Geophysical Research Abstracts, Vol. 9, 05887, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-05887

The surface geostrophic flow field in the Drake Passage determined from satellite altimetry data

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In order to determine the surface geostrophic current from satellite altimeter data, an inverse method based on the free surface boundary condition in the momentum equations with quasi-geostrophic balance is developed. The model is applied to the Drake Passage with the sea surface height anomaly grid data merged TOPEX/Poseidon and ERS for the period from April 1995 to December 2000. The results reveal a large scale behavior of the Antarctic Circumpolar Current (ACC) and activities of eddies in the region. The maximum mean velocity reaches about 70 cm/sec in the subantarctic frontal region. It appears that most of marked features of the ACC, such as the change in the direction of the ACC after passing the Shakleton Fracture Zone and the meandering of the ACC, are highly correlated with the bottom topography and current strength. No clear seasonal pattern is discernable, except weakly strengthen the currents in the subantarctic front in austral winter.