Dr. Tetsu Hara
Professor of Oceanography
Graduate School of Oceanography
University of Rhode Island

Abstract

Wind turbulence just above the sea surface (inside the wave boundary layer) is significantly modified by ocean surface waves. Thorough understanding of the wave boundary layer turbulence is needed to explain how ocean surface waves increase or decrease the wind stress (or the effective surface roughness for wind). In this study we focus on strongly forced conditions where the wind speed is significantly greater than the wave phase speed. First, a set of momentum and energy equations is derived to formulate the wave boundary layer turbulence. Next, a large eddy simulation result for wind over a sinusoidal wave train is analyzed using the proposed formulation. The result clarifies how surface waves increase the effective roughness length.

Dr. Hara received his Ph.D from Massachusetts Institute of Technology in 1990. Postdoctoral Researcher @ Woods Hole Oceanographic Institute, 1990-92.

His research interests include generation, evolution, and breaking of ocean surface waves, sea spray and bubbles, and mass, heat, energy and momentum fluxes at the air-sea interface. He also researches the impact of air-sea fluxes on tropical cyclone predictions.

Dr. Hara teaches undergraduate and graduate courses on geophysical fluid dynamicism, air-sea interaction, and surface waves and storm surge modeling.