BAECC SNEX: Comprehensive snowfall experiment during DOE ARM AMF2 deployment in Finland

Dmitri Moisseev
University of Helsinki, Finland

von Lerber, Annakaisa (Finnish Meteorological Institute, Finland)
Leskinen, Matti (University of Helsinki, Finland)
Chandrasekar, V., (Colorado State University, USA)
Bliven, Larry (NASA WFF, USA)
Petersen, Walt (NASA GSFC/Wallops Flight Facility, USA)

E-mail: dmitri.moisseev@helsinki.fi

The snowfall measurement experiment (BAECC SNEX) is a part of a joint campaign 'Biogenic Aerosols – Effects on Clouds and Climate (BAECC)' between DOE ARM, University of Helsinki, FMI and other international collaborators. As a part of this campaign, US Department of Energy second ARM Mobile Facility (AMF2) is deployed in Hyytiälä, Southern Finland in Feb 1 - Sept 12, 2014. During this deployment, we carry out an intensive observation period (Feb 1 – Apr 30) is dedicated to documenting cold precipitation microphysics through a combination of multi-frequency (C, X, Ka, W -band) radar, microwave radiometer and lidar measurements supplemented by a comprehensive suit of surface-based precipitation observations. Multi-instrumental remote sensing and ground-based observations are used to give a detailed view of snow growth processes, i. e. condensation growth of ice crystals, snowflake growth by aggregation and riming. The overall goal of the experiment is to characterize cold precipitation microphysics, improve radar based precipitation estimation in snowfall. The experiment is also contributing to the NASA Global Precipitation Measurement ground validation activities.

The surface-based precipitation measurement suit consists of two 2D-video disdrometers, two OTT Parsivel video disdrometers, laser snow depth sensor, three precipitation weighing gauges, NASA Particle Imaging Package (second generation of the snow video imager), Vasiala PWD22 and a total precipitation sensor (Hotplate). To facilitate accurate surface measurements of snowfall properties a double fence inter-comparison reference wind protection for the weighing precipitation gauge, optical disdrometer (OTT Parsivel) and 2D-video disdrometer was built on site. Due to the duplication of instruments the data set can also be used to characterize measurement errors as a function of wind speed.

At the time of writing this abstract about 20 snowfall events were recorded. The events cover a variety of cold precipitation processes, ranging from aggregation to riming to freezing rain. At the conference we will present results of the experiment and analysis of several characteristic cases.