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Mean and Turbulent Structures of the Oceanic Surface layer as Determined from One-Dimensional, Third-Order Simulations

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ABSTRACT

Various mechanisms that can drive the evolution of the oceanic surface boundary layer (OSBL) are numerically studied using a detailed turbulence-closure scheme. It is shown that stress and shear-driven regions are characterized by relatively poor mixing of momentum and heat, and by a local equilibrium at each level between shear production and destruction by viscous dissipation and buoyancy. Buoyancy-driven regions appear to be much more well mixed and to be characterized by counter-gradient turbulent diffusion of eddy kinetic energy. Consequences of these features for the parameterization and description of the OSBL are discussed.

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