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Viscous Sublayer Below a Wind-Disturbed Water Surface

Jin Wu

Air-Sea Interaction Laboratory, College of Marine Studies, University of Delaware, Lewes, DE 19958

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ABSTRACT

Drift currents immediately below the water surface were systematically measured in a circulating wind-wave tank. The results confirmed the existence of a viscous sublayer at the air–water interface, with the current varying linearly with depth and the shear stress determined from the linear profile comparing very favorably with the wind stress. The thickness (δ_v) of the sublayer was found to be almost invariant with wind velocity. Its nondimensional thickness ($\delta_v u_* / \nu$) is smaller than that over a solid surface, having a value of 4 at low wind velocities and increasing with wind velocity toward the solid-surface value of 8 at high wind velocities.

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