Geophysical Research Abstracts
Vol. 21, EGU2019-9676, 2019
EGU General Assembly 2019

An exploration of applications using retrievals of droplet size distribution dispersion from space

Daniel Miller
NASA Goddard Space Flight Center, Greenbelt MD, USA (Daniel.J.Miller@NASA.gov)

The size distribution of liquid cloud droplets plays an important role in defining different cloud behaviors ranging from light scattering and precipitation development processes. As a consequence the size distribution can be used to identify physical processes going on in the cloud. From a remote sensing perspective, the cloud droplet size distribution is often described using a two-parameter gamma distribution defined in terms of the effective radius (r_e) and effective variance (v_e). The cloud droplet effective radius has the most direct impact on scattered light as it is directly related to the mean scattering cross section of droplets. As a consequence r_e has long been a cloud remote sensing retrieval (e.g. the MODIS Cloud Products). The effective variance, in contrast, has a limited impact on the intensity of reflected light, and as a consequence cannot typically be retrieved by intensity based observations alone. However, measurements of polarized reflected light are sensitive to both the r_e and v_e, providing the possibility of retrieving the full droplet size distribution shape. Despite being a retrievable variable, very little has been written about applications of v_e retrievals to understand scientific questions about cloud development and precipitation processes. In this study we will explore the additional information provided by v_e how that information could be useful for further modeling and process studies.