Abstract View

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The Role of Surface Mixing in the Seasonal Variation of the Ocean Thermal Structure

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ABSTRACT

The role of surface-generated mixing in determining the seasonal variation of the ocean thermal structure is investigated using a one-dimensional numerical model. The model contains vertical eddy diffusion with a constant coefficient $K_H = 0.5$ cm^2 s^{-1}, an instantaneous convective adjustment mechanism as commonly used in oceanic general circulation models, and a simple parameterization of surface-generated wind and convective mixing based on recent mixed-layer theories. Forcing on the seasonal time scale is accomplished by prescribing the atmospheric solar radiation, longwave radiation, wind speed, temperature and dew point to vary sinusoidally with the annual period. Results of model integrations show that surface-generated wind and convective mixing are responsible for producing many features which are observed in the real ocean including the occurrence of two sea surface temperature maxima—one in summer and another in early fall.