Geophysical Research Abstracts,
Vol. 10, EGU2008-A-01367, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-01367
EGU General Assembly 2008
© Author(s) 2008

# First exposure ages from the Amundsen Sea Embayment, West Antarctica: the Late Quaternary context for recent thinning of Pine Island, Smith and Pope Glaciers.

**J. S. Johnson** (1), M. J. Bentley (2,1), K. Gohl (3)

(1) British Antarctic Survey, Cambridge, UK, (2) Durham University, Durham, UK, (3) Alfred-Wegener-Institut für Polar- und Meeresforschung, Bremerhaven, Germany
(Contact Email: jsj@bas.ac.uk)

Dramatic changes (acceleration, thinning and grounding line retreat of major ice streams) in the Amundsen Sea sector of the West Antarctic Ice Sheet (WAIS) have been observed during the last two decades, but the millennial-scale context for these changes is not yet known. Here we present the first surface exposure ages (obtained by measuring the abundance of cosmogenic $^{10}$Be in erratic boulders collected during a short field campaign in Marie Byrd Land and the Hudson Mountains in 2006) recording thinning of Pine Island, Smith and Pope Glaciers, which all drain into the Amundsen Sea. From these we infer progressive thinning of Pine Island Glacier at an average rate of $3.8 \pm 0.3$ cm yr$^{-1}$ for at least the last 4.7 k.y., and of Smith and Pope Glaciers at $2.3 \pm 0.2$ cm yr$^{-1}$ over the last 14.5 k.y.. These rates are more than an order of magnitude lower than the $\sim$1.6 m yr$^{-1}$ recorded by satellite altimetry for Pine Island Glacier in the period 1992–1996. Similarly low long-term rates (2.5–9 cm yr$^{-1}$ since 10 ka) have been reported further west in the Ford Ranges, Marie Byrd Land, but in that area, the same rates of thinning continue to the present-day. Our data provide the first evidence that puts into context recent rapid rates of thinning of the WAIS in the Amundsen Sea Embayment. The data also provide much-needed constraints for ice sheet models, which are the primary tool for predicting the future behaviour of the WAIS and its likely contribution to sea-level rise.