



Everyday forecast:

- Forecaster on each side of divide will produce forecast by ~8-9 AM
- At 9AM forecasters will discuss the forecast
- 9:15AM - all participants will meet via zoom to get weather briefing.

Watch the model forecast

- Go to <https://gwf-spade.weebly.com/additional-information.html>
- Click on link for spotwx
- Type in location and it will give you the closest ECCC scribe forecast

12 hrs before storm:

- Create a plan
 - Break up into pairs
 - Field team
 - Relief/ nowcast/forecast team -
 - Nipika and Fortress Powerline (require minimum two persons on site)
 - 1 person - 10 minute weather observations, check instruments, *clear MRR dish (only at Nipika. Make sure to log time of MRR clearing)
 - 1 person - microphotography of snowflakes
 - 2 persons - rest
- Watch the **Strathmore** radar
 - Designate a person to check radar every 10 minutes. At night, take shifts checking the radar.
- Make sure batteries are all charged
 - kestrel, camera, camera flash, GPS, inReach, trickle charger, 12V batteries for Nipika

1-3 hrs before storm:

(to be updated for Nipika, once setup is organized)

- Plug Parsivel to battery ****BLACK FIRST then red****
 - Check battery frequently using the charge analyzer. Don't let the charge go below 11.0 or else it will damage the battery!
- Make sure that all the instruments are working properly
- Set up camera setup on tailgate of truck

During storm:

- Check-in forecaster/relief team using inReach if no cellular reception once on site
- Fill in sign-in sheet
- Turn on TimeLapse camera (at Nipika)
- When on site:
 - 1 person will be taking photographs, 1 person taking weather observations
- weather observations at every 10 min, or when precipitation type changes
 - see “Human Observations” section
- Take photographs every 10 min (Take note of time, photo number(s), what do you see on the velvet pad with the naked eye?)
- If raining at Nipika, conduct carsonde
- If snowing at Fortress Powerline, team at BGI to conduct car sonde, or if three people at site, two conduct carsonde, 1 person remains at Fortress Powerline to take snowflake photography

*Make sure snow does not accumulate on the MRR dish and Parsivel at Nipika

- Be sure to take photos for blog: i.e. people in the field working, pictures of surrounding, promotional pictures for GWF and for respective universities (showcase your UNBC/UQAM attire)
- Take videos (i.e. life of a field scientist, people working, etc.)

After storm:

Nipika Mountain Resort

- UNPLUG parsivel battery - ****RED FIRST** then black**
- Create folder titled with date of event (DDMMYYYY) on laptop
- Transfer and save photos from timelapse camera to portable hard drive
 - Save pictures from any phones/cameras to laptop under folder with
- Retrieve data from Nipika DataLogger, parsivel, MRR and *LiDAR (only at Fortress locations)
 - *See Data Backup Instructions*
- Shut off lights, lock up trailer
- Turn off TimeLapse camera
- Transcribe data onto google doc
- Create blog entry

Analyze data for any unusual recordings

****Take note****

- Write everything in the log
 - Example: any issues with the laptop, issues with the kestrel etc., when you cleared top of MRR, spurious data, power outage, etc.
- At night, no carsondes are to be done, 2 person teams alternate at Fortress Powerline and Nipika

Human Observations

Goals:

1. Comparison between two sites on both sides of the continental divide
 - Characterize ice crystals
 - Weather conditions
 - Transition region

Characterize Ice Crystals:

- Collect ice crystals with velvet pad every 10 minutes
 - Take note of time length to collect crystals on pad (10 s, 20 s, 30 s etc.)
 - Be sure that ice crystals don't overlap on velvet pad
- Write down observations for each photograph (date, time, photo number, what you see, or if there are any issues)
- When taking photos, always go in the same direction
- Minimum 3x3

Weather Conditions:

- We have a template sheet to fill
- When there is precipitation 10 minute observations are expected
 - Though more frequently if there are any interesting weather changes
 - e.g. precipitation type changes

From MANOBS retrieved January 9, 2019

https://www.ec.gc.ca/manobs/73BC3152-E142-4AEE-AC7D-CF30DAFF9F70/MANOBS_7E-A19_Eng_web.pdf

Frozen precipitation Snow (SN) Precipitation of mainly hexagonal ice crystals, most of which are branched (star-shaped). The branched crystals are sometimes mixed with unbranched crystals. At temperatures higher than about -5 °C, the crystals are generally clustered to form snowflakes.

