Abstract View

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Numerical Simulations of the Natural Variability in Water Temperature during BOMEX Using Alternative Forms of the Vertical Eddy Exchange Coefficients

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ABSTRACT

An existing numerical model of air-sea interaction is used to facilitate the evaluation of five previously proposed forms of oceanic vertical eddy exchange coefficients for conductivity, diffusivity and viscosity. The results of model simulations are compared to observations collected at three ships during Period III of BOMEX. The relative merits of each form of parameterization are judged by comparing three model-predicted and observed features at and near the sea surface: the mean diurnal variations of temperature with depth, the vertical temperature structure, and the water temperatures. Two of the forms prove to be significantly better in their ability to predict these features. The inclusion of stability dependence and the mixing effects of surface gravity waves proves to be important for accurate temperature predictions. This complicated air-sea interaction model, coupled with the best parameterization formulas, sets some limits on the accuracy with which the near-surface ocean water temperatures can be predicted under quasi-steady-state conditions. This has an impact on the current drive to improve long-range weather forecasts since the time and space variations of sea surface temperature are an important input to the global atmospheric models.