,

Dr Claire Huck

Postdoctoral Fellow
University of Southampton
Southampton SO14 3ZH
UK

Claire Huck

National Oceanography Centre, University of Southampton, Waterfront Campus, European Way, Southampton SO14 3ZH, UK
c.e.huck@soton.ac.uk

Education and Professional Experience

Postdoctoral Fellow, University of Southampton, UK
(September 2014 – Present)

Postdoctoral Research Associate, University of South Carolina, USA
(September 2015 – October 2015)

Ph.D, Paleoceanography & Isotope Geochemistry, Imperial College London, UK
(July 2011 – June 2014)

Ph.D Thesis Title: *From jungle to ice: The role of changes in weathering and ocean circulation patterns in the onset of Antarctic glaciation*

BSc (Hons) Geoscience (2.1), The Open University, UK
(September 2006 – June 2010)

Research Interests and Skills

Strong focus on reconstructing changes in Southern Ocean circulation, Antarctic ice sheet dynamics and continental weathering patterns during the Paleogene

- **Radiogenic Isotope Geochemistry:** *Preparation and analysis of marine sediments, authigenic precipitates and fossil fish teeth for Nd, Hf and Pb isotopes using a Nu MC-ICP-MS, and Neptune MC-ICP-MS. Setup of Hf chemistry at Imperial College London and micro-column Nd chemistry at University of Southampton.*
- **Stable Oxygen and Carbon Isotopes:** *Benthic foraminifer identification and sample preparation for stable isotope analysis. Competent use of Kiel Carbonate Device/Thermo-Finnigan MAT253 MS. Stratigraphic correlation and orbital tuning of marine sediment records.*
- **X-Ray Fluorescence Scanning:** *Multiple scanning campaigns at Gulf Coast IODP Core Repository, including developing technique for producing high quality XRF data from U-channelled cores.*
- **Major and Trace Element Geochemistry:** *Analysis of sediments and fish tooth samples using ICP-AES at The Open University.*

Grants and Awards

Antarctic Science Research Bursary (£4850): Title*: Continental weathering on Antarctica and Southern Ocean productivity across the Eocene/Oligocene boundary – is there a link?*
(2014)

ESSAC-ECORD Research Grant (£1600): Title*: Main and trace element concentration data and rare earth element patterns in fossil fish teeth from the Southern Ocean.*
(2013)

Best Student Poster Prize: Climatic and Biotic Events of the Paleogene
(2014)

Publications

Huck, C.E., Bohaty, S.M., van de Flierdt, T., Scher, H.D., Duggan, B. and Wilson, P.A. (*in prep*) Synchronous switch in erosional source regions across East Antarctica over the Eocene-Oligocene climate transition. *Geology*

Huck, C.E., van de Flierdt, T., Bohaty, S.M. and Hammond, S.J. (submitted), Antarctic climate, ocean circulation patterns, and deep-water formation in the Southern Ocean during the Eocene. *Paleoceanography*.

Liebrand, D., Beddow, H.M., Lourens, L.J., Pälike, H., Raffi, I., Bohaty, S.M., Hilgen, F.J., Saes, M.J.M., Wilson, P.A., van Dijk, A.E., Hodell, D.A., Kroon, D., **Huck, C.E.** and Batenburg, S.J. (2016) Cyclostratigraphy and eccentricity tuning of the early Oligocene through early Miocene (30.1 – 17.1 Ma): Cibicides Mundulus stable oxygen and carbon isotope records from Walvis Ridge Site 1264. *Earth and Planetary Science Letters, 450, 392-405.*

Huck, C.E., van de Flierdt, T, Jiménez-Espejo, F.J., Bohaty, S.M., Röhl, U. and Hammond, S.J. (2016), Robustness of fossil fish teeth for seawater neodymium isotope reconstructions under variable redox conditions in an ancient shallow shelf setting. *Geochemistry, Geophysics, Geosystems, 17, 679-698.*

Pross, J., Contreras, L., Bijl, P.K., Greenwood, D.R., Bohaty, S.M., Bendle, J.A., Röhl, U., Tauxe, L., Raine, J.I., **Huck, C.E.,** van de Flierdt, T., Jamieson, S.S.R., Stickley, C.E., van de Schootbrugge, B., Schouten, S., Escutia, C., Brinkhuis, H., and IODP Expedition 318 Scientists (2012), Persistent near-tropical warmth on the Antarctic continent during the early Eocene epoch. *Nature, 488 73-77*.

Invited Seminars

University of South Carolina, USA: Title *New insight into early Cenozoic glaciation: Eocene-Oligocene climate records from IODP Expedition 318, Wilkes Land, Antarctica.*
(2015)

University of Cambridge, UK: Title *Early Cenozoic glaciation: Eocene-Oligocene erosional records from IODP Expedition 318, Wilkes Land, Antarctica.*
(2015)

Supervision

Myfanwy Wood, University of Southampton, MSci Geology: *The links between ocean circulation and Antarctic ice sheet behaviour during the Oligocene in the Southern Ocean.*
(July 2016 – Present)

Geogia Hole, Imperial College London, MSci MSci Geology & Geophysics**:** *The provenance fingerprint of Early Oligocene glaciation on George V Land Coast, Antarctica.*
(September 2012 – May 2013)

IODP
INTERNATIONAL OCEAN DISCOVERY PROGRAM

APPLICATION TOPARTICIPATE IN AN IODP EXPEDITION

ESSAC Office ECORD Science Support & Advisory Committee
GEOMAR | Helmholtz Centre for Ocean Research Kiel
Wischhofstrasse 1-3
24148 Kiel, Germany
Hanno Kinkel (ESSAC Science Coordinator):
Tel: +49 431 600 2418
Fax:+49 431 600 2922
Web Page: http://www.essac.ecord.org Email:essac@geomar.de

Please type information

Apply to Sail Application Form

Expedition Number373: Antarctic Paleoclimate and Ice History

1. PERSONAL INFORMATION

Family name: KOLODKA

First name: Christophe

Current Position: Postdoctoral Researcher

Institution: CEREGE – Centre Européen de Recherche et d'Enseignement en Géosciences de l'Environnement

Address: Europôle Méditerranéen de l'Arbois, Avenue Louis Philibert

City, Postcode, Country: Aix-en-Provence, 13545, France

Tel. work: +33 4 42 97 16 51
Tel. home: +33 6 88 93 88 77
Fax:
Email: kolodka@cerege.fr

Country of citizenship: French

Place of birth/date of birth: Vitry-le-François / 03/30/1985

Gender: Male

Education (highest degree, including year PhD was received/ is expected): PhD received in 2013

Are you currently a student? ~~YES~~/NO Expected Graduation Date:

2. EXPEDITION INFORMATION

Summary of proposed participation, includingarea of scientific interest, current research and participation plan(maximum 250 characters with space – more detail should be included in the Letter of Interest):

My current research focuses on the sedimentological evolution of continental carbonate systems. As a sedimentologist I would merely contribute to core description, stratigraphic correlation and interpretation of depositional environments.

Prior involvement with DSDP/ODP/IODP and nature of involvement (expedition number, shipboard/shore-based participation, co-chief, etc):

None

Post-cruise science support to achieve the proposed scientific objectives 1) future funding scheme and 2) support from host institution (e.g. staff, facilities)

A funding support from IODP-France will be requested to achieve the scientific objectives of the proposed post-cruise study. In addition, another funding request will be submitted to the French National Research Agency. The post-cruise research will receive full support from my host institution (CEREGE) both for the relevant staff and facilities.

Three scientific and/or personal references

Dr. Gilbert Camoin

CEREGE – UM 34 CNRS-IRD-AMU
Europôle Méditerranéen de l'Arbois
Avenue Louis Philibert
F-13545 Aix-en-Provence
France
camoin@cerege.fr

Dr. Emmanuelle Vennin

Université de Bourgogne
UMR 6282 BIOGEOSCIENCES
6 Bd. Gabriel
F-21000 Dijon
France
Emmanuelle.vennin@u-bourgogne.fr

Dr. Frédéric Boulvain

Université de Liège
Sart Tilman
B-4000 Liège
Belgium
fboulvain@ulg.ac.be

3. SCIENTIFIC EXPERTISE

For Scientist Jobs Descriptions visit: http://iodp.tamu.edu/participants/scientist_jobs.html

Please indicate your area(s) of expertise (maximum 3)

Discipline	Mark with X	Speciality
microbiologist		
organicandinorganicgeochemist/biogeochemist		
physicalproperties specialist		
sedimentologist	X	Sedimentology (carbonates and siliciclastics)
structuralgeologist		
paleontologist		
paleomagnetist		
petrologist		
hydrogeologist		
Other		

4. ADDITIONAL DOCUMENTS

Please, provide the following documents:

- Letter of interest, includingdetails about area of scientific interest, current research, expedition participation plan andpost-cruise research
- CV and Publication list
- Letter of recommendation (for PhD students)
- See also: http://www.essac.ecord.org/flyer/Guidelines_for_Applying_to_sail.pdf

Please, send your application form as *a MS Word document*and the additional documentsin *PDF format*(preferably as one file) by emailtoJan Behrmann andHanno Kinkel at the ESSAC office: essac@geomar.de.

In addition to the ESSAC application, all applicants***must inform their national office***(if applicable) ***and national delegate***and send a copy of the application documents. ECORD does not provide funds for participation; the national offices or national delegates can provide information regarding travel support, post-cruise funding opportunities, etc.

See http://www.essac.ecord.org/index.php?mod=about&page=ESSAC for a list of the national contact persons.

Dr. Christophe KOLODKA
CEREGE
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Avenue Louis Philibert
13545AIX-EN-PROVENCE
FRANCE
Phone: +33 6 88 93 88 77
E-mail: kolodka@cerege.fr

ECORD Science Support & Advisory Committee
GEOMAR
Helmholtz Centre for Ocean Research Kiel
Ostufer Wischhostrasse 1-3
24148 KIEL
GERMANY

Aix-en-Provence, August 31th,

Object: Application to sail on IODP Expedition 373 as Sedimentologist.

To whom it may concern,

This is to apply to participate to the IODP Expedition 373 "Antarctic Cenozoic Paleoenvironment" as advertised on the ESSAC website. This expedition would represent an invaluable human and scientific opportunity.

I completed my PhD in Geosciences at the University of Burgundy (Dijon, France) in December 2013 which was dealing with carbonate and clastic sedimentology, stratigraphic architecture evolution in relation with salt tectonics and stratigraphic forward modelling. Currently, I am postdoctoral researcher at the CEREGE in Aix-en-Provence where my research interests are focused on understanding geodynamical and climatic controls on the evolution of Pleistocene giant lake systems in Western US. This position will end in March 2017 but will be extended through another postdoctoral contract until the end of 2018 and will concern the Eocene Green River Formation from Utah, Wyoming and Colorado.

My main research interests involve sedimentology and stratigraphic architecture of sedimentary systems resulting from tectonic and climatic forcings. I have acquired solid theoretical and technical skills related to carbonate sedimentology, sequence stratigraphy, paleoclimate proxies and structural geology. Different fieldworks (United States-Pleistocene, Kazakhstan-Ordovician-Devonian, Iran-Permian, Spain-Triassic to Miocene, Belgium-Devonian and France-Jurassic-Miocene) carried out during my university cursus (since 2007) and after, provided me with good knowledge of processes driving sedimentation and basin infilling in various geodynamical settings throughout the whole stratigraphic column. I also had the opportunity to strengthen my technical skills interpreting subsurface data during collaboration with Oil and Gas companies (GDF Suez, National Iranian Oil Company, TOTAL).

As a sedimentologist on the IODP Expedition 373, I could merely contribute to core description stratigraphic correlation and interpretation of depositional environments. My previous experiences provided me with a strong expertise in the reconstruction of depositional models and evolution of sedimentary systems in different geological settings. For the IODP Expedition 373, I would be especially interested in characterizing the evolution of the sedimentary systems and the impact of climate and sea-level changes on these systems during the Eocene. The definition of the major depositional environments would be achieved through the identification of biological assemblages, sedimentological features and mineralogical content. Such an

evolution can be compared core-to-core and with literature data, including IODP data, available for this area and/or this stratigraphic interval. The proposed investigation would bring crucial information to better understand specific climatic events such as the Early Eocene Climate, the Mid-Eocene Climatic Optimum and the subsequent Late Eocene climate cooling together with the onset of the Antarctic ice-sheet.

My experience highlights the importance of integrated studies in the characterization of the evolution of depositional environments. The best approach to achieve such scientific objectives is a strong multidisciplinary collaboration which has been my course of action with rewarding and efficient collaborations (with sedimentologists, stratigraphers and structural geologists) during my PhD and the studies I have carried out since them.

I am a dynamic person with great adaptability in any situation. I enjoy working on stimulating projects and I am convinced that being part of a multidisciplinary team is the best way to reach ambitious scientific objectives.

Working as a sedimentologist on IODP Expedition 373 would be an invaluable on-board opportunity to gain a solid experience in such a unique research program. The acquisition and synthesis of different types of data and integration in a multidisciplinary context are the keys to the success of a project. The integration of different geological frameworks including well data interpretation would be the perfect scientific frame to improve my knowledge regarding the evolution of such sedimentary systems during elevated pCO_2 periods. Given my education, technical skills and my commitment to perform high-quality work, each of my professional experiences has always been appreciated by my supervisors.

I thank you, in advance, for your interest and consideration. I would be happy to discuss my application with you if needed.

I look forward to hearing from you.

Yours faithfully,

Christophe KOLODKA

Christophe Kolodka, PhD.

ALL APPLICATIONS EXPEDITION 373

CEREGE - Europôle Méditerranéen de l'Arbois
Avenue Louis Philibert. F-13545 Aix-en-Provence

+33 (0) 6 88 93 88 77

kolodka@cerege.fr

31 years – Single – Driving license

Postdoctoral researcher

Sedimentologist

SKILLS

Basin analysis

Fieldwork, sequence stratigraphy, geophisical interpretations, structural geology, basin modelling.

Reservoir analysis

Core logging, sedimentary petrography (macro / microscopic), depositional model reconstruction, diagenesis analysis, fluid-rock interactions.

IT skills

Stratigraphic forward modelling (DIONISOS, IFPEN),Geomodeller (SISMAGE, TOTAL) GIS softwares (QGIS; Surfer), Image analysis software (JMicroVision), Microsoft Office and Adobe Suites.

Technical skills & tools

Petrophysics, stable isotopes geochemistry, water chemistry (pH conductivity, temperature), XRD, well-log interpretations.

Communication skills

French (native); English (fluent); Spanish (spoken).

Student supervision

4 french Master's degree students from 2010 to 2013; 1 dutch PhD student since Oct. 2015.

PUBLICATIONS

5 articles in peer-reviewed journals

11 contributions to international and national meetings from 2007 to 2013.

Hobbies

Running, hiking, design, fashion.

(References on demand)

PROFESSIONAL EXPERIENCE

October 2015 - now *(10 months)*
Postdoctoral researcher at CEREGE-TOTAL (Aix-en-Provence)
Sedimentology and process-based modelling of Pleistocene lacustrine systems (Basin & Range Province, Western US).
Hydrological and structural controls on carbonate factories in continental settings.
Fieldwork: California - Nevada (1 month)

February 2015 - June 2015 *(5 months)*
Consultant geologist (Freelance).
Synthesis on Lacustrine carbonates in rift settings (Oligocene-Miocene of the Limagnes Basin; FRANCE).

April 2014 - November 2014 *(8 months)*
Research associate at University of Burgundy (Dijon).
Sedimentology of the Palaeozoic succession in Iran (Pre-Khuff series), depositional model reconstruction, well-log interpretation and correlations.

February 2014 - March 2014 *(2 months)*
Teaching associate at University of Burgundy (Dijon).
Sedimentary petrology (BSc degree).

March 2010 - December 2013 *(3years, 8 months)*
Geologist at GDF SUEZ EPI.
PhD. thesis: Impact of evaporite deformation on stratigraphic architecture: field-based & stratigraphic forward modelling approaches (examples from SE and N Spain).
Sedimentary architecture reconstruction of carbonate and siliciclastic systems, evolution of sedimentary basins in relation with salt tectonics, stratigraphic forward modeling (DIONISOS).
Fieldwork: Poza de la Sal area (N Spain; Triassic - Miocene; ~ 2 months).

July 2009 - March 2010 *(9 months)*
Exploration Geologist at GDF SUEZ New Ventures & University of Burgundy (Dijon).
Biostratigraphy and reservoir characterization of Middle-Late Permian carbonate ramp deposits in SE Iran, core logging, well-log interpretation and correlation, palaeogeographic reconstruction.
Corelab & NIOC Office: Tehran (1 month).

July 2008 - August 2008 *(2 months)*
Exploration Geologist at VICAT - MYNARAL TAS (Mynaral - Almaty, Kazakhstan).
Exploration geology and volumetrics evaluation for cement plant development (Cartography and geochemistry of Ordovician-Devonian deposits; Greenfield Jambyl cement plant).
Fieldwork: Mynaral area (E Kazakhstan; Ordovician - Devonian; 2 months).

EDUCATION

PhD. *in* **Earth Sciences** 2013
University of Burgundy (Dijon) - Funded by GDF SUEZ EPI (achieved with distinction).

MSc. *in* **Earth Sciences** 2009
University of Burgundy (Dijon; achieved with upper second class honours).
Speciality in Sedimentary Basin Evolution.

Publication list :

Vennin, E., **Kolodka, C.**, Asghari, A., Thomzao, C., Buoncristiani, J.F., Goodarzi, H. & Desaubliaux, G. (2015) Discussion on Palaeozoic discontinuities in the Kuh-e Surmeh area (Zagros, Iran). *Marine and Petroleum Geology*. doi:10.1016/j.marpetgeo.2015.05.019.

Kolodka, C., Vennin, E., Bourillot, R., Granjeon, D. & Desaubliaux, G. (2015) Stratigraphic modeling of platform architecture and carbonate production: a Messinian case study (Sorbas Basin, SE Spain). *Basin Research*, DOI: 10.1111/bre.12125.

Kolodka, C., Vennin, E., Vachard, D., Trocme, V. & Goodarzi, M.H. (2012) Timing and progression of the end-Guadalupian crisis in the Fars province (Dalan Formation, Kuh-e Gakhum, Iran) constrained by foraminifers and other carbonate microfossils. *Facies*, 58 (1), 131-153.

