





Home

Members

Libraries

Publications

Meetings

Employment

Activities

Search

Turbulent layering beneath the pycnocline in a strongly stratified pit-lake

Stevens, Craig L., Timothy S. R. Fisher, Gregory A. Lawrence

Limnol. Oceanogr., 50(1), 2005, 197-206 | DOI: 10.4319/lo.2005.50.1.0197

ABSTRACT: Temperature microstructure observations from a pit lake show alternate layers of high and low turbulence beneath a very strong pycnocline. The layers were clearly defined, around 0.3-0.5 m thick, and were found both at the edge and in the center of the pit lake. In the most energetic regions, the turbulent energy dissipation rate reached $\varepsilon = 10^{-6}$ m² s³ and the dissipation rate of thermal variance almost reached $X_q = 10^{-6}$ C²s⁻. The turbulent fluid in the middle of the lake had a higher dissipation ratio, the thermal component of potential energy gain vs. kinetic energy loss, when compared with the sidewalls. This is attributed to different forcing mechanisms for the turbulence. We hypothesize that basin-scale internal waves, in conjunction with the topography, create sidewall boundary layers. In the interior regions of the pit lake, the turbulent layers are probably generated by instability due to focusing of short-wavelength internal waves.

Article Links

Download Full-text PDF

Return to Table of Contents

Please Note

Articles in L&O appear in PDF format. Open access articles may be freely downloaded by anyone. Other articles are available for download to subscribers only, or may be purchased for \$10 per article. All L&O articles are moved into Open Access after three years.