



Interannual variability in the eddy activity in the Southern Ocean

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Near-surface “effective diffusivities” associated with geostrophic eddies in the Southern Ocean are estimated by numerically monitoring the lengthening of idealized tracer contours as they are strained by surface geostrophic flow observed by satellite altimetry. The resulting surface diffusivities show considerable spatial variability and are large (2000 m²/s) on the equatorward flank of the Antarctic Circumpolar Current and small (500 m²/s) at the jet axis. Regions of high and low effective diffusivity are shown to be collocated with regions of, respectively, weak and strong isentropic potential vorticity gradients. A multi-year calculation based on the TOPEX/Poseidon altimeter data is analysed to highlight interannual variations in the eddy diffusivity and hence possible interannual variability in the eddy-driven overturning circulation. The mechanisms for generating this interannual variability in eddy activity are examined, in particular the influence of the El Nino Southern Oscillation.