Bourillot, R., Vennin, E., Rouchy, J.M., Durlet, C., Rommevaux, V., **Kolodka, C.** & Knap, F. (2010.) Structure and evolution of a Messinian mixed carbonate-siliciclastic platform: the role of evaporates (Sorbas Basin SE Spain). *Sedimentology*, 57 (2), pp. 477-512.

Bourillot, R., Vennin, E., **Kolodka, C.**, Rouchy, J.M., Caruso, A., Durlet, C., Chaix, C. & Rommevaux, V. (2009). The role of topography and erosion in the development and architecture of shallow-water coral bioherms (Tortonian-Messinian, Cabo de Gata, SE Spain). *Palaeogeography, Palaeoclimatology, Palaeoecology*, 281, pp. 92-114.

APPLICATION TO PARTICIPATE IN AN IODP EXPEDITION

ESSAC Office ECORD Science Support & Advisory Committee
GEOMAR | Helmholtz Centre for Ocean Research Kiel
Wischhofstrasse 1-3
24148 Kiel, Germany
Hanno Kinkel (ESSAC Science Coordinator):
Tel: +49 431 600 2418
Fax:+49 431 600 2922
Web Page: http://www.essac.ecord.org Email: essac@geomar.de

Please type information

Apply to Sail Application Form

Expedition Number 373: Antarctic Paleoclimate and Ice History

1. PERSONAL INFORMATION

Family name: Mauffrey

First name: Marie-Aline

Current Position: Post Doc

Institution: CEFREM, Université de Perpignan

Address: 52, Avenue Paul Alduy

City, Postcode, Country: 66860 Perpignan, France

Tel. work: +33 698314109
Tel. home: +33 698314109
Fax:
Email: marie-aline.mauffrey@univ-perp.fr

Country of citizenship: France

Place of birth/date of birth: Epinal, France; 19/11/83

Gender: Female

Education (highest degree, including year PhD was received / is expected): PhD received in December 2015

Are you currently a student? NO

2. EXPEDITION INFORMATION

Summary of proposed participation, including area of scientific interest, current research and participation plan (maximum 250 characters with space – more detail should be included in the Letter of Interest):

Thanks to this application, I would like to demonstrate my interest to sail for the **IODP 373 Antarctic Cenozoic paleoenvironment Expedition**.
My PhD thesis (completed in December 2015) at the University of Perpignan focused on the impact of climate and sea level variations on the architecture of continental margins and submarine canyons (western Mediterranean Sea). It allowed me to acquire competences in accordance with the aims of the IODP 373 expedition regarding seismic correlations, seismic stratigraphy in relation with sea-level and climate changes. I worked with seismic data from different resolutions and succeeded to correlate the internal architecture of the shelf and submarine canyons to climatic events during the Plio-Quaternary. The correlations were made for large climatic cycles such as the 100 kyrs cycle of the Quaternary but also for rapid climatic changes such as the Heinrich stadials (~3 000 years) within glacial cycles. That is why, the **seismic stratigraphic** objectives expected for the IODP 373 regarding the timing of events such as the rifting between the GVAL margin and Australia, are absolutely part of the competences and expertise I acquired.
In addition, the post-doctoral research experience that I am carrying outI will complete until the IODP 373 Expedition, enables me to acquire more analytical skills in geotechnics and well logging. A project on salt water incursion within aquifer I will be part of will also allow me to be more independent in my research and give me strength and confidence.

Prior involvement with DSDP/ODP/IODP and nature of involvement (expedition number, shipboard/shore-based participation, co-chief, etc):

None

Post-cruise science support to achieve the proposed scientific objectives 1) future funding scheme and 2) support from host institution (e.g. staff, facilities)

1) Until July 2018, I will be under a post doctoral contract at the University of Perpignan. Additional support from the University of Perpignan will be obtained through a new grant (see recommendation letter from Pr Serge Berné) and I will apply for an IODP-France post-cruise financial support. My research projects/interests are developed in the letter of interest.
2) Working at the University of Perpignan enables me to have full access to the software essential for seismic interpretation (Kingdom Suite) and 3D modelling (DionisosFlow). Furthermore qualified technical staffs are available for assistance if necessary.

Three scientific and/or personal references

Pr. Serge Berné, CEFREM, University of Perpignan, France

Dr. Maria-Angela Bassetti, CEFREM, University of Perpignan, France

Dr. Roger Urgelès, CSIC, Barcelona, Spain

3. SCIENTIFIC EXPERTISE

For Scientist Jobs Descriptions visit: http://iodp.tamu.edu/participants/scientist_jobs.html

Please indicate your area(s) of expertise (maximum 3)

Discipline	Mark with X	Speciality
microbiologist		
organic and inorganic geochemist/biogeochemist		
physical properties specialist	x	
sedimentologist	x	
structural geologist		
paleontologist		
paleomagnetist		
petrologist		
hydrogeologist		
Other	x	Seismic correlation, stratigraphy

4. ADDITIONAL DOCUMENTS

Please, provide the following documents:

- Letter of interest, including details about area of scientific interest, current research, expedition participation plan and post-cruise research
- CV and Publication list
- Letter of recommendation (for PhD students)
- See also: http://www.essac.ecord.org/flyer/Guidelines_for%20Applying_to_sail.pdf

Please, send your application form as *a MS Word document* and the additional documents in *PDF format* (preferably as one file) by email to Jan Behrmann and Hanno Kinkel at the ESSAC office: essac@geomar.de.

In addition to the ESSAC application, all applicants ***must inform their national office*** (if applicable) ***and national delegate*** and send a copy of the application documents. ECORD does not provide funds for participation; the national offices or national delegates can provide information regarding travel support, post-cruise funding opportunities, etc.

See http://www.essac.ecord.org/index.php?mod=about&page=ESSAC for a list of the national contact persons.

Mauffrey Marie-Aline

Letter of interest

IODP 373 Antarctic Cenozoic paleoenvironment Expedition

Climate and sea-level changes with various magnitudes control continental erosion, sediment transport and its delivery to the deep basin. These variations are registered within sedimentary accumulation on shelf margins around the world. The study of the pattern of these deposits is the sequential stratigraphy, and leads to the understanding of the alternation of cold and warm periods and their impact from the shelf to the deep. During my PhD, completed in December 2015 at the University of Perpignan (France), I focused my research on the impact of climate and sea-level variations over the shelf and more precisely on submarine canyons. I had the opportunity to work on 2 study areas in the NW Mediterranean; the Gulf of Lions (France) and the Ebro margin (Spain), which enabled me to compare margins with different stacking patterns and oceanic processes. I also had the opportunity to work on the stratigraphic signature of climate and sea-level changes at different time scales from (a) the long evolution since the Messinian Salinity Crisis, 5.33Ma years ago, to the Milankovitch and sub-orbital time scales of the Quaternary. This was possible thanks to a large seismic database including very detailed Chirp profile, sparker single channel data, conventional 2D-seismic profiles from the oil industry and 3D seismic surveys. Seismic profiles were coupled to information from cores and boreholes in order to date the major events and give a chrono-stratigraphic framework to pattern observed on seismic.

Through this work, I acquired expertise in sequence stratigraphy and in the correlation of information from core/borehole to the interpretation of seismic profile. The interpretation of seismic profiles requires knowledge in stratigraphy but also in geology and sedimentology and geophysical properties for seismic acquisition/interpretation. Correlation with data from borehole/core also requires knowledge in the different parameters measured and their significance. In the special relationship between climate/sea-level variations and seismic stratigraphy, notions on climatology or paleoclimatology are also necessary.

This led me to interdisciplinary skills, ideal for solving a large scope of questions in various aspects of a project. It also gave me the capability to adapt to many different scientific problems.

Those competences match perfectly the seismic-stratigraphic, glacial-isostasic objectives of the IOPD 373 expedition. On board, my skills can serve to the physical properties analysis of retrieved material and their correlation with other data sets (including seismic and sedimentology). Acquiring well logging, while or after drilling, gives an additional opportunity to correlate more information from the borehole to seismic data. Resistivity, density or gamma ray logs for example could be measured during the IODP 373 expedition. These would give a detailed record of the geologic formations within the borehole such as the presence of condensed layers or the distinction between different types of rocks. This could induce more or complementary information that could be then correlated to the seismic data set already acquired. This implies, for the post-cruise research I would like to carry out, that borehole samples are not needed.

The seismic data that will be used for seismic-stratigraphic analysis could also be completed by more seismic acquisition during the expedition. In fact, being part of the CEFREM, gives me access to the instrumentation owned by the University of Perpignan, in particular the Mini-Sparker. Using this device during the IODP 373 expedition could enable a more detailed vision of the upper sediment deposits (Pliocene/Pleistocene) on the shelf in contrast (and in addition to) with the higher resolution seismic previously acquired.

For post-cruise research, from February 2018 onwards, I will be affiliated to CEFREM (University of Perpignan). This is a relatively small group, but with experience in the IODP system (M.A. Bassetti, S. Berné, A.S. Fanget) and skills in seismic interpretation and stratigraphic correlation, sedimentology, physical properties. I will be able to focus my research on the analysis of the seismic data coupled with the chrono-stratigraphic constraints acquired during the expedition. Being at the University of Perpignan allows me to have the essential access to several softwares such as Kingdom Suite for seismic interpretation but also DionisosFlow for the 3D stratigraphic modeling of margins. In order to carry my research out for at least a year post-cruise, I am willing to apply for a post-cruise financial support from IODP France, together with additional support from the University of Perpignan. The IODP 373 Expedition objectives that particularly motivate my research and enter in the scope of my expertise are the (a) understanding of the Georges V and Adélie Land shelf construction and the impact of the sea-level/climate variations on its morphology through large period of time. This means a stratigraphic analysis and the correlation between seismic lines and data acquired from boreholes. It could lead to a better understanding of the rifting between the GVAL Margin and Australia and a scenario of margin construction through time in relation to sea-level and climate variations. Having mainly worked, so far, on the Plio-Quaternary, I am also very interested in looking at a margin where the transition between the “Greenhouse world” and the “IceHouse” world has been recorded duriong the Eocene-Oligocene.

I have also an additional interest in the functioning of submarine canyons on the GVAL to give a further understanding the transition from shelf to deep basin. This would be in phase with my PhD work in the NW Mediterranean, but at different time scales and within a totally distinct sedimentary environment. Coupled to the work and analysis that will be made to achieve all the objectives of the IODP 373, this could give an entire overview of the land-sea continuum.

As a user of the 3D stratigraphic modeling software, *Dionisosflow* from IFPEN (Paris), I will also be able to develop a project on the 3D modeling of the margin evolution though time. As I did for the study on submarine canyon evolution, seismic interpretations will be the base of the parameters needed to use the software. Modeling can be an approach to evaluate the relative impact of sediment flow, subsidence, oceanic currents, using robust chrono-stratigraphic constraints from the boreholes. It can also be a way to evaluate, in a totally different framework, the validity of global sea-level charts in a context where glacio-isostasy plays an important role.

Curriculum Vitae

Mauffrey Marie-Aline

Age: 32 years old

Date and place of birth: 19th November 1983 , Epinal (88), France

Personal address: Espace Méditerranée, Bâtiment Grand Arc, B74, 66000 Perpignan, France

Professional address : Université de Perpignan, Laboratoire CEFREM, Bâtiment U, 52, Avenue Paul Alduy, 66000 Perpignan, France

Phone: 06.98.31.41.09

E-mail: marie-aline.mauffrey@univ-perp.fr

Current position

From the 1st of January 2016, research assistant at the University of Perpignan at CEFREM, under the supervision of Pr. Serge Berné. Duty: 1st and 2nd year Master degree intern supervision, study and work on environmental projects (establishment of offshore wind farms, impact of sea level rise on water resources and quantification of offshore sand resources) and publications of scientific papers.

Education

- **From October 2012 to December 2015**

PhD at the University of Perpignan, received the 17th December 2015, specialty : Marine Geosciences with high distinction .

Title: Impact of climate and sea-level variations on submarine canyons in the Gulf of Lions (France) and on the Ebro margin (Spain) during the Plio-Quaternary.

Supervisors: Pr. Serge Berné (CEFREM, University of Perpignan, Perpignan, France) and Dr. Roger Urgelès (CSIC, Barcelona).

- **2011**

Master 2nd year "EVOC", University of Perpignan, France: Marine geosciences program, head of the class

- **2010**

Master 1st year "BEM", University of Aix -Marseille, France: Marine biology and ecology program

- **2009**

Bachelor with Honours, University of Queensland, Australia: Obtaining the Honours degree in marine studies

- **2006**

Bachelor, Euro-American Institute of Technology, Sophia Antipolis, France: Beginning of the bachelor degree in marine studies

- **2003**

Scientific high school certificate, Lycée André Malraux, Remiremont, France

Professional experiences

- **From January to June 2016**

Post-doc at CEFREM, University of Perpignan, France: With Pr. Serge Berné, I work on the publications of scientific papers following on my PhD thesis. I also supervised interns and work at the development of research project (ANR SEDIM-3D, DEM'EAUX).

- **From January to August 2012**

Research assistant at CEFREM, University of Perpignan, France: I worked on the ESPEXS project (CPER Languedoc Roussillon 2007-2013). It was launched to improve knowledge on a specific area in the Gulf of Lions in order to extract offshore sand. This report had to be related to physical, biological, ecological properties of the area and also regulations about sand extraction. My work focused on the state of art of the sedimentologic and physical compartment (currents, hydrodynamics, sediment transfer and transport between shelf and canyons).

- **From March to September 2012**

Second year of master degree internship (6 months) at the University of Queensland, Australia: In the marine palaeoecology lab, managed by Pr. John Pandolfi, I studied density measurement and calcification on coral samples from cores of the Great Barrier Reef (***Goniopora*** **spp.**). This work used the 3D technology analysis called tomodensitometry (more information: http://marinepalaeoecology.org/honour-students-interns/).

Intern supervision

Names	Level	Year	Title	Current position
Held Joffrey	M2	2012	Study of the morphologic evolution of submarine canyons in the Gulf of Lions for the last glacial cycle	Geologist
Peix Morgan	M2	2013	Study on a giant sand dune field in the Celtic sea: morphology - dynamic	Research assistant
Baumann Juliette	M2	2014	Records of sea-level rise since the last glacial maximum in the sediment of the outer shelf in the Gulf of Lions (France)	PhD student
Miradji Mohamed	M1	2014	Evolution of submarine canyons in the Gulf of Lions (France) for the last 3 glacial cycles.	Master 2 at the university of Montpellier, France
Merazig Mohammed	M2	2015	Impact of high frequency climatic cycle on shelf deposit fir the last 300,000 year in the Gulf of Lions (France)	
Pennanech Vincent	M1	2016	Record of sea-level variations from 20 000 years to present day in the Gulf of Lions (France)	Master 1, University of Perpignan
Alonso Yoann	M2	2016	Study on sedimentary dunes in the western part of the Gulf of Lions (France)	Master 2, University of Perpignan
Hermann Gauduin	M2	2016	3D specification of past channels and Rhone deltaic lobe from SBP120 data	Master 2, University of Perpignan

Collective commitment

- 2013-2014 and 2014-2015: Involvement in the "Science Festival", Perpignan, France : reception of schools/high school and general public, laboratory presentation, presentation of research experiment.
- 2012-2013 and 2013-2014: Involvement in the laboratory (CEFREEM) presentation and visit for schools and high schools. Organization of scientific workshops, introduction to the morphology of the seafloor.
- 2012-2013: Secretary for the PhD student organization of the University of Perpignan.

Skills

- GIS tools : MapInfo, QGIS, ArcGIS
- Seismic interpretation software : Kingdom Suite, OpenTect
- 3D modeling and visualization tools : CT-Scan, Dionisos and Flerdermaus

Campaign at sea

- **2013**

PRISME campaign (IFREMER ; Géoazur Nice ; UBO ; MARUM (Germany)), scientific chief: Antonio Cattaneo (IFREMER) : **Slumps and mass wasting on margins**.
Seismic data acquisition (CHIRP, sismique HR 72 traces, SYSIF) and sonar on three study sites: Ligurian margin, Pianosa trough (eastern Corsica margin) and Gulf of Lions. 20 days on board of the Atalante in July/August 2013. During the campaign, I contributed to the acquisition of seismic data, the preparation of a GIS project and wrote reports.

Trainings

- **2014**

- Training on **QGIS** software, organized by Bertil Hebert, **CEFREM**.

- 3 days training on **Dionisos** at **Beicip** France (IFP, Paris).

- 3 days at **IFREMER** (Brest, France) to work with Marta Payo-Payo (PhD student) and Ricardo Silva Jacinto (Marine geosciences group director at IFREMER) on modeling the impact of flux in submarine canyon heads. Marta used my data analysis in order to visualize sediment flux and its effect on the morphology of submarine canyon head. This work has been presented at **ASF** 2015.

- For 4 months, I worked at **CSIC** (**Barcelona)**, under the supervision of Dr. R. Urgeles. I focused my research on the 3D seismic data on the Ebro margin. It allowed me to publish a paper Quaternary Science Reviews (submitted).

- **2013**

1 week training on **Dionisos** software developed at **IFP** (Paris) to model (3D) the morphologic evolution of the Bourcart canyon head (Gulf of Lions) at a glacial cycle scale. This work was made in collaboration with Didier Granjeon, software creator.

- **2012**

1 week stay at **Geolink** (Grenoble, France), with Dr. Matthieu Gaudin. Matthieu helped me to use Kingdom Suite for seismic interpretation. As Matthieu did part of his PhD

on the Gulf of Lions and also worked on submarine canyons, his advice were wise and he helped me a lot on understanding the problems that I could come across.

Teaching experience

During the 3 years of my PhD and while being a post doc, I had the opportunity to teach students from undergraduate to master degree. I taught geology, geophysics, GIS for about 120h during lectures but also tutorials and practical work.

