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Diurnal Variation of Temperature and Energy Budget for the Oceanic Mixed Layer During BOMEX

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ABSTRACT

The regularity and completeness of temperature soundings for a 12-day period during the 1969 Barbados Oceanographic and Meteorological Experiment (BOMEX) has permitted an analysis of the diurnal variation in temperature at all depths in the oceanic mixed layer at five fixed-ship positions. The growth and decline of the diurnal thermocline is pronounced and is well documented for all five ship positions. The primary instruments used were the Bissett Berman salinity-temperature-depth multisensor unit and the Eppley pyranometer. The oceanic heat storage term was combined in an energy budget equation with incident radiation measurements and estimates for advection and back radiation, so that estimates of the diurnal amplitude and phase of the evaporative and sensible heat transfer could be obtained.

A mean evaporation rate of about 5.8 mm day^{-1} was determined. The highest evaporation rates were calculated for a 6-hr period centered on the time of local sunset, and the lowest rates were found to occur around midnight and during midmorning.

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