Geophysical Research Abstracts,
Vol. 10, EGU2008-A-07225, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-07225
EGU General Assembly 2008

Circulation and melting beneath George VI Ice Shelf, Antarctica

A. Jenkins (1) and S. Jacobs (2)

(1) British Antarctic Survey, Natural Environment Research Council, Cambridge, UK, (2) Lamont-Doherty Earth Observatory of Columbia University, New York, USA (ajen@bas.ac.uk / Fax: +44-1223-221226 / Phone: +44-1223-221493)

Oceanographic data are presented from the eastern Bellingshausen Sea, representing the first near-contemporaneous sampling of conditions at both the northern and southern ice fronts of George VI Ice Shelf. Circumpolar Deep Water (CDW) with a temperature in excess of 1ºC floods the entire continental shelf and forms the main inflow to the cavity beneath the ice shelf. We use measurements of salinity, potential temperature, and dissolved oxygen to identify meltwater-laden outflows. Assuming that the currents are in geostrophic balance, we calculate relative velocities along the ice front sections, then estimate the absolute velocity by inversion of the tracer conservation equations. The derived transports give an overall mean melt rate of 3–5 m yr^{-1} and a net south-to-north through flow beneath the ice shelf of 0.17–0.27 Sv. The mean melt rate exceeds that required for equilibrium, consistent with recent observations of ice shelf thinning and retreat. The south-to-north through flow carries a particularly strong signature of upwelled CDW, including low dissolved oxygen and high nutrient concentrations, north into Marguerite Bay.