

WINTRE-MIX

WINter precip Type REsearch Multi-scale eXperiment

13–14 December 2021 project planning meeting

The meeting will start at ~9am ET

Zoom protocols

- Please remain muted, with video off, during presentations.
- Q&A will be moderated. Please type questions in chat or use “raise hand” feature.
- Feel free to leave and rejoin the meeting according to your schedule and interests.

Welcome & Overview

Justin Minder



UNIVERSITY AT ALBANY
State University of New York

WINTRE-MIX

WINter precip Type REsearch Multi-scale eXperiment

13–14 December 2021 project planning meeting



@WINTRE_MIX

https://www.eol.ucar.edu/field_projects/wintre-mix



AGS-2113995

Welcome & Overview

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- Q&A will be moderated. Please type questions in chat or use “raise hand” feature.
- Feel free to leave and rejoin the meeting according to your schedule and interests.

Technical issues?

- Email jminder@albany.edu and nbassill@albany.edu



- 1. Project Overview**
- 2. Meeting Overview**

Project Overview

Project Overview: *Funding & participants*

Core funding from the National Science Foundation (NSF)

NSF PIs:

- Justin Minder, Nick Bassill (UAlbany)
- Leonid Nichman, Cuong Nguyen (NRC)
- Jeff French, David Kingsmill (UWyoming)
- Katja Friedrich, Andrew Winters (UColorado)
- Karen Kosiba (Uillinois – FARM)
- NCAR Earth Observing Lab (EOL)

Many other collaborators, partners, contributors:

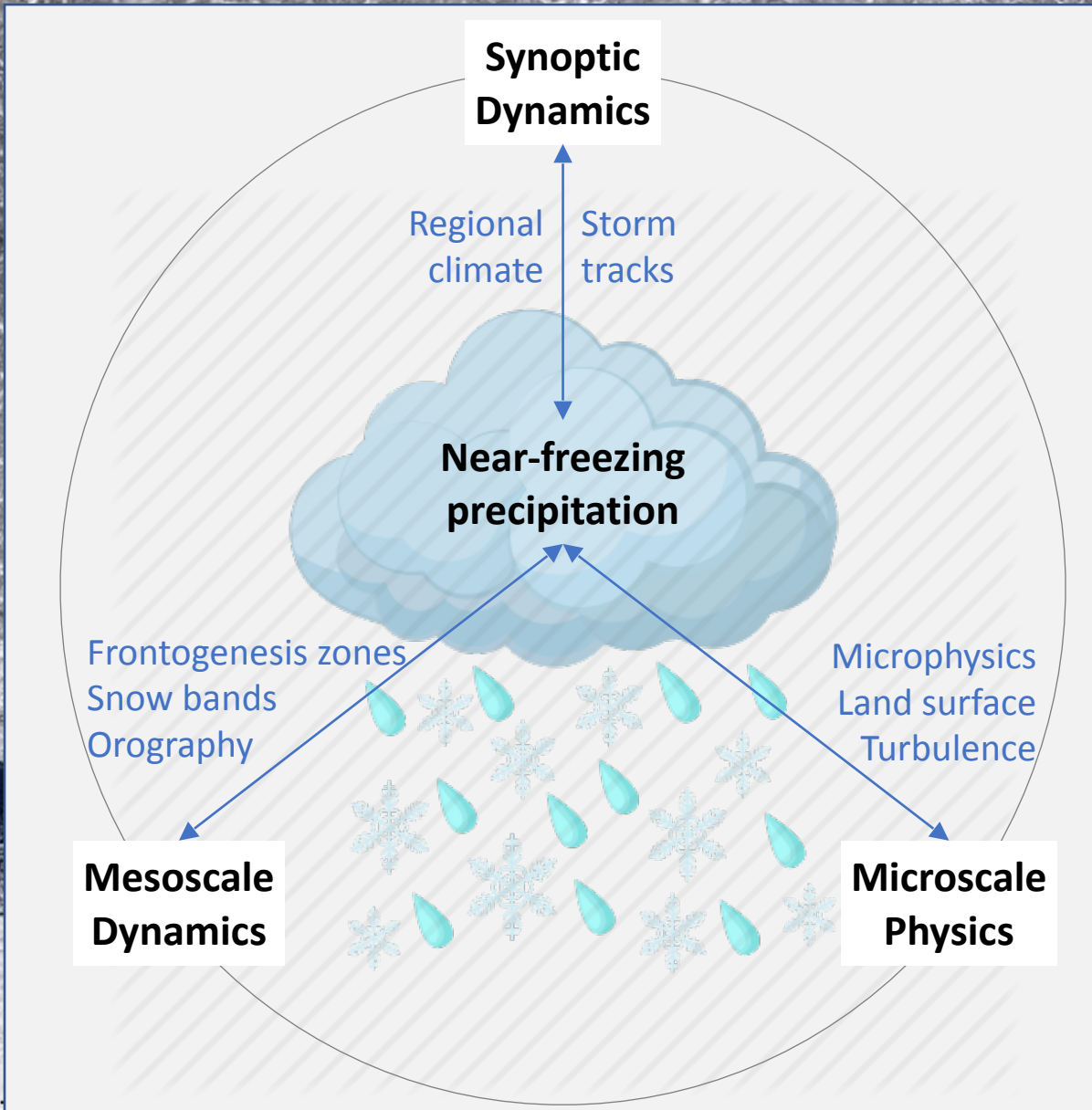
- University of Québec at Montréal –UQAM (Julie Theriault)
- McGill University (John Gyakum, Frederic Fabry, Dan Kirshbaum)
- Environment and Climate Change Canada – ECCC (Daniel Michelson, Ismail Gultepe)
- National Weather Service – NWS (BTV, Eastern Region)
- Northview Weather (Jason Shafer)
- FAA-TAIWIN demonstration project (Stephanie DiVito)
- NASA-IMPACTS project (Lynn McMurdie)



Project Overview: *Objectives*

Overarching goal

To better understand how multi-scale processes influence the variability and predictability of precipitation type and amount under near-freezing surface conditions.



Basic science questions:

- How do mesoscale dynamics modulate near-freezing precipitation?
- How do microscale processes modulate near-freezing precipitation?
- How do multi-scale processes combine to determine the predictability of near-freezing precipitation?

Broader impacts:

- Improved and better-leveraged observations & diagnostics
- Improved and better-leveraged numerical forecasts
- Improved communication between stakeholders, forecasters, researchers
- Educational opportunities through field work, outreach, and citizen science



Project Overview: *Research foci*

Overarching goal

To better understand how multi-scale processes influence the variability and predictability of precipitation type and amount under near-freezing surface conditions.

How do mesoscale dynamics modulate near-freezing precipitation?

- Role of terrain channeled and trapped flow within valleys?
- Role of orographic ascent / descent along surrounding terrain?
- Role of ascent in mesoscale precipitation bands?

