

The Summit-to-Shore Snow Monitoring Network in Vermont



University
of Vermont

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Background

Snow is an important but complex component of the hydrological system

Climatology Radiation balances, regional climate impacts

Water Resources Flooding, rain-on-snow, water supply

Ecology Vegetation, aquatic ecosystems, soil health

Anthropogenic Systems Infrastructure, recreation, economy

Climate Change Sensitivity of cryosphere to changes in climate

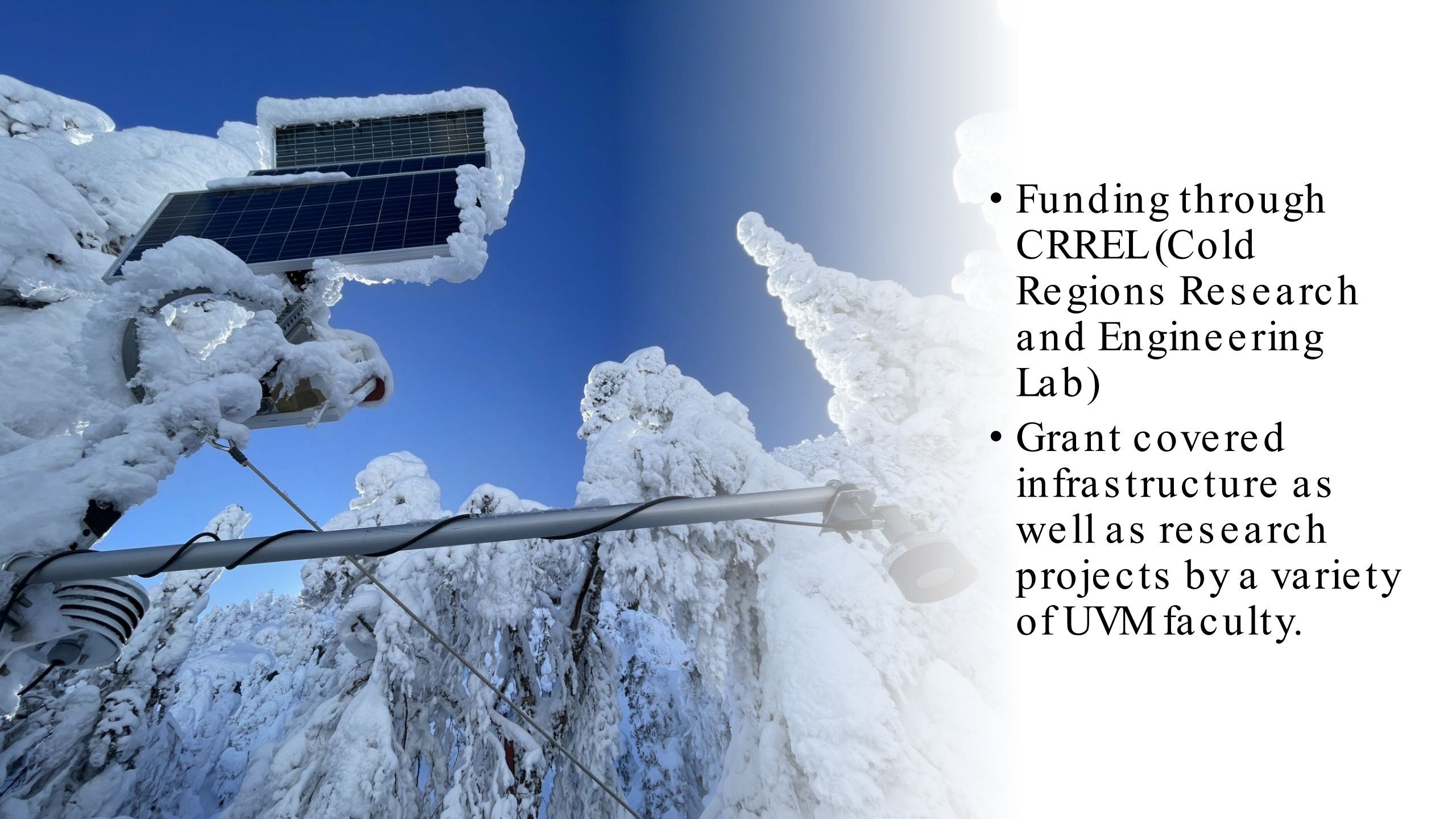
Snow in the Northeast

- Mountains in the Northeast relatively low elevation, making them highly sensitive to incremental changes in temperature
- Rain-on-snow events
- Humidity
- Forest cover (deciduous)
- Understudied region

