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The Effect of Droplets in the Air-Sea Transition Zone on the Sea Brightness Temperature

C.C.H. Tang

Jet Propulsion Laboratory, California Institute of Technology, Pasadena 91103

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ABSTRACT

A model is presented depicting that, for a fully developed sea driven by the wind with speeds above 5 m sec^{-1} , the air in the transition zone immediately above the air-sea interface is mixed with sea water droplets from bursting air bubbles. The absorptive droplet concentration in the zone is assumed to have a profile tapering off from the interface to zero at a certain height. The dielectric constant of the absorptive inhomogeneous droplet profile is thus both a function of the wind speed and the height above the interface. Both the inhomogeneity effect and the absorption-emission effect of the droplet concentration have been considered.

Theoretical calculations show that the presence of the absorptive inhomogeneous droplet transition zone significantly increases the sea brightness temperature as wind speed rises. Combined effects of both the droplet areas and the foam areas on sea surface also have been considered.

A brief review and discussion of related recent investigations is included.

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Headquarters: 45 Beacon Street Boston, MA 02108-3693

DC Office: 1120 G Street, NW, Suite 800 Washington DC, 20005-3826

amsinfo@ametsoc.org Phone: 617-227-2425 Fax: 617-742-8718

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