Geophysical Research Abstracts,
Vol. 11, EGU2009-10694-1, 2009
EGU General Assembly 2009

Orbitally paced sedimentary record across the Eocene/Oligocene boundary glaciation in the Western Antarctic Margin

S. Galeotti (1), R. DeConto (2), L. Lanci (1), S. Sandroni (3), and F. Talarico (3)

(1) University of Urbino, Istituto di Scienze della Terra, Urbino, Italy (simone.galeotti@uniurb.it), (2) Department of Geosciences, University of Massachusetts, Amherst, MA 01003 USA, (3) Dipartimento di Scienze della Terra Università di Siena, Siena Italy

The vertical distribution of lithofacies from glacimarine sequences recovered during the Cape Roberts Project displays cyclicity,which is interpreted as the sedimentary response to fluctuations in relative sea level. These changes are associated with climatic cycles and/or cycles of glacial advance and retreat (e.g. CRP Science Team, 2001; Naish et al., 2001), thus providing a unique opportunity to directly compare ice volume changes against the available high-resolution temperature and ice-volume proxy records derived from deep-sea records.

Here we present data from the CRP3 core that are based on available bio- and magnetostratigraphic data (CRP Science Team, 2001; Florindo et al., 2005), spanning the upper part of Chron C13r to the uppermost Chron C12r. The analysis of luminance data, which reflects fluctuations between marly and sandy sedimentary end members and clast abundance, reveals an orbital control over the deposition of the CRP-3 sedimentary succession. Frequency filtering of individual components in the orbital bands allows us to obtain the first cyclostratigraphy-based calibration of the Antarctic marginal record to well-resolved oceanic sequences across the major step of glaciation occurring during the Eocene-Oligocene transition.

Based on the astrochronological ages obtained from this study and changes in the power spectra of individual orbital periodicities, we recognize a lower interval (34-33 Ma) characterised by high sedimentation rates where precession cycles still dominate. Starting from the lower part of Chron C12R, sedimentation rates markedly decrease and the record becomes dominated by obliquity and long eccentricity cycles. These results are in agreement with modelling of orbitally forced changes in Oligocene Antarctic ice volume and sedimentary fluxes proposed by Pollard and DeConto (2003). The development of fully glacimarine facies containing diamictites shows that the East Antarctic Ice Sheet reached the margin at ca. 32.6 Ma, more than a million years after the peak of the Oi-1 isotope shift.