Abstract Submitted
for the DFD10 Meeting of
The American Physical Society

The role of non-QG dynamics in the formation and equilibration of eddies in the ocean and atmosphere J.R. TAYLOR, Massachusetts Institute of Technology, K.S. SMITH, New York University, R. FERRARI, Masschusetts Institute of Technology — The goal of this research is to examine the effect of unbalanced dynamics on the generation and evolution of eddies in the ocean and atmosphere. Numerical simulations of an eddy field generated through baroclinic instability of a jet in geostrophic balance on an f-lpane will be presented. Two numerical codes are used; one solves the Boussinesq nonhydrostatic Navier-Stokes equations, and the other solves the quasi-geostrophic (QG) equations. Consistent with previous literature, loss of balance arises spontaneously from the balanced initial condition in the Boussinesq model, but not in the QG model which filters out any inertia-gravity and high Rossby number motions. The novelty of our approach is that we can investigate the role of unbalanced motions on the evolution of the eddy field by comparing simulations run with the two models. Pairs of simulations of jets starting at progressively larger Rossby numbers show that non-QG dynamics become more important as the Rossby number is increased. Particular emphasis will be placed on the forward cascade of tracer variance, enstrophy, and energy from large to small scales.

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Date submitted: 02 Sep 2010 Electronic form version 1.4