Languages

French, mother tongue
English, very good skill (5 years in Australia)

Publications and communications

Publications in international journal

- Mauffrey, M. A., Berné, S., Jouet, G., Giresse, P., and Gaudin, M., 2015. Sea-level control on the connection between shelf-edge deltas and the Bourcart canyon head (western Mediterranean) during the last glacial/interglacial cycle: Marine Geology, v. 370, p. 1-19.
- Mauffrey, M. A., Urgeles, R., Berné, S. and Canning J., 2016. Influence of the Mid-Pleistocene Transition on the development of submarine canyons on the Ebro Margin, NW Mediterranean: the role of fluvial connection. Submitted to Quaternary Science Reviews

Communications in international and national conferences

- Mauffrey M. A., Berné S., Garlan T., 2016. Importance de la variabilité des dépôts et des processus sédimentaires pour l'implantation de fermes éoliennes : le cas du Golfe du Lion. Journée scientifique éolien en mer (GdR Energie Marine Renouvelable, Offshore wind farm scientific meeting), Marseille, France (**oral presentation**).
- Mauffrey M. A., Berné S., Jouet G., Gaudin M., 2014. Remplissage de la tête de canyon Bourcart (Méditerranée occidentale) durant la dernière période Glaciaire/Interglaciaire (les derniers 100.000 ans) : importance des connexions fluviatiles. Réunion des Sciences de la Terre 2014 à Pau, France (**oral presentation**).
- Mauffrey M. A., Berné S., Gaudin M., Jouet G. et Granjeon D., 2013. Chronologie et évolution des connections fleuves/canyons durant le dernier maximum glaciare : le canyon Bourcart (Méditerranée occidentale). Association des sédimentologistes français, Paris, France (**oral presentation**).
- Mauffrey M. A., Berné S., Jouet G., Gaudin M., 2013. Chronology and evolution of a fluvial/canyon connection around the Last Glacial Maximum: The Bourcart canyon head (western Mediterranean). Euopean Geosciences Union to Vienna, Austria (**poster**).

Associated communications in international and national conferences

- Berné S., Alonso Y., Agin G., Mauffrey M. A. et Simplet L., 2016. Shelf-edge nsand bodies in the western Mediterranean : relict deltas reworked by modern processes. 35th International Geological Congress, Cape Town, South Africa (**oral presentation**).
- Marta Payo-Payo, Mauffrey M. A., Silva Jacinto R. et Berné S., 2015. Numerical modelling of Bourcart canyon head. Association des sédimentologistes français, Paris, France (**oral presentation**).
- Baumann J., Mauffrey M. A., Berné S. et Jouet G., 2014. Signature stratigraphique d'une remontée pulsée du niveau marin au début de la dernière déglaciation (bordure de plateforme, Golfe du Lion, Méditerranée Ouest). Réunion des Sciences de la Terre 2014 à Pau, France (**poster**).
- Urgeles R., Mauffrey M. A., De Mol B., Amblas D., Canning J. et Berné S., 2014. Onset, development and persistence of prograding submarine canyons revealed by 3D seismic data: the Ebro Margin, NW Mediterranean. Réunion des Sciences de la Terre 2014 à Pau, France (**oral presentation**).
- Miradji M., Berné S., Mauffrey M. A., Peix M. et Jouet G., 2014. Contrôle eustatique de l'évolution des canyons sous-marins dans le Golfe du Lion (Méditerranée occidentale). Réunion des Sciences de la Terre 2014 à Pau, France (**poster**).

Popularisation of science

- Mauffrey M. A, 2015. Développement des canyons sous-marins du Plio-Quaternaire révélé grâce à la sismique 3D: la marge de l'Ebre (Médietrranée occidentale, Catalogne). Journée des doctorants du laboratoire CEFREM (**oral presentation**).
- Mauffrey M. A., 2014. Infill of the Bourcart canyon head (Western Mediterranean Sea) for the last Glacial/Interglacial cycle: Fluvial connections as a keystone. Présentation au laboratoire CSIC, Barcelone, Spain (**oral presentation**).
- Mauffrey M. A, 2014. Importance du niveau marin dans le contrôle de remplissage du canyon Bourcart durant le dernier cycle glaciaire-interglaciaire. Journée des doctorants du laboratoire CEFREM (**oral presentation**).
- Mauffrey M. A, 2013. Impact des changements du niveau marin et du climat dans les canyons du Golfe du Lion et de l'Ebre durant les derniers 500.000 ans. Journée des doctorants du laboratoire CEFREM (**oral presentation**).

MINISTERIO
DE ECONOMIA
Y COMPETITIVIDAD

CSIC
CONSEJO SUPERIOR DE INVESTIGACIONES CIENTÍFICAS
INSTITUT DE CIÈNCIES DEL MAR

August 8, 2016

Dr. Roger Urgeles
Institute of Marine Sciences (CSIC)
Barcelona, Spain
Tel +34 93 2309500 ext. 5885
Fax +34 93 2309555
urgeles@icm.csic.es

To whom it may concern:

Dear Sir or Madam:

I am writing to support the nomination of Dr. Marie-Aline Mauffrey to participate in IODP Expedition 373 “Antarctic Cenozoic Paleoclimate”. I have known Marie Mauffrey since 2012 when she started her PhD at the University of Perpignan in France. I was co-supervisor of her thesis entitled “Impact of climate and sea-level variations on submarine canyons in the Gulf of Lions (France) and on the Ebro margin (Catalonia) during the Plio-Quaternary”.

Marie Mauffrey has been an outstanding PhD student, one of the best I have ever known. She is a very capable person, a hard worker and someone with a great ability to solve all sorts of technical and scientific problems. As part of her PhD she sojourned 3 months at the Institute of Marine Sciences of CSIC in Barcelona where I work. The aim of this sojourn was to interpret a series of sequence boundaries along a large 3D seismic cube and tie those to well data in order to understand the role of fluvial systems in canyon evolution. After her sojourn the basis for a scientific article were put forward, an article that it is now nearing publication. She accomplished in a relatively short time span what other students normally take much longer. In her thesis, I think that Marie has made outstanding and innovative contributions to the field of sedimentology, and particularly to the understanding of the genetic mechanisms, long-term evolution and sedimentary processes along submarine canyons.

Correu electrònic: urgeles@icm.csic.es

Pssg. MARÍTIM DE LA BARCELONETA, 37-49
08003 BARCELONA
TEL.: 93 230 95 00
FAX: 93 230 95 55

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Marie has a very multidisciplinary background involving the scientific fields of marine biology, ecology and geosciences, which provides her with a holistic view of marine processes. During her PhD thesis she worked with data from multiple tools such as multibeam bathymetry, seismic reflection data (including 2D and 3D), well logs and sediment cores. She is one of the few persons I know that is able to integrate measurements and concepts with time spans ranging from *eras* to *chrons* at different spatial scales and understand the effect of geological processes on seabed geomorphology and the sedimentary record.

During her PhD, Marie has also acquired notable skills in writing scientific papers and presenting her research. She is the author of a couple of publications in peer-reviewed international journals and has delivered multiple presentations at major international conferences. She speaks an excellent English that she learnt during her bachelor studies in Australia.

Marie is a very easy going person; she works very well with other people and can cope easily with stress. I have a relative good knowledge of the International Ocean Discovery Program as I previously sailed on the Joides Resolution, served on the SCP Panel, and was ECORD Distinguished Lecturer, so I think that there is not only a good match between the candidate profile and the objectives of the cruise, but also that the candidate has the right character and attitude for a successful participation in IODP Expedition 373.

I offer my fullest endorsement to the nomination of Dr. Marie-Aline Mauffrey as participant in this IODP Expedition.

Sincerely,

Dr. Roger Urgeles
Institut de Ciències del Mar - CSIC

Correu electrònic: urgeles@icm.csic.es

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UNIVERSITE DE PERPIGNAN VIA DOMITIA

CENTRE DE FORMATION ET DE RECHERCHE
SUR LES ENVIRONNEMENTS
MEDITERRANEENS

UMR 5110

Perpignan, le 15 août 2016

Letter of support

TO WHOM IT MAY CONCERN

Marie-Aline MAUFFREY is applying to the upcoming IODP Expedition 373. I know Marie as a Professor during her Master, as a main PhD supervisor (together with Dr Roger URGELES from CSIC in Spain) in 2012-2015, and now as a colleague at CEFREM (University of Perpignan). Marie is presently working on a post-doc research project devoted to Land-Sea stratigraphic correlations in the Gulf of Lions (NW Mediterranean Sea) in order to better evaluate water resources along the French Mediterranean rim. This work will include seismic interpretation, stratigraphic modeling and correlations with onshore boreholes –sediment core and downhole logging- carried out by BRGM, the French Geological Survey. Expedition 373 is a unique opportunity for Marie to apply the skills that she acquired in a very different geological context, and within an international program.
Marie is a hard-working and very easy-going person who will certainly adapt easily to the IODP way of working and way of life. She is fluent in English and has skills in seismic stratigraphy, sedimentology, and marine geosciences in general. Her publication list is rather short at the moment (one published article), but she is re-submitting a paper to Quaternary Science Reviews (both reviewers said this manuscript should be published, but they required some shortening of the ms, that will be completed by the end of this month). She is also finishing a 3rd paper (also as first author) on canyon incisions in relation with 100-ky cycles.

At the time of the Expedition, Marie will still be a member of the staff of our laboratory, who will provide financial, technical and scientifical support. Because her research project is in phase with our objectives, we will secure additional funding from our laboratory after July 2018, and we 'll also apply for additional funding from IODP-France.
I strongly support the application of Marie Mauffrey to the upcoming IODP Expedition 373.

Serge Berné
Professor

Batiment U, 52, avenue Paul-Alduy - F-66860 Perpignan cedex 9 (France) - tél. : +33 (0)4 68 66 **2049** - fax : +33 (0)4 68 66 **1747**

APPLICATION TO PARTICIPATE IN AN IODP EXPEDITION

ESSAC Office ECORD Science Support & Advisory Committee
GEOMAR | Helmholtz Centre for Ocean Research Kiel
Wischhofstrasse 1-3
24148 Kiel, Germany
Hanno Kinkel (ESSAC Science Coordinator):
Tel: +49 431 600 2418
Fax:+49 431 600 2922
Web Page: http://www.essac.ecord.org Email: essac@geomar.de

Please type information

Apply to Sail Application Form

Expedition Number 373: Antarctic Paleoclimate and Ice History

1. PERSONAL INFORMATION

Family name: Egger

First name: Lisa Marie

Current Position: research associate, PhD student

Institution: Heidelberg University, Institute of Earth Sciences

Address: Im Neuenheimer Feld 234

City, Postcode, Country: Heidelberg, 69121, Germany

Tel. work: +49 (0) 6221-54 5988
Tel. home: +49 (0) 178-3260 596
Fax: +49 (0) 6221-54 5503
Email: lisa.egger@geow.uni-heidelberg.de

Country of citizenship: Germany

Place of birth/date of birth: Augsburg, Germany / 07.07.1986

Gender: female

Education (highest degree, including year PhD was received / is expected):

M.Sc., PhD defense planned for 08/2017

Are you currently a student? Yes Expected Graduation Date: please see above

2. EXPEDITION INFORMATION

Summary of proposed participation, including area of scientific interest, current research and participation plan (maximum 250 characters with space – more detail should be included in the Letter of Interest):

Based on my expertise in Late Eocene to Early Miocene dinocyst biostratigraphy and paleoecology, and my strong interest Cenozoic paleoceanography and climatology, I propose to establish on-board and post-cruise dinocyst biostratigraphies.

Prior involvement with DSDP/ODP/IODP and nature of involvement (expedition number, shipboard/shore-based participation, co-chief, etc):

IODP Expedition 342 (Paleogene Newfoundland Drift sediments), shore-based participation; PhD project on dinocyst biostratigraphy and paleoecology of the upper Eocene to lower Miocene from Sites U1405, U1406, and U1411

Post-cruise science support to achieve the proposed scientific objectives 1) future funding scheme and 2) support from host institution (e.g. staff, facilities)

1) I will submit a postdoc proposal to the German IODP priority program directly after the expedition

2) Full scientific, technical and administration support will be provided by the Institute of Earth Sciences, Heidelberg University.

Three scientific and/or personal references

Prof. Oliver Friedrich
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Heidelberg University
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D-69121 Heidelberg, Germany
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Prof. Richard D. Norris
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Prof. Martin J. Head
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Phone: +1 905 688 5550 ext 5216
E-mail: mjhead@brocku.ca

3. SCIENTIFIC EXPERTISE

For Scientist Jobs Descriptions visit: http://iodp.tamu.edu/participants/scientist_jobs.html

Please indicate your area(s) of expertise (maximum 3)

Discipline	Mark with X	Speciality
microbiologist		
organic and inorganic geochemist/biogeochemist		
physical properties specialist		
sedimentologist	X	Core description
structural geologist		
paleontologist	X	Dinocyst biostratigraphy
paleomagnetist		
petrologist		
hydrogeologist		
Other		

4. ADDITIONAL DOCUMENTS

Please, provide the following documents:

- Letter of interest, including details about area of scientific interest, current research, expedition participation plan and post-cruise research
- CV and Publication list
- Letter of recommendation (for PhD students)
- See also: http://www.essac.ecord.org/flyer/Guidelines_for_Applying_to_sail.pdf

Please, send your application form as *a MS Word document* and the additional documents in *PDF format* (preferably as one file) by email to Jan Behrmann and Hanno Kinkel at the ESSAC office: essac@geomar.de.

In addition to the ESSAC application, all applicants ***must inform their national office*** (if applicable) ***and national delegate*** and send a copy of the application documents. ECORD does not provide funds for participation; the national offices or national delegates can provide information regarding travel support, post-cruise funding opportunities, etc.

See http://www.essac.ecord.org/index.php?mod=about&page=ESSAC for a list of the national contact persons.

Letter of interest for Sailing on IODP Expedition 373
Lisa Marie Egger

Details on area of scientific interest

My main research interest is on the paleoceanographical and paleoclimatological evolution of the Cenozoic, with a strong focus on the Late Eocene, Oligocene and Early Miocene. The Oligocene epoch in particular represents in many ways a neglected chapter in Cenozoic climate evolution, although a better understanding of its highly dynamic climate states is crucial for understanding the descent from the early Paleogene 'greenhouse world' into the Neogene 'icehouse world'. While I am currently involved in deciphering the surface-water characteristics of the higher-latitude Atlantic Ocean during the Late Eocene to Early Miocene based on IODP Expedition 342 material (please see below for details), I clearly recognize the significance of the high southern latitudes (and notably Antarctica) as a driver of many of the surface-water changes that emerge from my data. Hence, it represents a logical next step for me to extend my surface-water analyses to the Eocene to Miocene of the circum-Antarctic realm.

Methodologically, my research approach is based on the analysis of organic-walled dinoflagellate cysts ('dinocysts'). Because most dinoflagellates live in the topmost surface-water layers, they are extremely sensitive responders to even slight changes in surface-water characteristics. At the same time, they are extremely useful as biostratigraphic markers. Both these characteristics are highly important when it comes to sediments from the high latitudes where the traditionally used calcareous and siliceous microplankton is poorly or not at all preserved. For the Eocene to early Miocene of circum-Antarctic waters, the advantages of dinocyst analysis both with regard to paleoenvironmental reconstruction and biostratigraphical age control have been demonstrated by the highly successful IODP Expedition 318 to the Wilkes Land Margin (e.g., Tauxe et al., 2012; Pross et al. 2012; Bijl et al., 2013; Houben et al., 2013), both during ship-based and subsequent shore-based work. I foresee a similar potential of dinocyst analysis for IODP Expedition 373.

Details on current research

My PhD work, which will be finished in the late summer of 2017, is on late Oligocene to early Miocene paleoceanography and paleoclimatology based on palynological analysis (mainly dinocysts) of IODP Expedition 342 (Newfoundland Sediment Drift). The main goals of my PhD work are (i) to establish a magnetostratigraphically calibrated dinocyst biostratigraphy for the Upper Eocene to Lower Miocene strata off Newfoundland (compare Egger et al., 2016), and (ii) to decipher the surface-water characteristics of the higher-latitude western North Atlantic. The latter issue, which in itself focuses on critical intervals of the of the Oligocene (i.e.,

Eocene/Oligocene transition, Oi-2b glaciation, Oligocene/Miocene transition) and will to a better understanding of North Atlantic Ocean circulation patterns during the Oligocene and the Oligocene climate system as a whole, will result in two manuscripts that are currently under preparation, with me as a first author on two manuscripts and a co-authorship on a third manuscript.

Details on expedition participation plan

During the course of IODP Expedition 373 I envision my primary role in providing dinocyst-based age constraints to the science party as quickly as possible. Because I have a strong background in the biostratigraphic analysis of late Eocene to early Miocene dinocysts (e.g., Egger et al., 2016; please see above), I am highly confident that I can provide the required dinocyst-derived biostratigraphic information. Beyond my personal expertise, I will also be able to bring along on-board access to the PALSYS biostratigraphic database (http://www.lpp-foundation.nl/palsys/) that is currently being developed at Utrecht University as a joint project of numerous partners, including Heidelberg University.

Although true 'real-time' biostratigraphic age control based on dinocysts is admittedly difficult to obtain due to the relatively complex palynological processing required, a somewhat simplified processing protocol, careful planning ahead and close interaction with other palynologists that will be potentially on board will allow to minimize the time required. Hence, I envision my biostratigraphic work to have great potential to support drilling operations.

Details on planned post-cruise research

My goal for post-Expedition 373 research is to develop a two-year postdoctoral research proposal that will focus on (i) refining the available dinocyst biostratigraphy for the southern high latitudes based on Expedition 373 material, ideally with the inclusion of magnetostratigraphic age control should such data become available for Expedition 373 cores; and (ii) to generate dinocyst-based surface-water reconstructions for the Paleogene and Neogene. This proposal will be submitted in March 2018 (i.e., immediately after the end of Expedition 373) to the IODP Priority Program of the German Research Foundation (DFG). Traditionally, well-constructed proposals submitted by expedition participants within the DFG – IODP Priority Program have exceptionally high chances to obtain funding.

In particular, I am to address following research issues during post-cruise research:

- *High-resolution biostratigraphy of Late Eocene and Oligocene sediments off Antarctica:*

As already outlined above, dinocyst biostratigraphy is one of the most promising tools for dating high-latitude sediments. By integrating newly developed data based on Expedition 373 cores with previously published information (e.g., Bijl et al. 2013), I would like to establish a high-resolution late Eocene and Oligocene dinocyst biostratigraphy scheme for the high southern latitudes.

- *Deciphering the nature and pattern of paleoenvironmental and paleoclimatic change off George V Land and Adélie Land*
  The results of Expedition 318 (Wilkes Land margin) have demonstrated that dinocyst analysis is able to provide important insights into Late Eocene and Oligocene Antarctic ice-sheet dynamics and related ecological changes in the Southern Ocean (e.g., Houben et al., 2013). New insights into the paleoceanographic changes off George V and Adélie Land will be gained by the analysis of dinocyst assemblages, ideally in concert with organic geochemical information (TEX-86, alkenones).
- *Antarctic glacial dynamics during the Oligocene:*
  Previous low-resolution work has shown that glacial episodes during the Oligocene (i.e., Oligocene isotope events) were accompanied by changes in dinocyst assemblages linked to strong surface-water cooling, notably by the sporadic appearance of the very distinct taxon *Svalbardella* (Van Simaeys et al., 2005). To date, only very few records exist for this taxon in the high southern latitudes, and still it is not clear whether *Svalbardella* migrated southwards from the northern high latitudes across the equator or originated from the Antarctic margin itself (Van Simaeys et al., 2005). If *Svalbardella* was encountered at IODP 373 sites also during less pronounced Oligocene glacial events, this could provide strong evidence against the transequatorial migration hypothesis, thus making a case against pronounced low-latitude surface-water cooling.

