Abstract View

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On Secondary Baroclinic Instability and the Meridional Scale of Motion in the Ocean

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ABSTRACT

The stability of the marginally stable baroclinic wave in a uniform zonal shear flow is studied. Although the single, marginally stable wave on a horizontally uniform baroclinic current has little or no cross-stream variation, the present paper shows that such a baroclinic wave is itself unstable to waves whose meridional scale is of the order of the Rossby deformation radius.

The implications of this result for oceanic mesoscale dynamics is discussed since the instability, which occurs in the form of a triad resonance, may provide an amplitude limiting mechanism ignored in single- wave stability analyses.