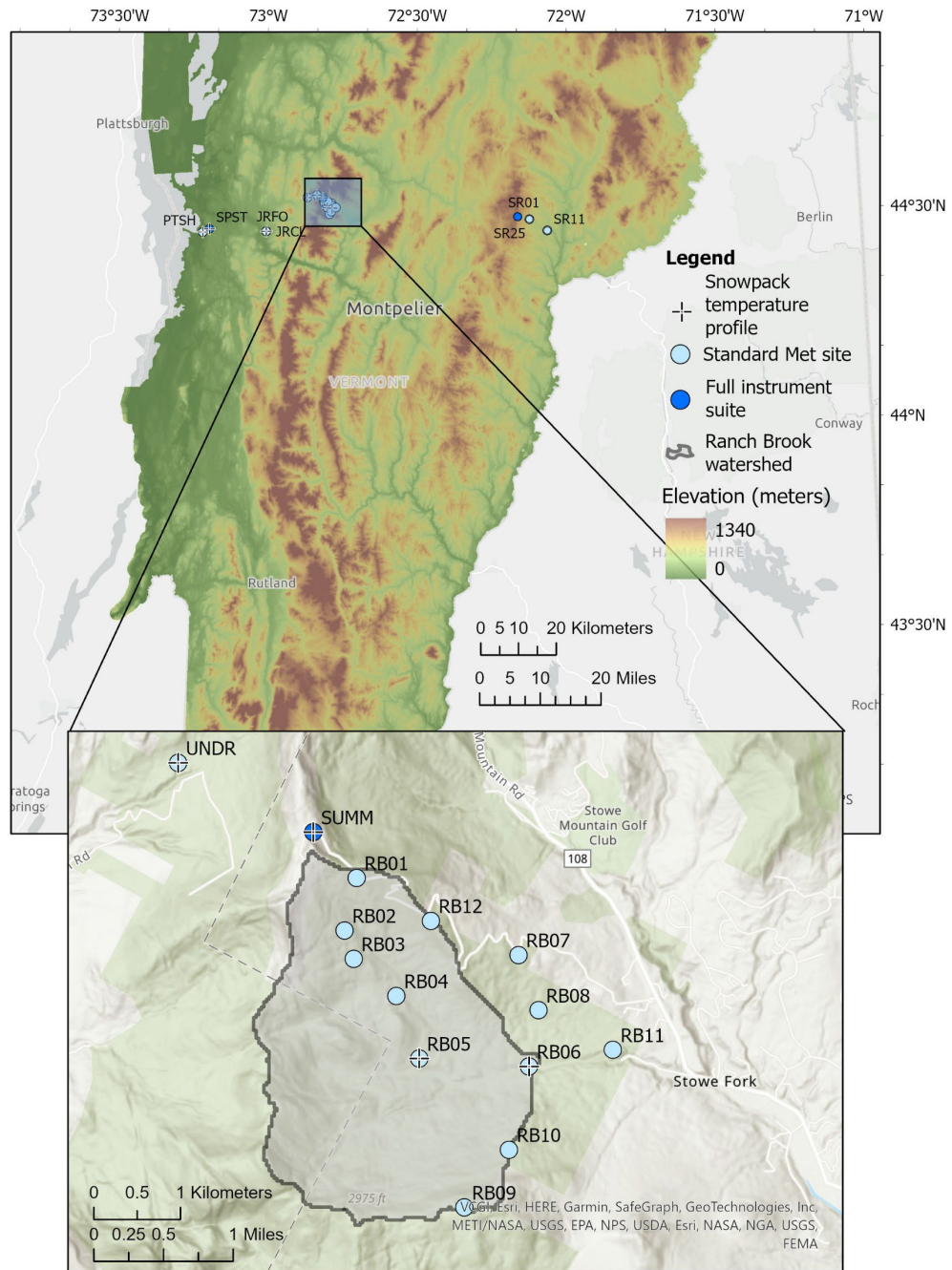
Snowpack Modeling

The majority of snow modeling research has been conducted in very different climates and snowpacks than the Northeast





- Funding through CRREL (Cold Regions Research and Engineering Lab)
- Grant covered infrastructure as well as research projects by a variety of UVM faculty.







