

***Workshop Report to ESSAC, October 14, 2008 by Maria Ask, Achim Kopf and Angelo Camerlenghi***

**Workshop on Marine Research Drilling (MAGELLAN WORKSHOP SERIES)**

**Ocean Drilling for Seismic Hazard in European Geosystems**

CONVENERS:

Maria Ask, Luleå University of Technology, Luleå, Sweden (Maria.Ask@ltu.se)

Achim Kopf, RCOM, Bremen University, Germany (akopf@uni-bremen.de)

SCIENTIFIC COMMITTEE:

Maria-Ana Baptista, CGUL, Lisbon University, Portugal

Pierre Henry, Aix-en-Provence, France

Shaoli Yang, NGI, Norway

Andreas Rietbrock, Liverpool University, UK



Photo of participants of the ESF and VR supported workshop “*Ocean Drilling for Seismic Hazard in European Geosystems*”, held August 18-20, 2008, Luleå University of Technology, Luleå. Sweden.

Main sponsor of the workshop



Life, Earth and Environmental Sciences (LESC)

Co-sponsor of the workshop



## SUMMARY

Submarine seismic geohazards are some of the most devastating natural events in terms of lives lost and economic impact. Earthquakes pose a big threat to society and infrastructure because of their episodicity, while tsunamis are known for their potential of striking coastlines world-wide. However, the governing processes and recurrence intervals of geohazards are still poorly understood. The European scientific community has a strong focus on geohazards along European and nearby continental margins. For example, the Mediterranean is highly vulnerable with respect to submarine geohazards because of its densely-populated coastline that is the World's leading holiday destination with up to 30% of the global tourism, and its seafloor that is criss-crossed by hydrocarbon pipelines and telecommunication cables. Examples include, but are not limited to, earthquakes along the active tectonic margins of the Mediterranean and Sea of Marmara, landslides on active and passive margins, and tsunamites and seismites in the sedimentary record that suggest a long history of similar events.

The Magellan Workshop sponsored by the European Science Foundation and the Swedish research council entitled "*Ocean drilling for seismic hazard in European geosystems*" was recently held in Luleå, Sweden, 18-20 August, 2008. The workshop objectives were to: (1) address scientific questions and goals on a European scale; (2) combine European expertise in research related to seismogenesis, and (3) coordinate and strengthen Europe's role within large-scale international projects (IODP, ICDP, etc.). A total of 19 dedicated scientists participated at the workshop, from nine European countries and USA (see section "*workshop participants*"). The expertise of the group spans over a wide scientific spectrum within geosciences. In addition, several of the participants have been (or are) leaders of scientific drilling expeditions, lead proponents of IODP and ICDP proposals, members of the IODP science advisory structure, and/or leaders of ongoing EU projects.

About half of the meeting was devoted to presentations about the Integrated Ocean Drilling Program (IODP) and International Continental Scientific Drilling Program (ICDP) structure, active and future drilling proposals related to the topic of the workshop, technology (stress measurements, observatories, ship status, new site survey sources), funding, as well as various aspects of seismic hazard (landslide triggers and slope response, earthquake modeling, and tsunamis). The second half of the meeting was devoted to discussions in the entire group as well as in break-out working groups. The first group focused on existing and new drilling- and engineering development proposals. Much of the discussion regarded proposals for which Mission Specific Platforms (MSPs) could be used. The second group concentrated on discussing proactive activities to increase the recognition of ocean drilling for geohazards within individual member countries, EU and IODP.

The deliverables of the workshop, stated in the application, are already fulfilled: (1) a summary article to the ECORD newsletter (October 15, 2008); and (2) a new proposal "*Ancillary Project Letter: Nankai Trough Submarine LandSLIDE history (NanTroSLIDE)*" to IODP (October 1, 2008) by Michael Strasser (lead proponent) and Angelo Camerlenghi among other co-proponents.

