Characterization of the Intermediate Western Boundary Current along the Brazilian continental slope using subsurface lagrangian floats

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The SAMBA experiment of the « World Ocean Circulation experiment » (WOCE) program has produced the equivalent of 300 years of lagrangian trajectories within the Antarctic Intermediate Water (AAIW) at 800db in the South West Atlantic ocean. The Intermediate Western Boundary Current (IWBC) is characterized using these data in the latitudinal range from 28˚S (at the bifurcation of the South Atlantic Subtropical gyre return current) to the equator. Its relation to the continental slope bathymetry is analysed.

Lagrangian float velocities are assumed to belong to the IWBC according to criteria on the float lateral distance to the 800m isobath and the angle between the velocity and this isobath. This allows one to recognize two regions (28˚S - 21˚S and 15˚S - 5˚S) where the IWBC at 800db has a maximum width of 85km and flows at a mean distance of about 20km off the 800m isobath along a relatively straight bathymetry of the brazilian continental slope. In between, a contrasted third region of major bathymetric perturbations (cape and a zonal seamount chain) shows strong values of eddy kinetic energy and some eddies downstream of the bathymetry. Although the flow is perturbated in this latter area, a lagrangian analysis of the trajectories reveals a partial connexion of the IWBC between the two former regions. The main locations of exchanges between the IWBC and ocean interior are also determined. A few continuous trajectories from 23,5˚S at the north of the Santos bifurcation to cape San Roque at 5˚S reveal transit times around 1 year. The mean residence time of a float in the IWBC is around 20 days. After determining the characteristics of the IWBC, the latitudinal distributions of these characteristics are related to those of the main bathymetric parameters (continental slope value and rugosity, isobath divergence / convergence).