Abstract View

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Turbulent Mixing at the Pacific Subtropical Front

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ABSTRACT

Some advection of water across the North Pacific subtropical front occurs by the subduction of surface mixed layers from the north side of the front underneath surface waters on the south side. Cross-frontal advection in the thermocline is obscure because waters from both sides of the front follow a single trajectory in $\theta-S$ space. When winds are less than 10 m s^{-1}, turbulence between these layers is too small to generate significant vertical diffusion. However, typical winter storms could mix these layers, in less than 20 days, to form a single homogeneous surface layer up to 145 m thick. When surface winds are too weak to maintain mixing over the entire depth of a surface mixed layer, turbulence associated with internal waves in the top of the thermocline contributes to the restratification of the surface layers. On a sampling grid of 37 km, there is no evidence for a systematic geographic variation of the rate of dissipation of kinetic energy. The rate of dissipation near the front is larger than in low energetic regions like the Sargasso Sea or of Vancouver Island, but smaller than in highly energetic ones such as the Equatorial Undercurrent or warm-core rings.