



## **Surface eddy diffusivity in the Southern ocean derived from tracer transport**

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Near-surface eddy diffusivities are presented for the Southern Ocean. Recent studies (Marshall et al 2006) have used the 'effective diffusivity' approach to calculate stream-wise average eddy diffusivities for the Southern Ocean from tracer fields advected by velocities derived from altimetry. The results to be presented here will instead focus on more local eddy diffusivities. On a basin-scale, the focus is on eddy diffusivity in the Pacific sector. On a more regional scale, the focus is on diffusivities associated for example with eddies which apparently reside in the same location for months.

Two possible extensions to the effective diffusivity calculations are described which provide local eddy diffusivities, one based on tracer calculations confined to small patches, and the other incorporating information from Lagrangian particle trajectory calculations. The results are considered firstly in the context of observations of the motion of drifters with the aims of validating the approach and of explaining some of the characteristics of the observations. Secondly, the results are considered in the context of physical processes, such as the influence of bottom topography, which may lead to enhanced values of eddy diffusivity. Thirdly, the results of a multi-year calculation in the Pacific region are presented to highlight interannual variability in the eddy diffusivities and to investigate the mechanisms generating this.