Lagrangian eddy diffusivities and convergence properties in the global ocean

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Surface drifters have been used extensively to estimate lateral eddy diffusivities in the mixed layer in many regions of the ocean, where the different studies differ in their approaches and methods. It is also still unclear whether the diffusivities calculated from Lagrangian statistics are applicable for parameterizing the effects of eddies as a downgradient diffusive process in ocean models.

We assess here spatial distributions and convergence properties of Lagrangian eddy diffusivities from a global eddying ocean model and compared to observations. The particular focus is on the question over what scales the eddy diffusion model may be appropriate in different dynamical regimes and how surface eddy diffusivities extend to depth. We discuss the results in the context of linear instability theory and mesoscale eddy parameterizations.