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Boundary-Forced Planetary Waves: A Simple Model Mid-Ocean Response to Strong Current Variability

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ABSTRACT

A simple linear model of the barotropic basin response to forcing imposed along the northern boundary is described. The dependence on latitude of the response may include oscillatory behavior or not, depending on whether the forcing frequency is smaller or greater than the fundamental free basin mode frequency. When oscillatory behavior is found, the forced solution may resemble oceanic mesoscale eddies. The relevance of this simple model to a description of the eddy fields of several mesoscale resolution general ocean circulation numerical experiments is examined. It is found that a single term of the analytical solution can very well describe the numerically produced eddy fields, away from the regions of strong currents. The possibility that this general mechanism might account for the existence of mesoscale eddies in the ocean is briefly discussed.

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