THE
ATMOSPHERIC RESERVOIR
Examining the Atmosphere and Atmospheric Resource Management

POLCAST Brings New Technologies

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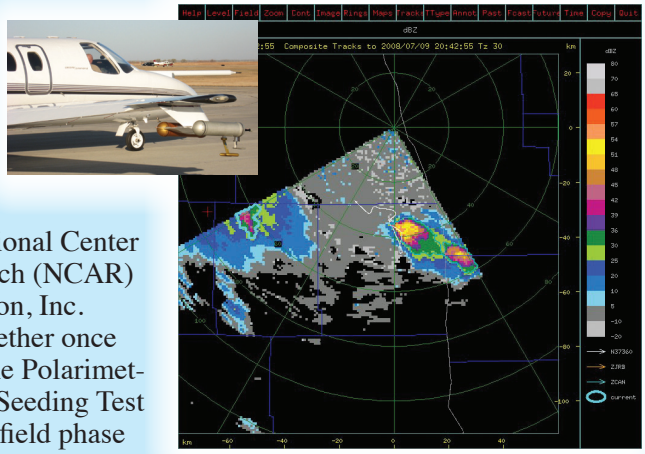

Photos courtesy of UND Aerospace

The North Dakota Atmospheric Resource Board (NDARB), the University of North Dakota (UND), the National Center for Atmospheric Research (NCAR) and Weather Modification, Inc. (WMI) are working together once again this summer on the Polarimetric Cloud Analysis and Seeding Test (POLCAST). The third field phase of the hygroscopic seeding research program will be conducted from June 21 through July 23 in eastern North Dakota.

Hygroscopic seeding utilizes tiny salt particles to enhance cloud droplet formation and accelerate and enhance rainfall. POLCAST will provide a unique opportunity to validate the physical "chain of events" of the seeding process. This will be done through the seeding of selected clouds on a randomized basis, meaning that half of the selected clouds will be seeded and half will be left unseeded for statistical comparison.

Radar operations will focus on documenting the variability and range of radar responses to precipitation development from seeded and unseeded clouds.

Important additions to this seasons' program include the use of UND's Citation II research aircraft, ground-based aerosol sampling, and higher resolution numerical forecast models. The Citation II jet's role is to conduct microphysical in-cloud measurements of seeded and unseeded clouds. The aircraft is outfitted with a robust instrumentation suite that measures the quantity and size of aerosols and water droplets in the atmosphere. In addition, a commonly used tracer gas will be utilized during seeding runs to "tag" the seeded cloud volumes, allowing researchers to identify which clouds, or parts of clouds were seeded with the hygroscopic nuclei. The gas will be released by the seeding aircraft and detected by equipment installed in the Citation II as it flies through the target clouds. Hygroscopic flares will once again be donated by Kindred, ND-based company, Ice Crystal Engineering (ICE).

Ground-based aerosol sampling conducted on the UND campus during the POLCAST project will provide another valuable resource for making comparisons with the in-cloud measurements taken by the Citation II aircraft. By understanding the concentration and sizes of aerosols in the atmosphere on any given day, the feasibility and effectiveness of seeding North Dakota's clouds with hygroscopic particles will hopefully be determined.

Lastly, the accuracy of weather forecast models used for the POLCAST program will be improved over the previous seasons. A specialized, high resolution Weather Research and Forecasting Model (WRF) will be run every six hours at UND to support project forecasting operations. The WRF model is designed to predict small-scale features, such as cloud fields and precipitation and can be customized for specific geographical areas.

Students enrolled in UND's Aerospace Sciences program will again make significant contribution to POLCAST. Both graduate and undergraduate students will be involved in various aspects of the program including radar operations, numerical modeling, and aircraft and ground-based instrumentation.

Conclusions about whether hygroscopic seeding is effective in North Dakota clouds will come into better focus with each new research operation. Ultimately, the results will determine whether it will eventually be used to enhance rainfall and suppress hail damage in North Dakota.

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