Breakout Session Report
ARM/ASR User and PI Meeting
March 16-20, 2015

Session Title: Marine Low Clouds
Session Date: Thursday, March 19, 2015
Session Time: 8:00–10:00 a.m.
Summary Authors: Robert Wood and Mark Miller

Description

Marine low clouds are critical for regulation of Earth's climate and are also sensitive to aerosols. ARM has invested considerably in new measurements in environments dominated by marine low clouds. This session focused on exploiting the new ARM observations together with a variety of numerical models and other data sets to better understand the behavior of marine low clouds and their interactions with meteorology and aerosols.

Main Discussion

The session consisted of eight short presentations from ASR principal investigators on a broad range of topics related to marine low clouds. There was no dedicated discussion time. The session was well attended.

Key Findings

- Impacts of drizzle on cloud property retrievals from visible/NIR sensors (e.g., cloud droplet concentration and optical thickness) are expected to be small at the ARM Facility Eastern North Atlantic (ENA) site.

- In strongly polluted stratocumulus and cumulus clouds, cloud droplet concentration variability is better explained by variability in updraft speed than by aerosol concentration.

- A proposal has been submitted to the German equivalent of National Science Foundation to support an ACTOS (helicopter-tethered instrument platform) campaign at ENA in summer 2016.

- Low clouds do not seem to be responsible for moistening the free-troposphere ahead of a Madden-Julian Oscillation (MJO), and so are unlikely to play a major role in driving MJO.

- Weather state analysis for ENA shows that almost all CMIP5 models underestimate the cold air outbreak weather state.

- Lateral entrainment rate [/km] in small Cu clouds is inversely correlated with updraft speed and dissipation rate. Environmental relative humidity seems to be a key variable that needs to be included in future parameterizations.

- A new algorithm to separate clouds and drizzle using surface radar/lidar remote sensing appears to be very robust and can be applied routinely.

Decisions

No programmatic decisions were made at the session.

Future Plans

For warm, low clouds, it makes sense to hold joint CLWC/CAPI sessions in the future to bring together all those with vested interests in low clouds.