

Relationship between Cloud Condensation Nuclei and Satellite Retrievals of Cloud Droplet Effective Radius

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What is the relationship between below cloud base cloud condensation nuclei (CCN) and satellite retrievals of cloud droplet effective radius in the North Dakota Region?

Relevance to NASA

The Terra and Aqua Satellites provide cloud effective radius; however, satellites can not measure cloud condensation nuclei (CCN) concentrations below cloud. We are using satellite observations to understand how CCN concentrations affect precipitation development.



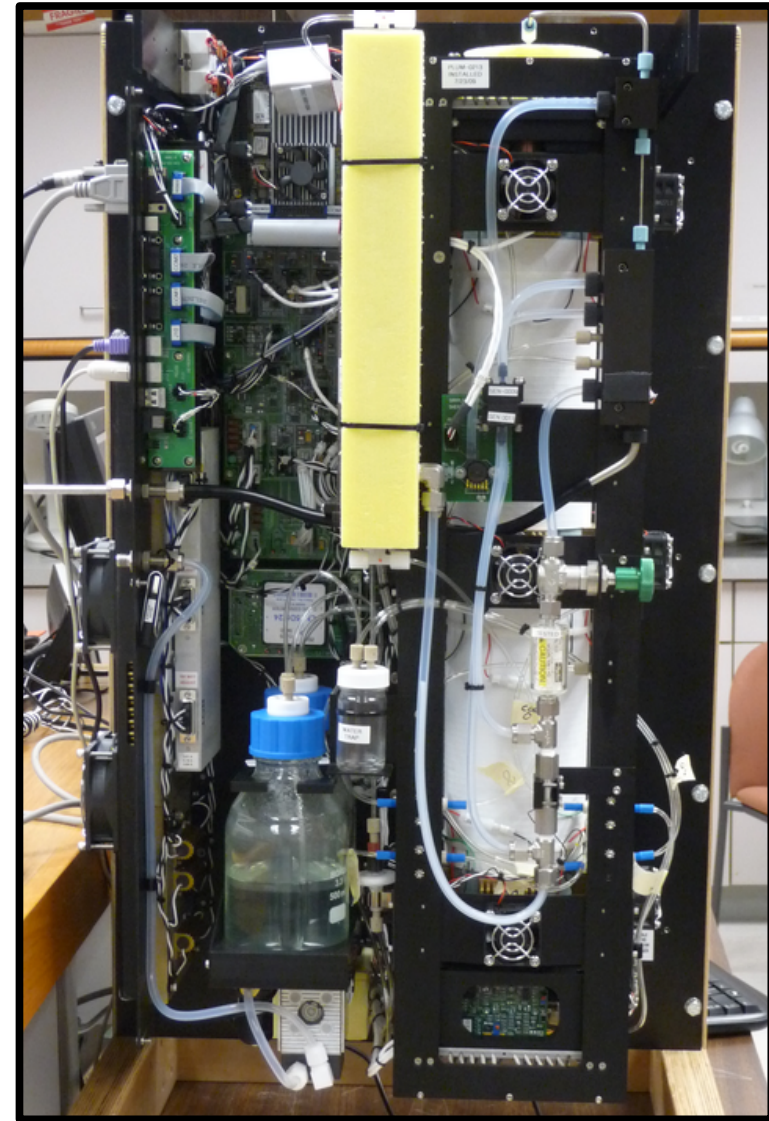
Aircraft view of cloud base on July 8, 2012



View of Cumulus Cloud on July 12, 2012

Accomplishments

- Software written to process all aircraft and surface CCN data.
- Statistical summary of the 2012 0.6 % supersaturation CCN concentrations measurements.
- Preliminary analysis of the satellite data corresponding to the aircraft CCN observations.



Collaborations, Students & Publications

NASA Goddard Space Flight Center (GSFC) Meeting

- May 8 meeting with Steven Platnick, Thomas Arnold and Kerry Meyer at GSFC.

Student Involvement

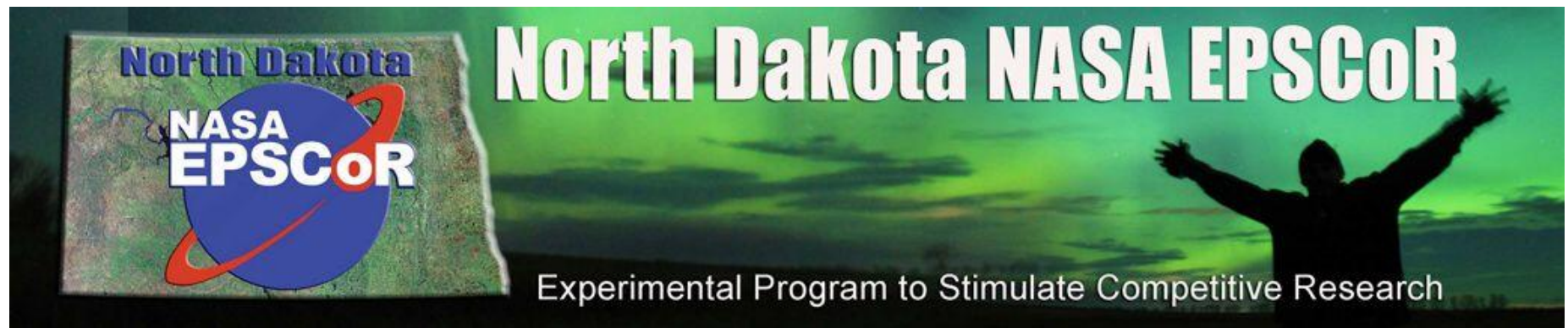
- Mariusz Starzec, Graduate Student
- Cody Troop, Undergraduate Student

Presentations

- Starzec, Mariusz (Faculty Sponsor - David Delene), Cloud Condensation Nuclei Retrievals at Cloud Base in North Dakota, Presentation given at the University of North Dakota Graduate School Forum in Grand Forks, North Dakota on March 12, 2014.
- Troop, Cody and David Delene, MODIS Observed Droplet Effective Radius in Developing Cumulus Clouds over North Dakota in Summer 2012, Presentation given at the University of North Dakota Graduate School Forum in Grand Forks, North Dakota on March 12, 2014.
- Delene, David, Mariusz Starzec, Cody Troop, and Darin Langerud, Observations of In-situ Cloud Condensation Nuclei and Satellite Cloud Droplet Effective Radius during the POLCAST4 Field Project in North Dakota, Talk given at the 2014 Annual Weather Modification Association Conference in Reno, Nevada on April 23, 2014.

Future Work

- Analysis of CCN supersaturation spectrum fits.
- Complete satellite effective radius analysis and combine with CCN observations.
- Publication of scientific results.
- Write proposal with NASA GSFC (Steven Platnick)



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