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On the study of radar backscattering of ocean surface in response to rainfall[1] XINAN LIU, QUANAN ZHENG, REN LIU, JAMES H. DUNCAN, University of Maryland, College Park — A model of radar backscattering from the ocean surface in response to rainfall is developed. The model shows that the radar return intensity is a function of the wavelength and incident angle of the radar waves and the rain rate. The model explains the differences between the radar response to rain rate simultaneously observed by C-band ASAR and ground-based weather radar. An experiment on the simultaneous measurements of the characteristics of the ocean surface in response to rainfall and its radar back-scatter is performed in the laboratory. The experiment is carried out in a water pool that is 1.22 m by 1.22 m with a water depth of 0.3 m. Artificial rainfall is generated from an array of hypodermic needles. The surface characteristics including crowns, stalks and ring waves are measured with a cinematic Laser-Induced-Florescence (LIF) technique while secondary droplets are measured with a shadowgraph technique. The radar backscattering signal is recorded with a dual-polarized, ultra-wide band radar. The frequency dependence and polarization of the radar signatures due to the surface features are discussed.

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