Geophysical Research Abstracts,
Vol. 10, EGU2008-A-08724, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-08724
EGU General Assembly 2008

The Fawn Trough Current across the Kerguelen Plateau: a bottleneck for the Antarctic Circumpolar flow

F. Roquet (1), Y.-H. Park (1), G. Madec (2)

(1) LOCEAN-IPSL, MNHN, Paris, France, (2) LOCEAN-IPSL, CNRS, Université Pierre et Marie Curie, Paris, France (roquet@mnhn.fr)

Due to its great meridional extent and relatively shallow depths, the Kerguelen Plateau constitutes a major barrier to the eastward flowing Antarctic Circumpolar Current in the Indian sector of the Southern Ocean. While most of the Antarctic Circumpolar Current transport is deflected north of the Kerguelen Islands, the remainder ($\sim$50 x 10^6 m^3 s^{-1}) must pass south of the islands, most probably through the Fawn Trough (56˚S, 77˚E, 2650m) and Princess Elizabeth Trough (64˚S, 82˚E, 3650 m).

The analysis of finely-resolved hydrographic data collected by instrumented elephant seals together with satellite and *in situ* datasets revealed the presence of a strong topographically controlled northeastward current through the Fawn Trough, the so-called Fawn Trough Current. The Fawn Trough appears to act as a veritable bottleneck, channelling the quasi-totality of the cold Antarctic Surface Water found south of the Ice Limit (58˚S) and the Circumpolar Deep Water transiting the Enderby Basin toward the Australian-Antarctic Basin. The Kerguelen Plateau also allows the formation of concentrated meridional flows such as the Deep Western Boundary Current (DWBC) flowing northward along the eastern escarpment of the southern Kerguelen Plateau. The area just downstream of the Fawn Trough in the Australian-Antarctic Basin should be of great dynamic importance as waters of different origins collide and mix.

The analysis of an interannual simulation performed with the global eddy-permitting (1/4˚) ocean/sea-ice model NEMO confirmed the presence of the strong Fawn Trough Current. The DWBC is also detected, albeit much weaker than in observations. How-

ever, a major discrepancy of the model is the quasi-inexistence of waters originating from the Antarctic slope current of the Australian-Antarctic Basin into the DWBC, implying the inexistence of the Australian-Antarctic subpolar gyre, in opposition to recent observational studies. An improvement of the model especially in vertical mixing parameterization via internal tidal energy dissipation is actually in progress.