Geophysical Research Abstracts
Vol. 14, EGU2012-8946, 2012
EGU General Assembly 2012

Aerosol influences on the radar signature of shallow maritime cumulus convection

K. Lonitz and B. Stevens
Max Planck Institute for Meteorology, Hamburg, Germany (katrin.lonitz@zmaw.de)

Factors influencing the radar signature of shallow maritime convection are explored using measurements from the MPI-M cloud observatory on the windward side of Barbados.
Since April 2010 a polarized scanning K-band cloud radar has been measuring cloud structure, and complements a suite of other instruments at this unique measurement site. This long-term data record of cloud properties facilitates the development of a statistical description of trade wind cumuli. Preliminary analysis of over one year of data shows that sixty percent of all clouds are shallow showing a mean projected cloud cover of about 20%. Furthermore, there exists a pronounced increase in radar reflectivity (Ze $\leq$ -10 dB) with height, which we explore as a function of the aerosol loading.
Backward trajectories arriving in Barbados are computed using the Hybrid Single Particle Lagrangian Integrated Trajectory Model (HYSPLIT) driven by meteorological variables from the ERA-INTERIM reanalysis database of the European Centre for Medium-Range Weather Forecasts (ECMWF). Conditional sampling of our cloud radar data using the backward trajectories allows for an exploration of how airmass origin, and presumably aerosol loading affects cloud radar signatures. Maritime and continental source areas are distinguished so as to investigate the appearance of footprints induced by different aerosol regimes in the radar signal.
This study aims to show how statistical derived properties of clouds can be used in order to gain a better understanding of the interplay between clouds and aerosols.