

The 2014-2105 Polar Winds Airborne Campaigns: Investigating Lower Tropospheric Circulations and Model Performance near Greenland Utilizing Doppler Wind Lidar and Dropsondes

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Recorded Presentation

During Oct-Nov 2014 and May 2015, NASA sponsored two airborne missions designed to fly the Doppler Aerosol WiNd (DAWN) lidar to take wind measurements of the Arctic atmosphere, specifically over and off the coasts of Greenland. Campaign I was based in Kangerlussuaq, Greenland and flew DAWN on board the NASA King Air UC-12B aircraft while Campaign II was based in Keflavik, Iceland and utilized the NASA DC-8 aircraft to fly DAWN and Dropsondes over the Arctic. More than 20 mission were flown and 100 hours of lidar data were obtained during the two campaigns along with ~100 dropsondes launched during the May campaign.

In addition to the observations, the WRF 3.6.1 with OSU BPRC polar optimizations (Polar WRF) was run twice daily to help in mission planning. Further, one of the main scientific goals of the campaigns was to provide an observational data base of 3-D wind information to compare with and validate the performance of mesoscale models and reanalysis fields in the polar regions. This will be discussed for the campaigns as a whole and for the low level circulations investigated

Individual missions were flown to investigate lower tropospheric circulations such as the Greenland Tip Jet, barrier winds off the southeast coast of Greenland, katabatic flows near the coast lines, and boundary layer rolls and organized large eddies (OLEs) over the water and transitional ice zones. Observational analysis for these cases will be presented along with model-observation comparison, particularly for the barrier wind case where post-experiment research versions of the high resolution WRF with varying horizontal and vertical resolutions were also run.