



Abstract View

[Volume 15, Issue 11 \(November 1985\)](#)

Journal of Physical Oceanography

Article: pp. 1502–1520 | [Abstract](#) | [PDF \(1.12M\)](#)

Turbulence Measurements with a Submarine

Thomas R. Osborn and Rolf G. Lueck

Department of Oceanography, Naval Postgraduate School, Monterey, CA 93943

(Manuscript received March 19, 1984, in final form May 29, 1985)

DOI: 10.1175/1520-0485(1985)015<1502:TMWAS>2.0.CO;2

ABSTRACT

Measurements of small-scale velocity and temperature fluctuations have been made from the research submarine *Dolphin* in the open ocean off San Diego, California. The important contribution of the submarine is that it collects horizontal profiles. The submarine can depth-cycle to obtain a quasi-vertical profile of the fluctuations along a horizontal path. The noise level depends on the configuration of the instrumentation and the operating conditions of the vessel.

Expressed in terms of energy dissipation, it is approximately 10^{-7} W m^{-3} , comparable to that of free-fall vertical profilers.

Much of the small-scale velocity and temperature data are similar to those collected with free-fall vertical profilers. A major difference is that the horizontal transects are aligned with the temperature gradient of salt fingers, which are not well detected by vertical profilers. Fingers were seen beneath the saline upper layer at values of R_ρ between 2 and 4. Off San Diego, the velocity signal from the fingers was below the noise level of the velocity probes.

More than 80% of our estimates of the local rate of dissipation of kinetic energy from a nighttime convecting surface layer are distributed log-normally. There is a deficit of large values and an excess of small values, as in atmospheric boundary layers.

Options:

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

Search CrossRef for:

- [Articles Citing This Article](#)

Search Google Scholar for:

- [Thomas R. Osborn](#)
- [Rolf G. Lueck](#)



© 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.