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Determination of the Aqueous Sublayer Thicknesses at an Air-Water Interface

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ABSTRACT

The thicknesses of the viscous and thermal sublayers in the water beneath an air-water interface are obtained by an application of the theory of rough-wall flows to results obtained in a laboratory wind, water-wave research facility. For fully rough flow the dimensionless viscous sublayer thickness δ_{v+} is proportional to the square root of the roughness Reynolds number h_+ based on mean roughness height, i.e., $\delta_{v+} = 0.37h_+^{\frac{1}{2}}$. In addition, if Pr is the (molecular) Prandtl number, the dimensionless thermal sublayer thickness $\delta_{t+} = 0.37h_+^{-\frac{1}{2}}$.

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