Geophysical Research Abstracts
Vol. 17, EGU2015-7441, 2015
EGU General Assembly 2015

Revised Late Oligocene to Early Miocene magnetic stratigraphy recorded by drift sediments at Sites U1405 and U1406, IODP Expedition 342 (Newfoundland, NW Atlantic)

Tim van Peer (1), Chuang Xuan (1), Paul Wilson (1), Diederik Liebrand (1), and Peter Lippert (2)

(1) National Oceanography Centre Southampton, University of Southampton, Southampton, United Kingdom (t.e.vanpeer@soton.ac.uk), (2) Department of Geology and Geophysics, University of Utah, Salt Lake City, United States of America

The nannofossil oozes drilled at IODP Expedition 342 (Paleogene Newfoundland Sediment Drifts) Sites U1405 and U1406 provide an exceptional sedimentary archive of the Late Oligocene to Early Miocene due to high sedimentation rates (2-6 cm/kyr at U1406 and up to 20 cm/kyr at U1405) and their ideal location below the Deep Western Boundary Current. These drift sediment sequences provide a unique opportunity to study the Oligocene-Miocene Transition (OMT) and Mi1-event (a transient 1‰ positive oxygen isotope excursion) at an unprecedented resolution from a Northern Hemisphere perspective. The exact timing of the OMT and its rate of change require a reliable and high-resolution magnetic stratigraphic age control, as Chron C6Cn with its three subchrons roughly spans the Mi1 event and the reversal C6Cn.2n/C6Cn.2r defines the Oligocene-Miocene boundary.
Natural Remanent Magnetisation (NRM) was measured on 140 m of u-channel samples at U1405 and 190 m at U1406. The u-channel sample based magnetostratigraphy is in good agreement with that based on the shipboard data and reveal distinctive well-defined patterns of normal and reversed polarities, which can be correlated to the Geomagnetic Polarity Time Scale between C6Bn.2n and C9n (ca. 22.2 to 27 Ma) at U1406 and between C6Bn.2n and C6Cr (ca. 22.2 to 23.5 Ma) at U1405. Furthermore, putative cryptochrons in Chron C6Br and C7Ar, previously reported at Site U1334 (IODP Expedition 320), are observed in the u-channel magnetic stratigraphy for Sites U1405 and U1406.
Anhysteretic Remanent Magnetisation (ARM) intensity variations are combined with X-Ray Fluorescence (XRF) generated elemental measurements to refine the shipboard splice of both U1405 and U1406. Latest Oligocene to earliest Miocene splice refinements are complicated by the presence of large-scale stratigraphic gaps (up to 25 m at U1405) unrelated to drilling disturbances. The depth and estimated age of these stratigraphic gaps vary from hole to hole, and do not appear to impact the completeness of the spliced magnetostratigraphic record. Rock and mineral magnetic studies of selected samples are currently ongoing to characterise the magnetic mineralogy of the sediments and how it changes across the stratigraphic gaps and intervals with contrasting lithological and/or palaeomagnetic properties. These data will help us understand the origin of the palaeomagnetic signal and test its reliability, while providing insights on the nature of the observed stratigraphic gaps and how they relate to global climate dynamics of the OMT and the Deep Western Boundary Current.