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Rotating convection and flows with horizontal kinetic energy backscatter

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Numerical simulations of large scale geophysical flows typically require unphysically strong dissipation for numerical stability, and the coarse resolution requires subgrid parameterisation. A popular scheme toward restoring energetic balance is horizontal kinetic energy backscatter. We consider a continuum formulation where momentum equations are augmented by a backscatter operator, e.g. in rotating Boussinesq. Consistent with numerical observations, it turns out that the injected energy can accumulate in certain scales. We discuss the occurrence of this phenomenon in specific plane waves and related bifurcations in the presence of bottom drag.

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