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# Formation of Meanders, Fronts, and Cutoff Thermal Pools in a Baroclinic Ocean Current

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### ABSTRACT

Using an analytical model similar to that previously applied by the authors to the atmosphere, calculations are made showing how second-order, nongeostrophic effects can modify a two-layer baroclinic wave system that grows exponentially from a small perturbation in a uniform zonal ocean current. It is shown that many of the asymmetric features characteristic of meandering ocean currents develop, including “fronts” and cutoff cyclonic cold pools to the south and anticyclonic warm pools to the north of the axis of the mean current. The implication is that all of these features can be viewed as being the simultaneous consequence of baroclinic instability (with attendant second-order finite-amplitude effects) of a broader, more uniform current that might tend to be forced externally by the wind stress and thermohaline processes.

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