Abstract View

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Scattering of Coastally Trapped Waves by Changes in Continental Shelf Width

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ABSTRACT

The scattering of dispersive, barotropic, coastally-trapped waves by narrowing and widening shelves is investigated. The shelves considered maintain a shelf-similar exponential shape. For such shelves, previous investigators have shown that no scattering occurs in the nondispersive, long-wave limit, but the present study demonstrates that dispersive shelf waves scatter strongly when large changes in shelf width occur over distances less than a representative width. To solve the scattering problem, a modal solution technique is adopted. The occurrence of multiple scattering between wave modes propagating energy in both directions along the shelf and the evanescent wave modes limits the parametric range of shelf variations which can be considered, but the model approach to solving this type of scattering problem is viable nevertheless. The study shows that the strength of scattering depends not only on the strength of interaction between the incident wave and the topographic variations, but also on the degree of destructive interference within the scattered modes.