



Abstract View

[Volume 18, Issue 6 \(June 1988\)](#)

Journal of Physical Oceanography

Article: pp. 801–812 | [Abstract](#) | [PDF \(896K\)](#)

The Effect of Varying Stratification on Low-Frequency Equatorial Motions

Antonio J. Busalacchi

Laboratory for Oceans, NASA/Goddard Space Flight Center, Greenbelt, Maryland

Mark A. Cane

Lamont-Doherty Geological Observatory of Columbia University, Palisades, New York

(Manuscript received May 12, 1987, in final form November 18, 1987)

DOI: 10.1175/1520-0485(1988)018<0801:TEOVSO>2.0.CO;2

ABSTRACT

A formalism is developed to examine the effect of zonally varying stratification on equatorial wave phenomena; an effect present in the real ocean but neglected from standard linear theory. The approach utilized involves the application of a matching condition to equatorial waves incident on a single zonal discontinuity in the density field of a shallow water system. Transmission and reflection coefficients are sought for the projection of an incoming wave onto the entire set of resultant vertical and horizontal wave modes of a general continuously stratified fluid. The limiting case of a meridional density front is extended, in a manner analogous to radiative transfer problems, to a series of discrete density intervals. These techniques are applied to specific choices of stratification ranging from a zonal jump discontinuity in the density field to density changes with zonal scales large with respect to the waves in question, i.e., a WKB limit. The results demonstrate that zonally varying stratification does not produce substantial changes in the energy flux of propagating equatorial waves. However, as a result of changes to the equatorial radius of deformation, the amplification of equatorial zonal velocity can be appreciable. A corresponding decrease in pressure, albeit smaller, may also be non-negligible.

Options:

- [Create Reference](#)
- [Email this Article](#)
- [Add to MyArchive](#)
- [Search AMS Glossary](#)

Search CrossRef for:

- [Articles Citing This Article](#)

Search Google Scholar for:

- [Antonio J. Busalacchi](#)
- [Mark A. Cane](#)



© 2008 American Meteorological Society [Privacy Policy and Disclaimer](#)

Headquarters: 45 Beacon Street Boston, MA 02108-3693

DC Office: 1120 G Street, NW, Suite 800 Washington DC, 20005-3826

amsinfo@ametsoc.org Phone: 617-227-2425 Fax: 617-742-8718

[Allen Press, Inc.](#) assists in the online publication of *AMS* journals.