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Egger, L.M., Śliwińska, K.K., van Peer, T.E., Liebrand, D., Lippert, P.C., Friedrich, O., Wilson, P.A.W., Norris, R.D., Pross, J., 2016. Magnetostratigraphically calibrated dinoflagellate cyst bioevents for the uppermost Eocene to lowermost Miocene of the western North Atlantic (IODP Expedition 342, Paleogene Newfoundland sediment drifts). *Review of Palaeobotany and Palynology*, DOI: 10.1016/j.revpalbo.2016.08.002.

Houben, J.P., Bijl, P.K., Pross, J., Bohaty, S.M., Passchier, S., Stickley, C.E., Röhl, U., Sugisaki, S., Tauxe, L., Van de Flierdt, T., Olney, M., Sangiori, F., Sluijs, A., Escutia, C., Brinkhuis, H., and the Expedition 318 Scientists, 2013. Reorganization of Southern Ocean plankton ecosystem at the onset of Antarctic glaciation. *Science* 340, 341-344.

Pross, J**.**, Contreras, L., Bijl, P.K., Greenwood, D.R., Bohaty, S.M., Schouten, S., Bendle, J.A., Röhl, U., Tauxe, L., Raine, J.I., Huck, C.E., van de Flierdt, T., Jamieson, S.R., Stickley, C.E., van de Schootbrugge, B., Escutia, C., Brinkhuis, H., Expedition 318 Scientists, 2012. Persistent near-tropical warmth on the Antarctic continent during the early Eocene epoch. *Nature* 488, 73-77.

Tauxe, L., Stickley, C.E., Sugisaki, S., Bijl, P.K., Bohaty, S.M., Brinkhuis, H., Escutia, C., Flores, J.A., Houben, A.J.P., Iwai, M., Jiménez-Espejo, F., McKay, R., Passchier, S., Pross, J., Riesselman, C.R., Röhl, U., Sangiorgi, F., Welsh, K., Klaus, A., Fehr, A., Bendle, J.A.P., Dunbar, R., Gonzàlez, J., Hayden, T., Katsuki, K., Olney, M.P., Pekar, S.F., Shrivastava, P.K., van de Flierdt, T., Williams, T., Yamane, M., 2012. Chronostratigraphic framework for the IODP Expedition 318 cores from the Wilkes Land Margin: constraints for paleoceanographic reconstruction. *Paleoceanography* 27, 1-19.

Van Simaeys, S., Brinkhuis, H., Pross, J., Williams, G.L., Zachos, J.C., 2005. Arctic dinoflagellate migrations mark the strongest Oligocene glaciations. *Geology* 33, 709-712.

Curriculum Vitae – Lisa Marie Egger

Contact Information

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Personal Details

Birth: July 7th, 1986 in Augsburg
Nationality: German

Employment

since 06/2014	**PhD student** within the Paleoenvironmental Dynamics Group at the Institute of Earth Sciences, Heidelberg University. Working title of PhD thesis: "*Late Eocene to Early Miocene surface-water characteristics of the higher-latitude Atlantic Ocean based on dinoflagellate cysts*"; supervisors: Prof. Jörg Pross, Prof. Oliver Friedrich
2009 – 2014	**Student research assistant** at the Institute for Paleontology and the Institute for Geology, University of Erlangen-Nürnberg. Responsibilities: scientific photography, microscope-based mineral separation, sample preparation for XRF analyses

Academic Education

10/2011 – 03/2014	**Master of Science** in Geosciences at the University of Erlangen-Nürnberg **Title of MSc thesis:** *"The Silurian Ireviken Event on Gotland (Sweden): Distribution of major and trace elements in the Lickershamn Section"*; supervisor: Prof. Axel Munnecke
10/2008 – 09/2011	**Bachelor of Science** in Geosciences at the University of Erlangen-Nürnberg **Title of BSc thesis:** *" Ultrafacies of platy limestones: SEM investigations on the lower part of the Upper Jurassic "Ettling" quarry"* (in German); supervisor: Prof. Axel Munnecke
09/2006 – 07/2008	**College of further education** ("Berufsoberschule"), Augsburg. Degree: "Abitur" (university-entrance diploma)

Non-academic Education

10/2003 – 09/2006	**Apprenticeship in nursery** at the School of Nursing, Wertingen Hospital; Degree: Registered Nurse (state qualification)

Seagoing Experience

03/2016 – 04/2016	Shipboard Scientist (Sedimentologist); *R.V*. Meteor Expedition M125 ("South American hydroclimates")

Participation in International Short Courses

- *"Advanced course in Jurassic-Cretaceous-Cenozoic organic-walled dinoflagellate cysts"*, presented by Peter Bijl, Appy Sluijs (Utrecht University, NL), Martin J. Head (Brock University, Canada), Jörg Pross (Heidelberg University, Germany), James Riding (BGS, UK), Poul Schiøler (Goodall Palaeo PTY Ltd., Aus), Heidelberg, 2015
- *"International Course on Carbonate Microfacies"*, presented by Axel Munnecke, Geozentrum Nordbayern, Erlangen, 2013.

Memberships

American Association of Stratigraphic Palynologists (AASP)

Publications – Lisa Marie Egger
(as of 08/2016)

2016:

Egger, L.M., Śliwińska, K.K., van Peer, T.E., Liebrand, D., Lippert, P.C., Friedrich, O., Wilson, P.A., Norris, R.D., Pross, J., 2016. Magnetostratigraphically-calibrated dinoflagellate cyst bioevents for the uppermost Eocene to lowermost Miocene of the western North Atlantic (IODP Expedition 342, Paleogene Newfoundland sediment drifts). *Review of Palaeobotany and Palynology*, DOI: 10.1016/j.revpalbo.2016.08.002.

Bijl, P.K., Brinkhuis, H., **Egger, L.M.**, Eldrett, J.S., Frieling, J., Grothe, A., Houben, A.J.P., Pross, J., Śliwińska, K.K., Sluijs, A., in press. Comment to "*Wetzeliella* and its allies – the 'hole' story: a taxonomic revision of the Paleogene dinoflagellate subfamily Wetzelielloideae". *Palynology*, DOI: 10.1080/ 01916122.2014.993888.

Amberg, C.E.A., Collart, T., Salenbien, W., **Egger, L.M.**, Munnecke, A., Nielsen, A.T., Monnet, C., Hammer, Ø., Vandenbroucke, T.R.A., 2016. The nature of Ordovician limestone-marl alternations in the Oslo-Asker District (Norway): witnesses of primary glacio-eustasy or diagenetic rhythms? *Scientific Reports* 6, 1-13.

Conference contributions (first-author contributions only):

Egger, L.M., Pross, J., Friedrich, O., Norris, R.D., Wilson, P.A., Expedition 342 Scientists, 2016. Northern hemisphere paleoclimatic and paleoceanographic changes at the Eocene/Oligocene boundary – new insights from dinoflagellate cysts. *12th International Conference on Paleoceanography*, Utrecht, The Netherlands.

Egger L.M., Śliwińska K.K., Norris, R.D., Wilson, P.A., Friedrich, O., Pross, J., 2016. Magnetostratigraphically calibrated dinoflagellate cyst bioevents for the uppermost Eocene to lowermost Miocene of the western North Atlantic (IODP Expedition 342, Newfoundland Drift). *IODP/ICDP Kolloquium 2016*, Institut für Geowissenschaften, Universität Heidelberg, Germany.

Egger, L.M., Pross, J., Friedrich, O., Lippert, P., Norris., R.D., Wilson, P.A., and Expedition 342 Scientists, 2015. Towards an integrated biomagnetochronology for the Oligocene of the mid- to high-latitude western North Atlantic based on organic-walled dinoflagellate cysts (IODP Expedition 342, Newfoundland Drift). *IODP Expedition 342 (Paleogene Sediment Drifts) Post-Cruise Science Meeting*, Salt Lake City, USA.

Egger, L.M., Pross, J., Friedrich, O., Lippert, P., Norris., R.D., Wilson, P.A., and Expedition 342 Scientists, 2015. From greenhouse to icehouse: Reconstructing surface-water characteristics of the western North Atlantic during the Oligocene based on dinoflagellate cysts (IODP Expedition 342, Newfoundland Drift). *IODP/ICDP Kolloquium 2015*, Steinmann-Institut, Universität Bonn, Germany.

Egger, L.M., Amberg, C., Vandenbroucke, T.R.A., Munnecke, A., Salenbien, W., Collart, T., Nielsen, A.T., Hammer, Ø., 2013. Primary or diagenetic rhythms? Geochemical investigations on limestone-marl couplets from the Late Ordovician Skogerholmen Formation (Hovedøya Island, southern Norway). *IGCP 591 Annual Meeting*, Lund, Sweden.

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Prof. Dr. Jörg Pross
Institutsdirektor

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Heidelberg, den 31.08.2016

Letter of support for Mrs. Lisa M. Egger's application to sail on Expedition 373

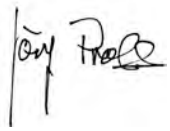
Within the context of her application to sail on IODP Expedition 373 as a palynologist, Lisa M. Egger has asked me for a letter supporting her application, which I gladly provide.

I have known Lisa since 2014 when she joined my group at the Institute of Earth Sciences at Heidelberg University in order to start a DFG-funded PhD project on North Atlantic surface-water characteristics during the late Eocene to early Miocene based on the application of organic-walled dinoflagellate cysts (‚dinocysts') both as biostratigraphic markers and recorders of surface-water conditions to sediments retrieved during IODP Expedition 342 (‚Newfoundland Drift'). Lisa is scheduled to finish her PhD thesis in the late summer of 2017. To date, she has published one peer-reviewed paper on dinocyst biostratigraphy (Egger et al. 2016; *Review of Palaeobotany and Palynology*). As she has recently finished the microscope work to be carried out for her thesis, Lisa is now analysing her extensive dinocyst datasets and integrating the dinocyst-based information on surface-water changes (notably temperature) with other datasets generated by the Expedition 342 consortium. I expect her to write up these results in manuscript form over the next ten months or so, such that by the end of the summer of 2017 she should have at least three more manuscripts submitted and/or at least partially accepted.

Besides having developed outstanding expertise in the biostratigraphic and paleoenvironmental analysis of late Eocene to early Miocene dinocysts and being a hard-working young researcher, Lisa has recently participated in a four-weeks-long *R/V Meteor* research cruise to the Central Atlantic as shipboard scientist. Based on this combination of assets (i.e., her deep knowledge of Paleogene and early Neogene dinocysts, her willingness to work hard and to go ‚the extra mile' in order to be successful, and her previous seagoing

experience), and considering that biostratigraphical age control will be crucial for the success of Expedition 373, I would like to endorse Lisa's application to sail on IODP Expedition 373 as a palynologist in the strongest possible terms and without any reservation.

For post-cruise research to be carried out by Lisa, the scientific and administration infrastructure of my research group at the Institute of Earth Science at Heidelberg University will be fully available.



Prof. Dr. Jörg Pross Heidelberg, August 31, 2016

APPLICATION TOPARTICIPATE IN AN IODP EXPEDITION

ESSAC Office ECORD Science Support & Advisory Committee
GEOMAR | Helmholtz Centre for Ocean Research Kiel
Wischhofstrasse 1-3
24148 Kiel, Germany
Hanno Kinkel (ESSAC Science Coordinator):
Tel: +49 431 600 2418
Fax:+49 431 600 2922
Web Page: http://www.essac.ecord.org Email:essac@geomar.de

Please type information

Apply to Sail Application Form

Expedition Number373: Antarctic Paleoclimate and Ice History

1. PERSONAL INFORMATION

Family name: Prader

First name: Sabine

Current Position: PhD-student

Institution: Center for Natural History and Department of Geosciences, Hamburg University,

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City, Postcode, Country: D-20146 Hamburg, Germany

Tel. work: +49 040 42838-4989
Tel. home: +49 01742959566
Fax:
Email: sabine.prader@uni-hamburg.de

Country of citizenship: Italy

Place of birth/date of birth: Bressanone/Brixen, Italy; 23.01.1984

Gender: female

Education (highest degree, including year PhD was received/ is expected): Diploma degree, 2013; PhD is expected.

Are you currently a student? YES Expected Graduation Date: 2017

2. EXPEDITION INFORMATION

Summary of proposed participation, including area of scientific interest, current research and participation plan (maximum 250 characters with space – more detail should be included in the Letter of Interest):

Application for offshore. Scientific interest: Palynology-Ecosystem and palaeoclimate research. Current research: Palynology-Ecosystem and palaeoclimate reconstruction (PhD thesis). Participation plan: Early Eocene; Eocene/Oligocene boundary (postdoctoral time).

Prior involvement with DSDP/ODP/IODP and nature of involvement (expedition number, shipboard/shore-based participation, co-chief, etc.):

IOPD Expedition 313 to New Jersey Shallow Shelf (post-cruise research): analysing sediment cores of M0027A in the ongoing PhD-thesis.

Post-cruise science support to achieve the proposed scientific objectives 1) future funding scheme and 2) support from host institution (e.g. staff, facilities)

1. Future funding: International Ocean Discovery Program priority program of the German Research Foundation (DFG). Post-Doc-position. 2. Future support: University of Hamburg: Institute of Geology and Center of Natural History. Permission of Schmiedl G. and Kotthoff U. for access to palynological laboratory and micro-optical equipment (Scanning electron microscope, light microscope).

Three scientific and/or personal references

Prof.Dr. Francine McCarthy, Department of Earth Sciences, Brock University
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Prof.Dr. Gerhard Schmiedl, Institute of Geology, University Hamburg,
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3. SCIENTIFIC EXPERTISE

For Scientist Jobs Descriptions visit: http://iodp.tamu.edu/participants/scientist_jobs.html

Please indicate your area(s) of expertise (maximum 3)

Discipline	Mark with X	Speciality
microbiologist		
organic and inorganic geochemist/biogeochemist		
physicalproperties specialist		
sedimentologist		
structuralgeologist		
paleontologist	X	palynology
paleomagnetist		
petrologist		
hydrogeologist		
Other		

4. ADDITIONAL DOCUMENTS

Please, provide the following documents:

- Letter of interest, including details about area of scientific interest, current research, expedition participation plan and post-cruise research
- CV and Publication list
- Letter of recommendation (for PhD students)
- See also: http://www.essac.ecord.org/flyer/Guidelines_for_Applying_to_sail.pdf

Please, send your application form as *a MS Word document* and the additional documents in *PDF format* (preferably as one file) by email to Jan Behrmann and Hanno Kinkel at the ESSAC office: essac@geomar.de.

In addition to the ESSAC application, all applicants ***must inform their national office*** (if applicable) ***and national delegate*** and send a copy of the application documents. ECORD does not provide funds for participation; the national offices or national delegates can provide information regarding travel support, post-cruise funding opportunities, etc.

See http://www.essac.ecord.org/index.php?mod=about&page=ESSAC for a list of the national contact persons.

Expertise and IODP involvement

For me, as a skilled botanist and palaeopalynologist, questions about vegetation and climate development and changes in past, present and future are fundamental. As botanist I have background in plant physiology, plant ecology, taxonomy and systematics.

During the last years of my biology study and during my diploma-thesis, I focused on pollen morphology and ultrastructure. I was trained to apply different preparation methods and analysing techniques in order to answer different palynological questions. For example, the acetolysis method is an additional useful tool to facilitate the identification of pollen grains and spores in light microscope samples, and the application of the transmission electron microscope (TEM) in addition to light(LM) and scanning electron microscope (SEM) allows a more precise analysis of pollen ultrastructure.

In my ongoing PhD-thesis, I am analysing sediment cores from the New Jersey shallow shelf (Site M0027, IOPD Expedition 313). During sampling I could several times visit the IODP Core repository at Marum, Bremen and became acquainted with IODP sampling protocols to understand more about the aims of IODP and drilling campaigns, I participated at the GESEP-School, 2015, Bonn. The main focus of my PhD-thesis is on the reconstruction of regional vegetation and climate of the hinterland of the New Jersey Shallow Shelf (NJSS) and how they have developed before, during, and after the Mid Miocene Climatic Optimum (MMCO) and during the Oligocene/Miocene boundary, and if Milankowitch cyclicity is reflected in the ecosystem changes. My PhD enables me to gain a better understanding about interactions of terrestrial ecosystems with the regional abiotic environment and with regionally- and globally-driven climate change. To me, it is particularly fascinating to find out how – and why – present-day vegetation compositions differ from those in the geological past. While climate is one of the most powerful triggers influencing plant associations and plant movements, my work on the sediments from the New Jersey shelf shows that regional factors like river development or orogeny have to be taken into account (e.g. Kotthoff et al. 2014). During several stays in Canada in the framework of my PhD thesis, I have learned additional processing methods thanks to Francine McCarthy (Brock University). David Greenwood (Brandon University) introduced me into enhanced application methods of the co-existence approach (‘bioclimatic analysis’, e.g. Kotthoff et al. 2014). This is one of the methods I would like to apply to palynological assemblages from sediments drilled during IODP Exp. 373.

Research Interest

To be part of the IOPD Expedition 373 to George V and Adélie Land (GVAL) continental shelf of East Antarctica would be a big chance for me to further improve my understanding how plants and vegetation formation react to climate change – in case of the GVAL in a

climatically highly sensitive region. Partitioning would allow me to expand my palynological knowledge by analysing south hemispherical samples and to do further research concerning the Eocene, the Eocene/Oligocene boundary and the Miocene (depending on respective drilling success). The examination of samples in higher temporal resolution combined with both light and scanning electron microscopy would be best suited to get a detailed picture of palaeovegetation for sediment cores of George V and Adélie Land of Antarctica. I am currently applying a similar approach on the sediment cores of NJSS.