Snow Pellets (GS) Precipitation of white and opaque particles of ice; these ice particles are either spherical or conical; their diameter is about 2 to 5 mm.

Snow pellets are brittle and easily crushed; when they fall on hard ground, they bounce and often break up. Snow pellets always occur in showers and are often accompanied by snowflakes or rain drops, when the surface temperature is around 0 °C. The abbreviation GS shall also be used to report small hail with a diameter of the largest hailstones less than 5 mm.

Snow Grains (SG) Precipitation of very small white and opaque grains of ice. These grains are fairly flat or elongated; their diameter is generally less than 1 mm. When the grains hit hard ground, they do not bounce or shatter. They usually fall in very small quantities, mostly from Stratus or occasionally from fog, and never in the form of a shower.

Ice Pellets (PL) Precipitation of transparent or translucent pellets of ice that are spherical or irregular, rarely conical, having a diameter of 5 mm or less.

Ice pellets are subdivided into two main types: Frozen raindrops, or snowflakes that have largely melted and then refrozen, the freezing process usually taking place near the ground. They generally fall as continuous precipitation; and Pellets of snow encased in a thin layer of ice that has formed from the freezing, either of droplets intercepted by the pellets, or of water resulting from the partial melting of the pellets. They occur in showers. The pellets of ice usually bounce when hitting hard ground and make a sound on impact. Unlike snow pellets, ice pellets are not opaque or easily crushable and may fall continuously as well as in showers.

- Snow Density

Mixed precipitation - can be a mixture of solid and liquid precipitation. From Stewart et al. 2015

| TABLE 1. Official and unofficial definitions of terms for winter precipitation types discussed in this article. Official definitions refer to those found in the online version of the <i>Glossary of Meteorology</i> (Glickman 2000). | |
|---|--|
| Name | Definition |
| Ice particles | |
| Ice crystal ^a | Pristine ice crystal |
| Ice pellet ^a | Type of precipitation consisting of transparent or translucent pellets of ice, 5 mm or less in diameter |
| Ice pellet aggregate ^d | Individual ice particles linked or fused together |
| Refrozen wet snow ^b | Partially melted snow that refroze |
| Sleet ^a | In the United states, this term refers to ice pellets |
| Snow ^a | Precipitation composed of white or translucent ice crystals, chiefly in complex branch hexagonal form and often agglomerated into snowflakes |
| Snow pellet ^a | Precipitation consisting of white, opaque, approximately round (sometimes conical) ice particles having a snowlike structure, and about 2–5 mm in diameter |
| Liquid particles | |
| Drizzle ^a | Very small, numerous, and uniformly distributed water drops; by convention, drizzle drops are less than 0.5 mm in diameter |
| Freezing drizzle ^a | Drizzle that falls in liquid form but freezes upon impact to form a coating of glaze |
| Freezing rain ^a | Rain that falls in liquid form but freezes upon impact to form a coating of glaze upon the ground and on exposed objects |
| Rain ^a | Precipitation in the form of liquid water drops that have diameters greater than 0.5 mm or, if widely scattered, the drops may be smaller |
| Supercooled rain ^a | Liquid precipitation at temperatures below freezing |
| Mixed-phase particles | |
| Almost melted particle ^{b,d} | Precipitation mainly composed of liquid water, but with some ice, and the original ice particle's shape is not discernible |
| Liquid core pellet ^c | Partially refrozen particle with an ice shell and liquid water within it |
| Semimelted snow pellet ^d | Snow pellet that has undergone some melting |
| Wet snow ^a | Snow that contains a great deal of liquid water |

Intensity of precipitation

Light: if rate of fall is 2.5 mm/h or less

Moderate: if rate of fall is 2.6 to 7.5 mm/h

Heavy: if rate of fall is 7.6 mm/h or more

Snowflake Microphotography

Camera settings

F 7.1, exp 200, ISO 100

Before you begin, take a photo of a ruler so that you have an idea of the pixel size

- Hold pad out to catch ice particles
 - Time how long pad was exposed - Take note of it!
- Take photographs every 10 minutes
 - Take note of time
 - Photo number(s)
- What do you see on the velvet pad with the naked eye?
- Use lint remover to clean pad when needed