

Research Topic: Unveiling Ice Crystal Chain Aggregates in Winter Storms: Contextualization

Using In-situ and Remote-sensing Observations

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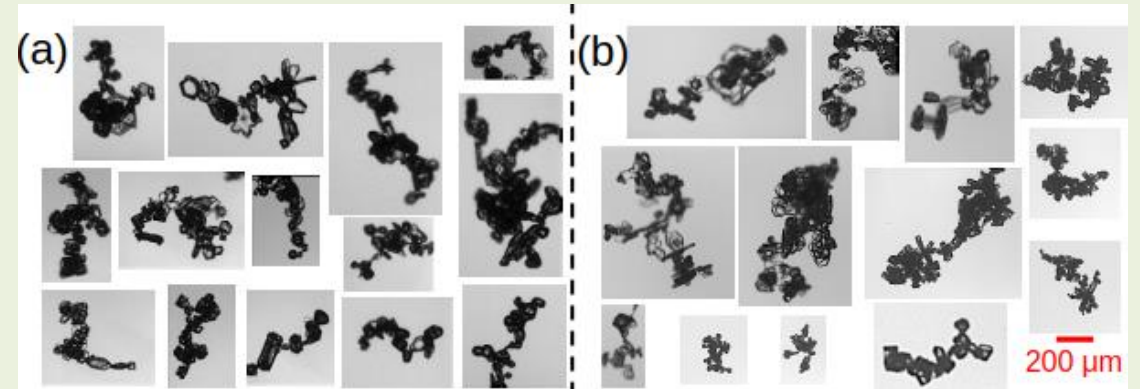


Figure 1. A collage of Particle Habit Imaging and Polar Scattering (PHIPS) probe images of ice crystal chain aggregates observed in-situ during (a) CapeEx19 and (b) IMPACTS field projects. Images courtesy of Dr. Emma Järvinen of Wuppertal University.

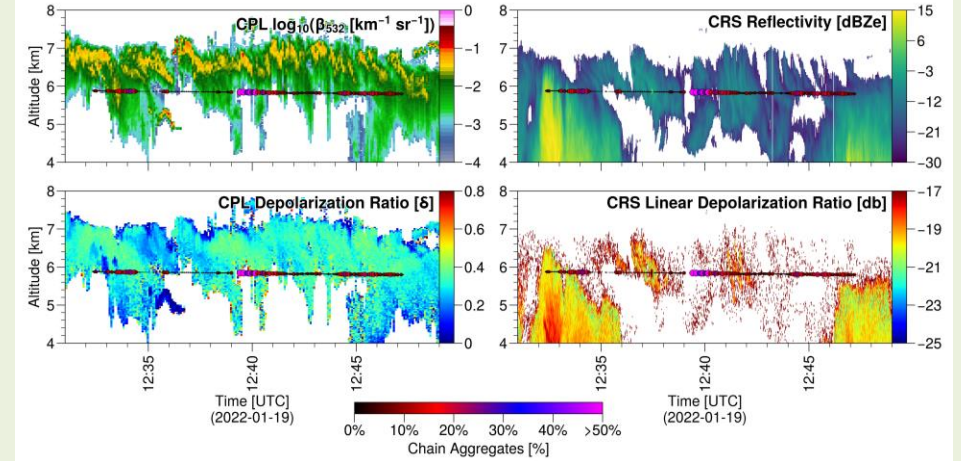


Figure 2. A 4-panel plot showing a collocated flight leg of the ER-2 (20 km AGL) and P-3 (5.9 km AGL) aircraft on January 19, 2022, during the NASA IMPACTS field campaign over Montréal, Canada. The P-3 flight track is overlaid using color-coding by the percentage of manually classified chain aggregates relative to all Cloud Particle Imager (CPI) particles.

Next Steps:

- Submission to MOSAICS 5-yr Collaboration Award.
- Pursue joint partnerships for future airborne/laboratory research.

Students:

- Two visits (10 weeks total) to GSFC to analyze chain aggregate observations from IMPACTS using ML/AI, contextualized with remote sensing data.
- Oral/poster presentation at international/national conferences. Two manuscripts submitted to scholarly journals (JAS/JGR).
- 1 Ph.D. student and 2-4 undergraduate students

SMD Relevance:

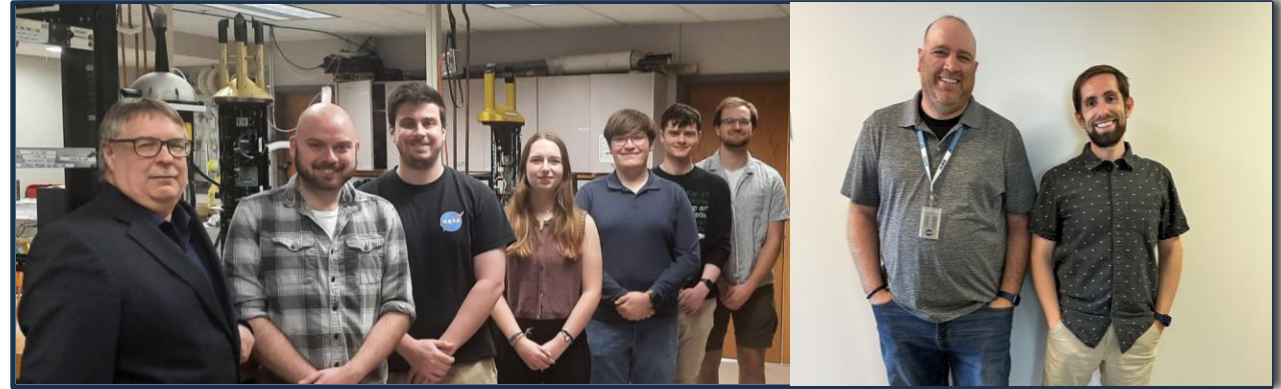
- NASA Earth Science and Aerospace Research Missions
- Understanding the formation and behavior of ice crystal aggregates in storms for improving model microphysical parameterizations.

Mentoring Approach:

- Conduct weekly in-person/virtual meetings, research and professional support.

Expected Impacts:

- Students gain research, career, and personal support to succeed in STEM.
- Long-term partnerships between faculty and NASA partner that will enable a robust foundation for future proposals.



Imaged From Left to Right: David Delene (PI), Shawn Wagner (Co-I), Christian Nairy (Ph.D.), Jenna Post (U), Jacob Halmos (U), Bryce Rickbeil (U), Conrad Slad (U), John Yorks (NASA Partner), Joseph Finlon (NASA Co-Partner)