Stability of Baroclinic Vortices in Rotating Stratified Flows
MANI MAHDINIA, UC Berkeley, PEDRAM HASSANZADEH, Harvard University, PHILIP MARCUS, UC Berkeley — The stability of axisymmetric shielded vortices in rotating linearly stratified flows is examined using three-dimensional numerical simulations of the Boussinesq equations. Vortices are initially in cyclo-geostrophic/hydrostatic dissipationless equilibrium in accord with the constraint presented in Hassanzadeh et al. (2012 JFM) and Aubert et al. (2012 JFM). For a range of Rossby numbers, vortex aspect ratios, and Burger numbers relevant to the oceanic and atmospheric flows, both cyclones and anticyclones are studied, and the type and growth rate of instabilities are reported for the unstable cases. Significance of these results for the cyclone-anticyclone asymmetry observed in rotating stratified flows is discussed.

Mani Mahdinia
UC Berkeley

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