

Late Oligocene contourite sedimentation in the Antarctic Wilkes Land margin: IODP Site U1356

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Abstract

Our study on sediment cores from IODP Expedition 318 Site U1356 off the east Antarctic Wilkes Land margin spans approximately 1 Myr (between 26.2 and 25.2 Ma) during the Late Oligocene. Sediment cores were studied using detailed facies analyses, X-Ray computed tomography (CT-scans), Scanning electron microscope (SEM) images, and X-Ray Fluorescence (XRF) core-scanner data at 2cm resolution. Sedimentary facies during the Late Oligocene are characterized by an alternation between scarcely bioturbated green claystones with variable silty laminations and highly bioturbated pale-brown silty-claystones with carbonate. In agreement, Magnetic Susceptibility (MS) and XRF analyses show a cyclical variation. Low magnetic susceptibility and high Barium (Ba) content characterize the laminated facies. In contrast, highly bioturbated facies show high MS and high Zr/Ti ratios. SEM images reveal that both facies record evidences of current reworking features. We interpret that sedimentation during the Late Oligocene in the Wilkes Land margin is dominated by bottom-currents of varying intensities during glacial and interglacial cycles. Spectral analyses of the XRF Ba and Zr/Ti ratio reveal that the cyclicity between the laminated and the bioturbated facies is paced by obliquity. In addition, the lack of Ice Rafted Debris (IRD) within the studied interval points to a reduced continental East Antarctic Ice Sheet (EAIS).

Keywords: Late Oligocene, Antarctic ice sheet, contourites, obliquity, IODP.