

Abstract Submitted
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Laboratory Measurements of Droplets Generated by Breaking Water Waves¹ X. LIU, J.H. DUNCAN, Department of Mechanical Engineering, University of Maryland — The sizes and motions of droplets that are generated by single breaking water waves are explored in a wave tank that is 11.8 m long, 1.1 m wide and 2.2 m high (0.91 m water depth). A programmable wave maker is used to generate wave packets (central frequency 1.15 Hz) that create breakers by dispersive focusing. Different amplitudes of the wave maker motion are used to generate various breaking waves ranging from weakly spilling breakers to plunging breakers. The profile histories of the breaking wave crests along the center plane of the tank are measured with a cinematic LIF technique. The droplets at various heights and positions above the crests of the breaking waves are measured with a shadowgraph technique that uses a double-pulsed laser, a long-distance microscope lens and a CCD camera. These two measurement systems are mounted on an instrument carriage that moves along the tank with the speed of the breaking crests. The results include the size distributions of the droplets, the variations of the droplet number with height above the wave crest and the velocities of the droplets. The effects of the intensity of the breaking waves on the dynamics of the droplets are discussed.

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