



## **The instability of baroclinic Rossby waves in large ocean basins**

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We consider the stability of long baroclinic Rossby waves in enclosed ocean basins. Previous theoretical work (LaCasce and Pedlosky, *J. Phys. Oceanog.*, 2004) suggests that such waves are baroclinically unstable and that this instability preferentially affects the slower-moving waves at mid- and high-latitudes (which break up prior to crossing the basin). However, this work was based on quasigeostrophic (QG) dynamics and thus is not strictly applicable to realistically-sized basins.

Here we extend that work to such basins. First we develop a dynamical expansion applicable to weak-amplitude basin waves. This predicts the generation of barotropic flows not found under QG which, however, does not affect the instability. The stability equations retain the full variation of the Coriolis parameter, but are nevertheless quasigeostrophic in a local sense. This then evidently supports the earlier assertions. We solve the stability equations numerically and will discuss the solutions. We will also compare them with simulations using a full primitive equation model.