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Nondivergent Planetary Oscillations in Midlatitude Ocean Basins with Continental Shelves

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ABSTRACT

Free oscillations in square, midlatitude basins with continental shelves and planetary vorticity gradients are numerically computed using the nondivergent shallow-water equations. The topography may rend a planetary mode into a family of basinwide modes, each comparable to the flat-bottom counterpart in frequency and midbasin structure. This phenomenon can be interpreted in terms of coupled planetary wave-shelf wave oscillations. The mechanism provides an alternative to strong dissipation in explaining broadbanded planetary-wave signals observed in tide gauge records.

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