Net Radiometer
Incoming/outgoing
short wave and long
wave radiation

Snow Depth
Sonic snow depth sensor

Snow Scale
Measures Snow Water
Equivalent

Anemometer

**Temperature & Relative
Humidity**
Sensor and solar radiation shield

Soil Heat Flux Plate
Soil Temp/Moisture Probe



NOT PICTURED:

OTT Pluvio
Weighing rain gauge

Snow Melt Analyzer (SMA)
Measures density, ice, air, and water content
of snowpack

Snowpack Temperature Profile
Thermistors at 10cm intervals to measure
vertical gradient





Radio Network (11/20/2024 11AM)

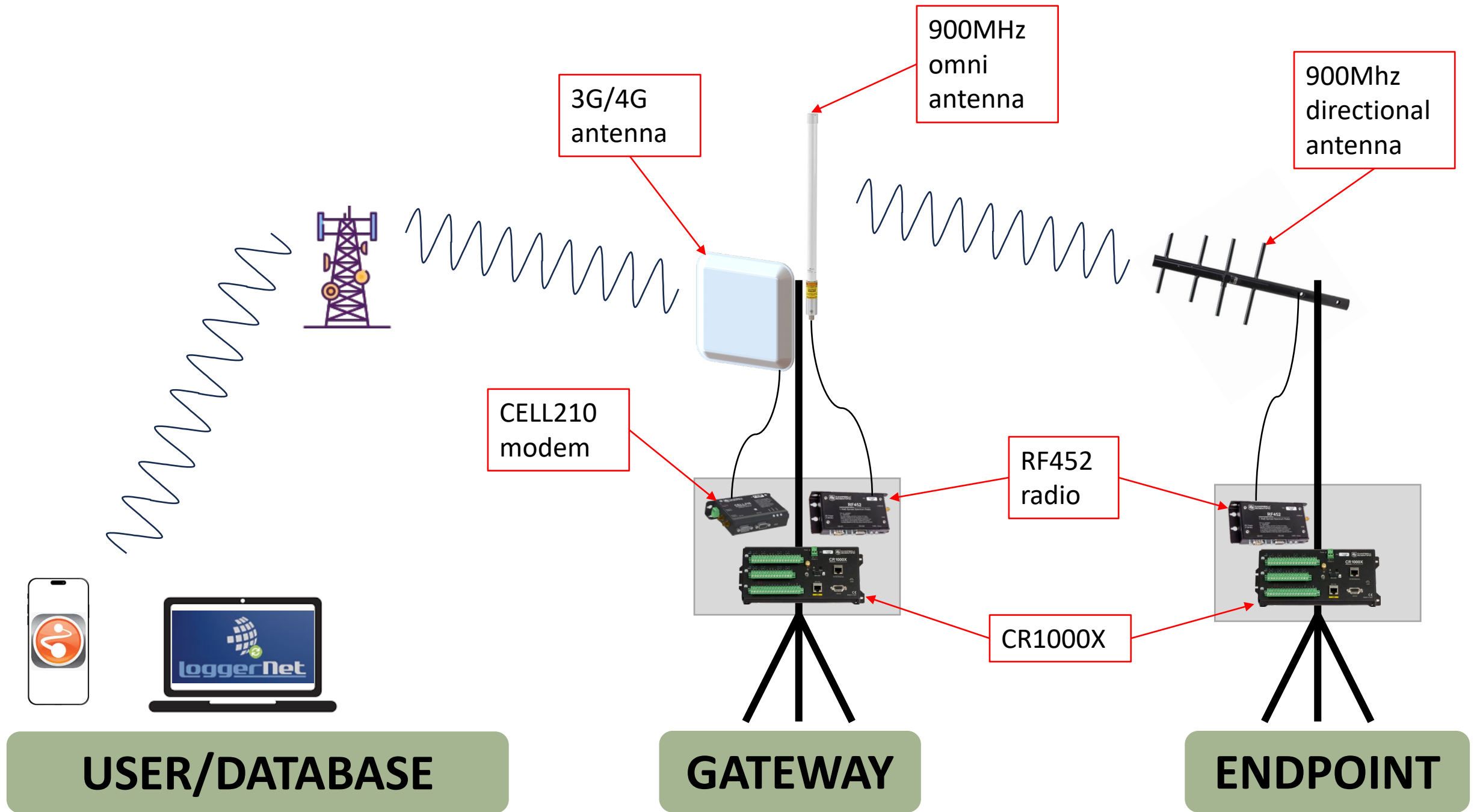
CURRENT CONNECTIONS

- RB 01
- RB 02
- RB 03
- RB 04
- RB 05
- RB 06
- RB 07
- RB 08
- RB 11
- SUMM
- UNDR
- PROC
- JRCL
- JRFO

FUTURE CONNECTIONS:

