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# A Time-Dependent Model of the Upper Ocean

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### ABSTRACT

A model describing the time-dependent modification of the upper mixed layer of the ocean by meteorological influences is developed. The turbulent mixing and the radiative heating within the mixed layer are expressed so that only simple parameters available from routine meteorological measurements are required as input. The model is sensitive to the rate of production by the wind stress of energy available for mixing, and to the rate of absorption with depth of the solar radiation. Analytic and numerical results of the model for conditions of large constant winds and typical summer heating are consistent with laboratory results. The mixing response to a wind normally distributed in time is also presented. Finally, the model simulates the physical behavior of the upper mixed layer in response to diurnally varying heating: results for several different values of wind speed indicate that, even in low winds and typical summer heating, the daily fluctuations in sea surface temperature in the open ocean should seldom exceed 0.2C.

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