



Abstract View

[Volume 6, Issue 3 \(May 1976\)](#)

Journal of Physical Oceanography

Article: pp. 299–305 | [Abstract](#) | [PDF \(453K\)](#)

The Role of Vertical Motion in the Heat Budget of the Upper Northeastern Pacific Ocean

William J. Emery

Hawaii Institute of Geophysics and Department of Oceanography, University of Hawaii, Honolulu 96822

(Manuscript received June 26, 1975, in final form February 3, 1976)

DOI: 10.1175/1520-0485(1976)006<0299:TROVMI>2.0.CO;2

ABSTRACT

A study of the heat budget of the upper northeastern Pacific Ocean demonstrates the importance of heat changes due to vertical motion. Bathythermograph observations are used to form time series of monthly average thermal structure at ocean weather station November (30°N, 140°W) and various 5° and 2° quadrangles between California and Hawaii. These time series are first used to explore correlations between heat content in a 250 m thick layer and the depth of the 14°C isotherm. High negative correlations between these quantities suggest that vertical motion at 250 m, indicated by the fluctuations of the 14°C isotherm, must play a significant role in altering the heat content of the upper layer. A heat budget equation is derived that includes the heat changes due to vertical motion. At all test locations, correlations between terms show that a stronger relationship exists between surface heat exchange and heat content change when the heat changes due to vertical motion are included. The mean square difference between surface heat exchange and heat content change is computed with and without heat changes due to vertical motion. The ratio of these differences shows about a 50% improvement when heat changes due to vertical motion are included.

Options:

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

Search CrossRef for:

- [Articles Citing This Article](#)

Search Google Scholar for:

- [William J. Emery](#)



© 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.