- RB 09
- RB 10
- RB 12
- NOSE
- SPEAR
- PTSH





PROC

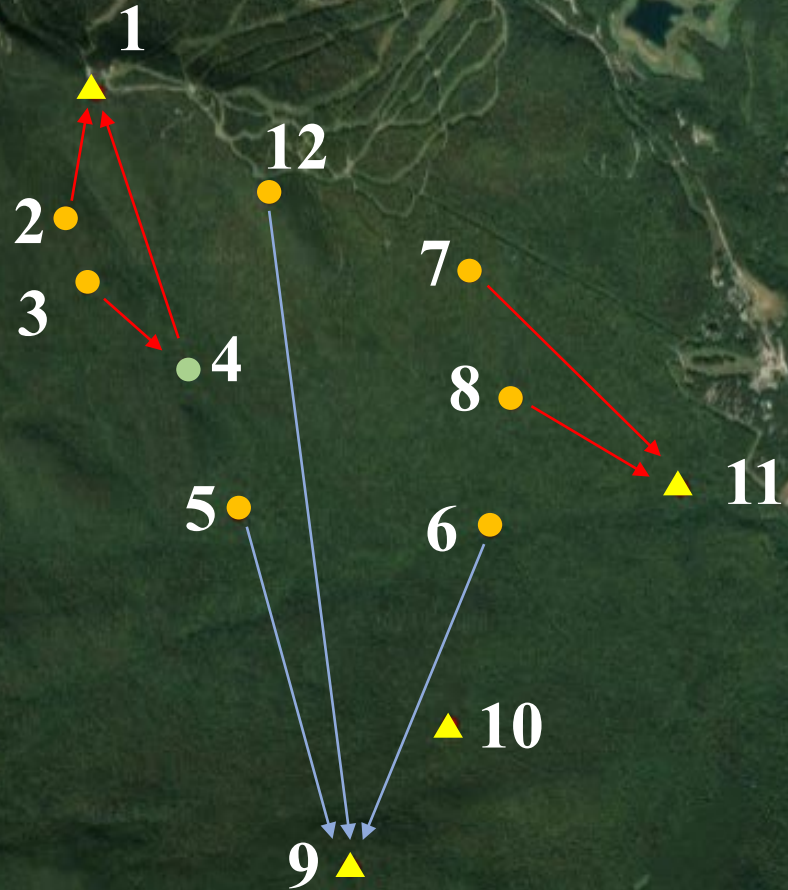
UNDR

SUMM

NOSE

LEGEND:

- ▲ Gateways (Cell modem)
- Endpoints (Radio transmits to gateway)
- Repeaters (Relays endpoint to gateway)
- Connections