How do microscale processes modulate near-freezing precipitation?

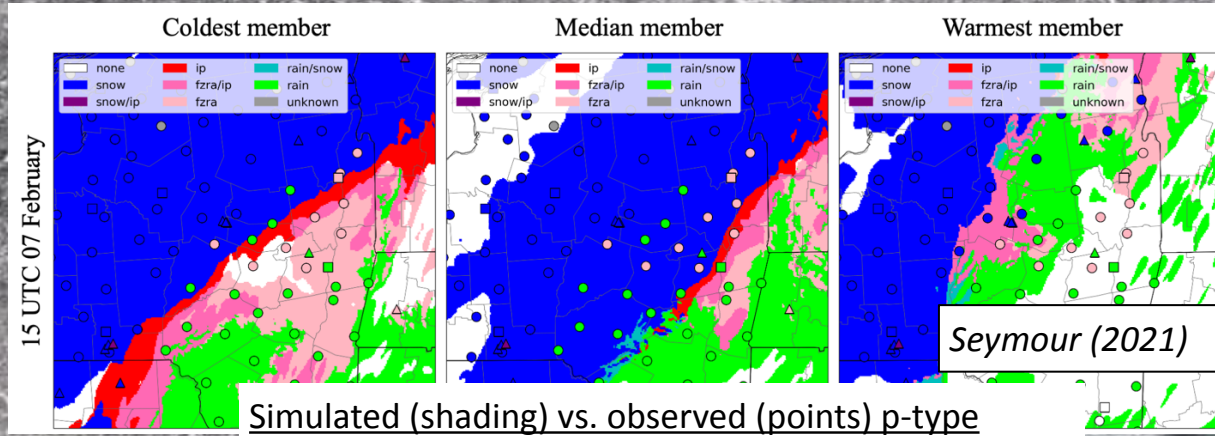
- Role of small-scale vertical motions (from turbulence, convection, waves)?
- Role of temperature and aerosol-dependent ice nucleation processes?
- Role of variations in melting layers associated with crystal habit, riming, precipitation rate?

How do multi-scale processes combine to determine the predictability of near-freezing precipitation?

- How is model predictability limited by imperfect representations of sub-grid turbulence and microphysics processes?
- How do mesoscale terrain features act to enhance or degrade predictability?
- How and when does uncertainty in synoptic flow modulate predictability?

Project Overview: *Broader impacts*

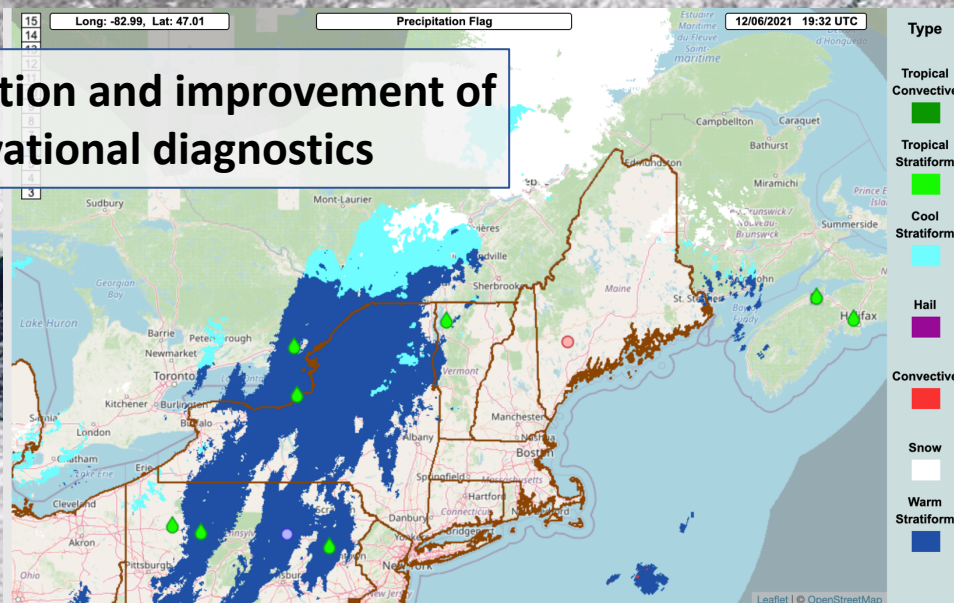
Evaluation and improvement of forecast models



Workshops to improve communication between groups

- Researchers
- Forecasters
- Stakeholders (transportation, energy, aviation,...)

Evaluation and improvement of observational diagnostics



Educational opportunities for students and general public

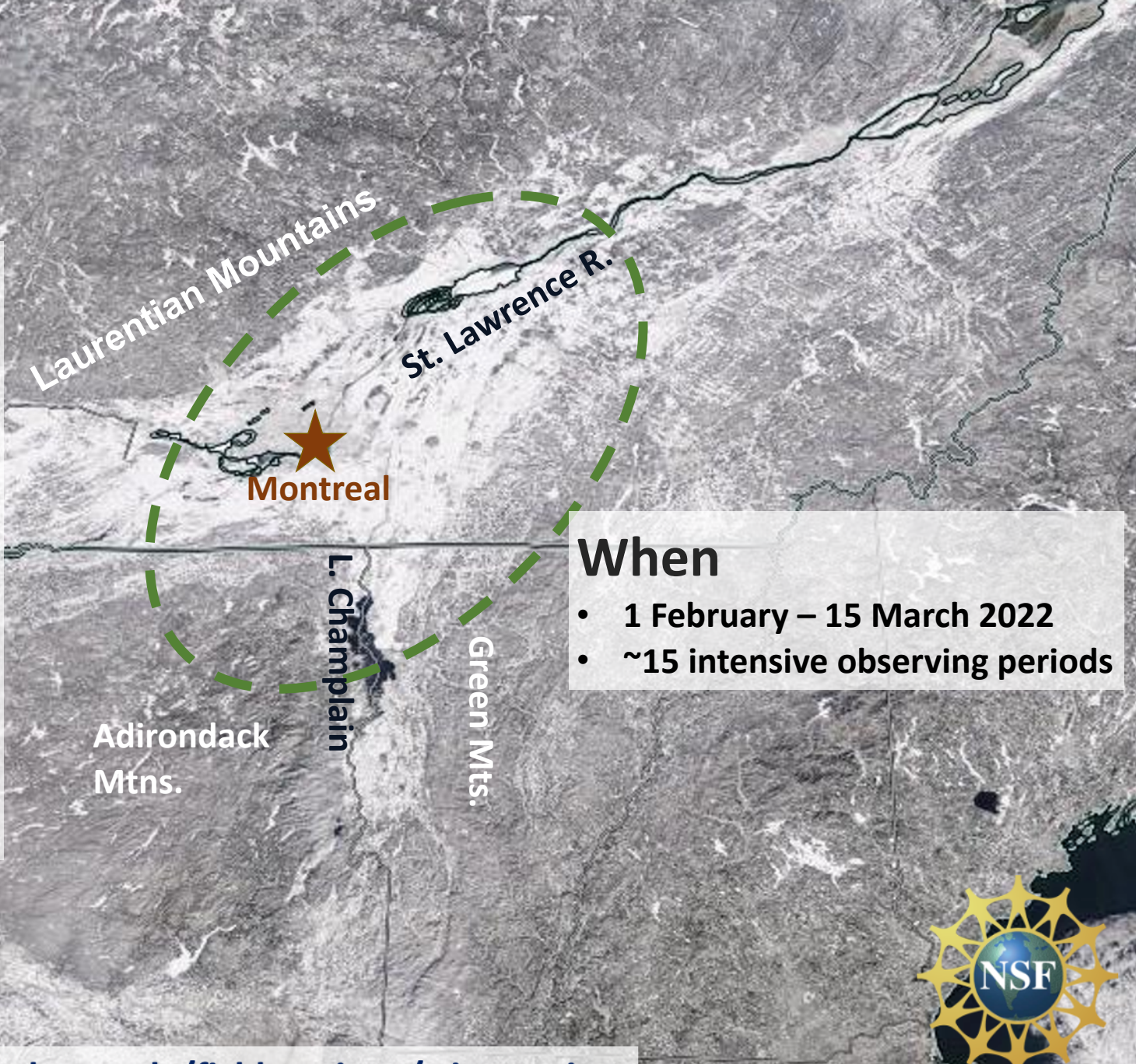
- Research opportunities for undergraduate and graduate students
- Educational outreach events
- Citizen science



