



New observational capabilities on atmospheric sciences of the Eastern North Atlantic (ENA) Graciosa island ARM facility

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One source of uncertainty that thwarts accurate and comprehensive representation of the present and future climate in models is the response of shallow cloud systems to changes in atmospheric greenhouse gases and aerosols. Low clouds systems that prevail over subtropical oceans, in particular, play a critical role in boundary layer dynamics and in the global climate, despite being poorly represented in climate models. The Azores have been identified as an optimal site to conduct research aimed at better understanding the physical processes and life cycle of marine stratocumulus and other marine boundary layer clouds.

The United States Department of Energy's Atmospheric Radiation Measurement (ARM) Climate Research Program has been providing data to advance research from atmospheric observations at diverse climatic regimes around the world (<http://www.arm.gov/>) for over 20 years. Since 2009, the Azores has been included in this global program. The campaign of the ARM Mobile Facility at Graciosa Island, Azores, in the context of the Clouds, Aerosol and Precipitation in the Marine Boundary Layer (CAP-MBL) project, added the most extensive and comprehensive dataset of marine boundary layer (MBL) clouds to date. Solid preliminary findings from this valuable data set have been used to understand interactions between the cloud microphysical and macrophysical processes in marine boundary layer clouds that play a fundamental role in the cloud dynamics and precipitation, which in turn determine cloud radiative properties that impact on the energy balance of the Earth.

Based upon the design and siting from the previous ARM Mobile Facility in support of CAP-MBL, the new Eastern North Atlantic (ENA) fixed site joined the global network of ARM Climate Research Facilities in October 2013. Since then, this user facility has augmented its baseline measurement capability to include a Ka-/W-Band scanning cloud radar, an X-Band precipitation radar and Raman and Doppler lidars. Coupled with an extensive set of radiometric measurements and routine radiosonde soundings, a full three-dimensional view of the atmospheric phenomena, some of them poorly understood until now, are freely available to the research community.

This presentation, besides showcasing the capabilities of this ARM Facility, aims to promote discussion about the potential for the facilities use in collaborative efforts in support of atmospheric and climatic sciences and in particular how they may relate to European research initiatives. The facility as a designated DOE user facility makes all of its data freely and publicly available. In addition, there may be opportunities for the facility to be used as a deployment platform with instrument accommodation and infrastructure available on request.