



The ARM West Antarctic Radiation Experiment (AWARE)

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West Antarctica is one of the most rapidly warming regions on Earth, and its changing climate in both atmosphere and ocean is linked to loss of Antarctic ice mass and global sea level rise. The specific mechanisms for West Antarctic Ice Sheet (WAIS) warming are not fully understood, but are hypothesized to involve linkage between moisture from Southern Ocean storm tracks and the surface energy balance over the WAIS, and related teleconnections with subtropical and tropical meteorology. This present lack of understanding has motivated a climate science and cloud physics campaign jointly supported by the US National Science Foundation (NSF) and Department of Energy (DOE), called the Atmospheric Radiation Measurement Program (ARM) West Antarctic Radiation Experiment (AWARE). The DOE's second ARM Mobile Facility (AMF2) was deployed to McMurdo Station on Ross Island in November 2015 and will operate through December 2016. The AMF2 includes (1) cloud research radars, both scanning and zenith, operating in the Ka- and X-bands, (2) high spectral resolution and polarized micropulse lidars, and (3) a suite of shortwave and longwave broadband and spectral radiometers. A second suite of instruments is deployed at the WAIS Divide Ice Camp on the West Antarctic plateau during December 2015 and January 2016. The WAIS instrument suite provides (1) measurement of all surface energy balance components, (2) a polarized micropulse lidar and shortwave spectroradiometer, (3) microwave total water column measurement, and (4) four times daily rawinsonde launches which are the first from West Antarctica since 1967. There is a direct linkage between the WAIS instrument suite and the AMF2 at McMurdo, in that air masses originating in Southern Ocean storm tracks that are driven up over the WAIS often subsequently descend over the Ross Ice Shelf and arrive at Ross Island. Preliminary data are already illustrating the prevalence of mixed-phase clouds and their role in the surface energy balance. A critical aspect of AWARE is that data from this campaign become publicly available in the DOE ARM archive, with no restrictions or proprietary periods, as soon as the quality control is complete. We therefore encourage maximum use of AWARE data for polar atmospheric process understanding and to help motivate new Antarctic field campaigns.