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# Impact of drizzle on remote sensing of cloud effective radius

T. Zinner (1), G. Wind (2), S. Platnick (2), and A. Ackerman (3)

(1) Deutsches Zentrum f. Luft u. Raumfahrt, Oberpfaffenhofen, Germany (tobias.zinner@dlr.de), (2) NASA Goddard Space Flight Center, Greenbelt, Maryland, USA, (3) NASA Goddard Institute for Space Studies, New York, New York, USA

Remote sensing of cloud particle size with passive sensors like MODIS is an important tool for cloud microphysical studies. As a measure of the radiatively relevant droplet size, effective radius can be retrieved with different combinations of visible through shortwave infrared channels. The resulting effective radii are often quite different, indicative of different penetration depths for the spectral radiances used. MODIS observations sometimes show significantly larger effective radii in marine boundary layer fields derived from the 1.6 and 2.1 ?m channel observations than for 3.7 um retrievals.

Possible explanations range from 3D radiative transport effects and sub-pixel cloud inhomogeneity aspects to the impact of drizzle formation. To investigate possible factors of influence, we use LES simulated boundary layer cloud situations in combination with 3D Monte Carlo simulations of MODIS observations. LES simulations of warm cloud spectral microphysics for cases of marine stratocumulus for typical daytime situations produce cloud structures comprising droplet size distributions with and without drizzle size drops.

From 1D and 3D radiative transport simulations considering individual droplet size distributions synthetic MODIS observations are obtained. On these scenes the operational MODIS effective radius retrievals are applied and the results are compared to the given LES microphysics.