

# **Authigenic Gypsum in Southern Ocean Sediments**

Gabriel Mangum Lehmann<sup>1,2</sup>, Victoria Peck<sup>3</sup>, Sidney Hemming<sup>4,1</sup>, Mike Kaplan<sup>4</sup>

*<sup>1</sup>Columbia University, <sup>2</sup>Trinity College Dublin, <sup>3</sup>British Antarctic Survey, <sup>4</sup>Lamont-Doherty Earth Observatory*

Antarctic Intermediate Water (AAIW) plays an important role in global climate systems as a southern component of the Atlantic Meridional Overturning Circulation (AMOC), and its zone of formation is strongly influenced by the position of Southern Ocean fronts. However, there is not yet a consensus on the extent to which AAIW occupies the Atlantic during glacial periods, nor its role in changes in the AMOC or relationship to glaciation in the Southern Hemisphere. Here, we present high-resolution counts on sediments surrounding three deglaciations from U1534, located near the source of AAIW south of the Falklands/Malvinas. The counts reveal that, at all three Terminations examined (II, III, and V), the core contains a brief interval of authigenic gypsum separating glacial and interglacial sediments. Gypsum formation is attributed to the northern migration of fronts and the AAIW formation during glacial periods, causing redox conditions to change at the seafloor during deglaciation. Our results show that fronts consistently migrated towards the equator during glacials between MIS 6 - MIS 12, which supports AAIW shoaling and extending further north with strengthening of the AMOC.