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A Generalized Bulk Model of the Oceanic Mixed Layer

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ABSTRACT

An initial-value problem for both the shallowing and deepening of the upper mixed layer of the ocean is presented, including storage and background dissipation of the turbulent kinetic energy produced by wind and released by convection. The numerical integration using Ocean Station Papa data suggests that periods of mixed-layer shallowing do not require a disjoined algorithm such as proposed by Kraus and Turner. Some characteristic modes of deepening, for example, the Kraus-Turner deepening, the Gill-Turner deepening and the Warren deepening, are identified as subsets of the present model.

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