



Shear-induced diapycnal mixing by the geostrophic flow in the Bransfield Strait (Antarctica).

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On December 1999 and on January 2003, two interdisciplinary high resolution surveys (CIEMAR and BREDDIES respectively) were carried out in the Bransfield Strait. Observations from hydrographics sections crossing the Strait confirm the dual character of the Bransfield Front. This consists in a slope front along the South Shetland Island slope and a hydrographic front separating relatively warm and fresh water from cool and salty water. In the first survey, CIEMAR 1999, we found mesoscale structures between the slope front and the hydrographic front with zones characterized by low gradient Richardson number, Ri , high density tendencies and high diapycnal convergence/divergence. In the survey BREDDIES 2003, the mesoscale structures were less developed with Ri values higher than in the first survey. Then we focused our attention to the slope front where we found relative Ri values lower, being another possible zone with high diapycnal mixing. We conclude that there are zones in the mesoscale structures and slope front with relative high diapycnal mixing caused by the vertical shear of the along-stream geostrophic velocity. This diapycnal mixing is a low limit of his value due that our geostrophic approach ignores the contribution to mixing by internal waves or baroclinic tides. The high downward and upward diapycnal mass fluxes in these zones can play an important role in the distribution of nutrients and chlorophyll.