Abstract View

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Obliquely Incident Poincaré Waves on a Sloping Continent

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ABSTRACT

An analytical theory of barotropic tides propagating onto a sloping continental shelf from the deep ocean is developed. The plane Poincaré waves incident from the deep ocean are obliquely angled, and a full matching of shelf and ocean solutions is implemented. Allowance for a nonzero water depth at the coast requires an additional term, the Bessel function of second kind, in the solution. The full solution is examined for response characteristics for both frictionless tides and for tides affected by a linear bottom friction, and energy dissipation rates are evaluated. Results for narrow continental shelves indicate that a small but nonzero coastal wall depth, in conjunction with the angle of incidence, can play a significant role in modifying the response, while for wider continental shelves both of these features greatly modify the response at resonance.