

## The Dynamics of Balanced Motions at High Rossby Numbers

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Recent numerical simulations (Riley and deBruynKops, 2003; Lindborg, 2005, 2006) have given some insight into the dynamics of balanced motions when the effects of rotation are weak or nonexistent. In the simulation results, a strong horizontal energy cascade of horizontal kinetic energy and potential energy is observed, along with the development of intermittent, localized turbulent events. For strong enough stratification and high enough Reynolds numbers, an inertial subrange is observed to develop in the horizontal energy spectra, dependent on both the kinetic energy and potential energy dissipation rates.

These results have potential implications on both larger horizontal scale (about 100m to 10km) and smaller horizontal scale (about 1 meter to a few hundred meters) ocean energetics (Lindborg and Riley, 2007). In the larger-scale range, it is shown that the balanced motion dynamics are consistent with several sets of ocean data, suggesting, at least for some situations, an alternative explanation for the flow dynamics in this range. In the smaller-scale range, the numerical results again give a consistent interpretation of existing ocean (and some atmospheric) data, which indicate a  $k_H^{-5/3}$  inertial subrange in the horizontal spectra, but a  $k_V^{-3}$  subrange in the vertical spectra.

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