## Comparison of Water Content Measurement System (WCM-3000), King Probe, and Cloud Droplet Probe in Liquid Water Clouds using IMPACTS 2022 Campaign Data

## Jennifer Moore, David Delene University of North Dakota, Grand Forks, North Dakota

The NASA P3 Research Aircraft (P3) conducted 12 flights in the 2022 deployment during the NASA Investigation of Microphysics and Precipitation for Atlantic Coast-Threatening Snowstorms (IMPACTS) Campaign. The Water Content Measurement System model 3000 (WCM) was deployed for the first time on the P3. The WCM measures in-situ liquid and total water content, which enables deriving of ice water content. Water content measurements are important for the project's goal of understanding regions of snowstorms that produce large quantities of snow. In addition to the WCM, the P3 deployed a King Hot Wire probe to directly measure liquid water content. Liquid water content is also available from integration of the Cloud Droplet Probe spectrum. The hot wire probes measure liquid water content (LWC) by maintaining the heated sensing elements at a specific temperature. The WCM maintains the sensing elements at a temperature of 140 °C. While the King probe uses a temperature of 180 °C. Liquid water on the heated element evaporates, which requires a specific amount of energy. The energy amount is directly related to the mass of liquid water in the cloud, known as liquid water content. The WCM liquid water content is compared to King and CDP liquid water content under specific cloud conditions. The first condition is sampling liquid water above freezing. The second condition is sampling droplets less than 50 microns in supercooled clouds that have little to no ice. The third condition is sampling liquid water content in mixed phase clouds. Taken together these three sampling conditions provide insight into the accuracy of liquid water measurements taken during the IMPACTS 2022 Campaign.