Project Overview: *Where & When*

Where

- US (NY) – CAN (QC) boarder region
- St. Lawrence / Champlain Valleys
- Excellent backbone of existing observations
- Plentiful & diverse near-freezing winter precipitation
- Scientifically interesting terrain effects
- Teams based in:
 - Mont-Saint-Hilaire, QC (opp. center)
 - Montreal, QC (McGill, UQAM)
 - Ottawa, ON (NRC Convair-580, UWyo)
 - Plattsburgh, NY (UAlbany)

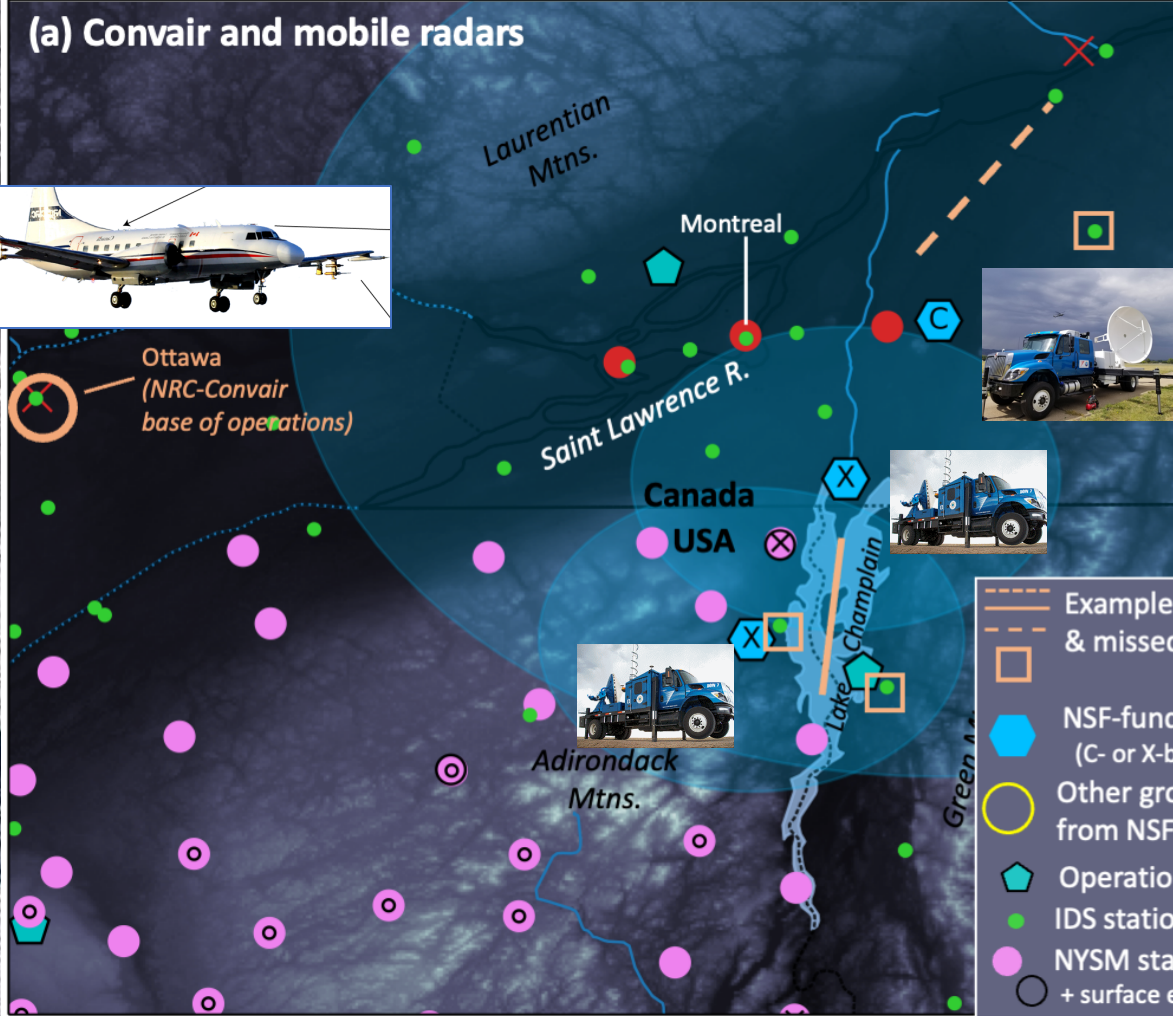


When

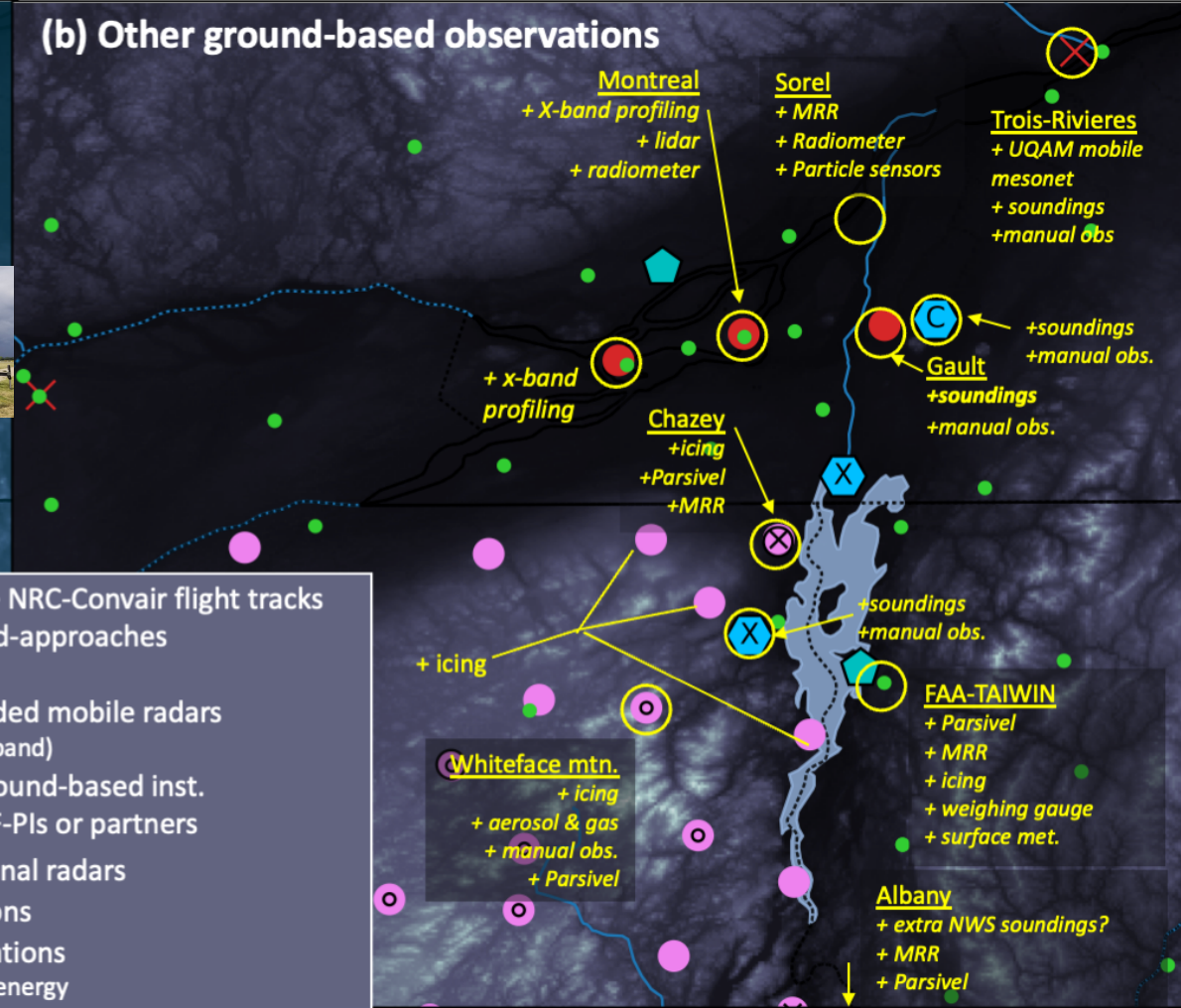
- 1 February – 15 March 2022
- ~15 intensive observing periods

Project Overview: Deployment strategy

(a) Convair and mobile radars



(b) Other ground-based observations



- Example NRC-Convair flight tracks & missed-approaches
- NSF-funded mobile radars (C- or X-band)
- Other ground-based inst. from NSF-PIs or partners
- Operational radars
- IDS stations
- NYSM stations
- + surface energy
- + profiling (lidar, radiometer)
- + snowpack
- CFICS stations (X=uncertain)



Project Overview: *Challenges*

Typical field campaign challenges

- Instrument deployment, maintenance, operation
- Coordination between groups
- Uncertain weather
- International travel, shipping, coordination
- Assuring adherence to standards of conduct

Winter-specific challenges

