Abstract View

Volume 11, Issue 8 (August 1981)

Journal of Physical Oceanography
Article: pp. 1113–1122 | Abstract | PDF (782K)

Propagation of Coastal-Trapped Waves at Low Latitudes in a Stratified Ocean with Continental Shelf Slope

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(Manuscript received November 6, 1980, in final form May 4, 1981)

DOI: 10.1175/1520-0485(1981)011<1113:POCTWA>2.0.CO;2

ABSTRACT

Poleward propagation of coastal-trapped waves induced by a baroclinic equatorial Kelvin wave incident on the eastern boundary is studied in numerical models. When the thermocline is shallower than shelf depth and so intersects a vertical coastal wall, a coastal-trapped, internal Kelvin-type wave keeps propagating poleward. The only change in its structure is that its trapping width decreases in accordance with the decrease in the local deformation radius. On the other hand, when the thermocline intersects a continental slope, which represents a typical situation for the eastern tropical Pacific, baroclinic disturbances decrease in amplitude as they propagate poleward, and eventually disappear at middle latitudes. Transformation of the baroclinic disturbances to quasi-barotropic shelf waves takes place. Part of the barotropic energy leaks away from the coastal region in the form of barotropic Rossby waves. As the period (wavelength) of an incident equatorial Kelvin wave increases, baroclinic disturbances propagate farther poleward.