I would be very interested to apply the methods and techniques I learned to examinenature of the Eocene Thermal Maximum 1-3 (ETM1-3) (DeConto et al., 2012) in the Antarctic region. Contreras et al. (2013) have shown a vegetation composition change from the early Eocene to Mid Eocene on the Wilkes Land margin. Among others, the following research questions seem particularly interesting to me in this context: How sensitive are plants to fast fluctuating environments? Can we expect vegetational fluctuations on a shorter timescale (3 Ma)? Considering that paratropical rainforest persists during the early Eocene (Pross et al. 2012): How strong was the climatic shift during the ETM 1-3? Are *Nothofagus* forests the dominant vegetation formation during colder intervals? Or, do we have indices for tundra-like landscape? Is there a complete retreat of the paratropical rainforest during the ETM 1-3 or do we find indices of some warm loving members like Myrthaceae which, could persist through colder intervals between the hyperthermals? Where was the main refugium of thermophilous taxa and how were they able to recolonize the research area, and how long took the recolonization? How did biodiversity develop during the Eocene? Do we recognize extinctions along the ETMs? Can we identify a cyclicity reflected by vegetation belts or single genera?

The Eocene/Oligocene boundary (~34 Ma) leads to similar questions as those made above concerning the middle Eocene, but we can expect a complete vegetation turnover creating an adapted climax community to colder temperatures. After the Oligocene, there is little evidence of vegetation in Antarctica, as shown, e.g., for Victoria Land Basin (Warny and Askin, 2000). Is there a return of thermophilous genera after the Oi 1 event? Or, does the ecosystem stagnate until the MMCO? When was the last occurrence of arboreal angiosperms in Antarctica?

Such questions could be answered by the analysis of samples from selected time intervals in a very high resolution. The application of the SEM would allow to be more precise in the identification of pollen grains and spores (especially for monocotyledons like Araceae). From a palaeobotanical point of view it could probably be that several new taxa can be described for the GVAL, and this would offer to receive a more complete picture of the geographical history of several south-hemispheric plant families and genera. Climate reconstruction could be done using the bioclimatic analysis, which was already successfully applied to sediment

cores from a neighbouring region (Wilkes Land, Site U1356, IODP Exp. 318; Pross et al., 2012).

Moratorium

While the research to be undertaken depends on the drilling success at the different sites, I would start analysing samples from the Early Eocene to examine the ETM 1-3 (DeConto et al., 2012), associated with a detailed documentation of terrestrial palynomorphs via SEM and LM. Based on the precise analyzation, the bioclimatic analysis approach could be applied in the next step.

Financial support

Research on sediment cores of GVAL could be done during my postdoctoral time. Equipment for palynological analysis, laboratory, SEM and research would be supported of the University of Hamburg, from the Institute of Geology. The postdoctoral founding provide International Ocean Discovery Program priority program of the German Research Foundation (DFG).

References

Askin, R.A., Raine, J.I., 2000. Oligocene and Early Miocene terrestrial palynology of Cape Robertsdrillhole CRP-2/2A, Victoria Land Basin, Antarctica. In: Barrett, P.J., Sarti, M., Wise, S. (Eds.), Palaeontological Studies for CRP-2/2A and CRP-1. Terra Antartica 7,pp. 493–501.

Contreras, L., Pross, J., Bijl, P.K., Koutsodendris, A., Raine, J.I., van de Schootbrugge, B., Brinkhuis, H., 2013. Early to Middle Eocene vegetation dynamics at the Wilkes Land Margin (Antarctica). Review of Palaeobotany and Palynology 197, 119-142.

DeConto, R.M., Galeotti, S., Pagani, M., Tracy, D., Schaefer, K., Zhang,T., Pollard, D., Beerling, D.J., 2012. Past extreme warming events linked to massive carbon release from thawing permafrost. Nature 484, 87-91.

Kotthoff, U., Greenwood, D., McCarthy, F., Müller-Navarra, K., Prader, S., Hesselbo, S., 2014. Late Eocene to middle Miocene (33 to 13 million years ago) vegetation and climate development on the North American Atlantic Coastal Plain (IODP Expedition 313, Site M0027). Climate of the Past 10, 1523-1539.

Pross, J., Contreras, L., Bijl, P.K., Greenwood, D.R., Bohaty, S.M., Schouten, S., Bendle, J.A., Rohl, U., Tauxe, L., Raine, J.I., Huck, C.E., van de Flierdt, T., Jamieson, S.S.R., Stickley, C.E., van de Schootbrugge, B., Escutia, C., Brinkhuis, H., 2012. Persistent near-tropical warmth on the Antarctic continent during the early Eocene epoch. Nature 488, 73-77.

Curriculum vitae

Sabine Prader

Born 23th January 1984

In Bressanone/Brixen, Italy

Education

- 2013, September 26th, Diploma in Biology, area of specialisation: Botany, University of Vienna. Title: Pollenmorphologie und Ultrastruktur ausgewählter Taxa der Saxifragaceae. Graged: 1.0.
- 2014, May 1st, Begin of PhD thesis atthe University of Hamburg, Center of Natural History and Department of Geology of Hamburg.Title: Miocene vegetation dynamics at the New Jersey Atlantic margin (IODP Exp. 313).

Additional expertise and courses

- 2014, June 23rd-July 13th, Brock University, St. Catharines, Ontario: host of Francine McCarthy, Department of Earth Sciences.
- 2015, March 4th-5th,GESEP-School, Bonn, Germany.
- 2015, April 22nd–May 2nd, Brock University, St. Catharines, Ontario: host of Francine McCarthy; Department of Earth Sciences.
- 2015, May 10th–May 17th, Brandon University, Brandon, Manitoba: host of David Greenwood; Department of Biology.
- 2015, September 13th-19th, Advanced course in Jurassic-Cretaceous-Cenozoic organic walled dinoflagellate cysts; Heidelberg, Germany.

Publications

Kotthoff, U., McCarthy, F.M.G., Greenwood, D.R., Müller-Navarra, K., Prader, S., Hesselbo, S.P., 2014. Vegetation and climate development on the Atlantic Coastal Plain from 33 to 13 million years ago (IODP expedition 313). Climate of the Past 10, 1523-1539.

Prader, S., 2013. Pollenmorphologie und Ultrastruktur ausgewählter Taxa der Saxifragaceae. Diplomarbeit, Universität Wien.(othes.univie.ac.at/29347/).

Conference contribution

Prader, S., Kotthoff, U., McCarthy, F.M.G., Greenwood, D.R., 2016. The hinterland of the Atlantic Coastal Plain: vegetation and climate development during the Late Mid Miocene (IODP Exp. 313). ICP12, Utrecht, Netherlands, poster presentation.

Prader, S., Kotthoff, U., McCarthy, F.M.G., Greenwood, D.R., 2016. Ecosystem reconstructions for the hinterland of the Atlantic Coastal Plain during the Late Mid-Miocene Climatic Optimum (IODP Expedition 313). EGU, Vienna, Austria, poster presentation.

Prader, S., Kotthoff, U., McCarthy, F.M.G., Greenwood, D.R., 2015. Mid-Miocene vegetation and climate development on the Atlantic Coastal Plain (IOPD Expedition 313). ACU-CGU-AMC-UGU, Montreal, Canada, poster presentation.

Prader, S., Kotthoff, U., McCarthy, F.M.G., Greenwood, D.R., 2015. Vegetation and climate development on the Atlantic Coastal Plain during the late Mid-Miocene Climatic Optimum. EGU, Vienna, Austria, poster presentation.

Prader, S., Kotthoff, U., McCarthy, F.M.G., Greenwood, D.R., Schmiedl, G., 2015. Vegetation and climate development on the Atlantic Coastal Plain during the late Mid-Miocene Climatic Optimum (IODP Expedition 313). IODP/ICPD Colloquium, Bonn, Germany, poster presentation.

Financial support

The PhD is founded by International Ocean Discovery Program priority program of the German Research Foundation (DFG). The year 2017/18 is probably founded by the “Provincia autonoma di Bolzano, Alto Adige; borse di studio per la formazione post-universitaria”.

Universität Hamburg
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Datum 25 August 2016
AZ

Letter of Support for Sabine Prader

To whom it may concern,

It is my pleasure to support the application of Sabine Prader for participation in IODP Expedition 373 (Antarctic Cenozoic Paleoenvironment). Provided successful raising of postdoctoral funding from the International Ocean Discovery Program priority program of the German Research Foundation (DFG), my working group at the Institute of Geology of the University of Hamburg will provide the necessary institutional infrastructure.

Specifically, my working group will provide standard office space and equipment, access to our micro-optical and palynological laboratories, to the scanning electron microscope and further equipment necessary for up-to-date palynological analyses and research.

Yours sincerely,

Prof. Dr. G. Schmiedl

Universität Hamburg
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CeNak
Centrum für Naturkunde

UHH • Centrum für Naturkunde (CeNak) – Zoologisches Museum
Martin-Luther-King-Platz 3 • 20146 Hamburg

Dr. Ulrich Kotthoff

Leiter Abteilung Geologie/Paläontologie
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25.08.2016
AZ

Application of Sabine Prader to Sail – IODP Expedition 373

To whom it may concern,

herewith, I want to strongly support the application of Sabine Prader to sail with IODP Expedition 373 ("Antarctic Cenozoic Paleoenvironment"/"Antarctic Paleoclimate and Ice History"). Sabine Prader is currently working on her PhD thesis, which deals with palynological analyses of Oligocene and Miocene sediments from the New Jersey shallow shelf, which have been drilled in the framework of IODP Expedition 313. As her first supervisor, I have to state that I am impressed by Sabine Prader's palynological expertise, both concerning preparation methods and palynomorph assemblage analyses. Her knowledge concerning pollen grain morphology is impressive and also documented in her highly graded diploma thesis at the Department of Structural and Functional Botany at Wien University. During the past two years, Mrs. Prader has furthermore widened her expertise by visiting the Utrecht Dino Course 2015 (Utrecht), in order to learn about the application of organic-walled dinoflagellate cysts for biostratigraphy and the GESEP school 2015 (Bonn) to learn more about planning and executing drilling campaigns. In the framework of her PhD, she met with scientists in eastern Canada and the eastern USA to get acquainted with palaeobotanical/palynological field work and different pollen-based climate reconstruction techniques. Sampling at the IODP core repository at Marum, Bremen, she already learned much about the sampling procedures during IODP onshore science parties. She had already supported one peer-reviewed publication as co-author during the beginning of her PhD, and is now completing her first manuscript. I am sure that Sabine Prader will be able to finish her PhD thesis during 2017, just in time to join IODP-Expedition 373 as young post-doc. Her particular interests are the reconstructions of changes in terrestrial ecosystems and of the climate development during the Cenozoic, but I am sure that she can also contribute to the biostratigraphic assessment of the sediments recovered during IODP Expedition 373.

Sailing with IODP Expedition 373 would be an ideal base for Sabine Prader's post-doc career and allow her to widen her palaeobotanical expertise to the southern hemisphere and time intervals preceding the Oligocene. Furthermore, she could gain offshore experience and widen her scientific network. In case that her application is successful, she will apply for a post-doc position in the framework of the International Ocean Discovery Program priority program of the German Research Foundation (DFG). Professor Gerhard Schmiedl from the Institute of Geology at Hamburg University has guaranteed that the institute would support such an IODP-Exp.-373-related post-doc project. The section "Geology/Palaeontology" at the Center of Natural History, Hamburg University, would also support Sabine Prader's planned research in the framework of IOPD Exp. 373.

In short, Sabine Prader can contribute to IODP Expedition with significant expertise. She learns very quickly, is sociable, and shows particular endurance. Joining IODP Expedition 373 would be an ideal experience for her and an ideal base for her future scientific career.

Please contact me in case you have further questions.

Ulrich Kotthoff

APPLICATION TO PARTICIPATE IN AN IODP EXPEDITION

ESSAC Office ECORD Science Support & Advisory Committee
GEOMAR | Helmholtz Centre for Ocean Research Kiel
Wischhofstrasse 1-3
24148 Kiel, Germany
Hanno Kinkel (ESSAC Science Coordinator):
Tel: +49 431 600 2418
Fax:+49 431 600 2922
Web Page: http://www.essac.ecord.org Email: **essac@geomar.de**

Please type information

Apply to Sail Application Form

Expedition Number 374: Ross Sea West Antarctic Ice Sheet History

1. PERSONAL INFORMATION

Family name: SALABARNADA ROSET

First name: ARIADNA

Current Position: PhD Student

Institution: Instituto Andaluz de Ciencias de la Tierra, IACT-CSIC

Address: Avenida de las Palmeras, 4

City, Postcode, Country: Armilla, 18100, Spain

Tel. work: (34) 958 230000 (ext. 190132)
Tel. home: (34) 660585931
Fax:
Email: a.salabarnada@csic.es
ariad.sr@gmail.com

Country of citizenship: SPAIN

Place of birth/date of birth: Barcelona, February 14 1984

Gender: Female

Education (highest degree, including year PhD was received / is expected): PhD / fall 2017

Are you currently a student? YES Expected Graduation Date: fall 2017

2. EXPEDITION INFORMATION

Summary of proposed participation, including area of scientific interest, current research and participation plan (maximum 250 characters with space – more detail should be included in the Letter of Interest):

My current research studies and interests are related to linking circumpolar current sedimentation and Antarctic ice sheet evolution during the Oligocene in a continental rise setting off the East Antarctic Wilkes Land Margin (Core U1356 IODP Exp. 318). This is achieved through the integration of sedimentological, physical properties, and geochemical data.

Proposed research plan:

1) Shelf-to-rise correlations during the Oligocene.

Correlations between proximal ice sheet interactions (U1360, and new exp. 373 cores) and distal (U1356) palaeoceanographic configuration. Based on our study from Site U1356 we interpret a dynamic behaviour of the ice sheet on the continent and the presence of two water masses on the continental rise (i.e., AABW and CDW/NADW). Sedimentary facies and geochemical data will be used to study continental shelf glacial processes/ice sheet dynamics and water masses that will be linked with the paleoceanographic evolution on the continental rise.

2) Test the Glacial Isostatic Adjustment (GIA) sea level changes model of Stocchi et al. (2013).

Exp. 318 continental rise sediments at site U1356 depict a 12 Ma hiatus across the WL-U3 unconformity, from 33.6 Ma (i.e., Oi-1 event) to the middle Eocene. Continental shelf site U1360 recovered sediments dated 33.6 Ma nearly 100 m above the WL-U3. This implies either high sedimentation rates or deepening of the shelf as proposed by Stocchi et al (2013). We will develop depositional environments and sea level changes models to test the existing GIA model for this margin.

Research plan proposed will help fulfill the objective 3.5 from Exp. 373.

Prior involvement with DSDP/ODP/IODP and nature of involvement (expedition number, shipboard/shore-based participation, co-chief, etc):

PhD thesis working with IODP exp. 318, cores U1356, U1357, U1361.

Internships and sample request in the three IODP core repositories in:

Marum (Germany) → Core description, CT-scans

Kochi (Japan) → XRF Geochemical mapping, CT-scans

TAMU (USA)→ Core description, Digital images, core sampling.

I have been involved in three marine geology research cruises. I gained experience with CTD- water sampling (RV García del Cid), refraction and wide-angle reflection seismic line acquisition and bathymetry (RV Sarmineto de Gamboa), and gravity cores and box cores retrieval, pore water sampling (RV Marion Dufresne).

Post-cruise science support to achieve the proposed scientific objectives 1) future funding scheme and 2) support from host institution (e.g. staff, facilities)

I intend to graduate during the fall of 2017. After PhD completion, I will continue having support and affiliation with my actual research institute IACT and my mentor Prof. Carlota Escutia. A 2-year Post-Doctoral position is planned in order to cover post-cruise science analysis and travel costs. Also, additional grants for funding proposed research analysis would be considered (for eg. EU Funding schemes, post-doctoral fellowships abroad, and SCAR Fellowships).

Three scientific and/or personal references

1.- Hans C. Nelson

IACT-CSIC Instituto Andaluz Ciencias de la Tierra
Avda. de las Palmeras nº 4, 18100 Armilla. GRANADA (Spain).
hansnelsonugr@hotmail.com

2. Francisco J. Jiménez-Espejo

Department of Biogeochemistry
Japan Agency for Marine-Earth Science and Technology,
2-15 Natsushima-Cho, Yokosuka, 237-0061, JAPAN.
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3.- Menchu Comas Minondo

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mcomas@ugr.es

3. SCIENTIFIC EXPERTISE

For Scientist Jobs Descriptions visit: http://iodp.tamu.edu/participants/scientist_jobs.html

Please indicate your area(s) of expertise (maximum 3)

Discipline	Mark with X	Speciality
microbiologist		
organic and inorganic geochemist/biogeochemist		
physical properties specialist	X	Geotek multi-sensor core logger, Digital images, CT-scan
sedimentologist	X	Contourites, turbidites, mass transport deposits. Smear slides
structural geologist		
paleontologist		
paleomagnetist		
petrologist		
hydrogeologist		
Other		

4. ADDITIONAL DOCUMENTS

Please, provide the following documents:

- Letter of interest, including details about area of scientific interest, current research, expedition participation plan and post-cruise research
- CV and Publication list
- Letter of recommendation (for PhD students)
- See also: http://www.essac.ecord.org/flyer/Guidelines_for%20Applying_to_sail.pdf

Please, send your application form as *a MS Word document* and the additional documents in *PDF format* (preferably as one file) by email to Jan Behrmann and Hanno Kinkel at the ESSAC office: essac@geomar.de.

In addition to the ESSAC application, all applicants *must inform their national office* (if applicable) *and national delegate* and send a copy of the application documents. ECORD does not provide funds for participation; the national offices or national delegates can provide information regarding travel support, post-cruise funding opportunities, etc.

See http://www.essac.ecord.org/index.php?mod=about&page=ESSAC for a list of the national contact persons.

IODP Expedition 373
Ariadna Salabarnada Roset

Letter of Interest for IODP Expedition 373

Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments

My name is Ariadna Salabarnada and I am in the last year of my PhD research at the Instituto Andaluz de Ciencias de la Tierra (IACT – CSIC) and Granada University in Spain, under the supervision of Professor Carlota Escutia Dotti.

For the past three years I have been working on the glacial and paleoceanographic evolution of the Eastern Antarctic Wilkes Land margin using sediments recovered during IODP Expedition 318. It would be for me a great opportunity to deeply involved, first hand with a team of experts working together to better understand the evolution of the East Antarctic Ice Sheet in a proximal setting. For this, I would like to be considered as a candidate for the IODP exp. 373 in Antarctic Cenozoic Plaeoclimate. Based on my expertise, I am applying to work as ONSHORE sedimentologist and physical properties specialist.