- Hazardous driving & working conditions
- Aircraft & instrument icing

COVID-specific challenges

- Need to minimize risks to participant & community health
- Travel & facility restrictions
- Variable federal, state, provincial, and institutional guidelines and rules
- Need to consider contingency plans in case of disruption

Meeting Overview

Meeting Overview

Day 1 (13 Dec.)

Open to all

- Observational platforms
- Safety
- Data management, policy, resources
- Forecasting
- Coordination with other projects
- Education & outreach

Day 2 (14 Dec.)

- ADVANCEGeo training [9am-noon]
 - *Registered field participants only*
- Forecasting and decision-making “dry run”
 - *Primarily for project PIs*

Detailed agenda here



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Meeting Overview (Day1):

9:45-10:25 am

Aircraft operations

(Wolde, French, Kingsmill)



NRC Convair-580

- 60 flight hours
- Thermodynamics, winds
- Rich array of in situ microphysics probes, with redundancy
- Profiling radar and lidar
- Aerosol sensors
- Well suited to operate in icing conditions
- Recently used in FAA ICICLE project
- Based in Ottawa, Canada

Meeting Overview (Day1):

10:40 – 11:25 am

Mobile radar operations

(Friedrich)



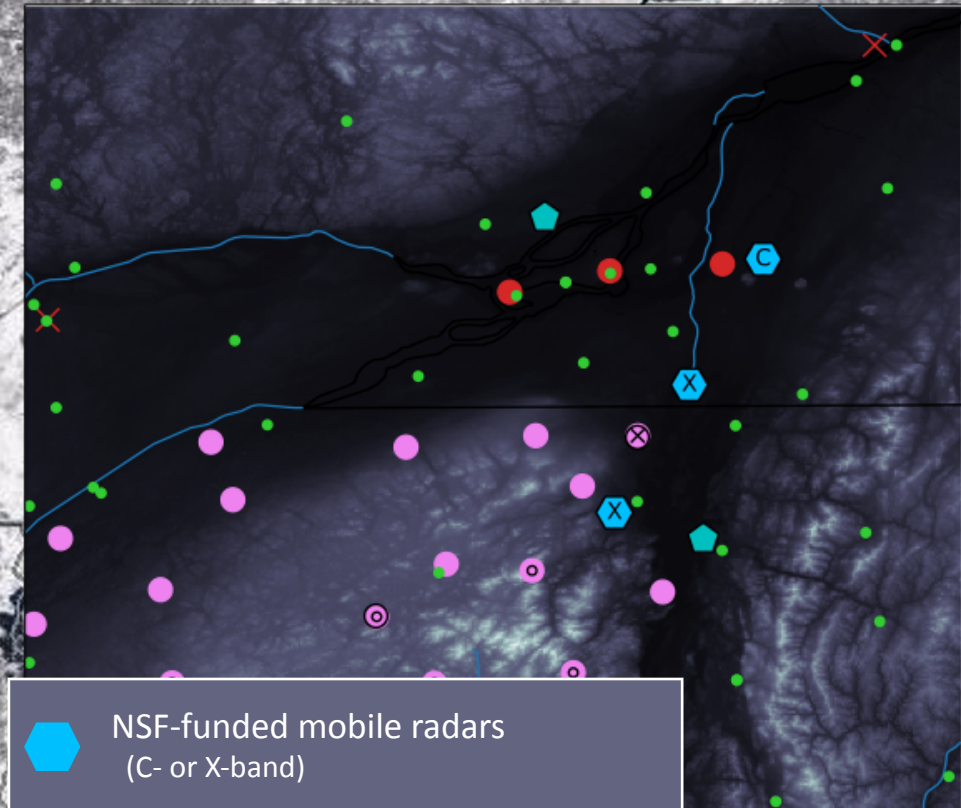
Doppler on Wheels (DOW)

