



## Abstract View

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## Freely Propagating Trench Waves on a Beta-Plane

**Andrew J. Willmott and Arlene A. Bird**

*Department of Oceanography, Naval Postgraduate School, Monterey, CA 93940*

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### ABSTRACT

The dispersion relation is derived for trapped freely propagating barotropic long trench waves on a midlatitude  $\beta$ -plane. It is found that a critical wavenumber  $k_c$ , which depends on trench orientation and wave frequency, partitions the behavior of each mode. Leaky modes occur when the wavenumber  $k$  of a particular mode satisfies  $k < k_c$ , in which case the mode takes the form of a linear barotropic Rossby wave in the ocean interior which radiates energy offshore. Coastally trapped solutions occur when  $k > k_c$ . For this latter case the solutions are spatially damped as they propagate along the trench. Dispersion curves are presented for the coastally trapped solutions along the Japan, Kuril and Peru trenches. Surfaces of the mass transport streamfunction are also displayed for both evanescent and propagating solutions along the Japan, Kuril and Peru trenches. The theory suggests that leaky trench waves might be a generating mechanism for barotropic Rossby waves in the Pacific Ocean basin.

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