Research Interests, Experience, and Expertise

My main scientific interests are related to the study of Antarctic Ice sheet and Southern Ocean palaeoceanographic evolution. I have focussed on three different time-windows: the late Oligocene warmth, the Oligocene-Miocene Transition, and the Holocene deglaciation using cores U1356 and U1357 collected by the IODP Expedition 318 in front of East Antarctic Wilkes Land Margin. For my thesis, I have focused on: 1) deep-water Antarctic sedimentation (i.e.,turbidites, Mass Transport Deposits (MTDs), contourite and hemipelagic deposits) as indicators of glacial and paleoceanographic changes; and 2) Holocene laminated and debris-laden deposits from the continental shelf to characterize the Holocene deglaciation.

For my work I have used and integrated different sedimentological, physical properties and geochemical methods. I have conducted detailed facies analysis based on visual descriptions of the lithology, microfossil abundance sediment structures and textures, bioturbation, high-resolution digital imaging. Facies interpretation has been aided with smear slides, SEM, CT-scan imaging and grain-size analyses. I have both, used shipboard data and collected new physical properties data from cores using a Geotek Multisensory Core Logger with Magnetic Susceptibility, Gamma-Ray density, P-Wave velocity, and resistivity sensors. I have used geochemical XRF Core Scanner, data and collected discrete XRF, XRD data; Finally, I have also conducted Spectral analysis (Analyseries, Astrochron) and multichannel seismic reflection profiles interpretation using Kingdom Suite Software.

For instrumentation that can be of relevance for an IODP expedition I have training in the use of Geotek multi-sensor core logger, XRF core scanner, and CT-scanner data acquiring and post-processing. Many of this work and analyses have been conducted in the IODP core repositories (MARUM, TAMU and Kochi) and laboratories from my own institution and JAMSTEC through different stays/collaborations. I also obtained a grant to participate in the ECORD Summer School held in MARUM, Bremen “Deep-Sea sediments: from stratigraphy to age models” that provided me with a holistic introduction to what means a IODP expedition, which techniques and methodologies are used on board, and “life on board” hints.

In addition to the main focus of my research, my PhD work also involves collaborations with other scientists working on data from IODP Expedition 318 (i.e., Eocene-Oligocene Transition, Oligocene, and Pliocene warmth) and other projects being now developed using DSDP data from site 269 (in a latitudinal transect to Site U1356) and site 274 (in a latitudinal transect with sites proposed for Expedition 374). I have participated in three scientific oceanographic cruises where I gained experience with CTD-water sampling (RV García del Cid), refraction and wide-angle reflection seismic line acquisition and bathymetry (RV Sarmineto de Gamboa), and gravity cores and box cores retrieval with pore water sampling (RV Marion Dufresne).

IODP Expedition 373
Ariadna Salabarnada Roset

Proposed Research Goals in Expedition 373

1) Shelf-to-rise correlations during the EOT and the Oligocene between U1360, U1356 and exp. 373 cores.

Correlations between (proximal) ice sheet interactions with (distal) palaeoceanographic configuration during the EOT (Eocene Oligocene Transition) and the early Oligocene.

During my PhD I studied in detail Oligocene climatic and paleoceanographic evolution from Site U1356 situated in the continental rise off Wilkes Land. After the Oi-1 event sediments from this site record glacial interglacial sedimentation paced by obliquity that is dominated by contourite and Mass Transport deposition. Based on facies analyses, physical properties and geochemical data we interpret a dynamic behaviour of the ice sheet on the continent and the presence of two water masses on the continental rise (i.e., AABW and CDW/NADW). Contour current deposition can be inferred also in the seismic profiles, providing a regional view, where a change in paleoceanographic conditions is marked by the onset of contourite drift morphologies at around 29 Ma. The new material from Expedition 373 will provide valuable snapshots on the continental shelf glacial processes and record advances and retreats of the ice sheet. Correlation of results from Expedition 373 shelf sites with continental rise Site U1356 will provide insights into links between ice sheet proximal dynamics, climate, and palaeoceanographic configuration (i.e., deep-water formation, circumpolar currents) of East Antarctica during the Oligocene.

With this objective in mind, we propose to conduct a detailed facies analyses to determine glacial and glacial-marine processes and sedimentary environments. Facies analyses will be conducted based on detailed visual descriptions (aided with high-resolution digital images), physical properties, and grain-size. In addition geochemical data will be acquired to determine down-core variations in terrestrial vs. biogenic deposition and water masses on the shelf that can be compared with those on the continental rise.

The proposed research aims to contribute to the Oligocene ice and climate condition objectives and into the paleoceanographic configuration during the Oligocene.

2) Test the Glacial Isostatic Adjustment (GIA) sea level changes model of Stocchi et al. (2013).

During the EOT crustal deformation and gravitational perturbations occurred around the continent as the result of the growth of a continental size ice sheet (Stocchi et al., 2013). It is argued that this resulted in a sea level rise in areas proximal to the ice sheet.

The continental rise sediments from site U1356 depict a 12 Ma erosion/hiatus across the WL-U3 unconformity spanning from 33.6 Ma (i.e., Oi-1 event) to the middle Eocene. However, proximal continental shelf site U1360 recovered sediments dated 33.6 Ma nearly 100 m above the WL-U3 unconformity (Escutia et al., 2011). This implies either very high rates of sedimentation during the Oi-1 event or, as indicated in the Stocchi et al. (2013) model, or a deepening of the basin allowing late Eocene sediments to de preserved.

We propose to study late Eocene to early Oligocene sedimentary facies (following criteria indicated in objective 1) in cores from Exp. 373 to determine environmental depositional settings and sea level changes. This will allow testing the expected transgression in the Stocchi et al (2013) paper.

The proposed research will contribute to the IODP expedition 373 objectives related with sea level variation across the major continental ice sheet expansion in Antarctica, and to the better comprehension of the EOT the GIA and the relative sea level rise effects adjacent to expanding ice sheets.

Sampling plan/interval of interest

We intend to sample late Eocene to Oligocene sediments. Sampling intervals will be facies dependent (or alternatively every 20 cm).

Collaborations

I am open to establish collaborations aimed at the study of EOT transition and bottom current sedimentation in Antarctica. As my specialty is based on sedimentology and physical properties other disciplines will be needed in order to undertake a more wide range research.
Collaborations with Carlota Escutia and Dimitrios Evangelinos are ongoing for all the objectives as part of my research group.
Geochemistry studies will be held in collaboration of Francisco Jimenez-Espejo.
Sedimentology and cyclostratigraphy in collaboration with Rob MacKay.

Future funding scheme

I intend to graduate during the fall of 2017. After PhD completion, I will continue having support and affiliation with my actual research institute IACT and my mentor Carlota Escutia. A 2-year Post-Doctoral position is planned in order to cover post-cruise science analysis and travel costs. Also, additional grants for funding proposed research analysis would be considered (for e.g. EU Funding schemes, post-doctoral fellowships abroad, and SCAR Fellowships).

References

- Escutia, C., Brinkhuis, H., Klaus, A., 2011. IODP Expedition 318: From Greenhouse to Icehouse at the Wilkes Land Antarctic Margin. Sci. Drill. 15–23.

- Stocchi, P., Escutia, C., Houben, A.J.P., Vermeersen, B.L. a., Bijl, P.K., Brinkhuis, H., DeConto, R.M., Galeotti, S., Passchier, S., Pollard, D., Klaus, A., Fehr, A., Williams, T., Bendle, J. a. P., Bohaty, S.M., Carr, S. a., Dunbar, R.B., Flores, J.A., Gonzàlez, J.J., Hayden, T.G., Iwai, M., Jimenez-Espejo, F.J., Katsuki, K., Kong, G.S., McKay, R.M., Nakai, M., Olney, M.P., Pekar, S.F., Pross, J., Riesselman, C., Röhl, U., Sakai, T., Shrivastava, P.K., Stickley, C.E., Sugisaki, S., Tauxe, L., Tuo, S., van de Flierdt, T., Welsh, K., Yamane, M., 2013. Relative sea-level rise around East Antarctica during Oligocene glaciation. Nat. Geosci. 6, 380–384.

Curriculum Vitae

Ariadna Salabarnada Roset
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PhD Student
Affiliation: IACT-CSIC
Dept. Marine Geosciences and Global Change
Instituto Andaluz de Ciencias de la Tierra – Universidad de Granada
Avda. de las Palmeras, 4. CP: 18100, Armilla, Spain.

Nationality: Spanish, *Date of Birth:* February 14, 1984

EDUCATION

2013 - present: Current academic status: Doctoral Student, expected in fall 2017.

Ph.D. thesis: "Cenozoic East Antarctic Glacial Evolution from Sediments Collected by Ocean Drilling in the Wilkes Land Margin (CAGES)"
Supervisor: Prof. Dr. Carlota Escutia Dotti

2012-2013: Pre-Doc Fellowship UCM-REPSOL at Repsol Technology Centre (CTR).
Commissioning and development of analytical techniques of mineralogy, petrology and geochemistry studies of upstream rock-fluid interaction.

2010-2012: M.Sc. in Global Change
Spanish Research Council (CSIC)-Universidad Internacional Menéndez Pelayo (UIMP)

Diploma thesis (M.Sc.): Recent depositional evolution of a high altitude, alpine lake: Marboré Lake (Ordesa-Monte Perdido National Park, Spanish Pyrenees). Supervisor: Prof. Dr. Blas Valero Garcés.

February 2010: Bachelor degree in Geology, University of Barcelona (UB), Spain.

INTERNSHIPS

2013 (August): 7-day stay at the IODP in the Gulf Coast Core Repository in College Station Texas A&M (USA). Re-describing and sampling sediment cores from Expedition 318 Site U1356.

2013 (6-9 May): 4-day stay at the IODP Bremen Core Repository (Germany). CT-scan acquisition of the deglaciation section from IODP Expedition 318 Site 1357.

2014 (October-December): 3 month stay in the Antarctic Research Center, University of Victoria in Wellington (NZ). Work with Rob MacKay and Tim Naish on data from Sites U1356 and U1361.

2015 (July-October): 3 month stay in JAMSTEC (Japan) and the IODP Kochi Core Repository. Geochemical data interpretation-IODP Site 1356. Analytical work: CT-scans and Geochemical mapping of the Oligocene-Miocene transition sediments.

2016: 10-day stay in the IODP in the Gulf Coast Core Repository in College Station Texas A&M. Re-describing and sampling sediment cores from DSDP Leg 28 and 29 (Sites 269, 274 and 278) and ODP Leg 113 (Site 696). Focusing on Eocene-Oligocene and Oligocene-Miocene Transitions.

SCIENTIFIC EXPEDITIONS

June 2013	RV Marion Dufresne, MD194 "EuroFLEETS GATEWAY" Ghent University (Belguim).	
	PI: Dr. David Van Rooij.	11 days duration
May 2010	RV García del Cid, "COSTEM" Institut de Ciències del Mar (ICM) Barcelona (Spain).	
	PI: Dr. Pere Puig.	6 days duration
April 2010	RV Sarmiento de Gamboa, "MEDOC" Institut de Ciències del Mar (ICM) Barcelona (Spain).	
	PI: Dr. César R. Ranero.	20 days duration

PROFESSIONAL EXPERIENCE

2009 – 2010	SOTASÒL-AT Serveis de geologia s.l.p. Geotechnical studies, geological cartography for the Geological Survey of Catalonia, Spain.
2008 – 2009	Geological Survey from Catalonia, IGC Natural Hazards area. Avalanche cartography, nivometeorological studies.
January 2009	Assistant in field campaign for magnetotelluric study in the Spanish Pyrenees. University of Barcelona

RELATED COURSES

May 2016 "Avizo Training" software for post-processing of CT-Scans. By FEI VSG Company. (http://www.vsg3d.com/).

May 2015 "Shortcourse on XRD methods for study of clays & clay minerals" taught by Ray E. Ferrell Jr. (Louisiana State University Professor Emeritus).

May 2015 Theoretical-practical course on ICP-MS, ICTJA-CSIC, in Barcelona, Spain.

April 2014 "Messinian Salinity Crisis: Budgets, Balances, and Diagenesis", IACT-CSIC, Spain. Taught by: Prof. Emeritus Dr. Gert J. De Lange.

Sep. 2013 ECORD Summer School. MARUM, Bremen, Germany. "Deep-Sea Sediments: From Stratigraphy to Age Models"

AWARDS

2016: Outstanding Student Poster (OSPP) Award for poster presentation in the International Conference EGU, Viena, for: Obliquity paced contourite cyclicity in Antarctic sediments from the Wilkes Land (Site U1356) during Late Oligocene. Ariadna Salabarnada et al.

GRANTS

2013 (9-20 September): ECORD Scholarship to participate in the ECORD Summer School "Deep-Sea Sediments: From Stratigraphy to Age Models" (ECORD awardee).

2014 (August): PAIS travel funding to attend the ISAES XII in Goa (India).

2104 (October-December): Ministry of Science and Competitively awardee for a 3-month stay in the Antarctic Research Centre-Victoria Univ. of Wellington (NZ).

2015 (13-17 July 2015): Participation in the PAIS activities during the ISAES XII in Goa (India): PRAMSO and Downhill meeting.

2015 (July-October): Ministry of Science and Competitively awardee for a 3-month stay in JAMSTEC (Japan).

2016: PAIS travel funding to attend IODP "Antarctica's Cenozoic ice and climate history: New Science and new challenges of drilling in Antarctic waters" Workshop.

PUBLICATIONS

Salabarnada, A., Escutia, C., Nelson, C.H., Roehl, U., Jimenez-Espejo, F.J., Evangelinos, D., Ikehara, M., McKay, R., and Lopez-Quiros, A. (in preparation). Obliquity paced contourite cyclicity in Antarctic sediments from the Wilkes Land (Site U1356) during Late Oligocene. In prep. to be submitted in Climate of the Past.

Valero-Garcés, B.L., Oliva-Urcia, B., Moreno Caballud, A., Rico Herrero, M.T., Mata-Campo, P., Salazar-Rincón, A., Rieradevall, M., García-Ruiz, J.M., Chueca Cía, J., González-Sampériz, P., Pérez Sanz, A., **Salabarnada, A.**, Pardo, A., Sancho, C., Barreiro-Lostres, F., Bartolomé, M., Garcia-Prieto, E., Gil-Romera, G., López Merino, L., Sevilla-Callejo, M., Tarrats, P., (2014). Dinámica glacial, clima y vegetación en el Parque Nacional de Ordesa y Monte Perdido durante el Holoceno. Organismo Autónomo Parques Nacionales.

PUBLICATIONS AT SCIENTIFIC MEETINGS

Salabarnada, A., Escutia, C., Nelson, C.H., Roehl, U., Jiménez-Espejo, F., Evangelinos, D., Ikehara, M., McKay, R., López-Quirós, A. Late Oligocene contourite sedimentation in the Antarctic Wilkes Land margin: IODP Site U1356. IX Congreso Geologico de España, 2016.

Salabarnada, A., Escutia, C., Nelson, C.H., Roehl, U., Jimenez-Espejo, F.J., Evangelinos, D., Ikehara, M., McKay, R., and Lopez-Quiros, A. (2016). Obliquity paced contourite cyclicity in Antarctic sediments from the Wilkes Land (Site U1356) during Late Oligocene. Geophysical Research Abstracts Vol. 18, EGU2016-14854, 2016. EGU General Assembly 2016 (Vienna).

Evangelinos, D., Escutia, C., López-Quirós, A., **Salabarnada**, **A.**, Nelson, C.H. Sedimentological evidences of enhanced bottom-currents developed across the Tasman Gateway from the Late Eocene to Oligocene-Miocene Transition. XXXIV SCAR Meetings and Open Science Conference 2016.

Lobo, F.J., López-Quirós, A., García, M., Pérez, L.F., Hernández-Molina, F.J., Escutia, C., Evangelinos, D., **Salabarnada, A.**, Rodríguez-Fernández, J., Maldonado, A., Bohoyo, F. Morphology and recent sub- surface stratigraphy of Dove Basin, Scotia Sea: Physiographic constrains on bottom current deposition. 35th International Geological Congress 2016.

López-Quirós, A., Lobo, F.J., Escutia, C., Evangelinos, D., **Salabarnada, A.**, García, M., Rodríguez- Fernández, J., Maldonado, A., Bohoyo, F., Hernández-Molina, F.J., Pérez, L.F. Late Quaternary sedimentation patterns in Ona Basin, southern Scotia Sea, Antarctica: Preliminary results. XXXIV SCAR Meetings and Open Science Conference 2016.

Salabarnada, A., Escutia, C., Nelson, C.H., Damuth, J.E., and Jiménez-Espejo F.J. (2015). East Antarctic Ice Sheet Dynamics during the Oligocene-miocene Transition: Insights from IODP Site 1356 Drilling off the Wilkes Land Margin. XII International Symposium on Antarctic Earth Sciences (Goa, India). Abstracts Vol S15-477.

Escutia, C., Jiménez-Espejo F.J., **Salabarnada, A.**, Gutierrez-Pastor, J., Roehl, U., Dunbar, R. (2015). Early Holocene Deglaciation Record from the East Antarctic ADELIE Land Margin: IODP Site U1357. XII International Symposium on Antarctic Earth Sciences (Goa, India). Abstracts Vol S15-478.

Jiménez-Espejo F.J., Etourneau, J., Dunbar, R., Escutia, C., **Salabarnada, A.**, Yamane, M., Ohkouchi, N., Crosta, X., Yokohama, Y., Gutierrez-Pastor, J. (2015). The early middle Holocene of Adélie land (East Antarctic margin): a high resolution record from IODP site U1357. XII International Symposium on Antarctic Earth Sciences (Goa, India) Abstracts Vol S15-476.

Jimenez-Espejo, FJ., **Salabarnada, A.**, and Gutiérrez-Pastor, J. (2015). Record of the early Holocene deglaciation from the East Antarctic Adélie Land margin: IODP Site U1357 XIX INQUA Congress (Nagoya, Japan) Abstracts Vol T02852(02288), P14.

Salabarnada A., Escutia C., Nelson H., Damuth J., Jimenez-Espejo F.J. (2015). The Oligocene-Miocene transition at the East AntarcticWilkes Land margin: IODP Site 1356. European Geophysical Union (EGU) General Assembly 2015 (Vienna), Geophysical Research Abstracts, Vol. 17, EGU2015-15698-1, 2015

Escutia, C., Jimenez-Espejo, FJ., **Salabarnada, A.**, and Gutiérrez-Pastor, J. (2015). Record of the early Holocene deglaciation from the East Antarctic Adélie Land margin: IODP Site U1357. European Geophysical Union (EGU) General Assembly 2015 (Vienna), Geophysical Research Abstracts, Vol. 17, EGU2015-15692, 2015

Salabarnada, A., Escutia, C., Nelson H.C., Damuth, L., and Brinkhuis, H. (2014). Varying depositional environments across the Oligocene-Miocene boundary and their relevance for East Antarctic ice sheet history: IODP Site U1356,Wilkes Land margin. European Geophysical Union (EGU) 2014 (Vienna), Geophysical Research Abstracts, Vol. 16, EGU2014-13705, 2014.

