

BROWSING A WEALTH OF MILLIMETER-WAVELENGTH DOPPLER SPECTRA DATA

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ABSTRACT

The U.S. Department of Energy's Atmospheric Radiation Measurement (ARM) program has collected an extensive archive of vertically pointing millimeter wavelength Doppler radar spectra at both 35 and 95 GHz. The recording of spectra, which is ongoing, began at the ARM Climate Research Facility Southern Great Plains, Oklahoma site in September of 2003, at the North Slope of Alaska site in April 2004 and at Tropical Western Pacific sites in 2006. Spectra have also been collected throughout several multi-month ARM Mobile Facility deployments in diverse climate regimes, with more deployments to come. The data's temporal resolution is as high as two seconds, at height intervals of 45 to 90 m. These data are a rich potential source of detailed microphysical and dynamical cloud and precipitation information. However, the sheer volume of available data can be somewhat daunting to access and search for specific features of interest. Here we present a graphical user interface for spectra browsing, which allows the user to view time-height images of radar moments, select a time or height of interest and then "drill down" through images of spectrograms to individual Doppler spectra or sequences of spectra. Available along with these images are visual summaries of spectral characteristics, such as number of spectral peaks, spectral shape information (skewness and kurtosis), moment uncertainty estimates and hydrometeor vs. clutter identification. These spectral characteristics are available in the new ARM value-added product, MicroARSCL (Microphysical Active Remote Sensing of Clouds). Once a browser user has identified a time- and height-bounded region of interest, the interface provides the option to package the relevant data into a custom-made data set to facilitate further study. In addition to the fast access and visualization tools, we are developing a Doppler spectra simulator capable of generating Doppler spectra from liquid, mixed-phase and solid cloud constituents and precipitation. The Doppler spectra simulator can be used as an interface between explicit microphysics models and Doppler spectra observations from the ARM radars.

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