Abstract Submitted
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Evolution of a turbulence cloud under rotation[1] AVISHEK RANJAN, P.A. DAVIDSON, Department of Engineering, University of Cambridge, UK — Localized regions of turbulence frequently occur in the geophysical environment and are governed by inhomogeneous dynamics. A direct numerical simulation study of such a region of turbulence (a "turbulence cloud") under external rotation is conducted at Rossby number of 0.1. The initial condition is generated using a spatial filter on a pre-run of fully developed homogeneous turbulence in a 512^3 periodic box. Lagrangian particle tracking is used to track turbulent diffusion. In the velocity isosurfaces, columnar flow structures are seen to emerge from the turbulence cloud and grow linearly with time. These are created by inertial waves sustained by the Coriolis force in the rotating reference frame and propagate on a faster time scale compared to turbulence. Helicity is used as a diagnostic to confirm that columnar structures are indeed inertial waves.[2] The observations conform with the evolution of a single Gaussian eddy under rotation for which analytical solution is available in literature.

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[2]Ranjan, A, Davidson, PA (2013) *Evolution of a turbulence cloud under rotation*, JFM (in preparation)

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