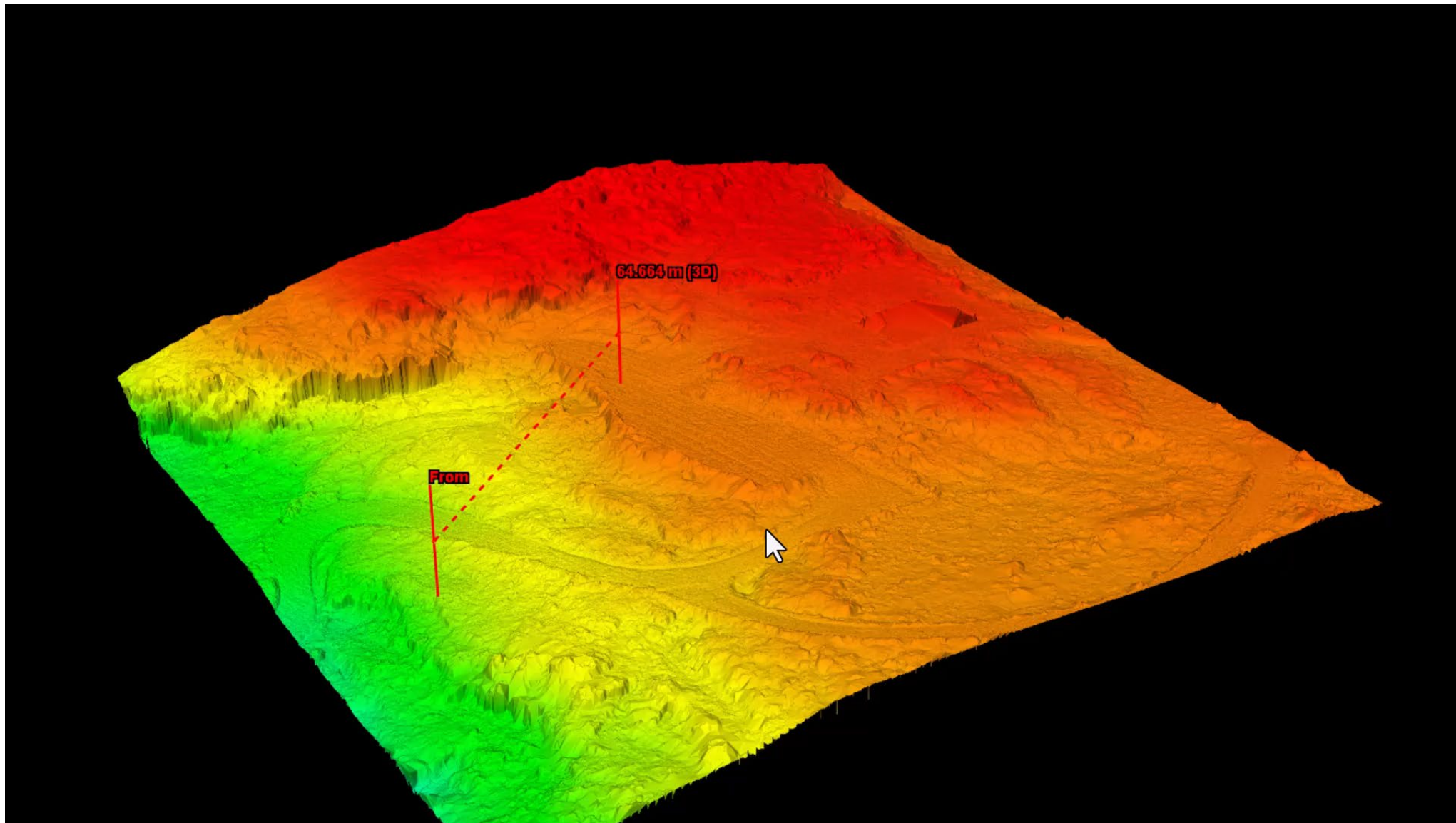
Data Acquisition - Mansfield



Data Acquisition – UAS- mounted LiDAR

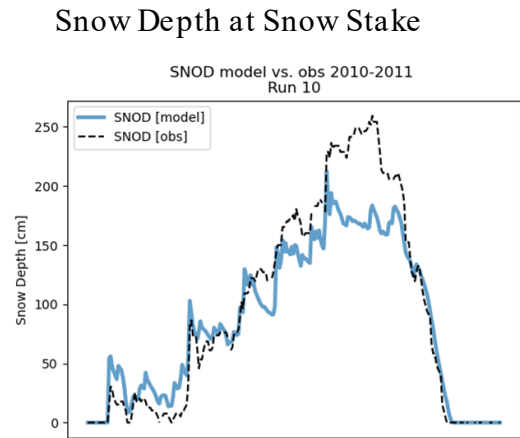


UAS-LiDAR Products

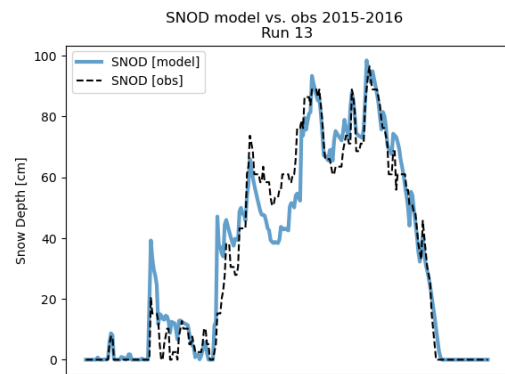


Calibration

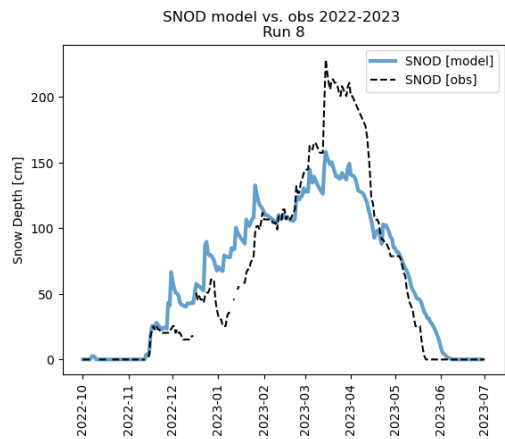