OUTREACH

November 2015 Science week in Andalusia (Spain): “Antarctica and the oceanic basins around it”, IACT-CSIC.
October 2015 PIISA – Introduction of science and research to High-School students in Andalusia, Spain.

SOFTWARE

Kingdom, Avizo Fire (CT-Scans)
R for Astrochron, Analyseries
ArcGis, Microstation, CAD
Profex XRD processing software
Microsoft Office, Adobe Pack (Illustrator, Photoshop)

LANGUAGES

Spanish: Native
Catalan: Native
English: Very good oral, written and communication skills.
Italian: Good oral and communications skills.

Dr. Carlota Escutia
Instituto Andaluz de Ciencias de la
Tierra, CSIC-Univ. de Granada
Avda. de las Palmeras 4
1800 Armilla (Granada)
Spain
Phone: +34 690614300
15 Agust 2016

To whom it may concern,

I am writing to support Ariadna Salabarnada's application to be a shipboard scientist for Expedition 373 to the Wilkes Land margin..

Ariadna is one of the top PhD students that I have had the pleasure of working with. I am very impressed with her background knowledge, her understanding of key concepts, her ability in the laboratory and in working with large data sets and I am confident that she will be a successful scientist in the future. During her PhD Ariadna has acquired a strong background in sedimentological, physical properties and geochemical signatures of deep-water sediments in the Antarctic margin and Southern Ocean. She is now preparing the scientific manuscripts where she integrates these data sets to obtain paleoenvironmental records that can be linked with paleoclimate, ice sheet and paleoceanographic changes during the Oligocene and early Miocene.

Most of her work has been conducted in large multidisciplinary and international teams. Ariadna is hard worker and she can be relied upon to complete a job she has committed herself to. Regarding her work habits, she is organized and thorough with her work and pays attention to detail. She works well both, independently and in collaboration with other colleagues. She has and open-personality and excellent oral language and communication skills, which make her able to work and interact with a large number of persons from many countries, disciplines and levels of expertise. In addition, she has a kind demeanour and a good sense of humour that is very pleasant and efficient when working in large research teams and collaborations. All of these qualities are very relevant for conducting successful independent and teamwork during two-month length expeditions.

Ariadna is expected to finish her PhD in the fall of 2017. If she participates in Expedition 373, we can secure funding to provide her with a two-year postdoctoral fellowship at the Instituto Andaluz de Ciencias de la Tierra (IACT), one of the Institutes of the Spanish Research Council at the University of Granada. We can also guarantee funding for full support for post-cruise laboratory and analytical work on samples collected during the Expedition.

In summary, I highly support Ariadna's application and I truly hope she will be able to participate in Expedition 373. I am confident she can be an asset to the science party and at the same time the opportunity of participating in an IODP Expedition would benefit her with a unique scientific experience that will allow her to grow scientifically and personally.

Dr. Carlota Escutia

APPLICATION TO PARTICIPATE IN AN IODP EXPEDITION

ESSAC Office ECORD Science Support & Advisory Committee
GEOMAR | Helmholtz Centre for Ocean Research Kiel
Wischhofstrasse 1-3
24148 Kiel, Germany
Hanno Kinkel (ESSAC Science Coordinator):
Tel: +49 431 600 2418
Fax:+49 431 600 2922
Web Page: http://www.essac.ecord.org Email: essac@geomar.de

Please type information

Apply to Sail Application Form

Expedition Number 373: Antarctic Paleoclimate and Ice History

1. PERSONAL INFORMATION

Family name: Sanz Enguita

First name: Daniel

Current Position: Master student

Institution: Universidad de Granada

Address: C/San Antón, 33 (Zaragoza; Aragón)

City, Postcode, Country: Zaragoza, 50016, Aragón, Spain

Tel. work: 682458370
Tel. home: 976572776
Fax:
Email: dani-daniel_sanz@hotmail.com

Country of citizenship: Spain

Place of birth/date of birth: 11/10/1991

Gender: Male

Education (highest degree, including year PhD was received / is expected): Graduated in Biology in the year 2015 with a 8.29, in the "Universidad Autónoma de Madrid". Currently, in the academic year 2015/2016, I am pursuing a master's degree in "Conservation, Management and Restoration of the Biodiversity" at the University of Granada. I expect to recive my tittle the 27/09/2016.

Are you currently a student? YES/NO Expected Graduation Date: 27/09/2016

2. EXPEDITION INFORMATION

Summary of proposed participation, including area of scientific interest, current research and participation plan (maximum 250 characters with space – more detail should be included in the Letter of Interest):

I am really interested in paleopalynology science applied to ecology and conservation. Actually, that is the area I have been working for the last year. And I will love to get involved in your project for learning new skills.

Prior involvement with DSDP/ODP/IODP and nature of involvement (expedition number, shipboard/shore-based participation, co-chief, etc):

I have never been involved in any project with DSDP/ODP/IODP. And I have never been in an onboard expecition.

Post-cruise science support to achieve the proposed scientific objectives 1) future funding scheme and 2) support from host institution (e.g. staff, facilities)

Once finished the cruise, I can help on the chemical processing of shamples and in the palynologycal analysis. I could also help in other tasksf if it is required as developing ecological models on vegetation evolution.

Three scientific and/or personal references

Francisca Alba Sanchez

Juan Esteban Malo Arrazola

Gerardo Sanz Saiz

3. SCIENTIFIC EXPERTISE

For Scientist Jobs Descriptions visit: http://iodp.tamu.edu/participants/scientist_jobs.html

Please indicate your area(s) of expertise (maximum 3)

Discipline	Mark with X	Speciality
microbiologist		
organic and inorganic geochemist/biogeochemist		
physical properties specialist		
sedimentologist		
structural geologist		
paleontologist		
paleomagnetist		
petrologist		
hydrogeologist		
Other	X	Paleopalynology, Ecology and Conservation

4. ADDITIONAL DOCUMENTS

Please, provide the following documents:

- Letter of interest, including details about area of scientific interest, current research, expedition participation plan and post-cruise research
- CV and Publication list
- Letter of recommendation (for PhD students)
- See also: http://www.essac.ecord.org/flyer/Guidelines_for_Applying_to_sail.pdf

Please, send your application form as *a MS Word document* and the additional documents in *PDF format* (preferably as one file) by email to Jan Behrmann and Hanno Kinkel at the ESSAC office: essac@geomar.de.

In addition to the ESSAC application, all applicants ***must inform their national office*** (if applicable) ***and national delegate*** and send a copy of the application documents. ECORD does not provide funds for participation; the national offices or national delegates can provide information regarding travel support, post-cruise funding opportunities, etc.

See http://www.essac.ecord.org/index.php?mod=about&page=ESSAC for a list of the national contact persons.

To Whom It May Concern

My name is **Daniel Sanz Enguita**, I am graduated in biology by the "Universidad Autónoma de Madrid". In the current year I am completing my thesis in the master of Conservation, Management and Restoration of Biodiversity in the Department of Botany (University of Granada) under the supervision of the professor Francisca Alba Sanchez. My thesis is about paleopalynology issues in North Africa (Morocco). I aim to elucidate the Holocene history of the vegetation communities in the Western Mediterranean (Atlas Mountains in Morocco). To achieve that goal, the analysis of available fossil pollen can give us important information about how climate changes and anthropogenic disturbances and other factors may have influenced in the vegetation communities evolution.

My master thesis has given me experience in reading and identification on pollen and non-pollen Palynomorphs. I will love to continue my formation on Paleopalynology by collaborating with your proyect on Antarctic Paleoclimate and Ice History from George V Land and Adélie Land Shelf sediments in the framework of the International Ocean Discovery Program (IODP).

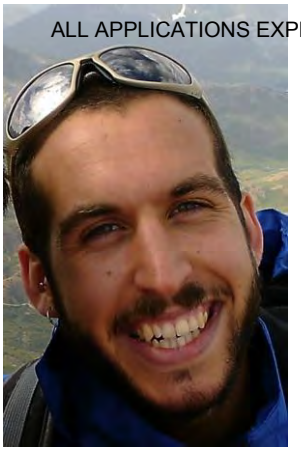
I consider myself enthusiastic, keen on learning, always with positive attitude, collaborative, very active and hard working. I am friendly and a good team worker.

My priority and intentions after finishing my thesis was to try to get as most experience as possible not only with biological Sciences and paleopalynology, but also meet people with the same concerns as me; explore myself trying, at the same time, working on Conservation. It is very difficult to find institutions that are taking volunteers and are really working at the highest level it. For all these reasons I am extremely interested in your project and why this is of such relevance to me.

Finally, I want say that even I have never been in an onboard expedition, I will love learning about it with you, working hard, getting involved in the project and doing my best if you finally give me the opportunity to enroll myself in your vessel.

Thank you very much in advance.

Very pleased to meet you and looking forward to hearing from you.



Daniel SANZ

ID: 73020858K

Calle San Antón, 33

50016 ZARAGOZA

SPAIN

Phone: **682 458 370** Email: **dani-daniel_sanz@hotmail.com**

Date of birth: 11/10/1991 Nationality: Spanish

EDUCATION

Degree in Biology. **Universidad Autónoma de Madrid (UAM)**

Average score: 8.29 (out of 10)

The first two years I studied at the UAM (Madrid).

For the third year I enjoyed a scholarship from the SICUE/SENECA program to study that year in Basque Country University (Euskal Herriko Universitatea, Leioa campus, Bilbao).

The first semester of the fourth year (final year) I studied at the University of Chile (Santiago de Chile, Chile) with a scholarship from the program CEAL (Center for Latin American Studies).

I spent two weeks in the "Torres del Paine National Park" in Chile collecting data for my Final year project on "Behaviour about grouping and surveillance of groups of guanacos in "Torres del Paine Park".

My final year project was done under the supervision of professor Juan MALO from the Department of Ecology of the UAM (Universidad Autónoma de Madrid).

Score of the final year project: 9.5 (out of 10).

I also did academic internships in the "Instituto de Oceanografía" in Palma de Mallorca (Balearic Islands, Spain).

During that stay I collaborated with the research group of coastal ecology led by the researcher Salud DEUDERO, inside her project on "Ecology and conservation of Pinna Nobilis".

Master Degree. University of Granada

Currently, in the academic year 2015/2016, I am pursuing a master's degree in "Conservation, Management and Restoration of the Biodiversity" at the University of Granada. Right now I am finishing my master's thesis to defend next September.

The master's thesis is on "Paleobotany and paleoclimatic reconstruction and anthropic impact in Atlas from fossil pollen collected in the peat blog Tigalgamine" and is being done under the supervision of professor Francisca ALBA SÁNCHEZ, from the Department of Botany at the University of Granada.

OTHER ACADEMIC ACTIVITIES

Related to Biology

Simultaneously with my master's thesis I am doing master academic internships in the "Instituto Pirenaico de Ecología - IPE-CSIC" in Jaca (Spain) collaborating in the project named RESECOM. This is an European LIFE project developed by the IPE. Its goal is to establish a monitoring network of plants and habitats of European interest (EICs and ICHs, respectively), in the NATURA 2000 network in Aragón (Spain).

During my stay in Basque Country University I did two extra courses

1.- Marine Biology and Oceanography (20 hours).

2.- Management of projects on Marine Conservation

In Chile I made several field works related to zoology and Botany typical of coastal and mountain regions.

In the University of Granada I have taken an extra course on Biosphere Reserves, organized by the UNESCO.

Others

I have collaborated in the organization of two mathematical congresses. I was responsible of the attention to participants. The official language of both conferences was English.

The congresses are:

A.- The Pyrenees international workshop and summer school on Statistics, Probability and Operations Research, SPO 2009, held in Jaca from 15 to 18 September 2009.

B.- The Pyrenees international workshop and summer school on Statistics, Probability and Operations Research, SPO 2011, held in Jaca from 13 to 16 September 2011.

SCHOLARSHIPS

1.- Academic year 2012/2013: SICUE/SENECA scholarship, funded by the Spanish Ministry of Education, to study an academic year of Biology Degree in Basque Country University.

2.- July 2013 - January 2014: CEAL scholarship, funded by the Santander bank, to study one semester of Biology Degree in the University of Chile.

LANGUAGES

English: Fluent **(Speaking, Writing and Reading).** First Certificate of English of Cambridge Universitiy.(Level B2).

French: Basic **(Speaking, Reading**)

Aragonés Language: Intermediate (Speaking). Advanced (Reading, Listening).

COMPUTING

Intermediate user of Microsoft Office

Software R (statistical software), basic user.

WORK EXPERIENCE

I have worked in summer time, several years, in the company “Enguita S.L”; located in Zaragoza.

During my student years I teach private classes, from high school to university level, in Spain and in Chile, in order to get financial support for my courses.

In June 2015, I worked for the University of Zaragoza as amanuensis for disabled students in the university entrance exams.

INTERESTS AND ACTIVITIES

Course on “Identification of traces and fingerprints of mammals in the Pyrenees” (Canfranc, Aragón) taught by “Muscari Rastros (Muscari traces)”.

Advanced Open Water Diver certificate. This certificate was one of the requirements for doing my intership in the "Instituto de Oceanografía" in Palma de Mallorca (Balearic Islands, Spain).

I do sports regularly, specially mountain sports as climbing, mountaineering, trekking and trail running. In my experience as a mountaineer I have done different climbings over 6000 meters above sea level in Andes (during my stay in Chile). I also did some trekking to Patagonia alone and, I was a member of an expedition to climb the “Ojos del Salado” (6893 m.) in Atacama, north of Chile.

I have also done trekking in Bulgaria, Norway and Argentina, but the mountain range I know the best are the Pyrenees, where I do a lot of climbing and I walked the way GR-11, a way from West to East along the whole Pyrenees range.

I love nature, the mountains, its landscapes, plants and animals and I often escape to nature whenever I can.

Note.- The merits can be justified, if necessary.

Universidad de Granada
DEPARTAMENTO DE BOTANICA
Facultad de Ciencias

Prof. Dr. Francisca Alba Sánchez
Department of Botany, University of Granada

To Whom It May Concern

Daniel Sanz Enguita is working under my supervision as Master Student in the Department of Botany (University of Granada) for one year. Daniel Sanz Enguita's Thesis is about paleopalinology issues in North Africa (Morocco). He aims to elucidate the Holocene history (*ca.* 11 Ka) of forest populations in the Western Mediterranean (Atlas Mountains in Morocco) focusing on *Cedrus atlantica* (Endl.) Manetti ex Carrière populations. The Atlas cedar populations have undergone a dramatic decline during the Late Holocene in Africa. The available pollen sequence could to draw significant conclusions about Atlas cedar populations decline during the Late Holocene in Africa. So to understand the factors involved in this decline, an approach on climate change and anthropogenic disturbances is being studied by Daniel Sanz Enguita.

He has experience in Pollen and Non-Pollen Palynomorphs identification and he assisted in taking morphological measurements. In addition, he is at ease working with large climate datasets, and he has been involved in data intensive projects which required good understanding of specific statistical techniques and software.

I would like to state that he did a superb job. Since the beginning, he showed very strong analytical skills as well as very good theoretical thinking. In addition, he is hard working and has strong collaborative skills. He is comfortable sticking to the established frame when he is working alone or in a team. In sum, it was a pleasure having him under my supervision and collaborate with him.

Given this very positive experience with Daniel Sanz Enguita, I am highly pleased to recommend him as a palynologist researcher on the project on Antarctic Paleoclimate and Ice History from George V Land and Adélie Land Shelf sediments in the framework of the International Ocean Discovery Program (IODP).

If you have any questions, please, do not hesitate to contact me.
Yours sincerely,

UNIVERSIDAD DE GRANADA FACULTAD DE CIENCIAS - DPTO. DE BOTANICA

Prof. Dr. Francisca Alba Sánchez

APPLICATION TO PARTICIPATE IN AN IODP EXPEDITION

ESSAC Office ECORD Science Support & Advisory Committee
GEOMAR | Helmholtz Centre for Ocean Research Kiel
Wischhofstrasse 1-3
24148 Kiel, Germany
Hanno Kinkel (ESSAC Science Coordinator):
Tel: +49 431 600 2418
Fax:+49 431 600 2922
Web Page: http://www.essac.ecord.org Email: essac@geomar.de

Please type information

Apply to Sail Application Form

Expedition Number 373: Antarctic Paleoclimate and Ice History

1. PERSONAL INFORMATION

Family name: Sinnesael

First name: Matthias

Current Position: PhD-student

Institution: Vrije Universiteit Brussel

Address: Pleinlaan 2

City, Postcode, Country: Brussels, 1050, Belgium

Tel. work: 003226291479
Tel. home: 0032471654578
Fax: //
Email: masinnes@vub.ac.be

Country of citizenship: Belgium

Place of birth/date of birth: Jette, 25/08/1991

Gender: Male

Education (highest degree, including year PhD was received / is expected):

Master (2014) – PhD expected in 2019.

Are you currently a student? YES Expected Graduation Date: PhD expected in 2019.

2. EXPEDITION INFORMATION

Summary of proposed participation, including area of scientific interest, current research and participation plan (maximum 250 characters with space – more detail should be included in the Letter of Interest):

Cyclostratigraphy and astronomical climate forcing. My main, but certainly not exclusive, interest goes to the use of various proxies (e.g. physical properties) to construct and interpret age models, stratigraphy and climate change.

Prior involvement with DSDP/ODP/IODP and nature of involvement (expedition number, shipboard/shore-based participation, co-chief, etc):

None. (only summer schools: USSP, Urbino, 2013; Petrophysics Summer School, Leicester, 2016)

Post-cruise science support to achieve the proposed scientific objectives 1) future funding scheme and 2) support from host institution (e.g. staff, facilities)

1) FWO PhD funding (monthly salary + 4000 euro bench fee a year) till October 2019. 2) Access to the lab-facilities of the Vrije Universiteit Brussel: mass spectrometry (e.g. d13C & d18O on carbonates or DIC or d15N & d13C on organic material) (e.g. Nu Perspective IRMS), portable (Bruker Tracer IV Hand Held) and micro XRF (Bruker M4 Tornado) d15N & d13C organic material, ICP-MS (HR-ICP-MS ELEMENT2, Thermo Finnigan). In collaboration we have access to the spectrometry labs of the Université Libre de Bruxelles and Universiteit Gent.

