Geophysical Research Abstracts
Vol. 12, EGU2010-2261-1, 2010
EGU General Assembly 2010

A robust algorithm to retrieve precipitation from space-borne dual frequency observations

Mircea Grecu (1), Lin Tian (1), and Simone Tanelli (2)
(1) UMBC and NASA GSFC, Greenbelt, United States , (2) Jet Propulsion Laboratory, Pasadena, United Stated

Although potentially superior to retrievals from single frequency observations, retrievals from space-borne dual frequency radar observations are sensitive to measurement errors. To effectively make use of the information provided by both frequencies, algorithms able to handle measurement errors without significant impact on performance are necessary. In this study, we formulate and investigate such an algorithm. The algorithm is based on physical models that predict the attenuated reflectivity profiles at the two operating radar frequencies as functions of two-parameter profiles of particle size distributions. The precipitation retrieval process consists in finding the two-parameter particle size distribution profile (along with a few other parameters describing related variables such the the cloud water and cloud ice distribution, relative humidity, etc.) that minimizes the sum of squared differences between model prediction and actual observations. Additional information such as surface-return estimates of the path integrated attenuation and climatological is incorporated in the retrieval as quadratic terms added to the sum of squared difference functional. The minimization of this functional is achieved through a gradient based method. The algorithm is tested using airborne data collected in the NASA Tropical Composition, Cloud, and Climate Coupling (TC4) campaign.