A vortex pair near a density gradient interface SURUPA SHAW,
NICK JENKINS, JOHN MCHUGH, University of New Hampshire — The dynamics of a vortex pair in a stratified atmosphere near a density gradient interface is
considered here using direct numerical simulations. A density-gradient interface has
continuous density but discontinuous gradient of density, and is a common model
of the tropopause. The vortex pair is released below the interface and allowed
to propagate vertically toward the interface. The anelastic approximation of the
Navier-Stokes equations are treated using a spectral method, and the initial vortex
has a Gaussian distribution of vorticity. The results show that strong vortices propagate through the interface without much change in dynamics. Weaker vortices will
dissipate energy when they reach the interface and although a remnant of the vortex
pair transits the interface, it does not achieve the same altitude that it would have
without the interface. Overall, the interface is not a barrier to vortex pairs, but
would be expected to change the distribution of energy in more complicated flows.

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