Canada
Consideration of Sites for Cryonet

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MSC Test Sites
(Solid Precipitation, Snow on Ground)

- (A) Iqaluit: 63.747765, -68.542362
- (B) Mount Pearl: 47.513396, -52.783386
- (C) CARE (Egbert) 44.233416, -79.779272
- (D) Coquihalla Summit: 49.59398, -121.099702 (new)
CARE Configuration (1)

• **Studies of References:**
  – DFIR + manual gauge (WMO SPICE);
  – DFIR + Geonor, CRN heater;
  – Pluvio2, Geonor: Single Alter + unshielded, heated

• **Wind Shields:**
  – Belfort Double Alter (30% porosity);
  – Canadian Double Alter (50% porosity).
  – Single Alter, Tretyakov, Nipher.

• **Studies of Heating:**
  – Geonor with various heating configurations;
  – Pluvio2: standard heating.

• **Other weighing gauges being assessed:**
  – Geonor 1500 mm; Belfort 3000;

• **Develop adjustment curves** representing the MSC operational networks:

• **Emerging technologies:**
  – Optical sensors (FD12P, Parsivel2, FS11P, PWS 100, PWD22, Theis LPM)
  – Radar based (POSS, LUFFT)
  – Hot plate.
CARE Configuration (2)

- **Snow on the Ground, SWE:**
  - Daily manual/webcam;
  - SWE GMON/CS725:
  - Snow Depth Sensors (SR50AH, Jenoptik laser, USH-8)
  - Snow Drift sensors;
  - Radiometers;
  - Periodic snow survey;

- **Intercomparison Sensors (from Manufacturers for WMO SPICE)**
  - Droplet Measurement Technologies;
  - Various heated Tipping Buckets;

- **Ancillary measurements:**
  - Snow Video Imaging
  - 2D Video Disdrometer
  - High Speed Camera: image processing software for the trajectory analysis of the snow particles
  - 3D Wind measurements;
  - Temperature, Humidity, Pressure;
  - Wind Speed and Direction: 2, 3, 10 m
  - Visibility; Sky conditions; Ice Accretion.
  - Microwave Rain Radar (MRR);
  - GEM Model Profiles and precip types;
  - 25 km from King Radar (C-band, dual-polarised)
  - Scanning WEBCAM.
Mount Pearl (St John’s) Configuration

- **Reference and instrument assessments:**
  - Pluvio2: DFIR, Single Alter, unshielded, Belfort Double Alter, std heating
  - Manual Nipher gauge.

- **Derivation/validation of adjustment curves.**

- **Potential validation site for Global Precipitation Mission (NASA)**

- **Evaluation of Emerging Technologies:**
  - Theis Laser Precipitation Monitor, Parsivel2, PWD22; Hot plate

- **Snow on the Groung and Blowing Snow:**
  - Manual Obs;
  - Snow depth sensors: SR50; USH-8;
  - Snow Drift Sensors (IAV FlowCapt)

- **Ancillary measurements:**
  - MRR – expect mixed conditions
  - Upper Air stations, 2 flights/day.
  - Scanning WEBCAM;
  - Temperature, Humidity;
  - Wind speed/direction: 2, 3, 10 m.
  - Ice accretion; Visibility; Sky Conditions;

- **2012/13: SAAWSO Satellite Applications for Arctic Weather for SAR Operations** (Dr I Gulntepe S&T): evaluate satellite based retrievals for nowcasting studies (fog, icing, cloud cover) and convection occurring over the eastern Canada. Outcomes will be used for future GOES-R satellite retrieval developments over the Arctic weather systems.
Iqaluit Configuration

**Primary Objective:**
- Existing and Emerging technologies:
- Impact of the Arctic Environment;
- Precipitation and Snow on the Ground

- Experiment to start in 2013

- Operational Upper Air station: 2 flights/day.

- 2013: Ka Band radar for light precipitation;

**Currently on Site:**
- DFIR + Geonor with standard heating
- Single Alter Geonor with no heating (operational configuration)
- Hot Plate
- Optical Sensors (Parsivel1, PWD22)
- SR50
- Snow Drift detector—blowing snow major issue
- Wind speed, direction: 10, 3, 2 m
- Temperature, RH, pressure.
- Sky Conditions, Ice Accretion, precip type
Additional configuration planned for 2013
Potential activities in Iqaluit

- Assess impact of the Arctic Environment: Existing and Emerging technologies:
  - Potential Arctic SuperSite;
  - Validation site for Global Precipitation Mission (NASA)
  - Potential reference site for in situ and upper air - supporting the WEM Strategy;
  - SAAWSO Satellite Applications for Arctic Weather for SAR Operations (13/14)
- Support NofN strategy - an inter-comparison site for all instruments used in the Arctic
- Testbed to compare X and Ka Band radar.
- SWE/SOG radiometer studies.
- Currently on Site: DFIR + Geonor with standard heating; Operational Upper Air station: 2 flights/day.
Eureka – 79.6N 85.6W

• Suite of meteorological parameters including snowfall and snow depth
• Snow course
• Ice thickness
Summary

• CARE
  – Near Toronto
  – Extensive met infrastructure
  – EC owned and operated
  – Manned as needed

• Mt Pearl
  – Near St. John’s
  – Extensive met infrastructure
  – Regular Upper air soundings
  – Manned

• Iqaluit
  – In northern community
  – Manned as needed
  – Ka Band radar coming soon
  – Expanding site with met infrastructure

• Eureka
  – EC owned and operated
  – True Arctic site
  – Regular upper air soundings
  – Extensive support infrastructure (airport runway, etc.)