- x 2
- Mobile X-band scanning radar
- Dual-pol
- one in NY one in QC



C-band on Wheels (COW)

- C-band scanning radar
- Dual-pol
- Dual-frequency
- To be deployed at fixed location in QC



- NSF-funded mobile radars (C- or X-band)
- Operational radars
- IDS stations
- NYSM stations
- + surface energy
- × + profiling (lidar, radiometer)
- + snowpack
- CFICS stations (X=uncertain)

Meeting Overview (Day1):

11:25 – 11:55 am

Sounding operations (*Winters*)

12:10 – 12:25 pm

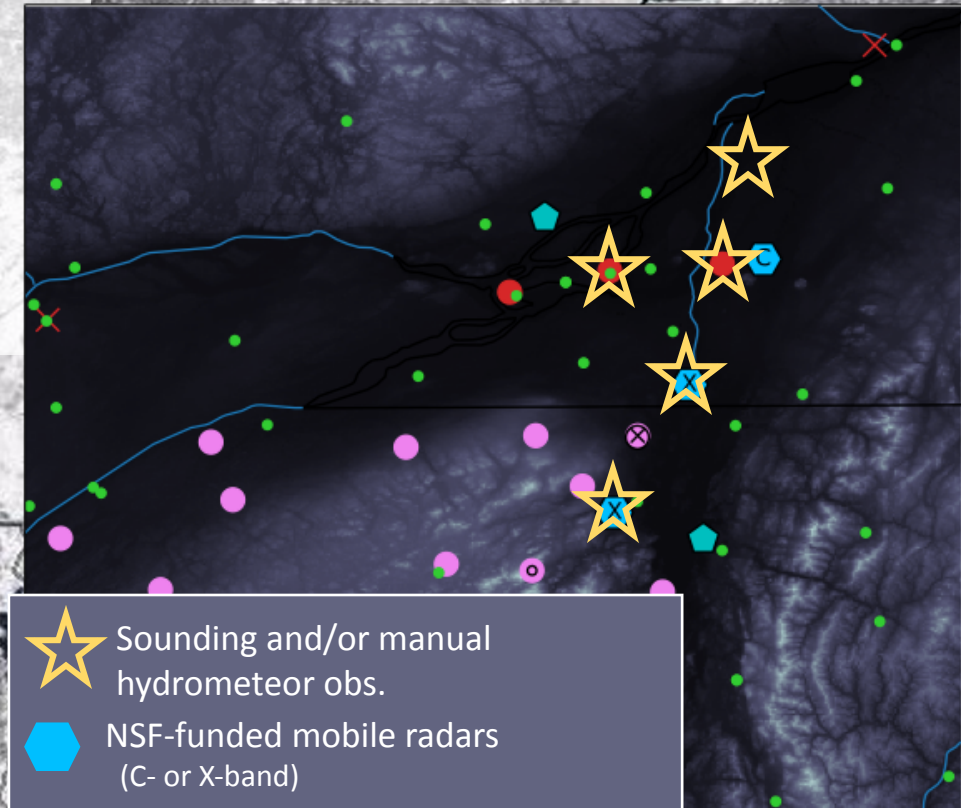
Manual hydrometeor observations (*Theriault*)










Research sounding operations

- 4 teams (UAlbany, UQAM, CU, McGill)
- ~70 sondes each

Manual hydrometeor observations

- Manual ID
- Hydrometeor photography
- Manual accumulation



-  Sounding and/or manual hydrometeor obs.
-  NSF-funded mobile radars (C- or X-band)
-  Operational radars
-  IDS stations
-  NYSM stations
-  + surface energy
-  + profiling (lidar, radiometer)
-  + snowpack
-  CFICS stations (X=uncertain)



Meeting Overview (Day1):

