Geophysical Research Abstracts
Vol. 15, EGU2013-11478, 2013
EGU General Assembly 2013

Direct Observations of the Antarctic Circumpolar Current transport on the northern flank of the Kerguelen Plateau

Gillian Damerell (1), Karen Heywood (1), and David Stevens (2)

(1) School of Environmental Sciences, University of East Anglia, Norwich, United Kingdom (g.damerell@uea.ac.uk), (2) School of Mathematics, University of East Anglia, Norwich, United Kingdom

The standing meander in the Antarctic Circumpolar Current found on the northern flank of the Kerguelen Plateau was investigated during the SOFine (Southern Ocean Finestructure) cruise in November-December 2008. An 18-year time series of surface geostrophic currents from satellite altimetry shows that the meander as observed during this survey is typical of the region. Hydrographic stations were occupied between 65-75°E, 43-48°S on the shelf (∼200 m depth) and slope into the deep ocean to the north of Kerguelen (∼4700 m), providing the most detailed survey of this region to date. Geostrophic shears are referenced to lowered acoustic Doppler current profiler velocities to give the first estimate of the total volume transport in this region, and the transport budget is closed around the survey box. The Subtropical Front, Subantarctic Front and a northern branch of the Polar Front together have an associated transport of 174 ± 22 Sv eastward. While 174 Sv is large compared with typical Drake Passage transports, it is reconciled with other estimates of the total transport with the additional 15 Sv of the Indonesian Throughflow. Baroclinic transport referenced to the deepest common level between station pairs is 119 Sv, consistent with other estimates of the baroclinic transport in this area. At this longitude the fronts of the Antarctic Circumpolar Current are exceptionally close together. We discuss the exchange of properties across the fronts.