



Due to technical problems, there is a delay in posting the full text version of articles. We hope to have this resolved soon.  
In the meantime please see the PDF version of articles.

## Abstract View

[Volume 3, Issue 1 \(January 1973\)](#)

### Journal of Physical Oceanography

Article: pp. 133–138 | [Abstract](#) | [PDF \(417K\)](#)

# Length Scales in a Rotating Stratified Fluid on the Beta Plane

**Steven L. Blumsack**

*Dept. of Mathematics and Geophysical Fluid Dynamics Institute, Florida State University, Tallahassee 32306*

(Manuscript received September 14, 1972, in final form October 9, 1972)

DOI: 10.1175/1520-0485(1973)003<0133:LSIARS>2.0.CO;2

### ABSTRACT

The relationships between vertical and horizontal length scales in a rotating stratified fluid on the beta plane are discussed in an attempt to unify the results of previous papers. The model is steady, linear and Boussinesq, but allows for different coefficients for the horizontal and vertical eddy mixing processes. The boundary layers in previous papers together with a new physical scale are analyzed with respect to their physical balances, length scale, and existence in a parameter space. The results are summarized in a three-part schematic graph, which shows the relations between dimensionless horizontal and vertical scales, and in a table, which contains the relevant physical balances for each relation. Three internal dimensionless parameters are considered, namely  $S$  a measure of the importance of stratification relative to rotation,  $\delta$  a measure of the magnitudes of vertical to horizontal mixing processes, and  $\beta E^{1/2}$  a ratio of the length scales over which lateral friction and the beta effect are important.

Options:

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

Search CrossRef for:

- [Articles Citing This Article](#)

Search Google Scholar for:

- [Steven L. Blumsack](#)



© 2009 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](mailto:amsinfo@ametsoc.org) Phone: 617-227-2425 Fax: 617-742-8718  
[Allen Press, Inc.](#) assists in the online publication of *AMS* journals.