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Laboratory Measurements of Droplets Generated by Breaking Water Waves[1] D. WANG, X. LIU, J.H. DUNCAN, University of Maryland — The production of droplets generated by breaking water waves greatly affects the heat, mass and momentum transfer between the atmosphere and the sea surface. In this study, the generation of droplets by single breaking water waves, was explored in a wave tank. Plunging breakers were generated from dispersively focused wave packets (average frequency 1.15 Hz) using a programmable wave maker. The profile histories of the breaking wave crests along the center plane of the tank were measured with a cinematic laser-induced fluorescence technique, while the droplet diameters and motions were measured with a double-pulsed cinematic shadowgraph technique. The two measurement systems were mounted on an instrument carriage that was set to move along the tank following the breaking crests. It was found that droplets are primarily generated when the wave's plunging jet generates strong turbulence during impact with the wave's front face and when large air bubbles, entrapped during the plunging process, rise to the free surface and pop.

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James Duncan
University of Maryland

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