Additional post-workshop activities include submission of an abstract to the AGU fall meeting in San Francisco in December 2008 by the group of workshop participants [Ask *et al.*, 2008], and two presentations on geohazards and scientific drilling, given as a follow-up of the workshop, at the 2nd EURO-MEDITERRANEAN Symposium by Angelo Camerlenghi, and for Statoil executives by Maarten Venneste. We are planning talks on geohazards at the ESONET General Assembly in October 2008 by Maria Ask, EGU General Assembly in April 2009, and IODP INVEST meeting in Bremen in September 2009. Further progress regarding proposals include (1) several existing IODP proposals are planned to be resubmitted on April 1, 2009 (685-full [Pierre Henry *et al.*] and one complex drilling proposal, CDP, 715-full [Angelo Camerlenghi *et al.*]) and October 1, 2009 (710-pre2 [Lisa McNeill *et al.*] that will be adapted for MSP drilling, and 704-full2 by [Chris Goldfinger *et al.*]); (2) one engineering drilling proposal will be submitted to IODP on March 15, 2009, for development of in situ stress measurements by Francois Cornet, Pierre Henry, and Achim Kopf; and (3) one pre-proposal on riser or riser-less drilling is planned to be submitted during year 2009, by Jean-Yves Collot. Another result of the workshop is the contention that ocean scientific drilling of geohazards needs more attention in the EU framework programs. The two workshop organizers try to respond to this shortcoming by leading a proposal for a coordination action on subseafloor sampling (formerly Deep-Sea Frontier Initiative; Achim Kopf) and for submission of a Marie Curie RTN (initial training network; Maria Ask) proposal in early 2009. The workshop also recognizes the need for industry cooperations, and a small group lead by Maarten Venneste, was formed.

# FINAL PROGRAM OF THE WORKSHOP

DAY/TIME	TITLE	SPEAKER
<b><u>Monday, 18 August</u></b>		
9.00 – 10.00	Opening and welcome Introduction to workshop goals and ocean drilling	Maria ASK (SE), Achim KOPF (DE)
10.00 – 10.30	Coffee (Centrumrestaurangen Amica)	
10.30 – 11.15	Report from IODP International Workshop on Geohazards	Julia MORGAN (USA)
11.15 – 12.00	Scientific Drilling Programs and their proposals IODP and ICDP Drilling Proposals and Statistics IODP Engineering development proposals	Achim KOPF (DE) Maria ASK (SE)
12.00 – 13.00	Lunch (Wibergsgården)	
13.00 – 14.00	Funding EU – Project funding, Collaborations and links to ongoing European activities	Angelo CAMERLENGHI (SP)
14.00 – 15.00	Technology EMSO: European Multidisciplinary Seafloor Observation In Situ Stress Measurements and Regional Stress Field Determination	Miguel MIRANDA (PT) François CORNET (FR)
15.00 – 15.30	Coffee (Centrumrestaurangen Amica)	
15.30 – 17.00	IODP and other European drilling proposals on seismic hazard Ligurian Sea Cold seeps associated with the North Anatolian Fault zone in the Sea of Marmara Gulf of Corinth, Greece: Geohazards and Drilling Potential New results and challenges for the Corinth Rift Laboratory	Pierre HENRY (FR) Pierre HENRY (FR) Lisa MCNEILL (UK) François CORNET (FR)
17.00 – 17.15	Coffee (Hoppe-salen)	
17.15 – 18.00	<i>Continue</i> IODP and other European drilling proposals on seismic hazard Eastern Mediterranean Sea: Drilling proposal 555-full3 International Continental Scientific Drilling Program and proposals on seismic hazard	Achim KOPF (DE) Achim KOPF (DE)
18.00 – 18.15	Status of drillships and tools	Maria ASK (SE)

18.15 – 18.45	NantroSEIZE: Nankai Trough Seismogenic Zone Experiment	Achim KOPF (DE)
18.45 – 19.00	Wrap-up of day 1	Achim KOPF (DE)
<b><u>Tuesday, 19 August</u></b>		
8.30 – 10.00	Seismic hazard: Geotechnical stuff, modelling and mitigation	
	Particle Dynamics Models of Faulting and Structural Evolution: Applications to Geohazards	Julia MORGAN (USA)
	Earthquake modeling	
	Earthquake response of submarine slopes	Amir KAYNIA (NO)
	Tsunami hazards in the North East Atlantic (NEA) region	Maria Ana BAPTISTA (PT)
10.00 – 10.30	Coffee (Centrumrestaurangen Amica)	
10.30 – 11.00	Seismic hazard: Geotechnical stuff, modelling and mitigation	
	Submarine landslides, earthquakes, and the Mediterranean case	Angelo CAMERLENGHI (SP)
	Seabed Mapping with surface and shear Waves for Geohazards	Maarten VANNESTE (NO)
11.00 – 12.00	Open session on future IODP drilling projects on seismic hazard/related geohazards	
	EQ-triggered subaquatic landslides, paleoseismology and seismic hazard in the Swiss Alps	Michi STRASSER (DE)
	Paleoseismology of South-Central Chile	Marc De Batist (BE)
	MSP proposal Nice airport	Nabil SULTAN (FR)
12.00 – 13.00	Lunch (Wibergsgården)	
13.00 – 14.00	<i>Continue</i> Open session on future IODP drilling projects on seismic hazard/related geohazards	
	The Ecuador Margin: a potential IODP target (linked to the Seize initiative)	Jean-Yves COLLOT (FR)
	Sumatra Sunda subduction zone - Future drilling and related activities	Lisa MCNEILL (UK)
	Cenozoic mud volcano activity along the Indus Fan – offshore Pakistan	Gerome (CALVES)
14.00 – 15.00	Plenary discussion of European role in IODP and potential drilling targets Set up of the two working groups on Proposals (existing and new ones) and Proactive working group on increasing the recognition of geohazards	
15.00 – 15.30	Coffee (Centrumrestaurangen Amica)	
15.30 – 17.00	Discussion in the two working groups on the development of active and planned drilling proposals (and engineering development proposals)	