Three scientific and/or personal references:

Prof. dr. Philippe Claeys, Vrije Universiteit Brussel, Belgium (phclaeys@vub.ac.be)

Prof. dr. Stephen Meyers, University of Wisconsin-Madison, USA (smeyers@geology.wisc.edu)

Dr. David De Vleeschouwer, MARUM, Germany (ddevleeschouwer@marum.de)

3. SCIENTIFIC EXPERTISE

For Scientist Jobs Descriptions visit: http://iodp.tamu.edu/participants/scientist_jobs.html

Please indicate your area(s) of expertise (maximum 3)

Discipline	Mark with X	Speciality
microbiologist		
organic and inorganic geochemist/biogeochemist	3) X	$\delta^{13}C$ & $\delta^{18}O$
physical properties specialist	2) X	XRF, MS
sedimentologist		
structural geologist		
paleontologist		
paleomagnetist		
petrologist		
hydrogeologist		
Other	1) Time-series analysis	CYCLOSTRATIGRAPHY

4. ADDITIONAL DOCUMENTS

Please, provide the following documents:

- Letter of interest, including details about area of scientific interest, current research, expedition participation plan and post-cruise research
- CV and Publication list
- Letter of recommendation (for PhD students)
- See also: http://www.essac.ecord.org/flyer/Guidelines_for_Applying_to_sail.pdf

Please, send your application form as *a MS Word document* and the additional documents in *PDF format* (preferably as one file) by email to Jan Behrmann and Hanno Kinkel at the ESSAC office: essac@geomar.de.

In addition to the ESSAC application, all applicants ***must inform their national office*** (if applicable) ***and national delegate*** and send a copy of the application documents. ECORD does not provide funds for participation; the national offices or national delegates can provide information regarding travel support, post-cruise funding opportunities, etc.

See http://www.essac.ecord.org/index.php?mod=about&page=ESSAC for a list of the national contact persons.

Essac Office
Science Support and Advisory Commitee of ECORD
GEOMAR, Helmholtz Centre for Ocean
Ostufer Wischhofstrasse 1-3
24148 Kiel, Germany

Brussels, 30/08/2016

Matthias Sinnesael: Apply to sail, Expedition 373: Antarctic Cenozoic Paleoenvironment.

To Whom It May Concern,

The thread running throughout my budding scientific career as an earth scientist is cyclicity. I have worked on different archives and with various proxies, each time with a special focus on astronomical climate forcing and its fingerprints. It started with undergraduate research work on Late Devonian orbital cycles looking at magnetic susceptibility and stable isotopes ($\delta^{13}C$ & $\delta^{18}O$) records from South-Belgian carbonate platform deposits (Vrije Universiteit Brussel, Belgium, 2012). Subsequently, for my masters we studied cyclo- and event stratigraphy in the Cretaceous-Paleogene pelagic carbonate successions of the Umbria-March basin, Italy (Sinnesael et al., 2016, GSA Special Paper). Essential proxies were again magnetic susceptibility and stable isotopes ($\delta^{13}C$ & $\delta^{18}O$). The research on these sections is currently being elaborated on using portable and lab-based XRF equipment. An Erasmus semester at the Stockholm University, Sweden, introduced me to basic concepts of (Quaternary) micro-paleontology and palynology. Currently I am pursuing a PhD at the Vrije Universiteit Brussel, Belgium, focusing on astronomical climate forcing and cyclostratigraphy in the Late Ordovician. Therefore we work on several sections (both outcrops and cores) with different proxies including magnetic susceptibility, XRF and logging data. This PhD-position is funded till October 2019, including a monthly salary and a bench fee of 4000 euro a year. The laboratory facilities of our department of Analytical and Environmental Geochemistry, directed by my supervisor prof. dr. Philippe Claeys, are fully accessible for potential processing samples related to this project. These facilities include several aspects of spectrometry (IRMS & ICP-MS) and XRF (pXRF and micro-XRF) laboratories. There is a close collaboration too with the spectrometry groups of the Universiteit Gent (Belgium) and Université Libre de Bruxelles. There is are no funding opportunities via ESSAC Belgium, but the Research Foundation Flanders (FWO) could be an additional source of funding for travelling and other expenses.

The Urbino Summer School in Paleoclimatology (Italy, 2013) was the first time I was overwhelmed and becoming fully aware of the revolutionary impact ocean sediment drilling had and has on our understanding of the planet Earth system. This experience really triggered my interest to follow IODP missions online and on conferences as for example AGU or EGU.

More recently I also attended with great pleasure the first ECORD Petrophysics Summer School in Leicester. Besides providing an adequate training in petrophysics and down-hole logging, did the summer school revive the desire to be part, and contribute to, of such a great public science initiative as the IODP-program. The Expedition 373: Antarctic Cenozoic Paleoenvironment caught my special attention for several reasons. First and foremost are all main paleoclimate objectives (potentially) linked to astronomical climate forcing, which form the basis of my primary research interest. In addition to various other essential stratigraphical tools, cyclostratigraphy has the potential to construct high-resolution and high-precision temporal frameworks. Furthermore does orbital forcing play an important role in another major objective of this mission: understanding initiation and evolution of the (Antarctic) glacial period. The courses of glaciologist prof. dr. Philippe Huybrechts (Vrije Universiteit Brussel) introduced, and got me interested, in glacial dynamics and the Milankovitch theory. This aspect is equally crucial for my current research focusing on the Late Ordovician, Hirnantian, intense glaciations. For the Paleozoic glaciations more and more evidence is appearing that those followed "Cenozoic-like scenarios" (e.g. Ghienne et al., 2014, Nature Communications). The possibility of studying both Paleozoic and Cenozoic archives, both with their different characteristics, but with similar environmental changes is for me an extra point of interest. Next to the role of orbital forcing in the icehouses, its importance has also been demonstrated under greenhouse conditions with for example the pacing of the Eocene hyperthermal events (e.g. Lourens et al., 2005, Nature).

Looking at my past and current research I believe that I could serve the Expedition 373 best by applying for physical properties. This is based on my experience with working with magnetic susceptibility and XRF. Together with a colleague, we are about to submit a paper concerning XRF methodology named "Trace element analyses of carbonates using portable and micro-X-ray Fluorescence on Carbonates: Performance and optimization of measurement parameters". Alternatively I could contribute in downhole logging or stratigraphic work. Developing age models is essential for all stratigraphic work. During the summer of 2014 I participated in the "Isoastro Geochronology Workshop: The integration and intercalibration of radioisotopic and astrochronologic time scales". My most recent paper ("Astronomical component estimation (ACE v.1) by time-variant sinusoidal modeling, Sinnesael et al., 2016, Geoscientific Model Developments") also focusses on the use of astronomical forcing and the construction of age models. In this work our new model is applied on a benthic oxygen isotope record from ODP Site 846. A good example of a study where similar model analysis would be interesting is the paper on orbital forcing of ice dynamics resulting from this expeditions 'precursor', IODP Expedition 318: "Orbital forcing of the East Antarctic ice sheet during the Pliocene and Early Pleistocene, Patterson et al., 2014, Nature Geoscience". This study convincingly illustrates the importance of astronomical climate forcing. My main, but certainly not exclusive, interest goes to learning about and contributing to the use of different proxies (e.g. physical properties) to construct and interpret age models, stratigraphy and (paleo-) climate change. What astronomical parameters can be identified in different proxies? What are their respective phase relationships with respect to changes in insolation and can we quantify time lags. Are these observations and relationships consistent over the studied records or do we detect changes, for instance related to glacial dynamics?

Astronomy and cycles are of course only the tip of the iceberg in this story of integrated research. I hope I will be able to attend this Expedition 373 and to be immersed into this joined and international quest to advance and share our knowledge of the Antarctic climate.

Sincerely,

Matthias Sinnesael

CV Matthias Sinnesael (August 2016)

Personal Information:

Matthias Sinnesael
25th August 1991
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Education:

2014-present: PhD student (FWO) at Vrije Universiteit Brussel, Belgium.

June 26-July 01 2016: ECORD Summer School in Petrophysics, Leicester, Belgium.

March 2-6 2015: Flügelcourse on Carbonates, Erlangen University, Germany.

August 18-23 2014: Workshop IsoAstro, Madison University, Wisconsin, USA.

2012-2014: Master in Geography (Terrestrial ecosystems and global change) at the Katholieke Universiteit Leuven and the Vrije Universiteit Brussel, Belgium. Great Distinction.

2013: Erasmus semester at Stockholm University

July 2013: Urbino Summer School in Paleoclimatology, University of Urbino, Italy.

2009-2012: Bachelor in Physical Geography at the Vrije Universiteit Brussel, Belgium (Great Distinction, in dutch).

2003-2009: Latin-Mathematics (8h) at the Koninklijk Atheneum Etterbeek, Belgium.

Professional Experience:

April 2016: Field work Bretange, France.

April 2016: Research visit at Osservatorio Geologico di Coldigioco, Italy.

July 2015: Field work Anticosti Island, Canada.

June 2015: Research stay Wisconsin Geological Survey Core Depository, USA.

March 2014: Master thesis research stay at Osservatorio Geologico di Coldigioco, Italy.

April 2013: Master thesis fieldwork at Osservatorio Geologico di Coldigioco, Italy.

August 2011: Summer job at the Royal Meteorological Institute (ozone measurements), Belgium.

Publications:

Papers

Sinnesael M., De Vleeschouwer D., Coccioni R., Claeys P., Frontalini F., Jovane l., Savian J., and Montanari A. (2016) High-resolution multiproxy cyclostratigraphic analysis of environmental and climatic

events across the K-Pg boundary in the classic pelagic succession of Gubbio (Italy). Geological Society of America, Special Paper 524, p. 115-137, doi:10/1130.2016.2524(09).

Sinnesael M., Zivanovic M., De Vleeschouwer D., Claeys P., and Schoukens J. (2016) Astronomical component estimation (ACE v.1) by time-variant sinusoidal modeling. Geoscientific Model Development doi:10.5194/gmd-2016-104. (*accepted*)

Montanari A., Farley K., Claeys P., De Vleeschouwer D., de Winter N., Vansteenberge S., **Sinnesael M.**, and Koeberl C. Stratigraphic record of the asteroidal Veritas breakup in the Tortonian Monte dei Corvi section (Ancona, Italy). The Geological Society of America Bulletin (*in review*).

De Winter N.*, **Sinnesael M.***, Makarona C., Vansteenberge S. and Claeys P. Trace element analyses of carbonates using portable and micro-X-ray Fluorescence on Carbonates: Performance and optimization of measurement parameters. (*in prep.*) **These authors contributed equally to this study.*

Meeting Abstracts

Sinnesael M., Desrochers A., McLaughlin P., Mauviel A., Vandenbroucke T.R.A., and Claeys P. (2016): Orbital climate forcing in the Late Ordovician, Anticosti Island, Canada. IGCP591 Closing Meeting, July 6-9, 2016. Ghent University, Ghent, Belgium.

Sinnesael M., Zivanovic M., De Vleeschouwer D., Claeys P., and Schoukens J. (2016): Orbital component extraction by time-variant sinusoidal modeling. EGU General Assemblee, Tuesday, 19 April 2016, 17:30 - 19:00, Poster in Session SSP2.4 The Need for Integrated Stratigraphy - Recent advances in cyclostratigraphy, astrochronology, radio-isotopic dating and age modelling (including Jean Baptiste Lamarck Medal Lecture).

de Winter N., **Sinnesael M.**, Makarova C. and Claeys P. (2016): Performance of portable XRF and micro-XRF on carbonates. EGU General Assemblee, Tuesday, 19 April 2016, 17:30 - 19:00, Poster in Session SSP2.3 Carbonate systems: records and responses to global change (sponsored by IAS and SEPM).

Sinnesael M., Montanari A., & Claeys P. (2016): New XRF data for the upper Maastrichtian in Gubbio, Bottaccionne section, central Italy. 5th International Geologica Belgica Meeting, Mons, January 26-29, 2016, Belgium.

Sinnesael M. & Claeys P. (2015): Understanding rapid climate variations during the Late Ordovician (~450 million years ago) in terms of astronomical forcing. Vrije Universiteit Brussel, 6th Belgian Geography 2015 - Reseachers Day, November 13nd 2015, Brussels, Belgium.

Sinnesael M., Mauviel A., Desrochers A., Vandenbroucke T.R.A., Claeys P. (2015): Understanding rapid climate variations during the Late Ordovician in terms of astronomical forcing. 5th Annual Meeting of the IGCP591, July 8-11, 2015. INRS Centre Eau Terre Environnement (INRS-ETE), Quebec City, Canada.

Sinnesael M. & Claeys P. (2015): Understanding rapid climate variations during the Late Ordovician (~450 million years ago) in terms of astronomical forcing. Vrije Universiteit Brussel, Doctoral School of Natural Sciences and (Bioscience) Engineering (NSE), PhD Day, May 22nd 2015, Brussels, Belgium.

Sinnesael M., Montanari A., De Vleeschouwer D., Coccioni R., and Claeys P. (2014): Astronomical influence on climate change through the latest Maastrichtian: A high-resolution multiproxy cyclostratigraphic study at Gubbio (Italy). AGU Fall Meeting, 15-20 December, 2014, Monday, 15 December 2014, 1:40 PM -6:00 PM, PP13A: Ocean Climate Dynamics: Carbon Cycle and Oxygenation Perturbations III Posters, Moscone West; Poster Hall, San Francisco, USA.

Sinnesael M., De Vleeschouwer D., Montanari A., Coccioni R., and Claeys P. (2014): The astronomical influence on climate change across the K-Pg boudary: A cyclostratigraphic study of the late Maastrichtian –

early Paleocene at the Umbria – Marche Basin (Apennine mountains, Central Italy). Workshop IsoAstro, 18-23 August, Madison University, Wisconsin, USA.

Sinnesael M., De Vleeschouwer D., Montanari A., Coccioni R., and Claeys P. (2013): The astronomical influence on climate change across the KT boundary: A cyclostratigraphic study of the late Maastrichtian - early Paleocene in the Umbria-Marche Basin (Apennine mountains, central Italy): Poster in the workshop "Transient Changes in Past Climates on the 10th Cioppino Conference", Urbino Summer School in Paleoclimatology, July 21, 2013, Urbino, Italy.

De Vleeschouwer D., Da Silva A.C., Boulvain F., Crucifix M., Belza J., **Sinneseal M.** & Claeys P. (2012): Stable isotopes (δ13C, δ18O, 87Sr/86Sr) versus magnetic susceptibility at the Mid-Devonian La Couvinoise section: Does the astronomical interpretation stand? Poster in Session 3. Magnetic susceptibility: a high resolution stratigraphic tool during greenhouse periods. 4th International Geologica Belgica Meeting 2012. 11-14 September 2012, Brussels.

University Service:

Vrije Universiteit Brussel
University Council Member (2015 – present)

Faculty of Science and Bio-Engineering Sciences, Vrije Universiteit Brussel
Faculty Council Member (2010-2011, 2015-present)
Faculty Education Board Member (2011-2013)

Department of Earth Sciences, Faculty of Science and Bio-Engineering Sciences, Vrije Universiteit Brussel
Department Council Member (2009-2014)
Inter-University-Education-Commission Member (2012-2014)

Honors:

2014-2016 Travel & Research Grants (≤1000 €) from IAS, IGCP591, ECORD, VUB NSE Doctoral School
2015 FWO PhD-grant
2009 Laureate of the Flemisch Geo-Olympiade

Vrije Universiteit Brussel

Department of Chemistry
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Professor Philippe Claeys phclaeys@vub.ac.be

Monday 29 August 2016

Letter of recommendation for Matthias Sinnesael

Dear colleagues,

Matthias is an outstanding and highly motivated PhD student in my group working on cyclostratigraphy and astrochronology in the Late Ordovician and Late Cretaceous sequences. In 2015, he was awarded a highly competitive PhD fellowship from the Research Foundation Flanders (FWO); every year less than 5 such fellowships are given in the field of Earth Sciences. His PhD project focuses on cyclostratigraphy and rapid climate changes during the Ordovician-Silurian transition though the determination of astronomical parameters based on selected archives and proxies. The Late Ordovician – Silurian transition is marked by strong climate shift(s) between greenhouse and icehouse conditions and the first major mass extinction of organisms.

I know Matthias since he took my Geology class as part of the 1st year bachelor student. Later, he also followed Sedimentology & Stratigraphy class, and wrote a high-quality bachelor thesis under my supervision on time-series analyses in the Devonian. This first experience stimulated Matthias to continue working for his master thesis on astronomical parameters to document paleoclimates and improve stratigraphic resolution in the Late Cretaceous of the Apennines in Italy. The results were recently published by the *Geological Society of America*, as part of a Special Paper volume devoted to the Late Cretaceous. Matthias attended several Summer Schools such a the "*Urbino Summer of School of Paleoclimatology*", he also took the "*Flügel Course on carbonate microfacies*" at the University of Erlangen.

Matthias is a smart and enthusiastic student, capable to work hard and who is not afraid of being confronted with new working environments. He is a team player, who interacts well with others, and defends his arguments while at the same time remaining critical of their value. I was particularly impressed recently, by how he argued convincingly with a senior co-author about his reasons for anchoring his derived Maastrichtian cyclostratigraphy to a specific Late Cretaceous absolute age. Over the last year, Matthias has considerably matured as a scientist, and is fully integrated in small but tied group of PhD students and Post-docs all working, in a stimulating atmosphere, on paleoclimate reconstructions at the VUB. He is an avid reader, who possesses a deep knowledge of the literature in cyclostratigraphy and (paleo)climates. In the lab, he has acquired the skills and techniques that render him fully autonomous for stable isotope analyses, XRF and data processing. He learned fieldwork and sampling methods during his master thesis with Prof. A. Montanari in Italy. I consider him well prepared for an IODP expedition, he is interested in greenhouse-icehouse transition, possesses a deep knowledge of climate processes, his skills in the application of Fourier transform methods to extract astronomical signals from different proxies (see his recent publication in *Geoscientific Model Development*). In terms of instrumentation Matthias is familiar with portable and micro-XRF, magnetic susceptibility and mass spectrometry.

In conclusion, I most strongly recommend Matthias as a participant for IODP373. Thanks for considering my advice on this matter.

Sincerely,

PHILIPPE CLAEYS
Director AMGC