Abstract View

Volume 15, Issue 7 (July 1985)

Journal of Physical Oceanography
Article: pp. 985–996 | Abstract | PDF (830K)

Interior Reflections of a Periodically Forced Equatorial Kelvin Wave

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(Manuscript received September 1, 1984, in final form February 19, 1985)

DOI: 10.1175/1520-0485(1985)015<0985:IROAPF>2.0.CO;2

ABSTRACT

A fully three-dimensional, wind-forced equatorial model is used to study the effects of the strong near- surface equatorial pycnocline on energy transmission into the deep ocean. The equatorial Kelvin waves forced by a patch of zonal wind oscillating at the annual period are isolated from the complete response, and their energy transmission into the deep ocean is investigated as a function of forcing geometry, pycnocline structure, and the amplitude of deep-ocean mixing. Solutions form well-defined beams of energy that propagate through realistic pycnoclines with surprisingly little reflection. Vertical mixing damps the beams in the direction of their propagation and stretches their longitudinal extent. For sufficiently strong mixing the solutions low their beamline character and appear as surface-trapped signals. This result may help to resolve the differences between the solutions found in previous investigations.