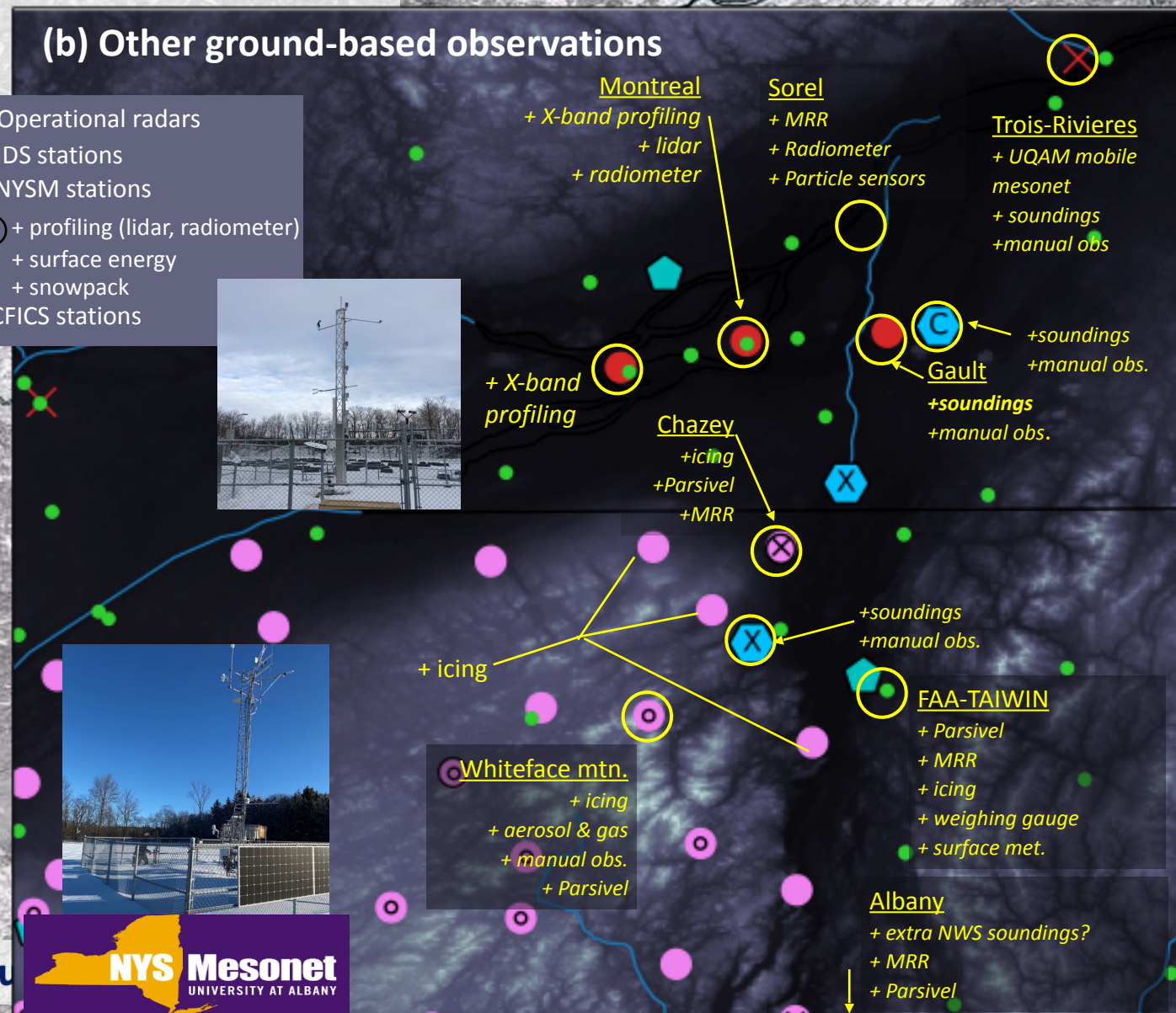
12:25 – 12:55 pm

Operational mesonets + (Bassill, Gyakum, Theriault)

- Advanced mesonets in US & CAN provide high-quality measurements
- Surface and profiling measurements
- Additional sensors:
 - Sorel (ECCC, CU)
 - Northeast NY (UALbany)
 - Trois-Rivieres (UQAM)
 - Montreal (McGill)

(b) Other ground-based observations

- Operational radars
- IDS stations
- NYSM stations
- + profiling (lidar, radiometer)
- + surface energy
- + snowpack
- CFICS stations

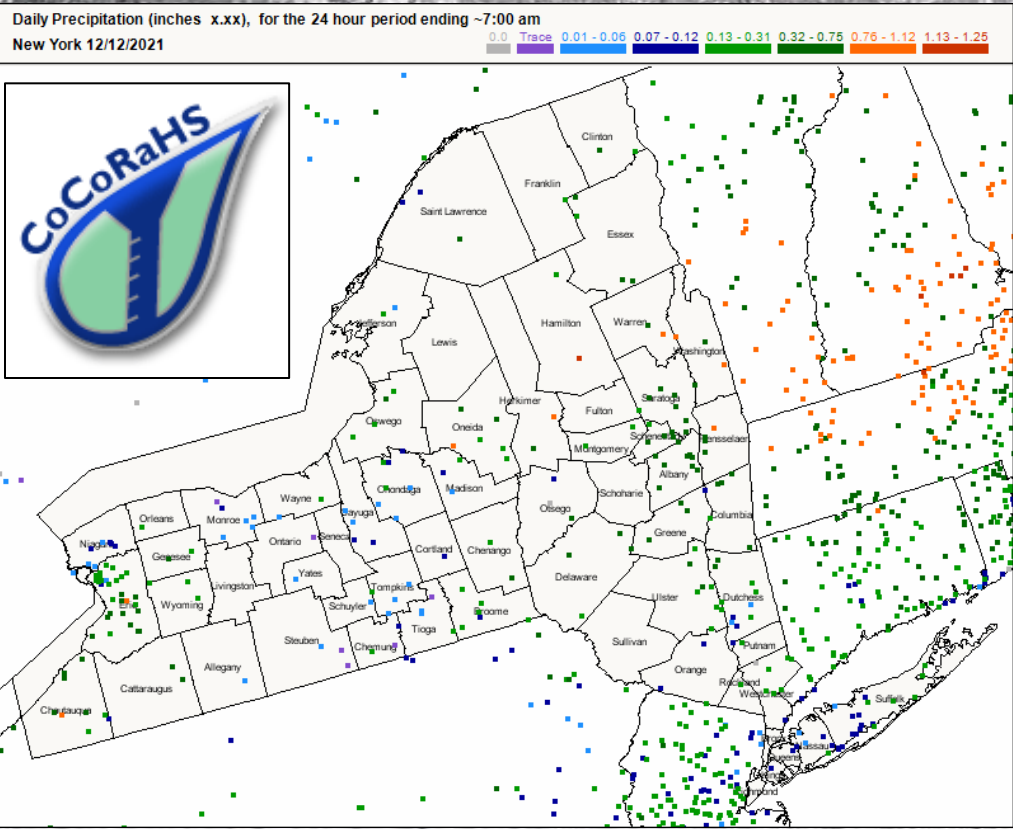


Meeting Overview (Day1):

12:55 – 1:05 pm

Citizen science

(Winters, Bassill, Minder)



- Verizon 10:23 PM
- < Report Types Rain/Snow
- Rain
 - Freezing Rain
 - Drizzle
 - Freezing Drizzle
 - Ice Pellets/Sleet
 - Snow and/or Graupel
 - Mixed Rain and Snow
 - Mixed Ice Pellets and Snow
 - Mixed Freezing Rain and Ice Pellets
 - Mixed Rain and Ice Pellets

Meeting Overview (Day1):

2:05 – 2:20 pm

COVID safety / policies (*Minder*)

2:20– 2:35 pm

Field safety (*Friedrich*)



NCAR is sponsored by National Science Foundation

 Search

WINTRE-MIX



February 1, 2022 to March 15, 2022

Project Location:

Northern New York and Southern Quebec, with a focus on the Saint Lawrence River Valley and Lake Champlain Valley

What's New?:

- [WINTRE-MIX Planning Meeting](#) - 13/14 December 2021 - SUNY Albany
- [ADVANCEGeo training - Required Code of Conduct Training \(Virtual\)](#) - 14 Dec 2021
- [Northeast Regional Operational Workshop 22 \(NROW22\) Presentation](#) - 9 November 2021 - Albany, NY
- [Internal Winter Weather Workshop Presentation](#) - 5 November 2021 - NWS Burlington, Vermont (BVT)

Project Description:

DATA ACCESS

Data Access
Field Catalog

DATA DOCUMENTATION

- WINTRE-MIX Data Policy
- WINTRE-MIX Data Management Plan
- Dataset Documentation ("Readme")
- Requirements
- DOI Guidance to Authors
- EOL FDA Data Submission Instructions - Post Field Phase

