

CPEX 2017: Evaluating the Precision and Bias of NASA's Airborne Doppler Aerosol WiNd (DAWN) Lidar Using Comparisons with Dropsondes and Other Wind Observing Systems

Tuesday, 17 April 2018

Champions DEFGH (Sawgrass Marriott)

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In May-June 2017, NASA conducted the airborne 2017 Convective Processes in the Tropics Experiment (CPEX) which utilized the Doppler Aerosol WiNd lidar (DAWN), dropsondes and other remote sensing instruments aboard a NASA DC-8 aircraft to study convective processes and circulations in the tropics. Sixteen NASA DC-8 missions were flown into the Gulf of Mexico, Caribbean Sea, and the Atlantic Ocean where a comprehensive set of observations (particularly winds from DAWN and the dropsondes) were taken near isolated, scattered, and organized deep convection during all phases of the convective life cycle.

DAWN is NASA's most capable airborne wind-profiling lidar with a 2 micron laser that pulses at 10 Hz. DAWN has previously participated in NASA GRIP (2010) and Polar Winds (2014-15) airborne campaigns. The dropsondes and system used during CPEX 2017 were the High Definition Sounding System (HDSS) dropsonde delivery system developed by Yankee Environmental Services (YES).

Initial review of DAWN CPEX data has shown excellent vertical coverage and agreement with dropsonde winds, but a more detailed comparative study is needed to assess the performance and potential utility. Quantitative comparisons between DAWN wind speed and wind direction measurements and those made by the dropsondes, ocean buoys and CYGNSS will be undertaken for the entire CPEX experiment and presented. The accuracy, representativeness, and potential bias of the DAWN wind measurements for CPEX and for different convective conditions will be discussed.