

Reports of MagellanPlus Workshops

:: North Atlantic Drilling for Climate Dynamics: Filling the Oligo-Mio-Pliocene gap in the North Atlantic - 15-17 September 2014, Heidelberg (Germany)

Convenors: O. Friedrich, R.D. Norris, P.A. Wilson and B.N. Opdyke

This workshop brought together specialists from various fields to develop a drilling proposal to fill the "Oligo-Miocene Gap" that exists in our understanding of the function of Earth's systems. We propose to establish the first continuous high-deposition record of the Oligo-Miocene through new IODP drilling in the North Atlantic to allow the development of a continuous Neogene cyclostratigraphy and to enhance our knowledge of Oligo-Miocene ocean-ice-climate dynamics. The workshop was held in Heidelberg from 15-17 September 2014 funded by ESF (EARTHTIME EU), NSF, and the ECORD MagellanPlus Workshop Series Programme. 24 participants from six countries (Australia, France, Germany, The Netherlands, United Kingdom, and United States) attended the workshop, including several early-career researchers. We discussed certain aspects of Cenozoic paleoceanography and paleoclimate and how the gaps in the Oligo-Miocene could be filled using scientific drilling.

The first day was devoted to overview presentations of major scientific themes and questions to set the ground for the following group discussion that took place on the same day. During the discussion, the potential to propose a new IODP expedition to Newfoundland was evaluated. Furthermore, potential links to the existing IODP pre-proposal 851 (Cenozoic Evolution of the North Atlantic - the Western Atlantic Latitudinal Transect) were discussed.

The workshop showed that there is a major, persistent gap in recovery of high-deposition records of Oligocene-Miocene age in the North Atlantic. This gap persists despite the importance of this area and time interval for understanding the evolution of the cryosphere, Northern Hemisphere ecosystem structure, and the history of ocean productivity and chemical



The participants of the workshop in alphabetic order: Markus Badger (University of Bristol), Ian Bailey (University of Exeter), Helen Beddow-Twigg (University of Utrecht), Steven Bohaty (NOCS), Clara Bolton (CEREGE), André Bornemann (BGR), Anja Crocker (NOCS), Oliver Friedrich (University of Heidelberg), Jens Grützner (AWI), Timothy Herbert (Brown University), Ann Holbourn (University of Kiel), Pincelli Hull (Yale University), Diederick Liebrand (NOCS), Peter Lippert (University of Utah), Lucas Lourens (University of Utrecht), Mitch Lyle (Oregon State University), Richard Norris (Scripps Institution of Oceanography), Bradley Opdyke (ANU), Jörg Pross (University of Heidelberg), Yair Rosenthal (Rutgers State University), Phil Sexton (The Open University), Michael Stärz (AWI), Thomas Westerhold (MARUM), Paul Wilson (NOCS).

balances. Our new pre-proposal therefore focuses on Oligocene-Miocene objectives, particularly the Middle Miocene Climatic Optimum (15-17 Ma). This drilling strategy acknowledges the importance of focusing on extreme climate dynamics (such as the abrupt warming and carbon-cycle dynamics of the middle Miocene).

The following two days of the workshop were dedicated to the development of scientific questions and text writing as well as figure drafting for the planned pre-proposal. During this phase of the workshop, analysis of existing seismic data for the SE Newfoundland Ridge (available from previous IODP Expedition 342) was used to identify 15 primary and alternate drill sites that could cover the entire Oligocene-Pliocene sequence with high

deposition rate sections. These prospective drill sites also span an ~1,800 m depth transect, including abyssal sites at up to 5 km water depth. All but three of these sites would be drilled entirely with APC to depths of ~250 m.

Immediately following the workshop, on 18-19 September 2014, the convenors continued to work on the proposal structure, site forms, cover sheets and editing text in order to submit an IODP pre-proposal. As a direct outcome of the workshop, IODP pre-proposal 874-pre was submitted on 1 October 2014 to drill Neogene Newfoundland drift sediments.

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