Abstract View

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Finite-Amplitude Baroclinic Disturbances in Downstream Varying Currents

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ABSTRACT

The finite-amplitude dynamics of baroclinic disturbances in currents whose cross-stream structure varies in the *downstream* direction is investigated.

It is first shown under what circumstances downstream variations of the current properties influence the local stability of the current. For flows near the neutral curve only the potential vorticity in *one* of the fluid layers is significant in determining the local stability.

For currents which are locally stable at some downstream locations and unstable at others, it is shown that the disturbance amplitude depends on the entire upstream structure of the current. In particular, simple examples illustrate the lack of a local relationship between "local" stability characteristics and the disturbance intensity.

The linear initial value problem for uniform (in the downstream direction) currents is also discussed to elucidate the relation between the temporal and spatial stability problems.