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Resolution-dependent partitioning of heat transport between transient and standing eddies: An idealized Southern Ocean context

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A developing area of research concerns Southern Ocean response to changes in forcing, and whether eddy parameterizations are capable of capturing the character of this response. Recently it has become known that this response is determined not by transient eddies alone, but also by stationary features that may be referred to as standing eddies (Ivchenko et. (1996)). These standing eddies occur where the flow is constrained in latitude by the underlying bathymetry.

Our idealized model contains one strong standing eddy. As in the realistic model of the Southern Ocean (Dufour et al. (2012)), we too find that much of the poleward heat transport is delivered by the standing eddy, when the model is strongly eddying. We apply our idealized model to investigate the resolution dependence of this partitioning of poleward transport between transient and standing eddies. The results have implications for the development and assessment of parameterizations of eddy transport, and on the question of the extent to which climate models can accurately represent the response to changing forcing over the Southern Ocean.

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- Ivchenko et al., J. Phys. Oceanography, doi: 10.1175/1520-0485(1996)026<0753:TDOTAC>2.0.CO;2, 1996.