



Abstract View

[Volume 13, Issue 4 \(April 1983\)](#)

Journal of Physical Oceanography

Article: pp. 648–662 | [Abstract](#) | [PDF \(1.00M\)](#)

Mid-Latitude Mesoscale Temperature Variability in Six Multiship XBT Surveys

D.E. Harrison

Department of Meteorology and Physical Oceanography, Massachusetts Institute of Technology, Cambridge, 02139

W.J. Emery

Department of Oceanography, University of British Columbia, Vancouver, BC, Canada V6T 1W5

J.P. Dugan

Ocean Sciences Division, Naval Research Laboratory, Washington, DC 20375

Bo-Cheng Li

The First Research Institute, National Bureau of Oceanography, Tsingtao, China

(Manuscript received August 4, 1982, in final form January 10, 1983)

DOI: 10.1175/1520-0485(1983)013<0648:MLMTVI>2.0.CO;2

ABSTRACT

We discuss the spatial character of mesoscale temperature variability as observed in six midlatitude multiship expendable bathythermograph (XBT) surveys, two from the North Pacific and four from the North Atlantic. These surveys sample mid-ocean regions as well as regions adjacent to the western boundary currents of both subtropical gyres. Mesoscale characteristics exhibit substantial changes between surveys, between ship tracks within each survey and between different portions of individual ship tracks. These results suggest that a single XBT section across a region is unlikely to represent the range of variability within that region satisfactorily.

Fluctuations below the mixed layer are strongly vertically correlated, but surface temperatures are not well correlated with those below the mixed layer. We concentrate on the horizontal variability of the temperature at 450 m, and present rms thermal variability values and zonal autocorrelation functions as conventional measures of the variability. We also discuss the utility of analysis perspectives that focus on the “event-like” character of much of the variability and describe the properties of the different features in the data. Using climatology rather than a linear trend to remove the large scale can result in markedly different feature characteristics and survey statistics. In particular, warm and cold features (defined relative to climatology) often have quite different

Options:

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

Search CrossRef for:

- [Articles Citing This Article](#)

Search Google Scholar for:

- [D.E. Harrison](#)
- [W.J. Emery](#)
- [J.P. Dugan](#)
- [Bo-Cheng Li](#)

scales. Assuming that the mesoscale temperature variability is a Gaussian process with 150 km decorrelation length is acceptable at the 95% level in several surveys using linearly detrended data, but is generally unacceptable when climatology is removed.

top ▲



© 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.