



Late Quaternary glacial history and sedimentary processes on the continental shelf and slope off Pine Island Bay, West Antarctica: preliminary results from RRS *James Clark Ross* Cruise JR141

R.D. Larter, C.-D. Hillenbrand, T.J. Deen, R.A. Livermore and J.A. Smith
British Antarctic Survey, High Cross, Madingley Road, Cambridge CB3 0ET, UK
(r.larter@bas.ac.uk / Phone: +44 1223 221573)

Pine Island Bay lies offshore from Pine Island and Thwaites glaciers, which exhibit the most rapid ice thinning and grounding-line retreat in present-day Antarctica. It has been suggested that this area may be the most likely site for the initiation of collapse of the two million km² West Antarctic Ice Sheet (WAIS), which is a marine ice sheet with large parts of its ice being grounded below sea level. Some workers consider that minor eustatic sea-level rise and/or intense basal melting beneath ice shelves may accelerate grounding-line retreat, ice stream flow and ice sheet thinning, ultimately leading to complete collapse of the WAIS, which would result in a global sea-level rise of 5 to 6 m.

At present it is not clear to what extent current retreat of WAIS grounding lines is part of ongoing recession that started during the last deglaciation and to what extent it reflects more recent climatic changes. Even though more than 40% of the area of the WAIS drains towards the Pacific Ocean, very little is known about the history of the major glacial systems on this flank of the ice sheet. Pine Island Bay is the only part of the SE-Pacific margin of the WAIS for which a chronology of ice retreat has been proposed, but this chronology is based on only a small number of radiocarbon dates with large uncertainties.

Preliminary results will be presented from RRS *James Clark Ross* Cruise JR141 (January–February 2006), on which the glacial history and sedimentary processes on the continental shelf and upper slope were investigated using multibeam bathymetry

data, high-resolution seismic reflection profiles, sub-bottom acoustic profiles, vibro-cores and box cores. These new data will be used to determine the maximum extent of the WAIS during the last glacial period, the extent of fast ice flow in the former ice sheet, controls on the location and onset position of fast ice flow, the retreat history of the WAIS, how changes on the shelf affected sedimentary processes on the slope, and whether the last ice sheet and its deglaciation are representative of events during earlier Quaternary glacial cycles. The marine record of late Quaternary deglaciations in Pine Island Bay, coupled with ice sheet models, will provide important clues to understanding the stability and climate sensitivity of the WAIS.