SAFETY & CODES OF CONDUCT



- WINTRE-MIX COVID Safety Protocols
- WINTRE-MIX Code of Conduct
- NSF Important Notice No. 144: Harassment
- UCAR/NCAR Codes of Conduct



Meeting Overview (Day1):

2:35 – 2:45 pm

Data management / policy (*Cully*)

2:45 – 3:00 pm

Field catalog (*Costanza*)



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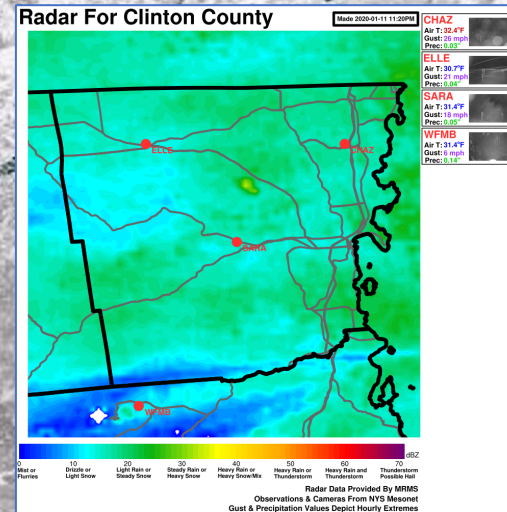
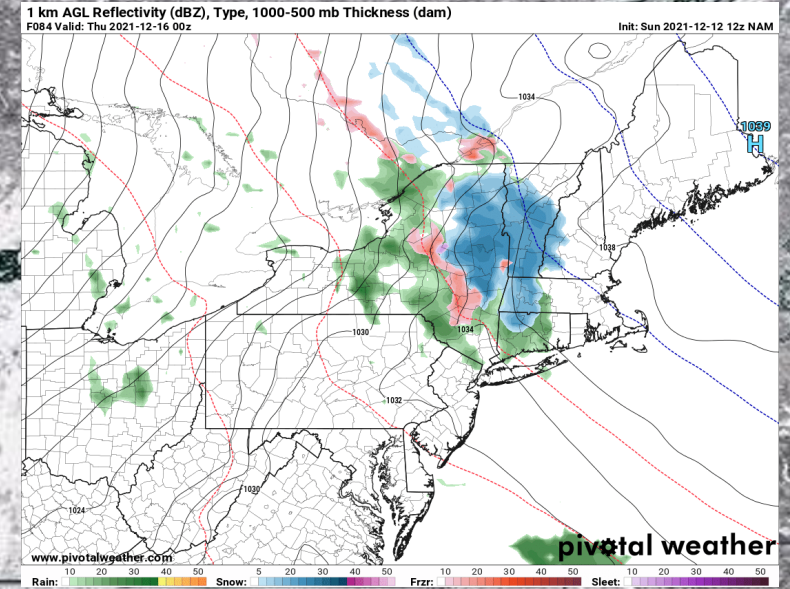
WINTRE-MIX COVID Safety Protocols
 WINTRE-MIX Code of Conduct
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 UCAR/NCAR Codes of Conduct

Meeting Overview (Day1):

3:15 – 3:30 pm

Forecasting (*Bassill, Winters*)

- 2 briefings per day (~30–60 minutes each)
 - ~15Z Briefing: Full forecast discussion with focus on the short-range evolution (0–2 days) as well as the long-range forecast (2–5 days)
 - ~21Z Briefing: Abbreviated discussion with a focus on updates to the short-range forecast.
- Delivered in a hybrid format
- Lead forecaster with assistance from student forecasters



Meeting Overview (Day1):

3:30 – 3:50 pm

FAA-TAIWIN coordination (*DiVito*)

3:50 – 4:10 pm

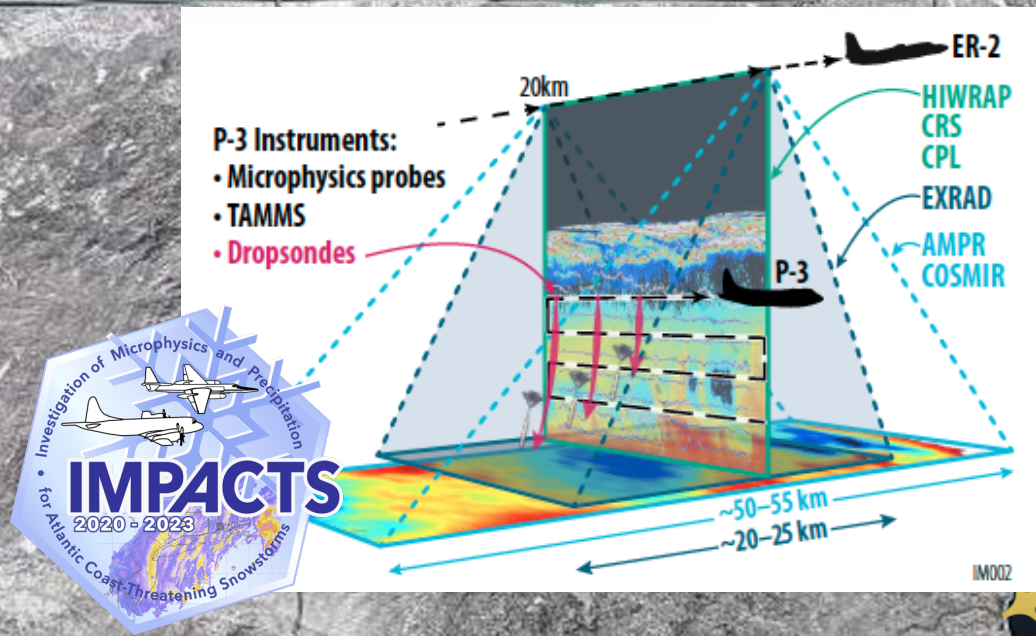
NASA-IMPACTS coordination (*McMurdie / Rauber*)

FAA Terminal Area Icing Weather Information for NextGen (TAIWIN) demonstration project

- Jan–Feb 2022
- Operations in NY and VT
- Supplemental ground-based obs. at Burlington
- Overlapping use of Convair-580

NASA Investigation of Microphysics and Precipitation for Atlantic Coast-Threatening Snowstorms (IMPACTS)

- Jan–Feb 2022
- Operations over midwestern to northeastern US
- ER-2 and P-3 aircraft
- <https://espo.nasa.gov/impacts/content/IMPACTS>



Meeting Overview (Day1):

4:10 – 4:30 pm

Educational outreach activities (*Nguyen, Minder*)

Open house event at NRC in Ottawa, ON on 1 February

- Opportunity to view aircraft and other instruments

DOW radar in Albany, NY on 27-28 January

- Events at local K-12 schools
- Events at UAlbany



<https://nrc.canada.ca/en/research-development/nrc-facilities/research-aircraft-fleet>