2010-2011



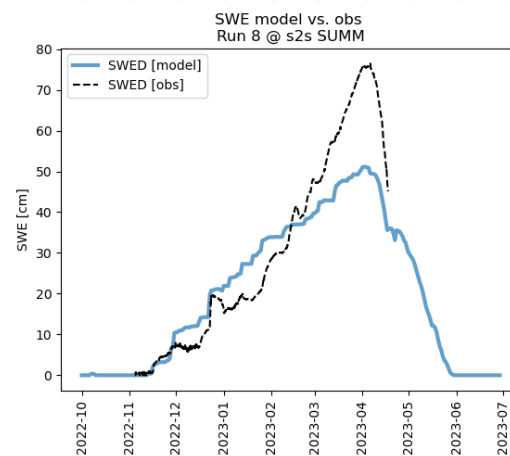
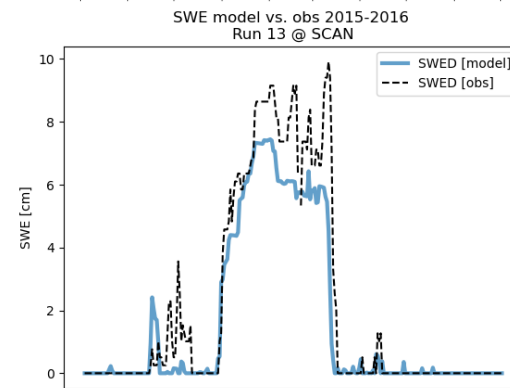
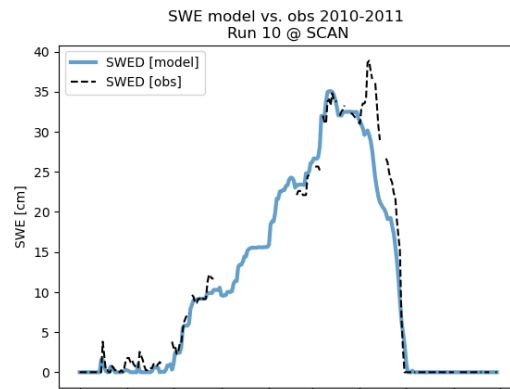
2015-2016



2022-2023

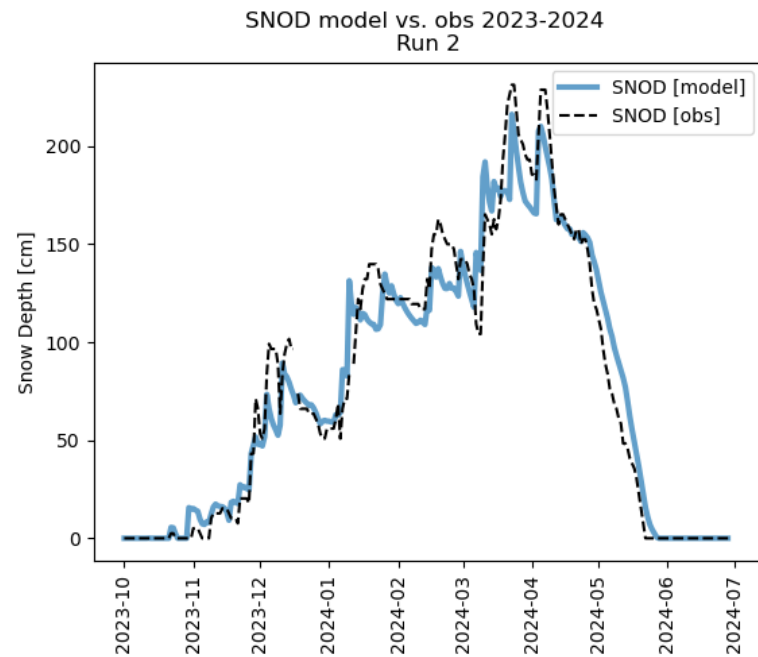


SWE at SCAN/SUMMSites



Validation

2023-2024



Questions?

