**Objectives**

This work will improve King Air in-situ droplet distribution and LWC retrieval capabilities utilizing algorithm development, laboratory development, and UWKA data analysis. Several data analysis and laboratory-based foci will advance departmental in-situ probe limitation characterization and calibration abilities.

In-lab droplet generator development will expand departmental Cloud Droplet Probe (CDP) and 2D-S calibration and characterization capabilities. Laboratory efforts will be focused on system development, equipment assembly/testing, and procedure development/documentation. The droplet generator will be capable of creating pure liquid water particles of precise size, velocity, and placement; attributes which will allow for calibration and uncertainty investigations free of calibration refractive index and locational uncertainty complications.

New Nevzorov IDL data processing algorithms will correct for instrument bias, quantify uncertainty, output diagnostic and experimental products, and streamline processing workflow. Algorithm truthfulness and robustness are to be tested against independent COPEMED 13 Nevzorov calculations and local spring/fall 2016 UWKA flight data.

Nevzorov algorithms will allow for in-depth assessment of both characterized and less explored uncertainty sources including particle collection efficiency, latent heat of water temperature dependence, sensor saturation, pressure and temperature variations, airspeed fluctuations, and aircraft orientation effects. The Nevzorov flown during COPEMED 13 featured an experimental design providing opportunity for novel performance assessment.

A combination of Nevzorov/CDP derived LWC, refined Nevzorov uncertainty characterization, and numerous in-situ flight data will allow detailed CDP uncertainty assessment.

**Background**

Nevzorov data processing software has been developed and tested against well-established COPE-MED 2013 calculations provided by Alexi Korolev, a principle Nevzorov developer. Summer/Autumn 2016 research flight data will provide further algorithm truthfulness and robustness confirmation.