Bell et al. (2015)

Meeting Overview (Day 2)

ADVANCEGeo training

9 am – 12 pm

- For all WINTRE-MIX field participants
- Pre-registration required
- Join using special Zoom link emailed to registrants

“Dry run” activities

1 pm – 5 pm

- Primarily for project PIs to practice decision making procedures
 - *Decision making overview*
 - *Weather briefing*
 - *PI mock decision making activity*
 - *Debrief*
- Use “Day 2” Zoom link
- Will continue to have dry runs on Wed – Fri (10 am – 1 pm)

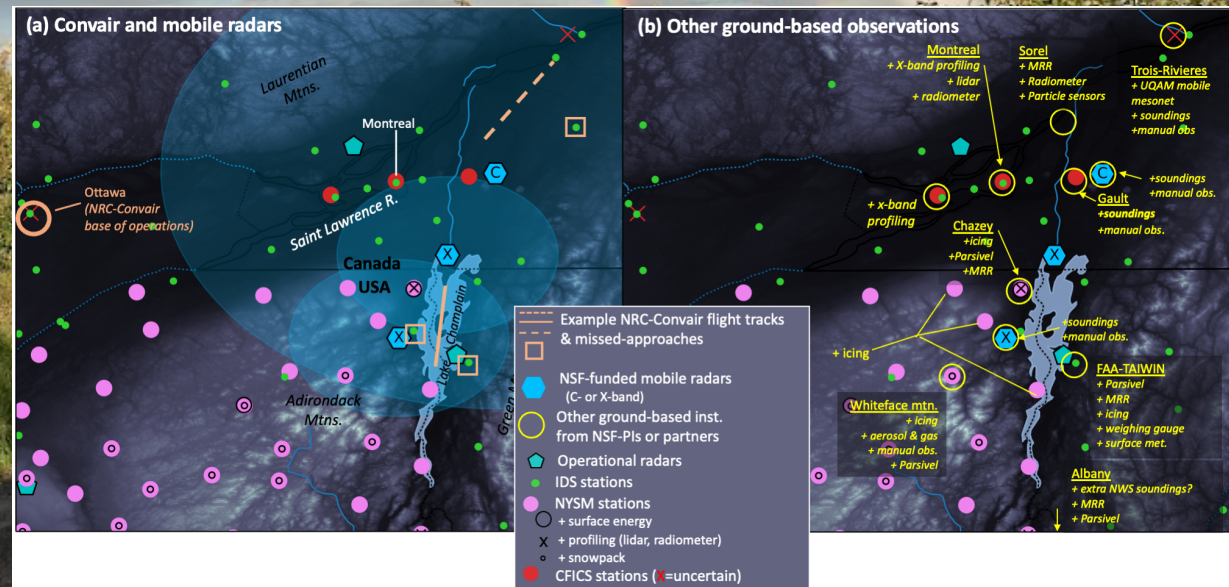
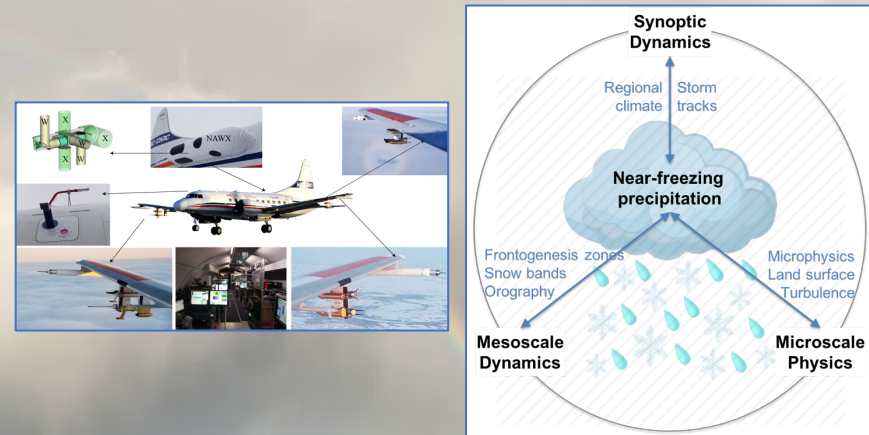
Summary

WINTRE-MIX will take place during 1 Feb -15 Mar 2022

Focused on processes and predictability of near-freezing precipitation in northern New York & southern Quebec

Observational facilities:

- advanced mesonets
- mobile radars (DOW)
- research aircraft (NRC-Convair)
- soundings
- numerous other ground-based sensors



https://www.eol.ucar.edu/field_projects/wintre-mix

jminder@albany.edu

Monday 12/13

<https://albany.zoom.us/j/92277307237?pwd=aHEwcEZvQmRPYS9UdFVXY2I5RjNDdz09>

Meeting ID: 922 7730 7237

Passcode: 720377

Speakers: please email a copy of your slides to jminder@albany.edu & cully@ucar.edu

start	end	event	presenter	audience
9:00 AM	9:45 AM	Welcome, overview	Justin Minder	all
9:45 AM	10:05 AM	Aircraft operations (NRC)	Mengistu Wolde	all
10:05 AM	10:25 AM	Aircraft operations (PI-Team)	Jeff French, Dave Kingsmill	all
10:25 AM	10:40 AM	BREAK		
10:40 AM	11:25 AM	Mobile radar operations	Katja Friedrich	all
11:25 AM	11:55 AM	Sounding operations	Andrew Winters	all
11:55 AM	12:10 PM	BREAK		
12:10 PM	12:25 PM	Manual hydrometeor obs.	Julie Theriault	all
12:25 PM	12:55 PM	Operational mesonets	Nick Bassill, John Gyakum, Julie Theriault	all
12:55 PM	1:05 PM	Citizen science	Andrew Winters, Nick Bassill, Justin Minder	all
1:05 PM	2:05 PM	LUNCH		
2:05 PM	2:20 PM	COVID safety / policies	Justin Minder	all
2:20 PM	2:35 PM	Field safety	Katja Friedrich	all
2:35 PM	2:45 PM	Data management / policy	Linda Cully	all
2:45 PM	3:00 PM	Field catalog	Carol Costanza	all
3:00 PM	3:15 PM	BREAK		
3:15 PM	3:30 PM	Forecasting overview	Andrew Winters, Nick Bassill	all
3:30 PM	3:50 PM	FAA-TAIWIN coordination	Stephanie DiVito	all
3:50 PM	4:10 PM	NASA-IMPACTS coordination	Lynn McMurdie or Bob Rauber	all
4:10 PM	4:30 PM	Outreach activities	Justin Minder and Cuong Nguyen	all
4:30 PM	5:00 PM	Open discussion / flex time		all