17.00 – 17.15	Coffee (Hoppe-salen)	
17.15 – 17.45	Continuation of discussion in working groups on the development of active and planned drilling proposals (and engineering development proposals)	
17.45 – 18.30	Report from working groups on the development of active and planned drilling proposals (and engineering development proposals), and plenary discussion	
18.30 – 18.45	Wrap-up of day 2	Achim KOPF (DE)
18.45	Bus departs to Gammelstad (Location D in MAP 3)	
19.00 –	Tour in Church Village of Gammelstad, UNESCO World Heritage	
19.30 –	Social dinner at Margaretas Vårdshus, Gammelstad	
22.30 –	Bus departs to hotel	
<b><u>Wednesday 20 August</u></b>		
9.00 – 10.00	Working group reports, plenary discussion	
10.00 – 10.30	Coffee (Centrumrestaurangen Amica)	
10.30 – 12.30	Discussion and writing of pre-proposal drafts in working groups or sub-groups	
12.30 – 13.30	Lunch (Wibergsgården)	
13.30 – 14.45	Discussion of upcoming SEIZE Portland workshop (Nov. 2008) and IODP Bremen meeting (Sept. 2009) and future activities/milestones Geohazards Scope Final plenary discussion.	
14.45 – 15.00	Wrap-up of day 3 and workshop	Achim KOPF (DE), Maria Ask (SE)
15.00	End of workshop Coffee (Centrumrestaurangen Amica)	

## WORKSHOP PARTICIPANTS

Achim Kopf, RCOM, Bremen University, Bremen, Germany (akopf@uni-bremen.de)

Amir M Kaynia, Norwegian Geotechnical Institute, Oslo, Norway (Amir.M.Kaynia@ngi.no)

Angelo Camerlenghi, Dept. Estratigrafia, University of Barcelona, Barcelona, Spain  
(acamerlenghi@ub.edu)

Francois Cornet, Institute de Physique du Globe Strasbourg, Strasbourg, France,  
(Francois.Cornet@eost.u-strasbg.fr)

Gerome Calves, School of Geosciences, University of Aberdeen, Aberdeen, UK (g.calves@abdn.ac.uk)

J. Miguel Miranda, Centro de Geofísica da Universidade de Lisboa, Lisboa, Portugal  
(jmmiranda@fc.ul.pt)

Jean Yves Collot, GeoAzur, Villefranche, France (collot@geoazur.obs-vlfr.fr)

Julia Morgan, Department of Earth Sciences, Rice University, Houston, TX, USA (morganj@rice.edu)

Kari Strand, Thule Institute/Department of Geology, University of Oulu, Oulu, Finland  
(Kari.Strand@oulu.fi)

Lisa McNeill, School of Ocean & Earth Sciences, National Oceanography Centre, University of  
Southampton, Southampton, UK (lcmn@noc.soton.ac.uk) lcmn@noc.soton.ac.uk]

Maarten Vanneste, International Centre for Geohazards - Norwegian Geotechnical Institute, Oslo,  
Norway (Maarten.Vanneste@ngi.no)

Marc De Batist, Department of Geology and Soil Science, University of Gent, Gent, Belgium  
(marc.debatist@ugent.be)

Maria-Ana Baptista, CGUL, Lisbon University, Lisbon, Portugal mabaptista@dec.isel.ipl.pt

Maria Ask, Luleå University of Technology, Luleå, Sweden (Maria.Ask@ltu.se)

Michi Strasser MARUM, Center for Marine Environmental Sciences / University of Bremen, Bremen,  
Germany mstrasser@marum.de]

Nabil Sultan, IFREMER – GM/LES, Plouzané, France (nabil.sultan@ifremer.fr)

Pierre Henry, CEREGE – Géodynamique, Aix-en-Provence, France (henry@cerge.fr)

Sergio Llana-Funez, Department of Earth and Ocean Sciences, University of Liverpool, Liverpool, UK  
(S.Llanafunez@liverpool.ac.uk)

Sylvia Stegmann, Bremen University, BREMEN, Germany ([stegman@uni-bremen.de](mailto:stegman@uni-bremen.de))