



Snow Depth and Snow Water Equivalent: A 30-Year New York, and Western Maine Climatology

Amber Rochon and Joseph Riggle





Presenter 1: 30-Year Climatology of New York

Amber Rochon

NSF-GEOPATHS 2021 Internship

Plymouth State University

Advisor: Eric Kelsey



Presenter 2: 30-Year Climatology of Western Maine

Joseph Riggle

NWS Gray Maine Summer Intern

UMass Lowell

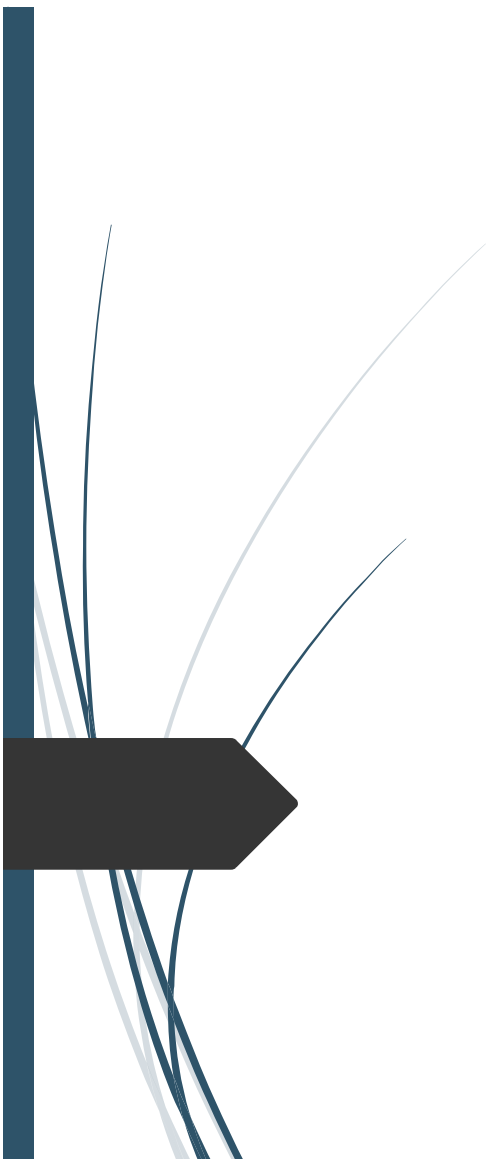
Advisors: Nikki Becker and Margaret Curtis



Learning with Purpose



Acknowledgements



Previous work by Stephen Baron: Snow Depth and Snow Water Equivalent:
a 30-Year Climatology and Analysis of Spatial Variability Underneath the
Canopy of the White Mountain National Forest.

Plymouth State University, M.S. Applied Meteorology Thesis.





The importance of Snow Depth and Snow Water Equivalent: a 30-Year Climatology

- US population relies directly on seasonal snowfall
- Spring flooding can be dangerous
 - Need for high-quality, organized snow data and metadata



Data and Methods: Data

- Data from Maine Geological Survey 1903-2021
- Data from the Northeast Regional Climate Center (NRCC)
 - NY State Snow Survey (1937-2020)



Data and Methods: Metadata

- Confirm latitude, longitude, and elevation
- Associate NWSLI (National Weather Service Location Indicator)
 - 5-character name

Metadata example

NWSLI	Location	Latitude	Longitude	Elevation	County	Station Type	Remarks	Time Period
ROKM1	Rockwood	45.678	-69.7589	1,181	Somerset	SNOCOR	None	1991-2021
TFKM1	The Forks	45.344	-69.9488	755	Somerset	SNOCOR	forest	1991-2021
GRNM1	Grindstone	45.730	-68.587	295	Penobscot	USGS	none	Very few observations 1996-2014



Data and Methods (Cont.): Cleaning data

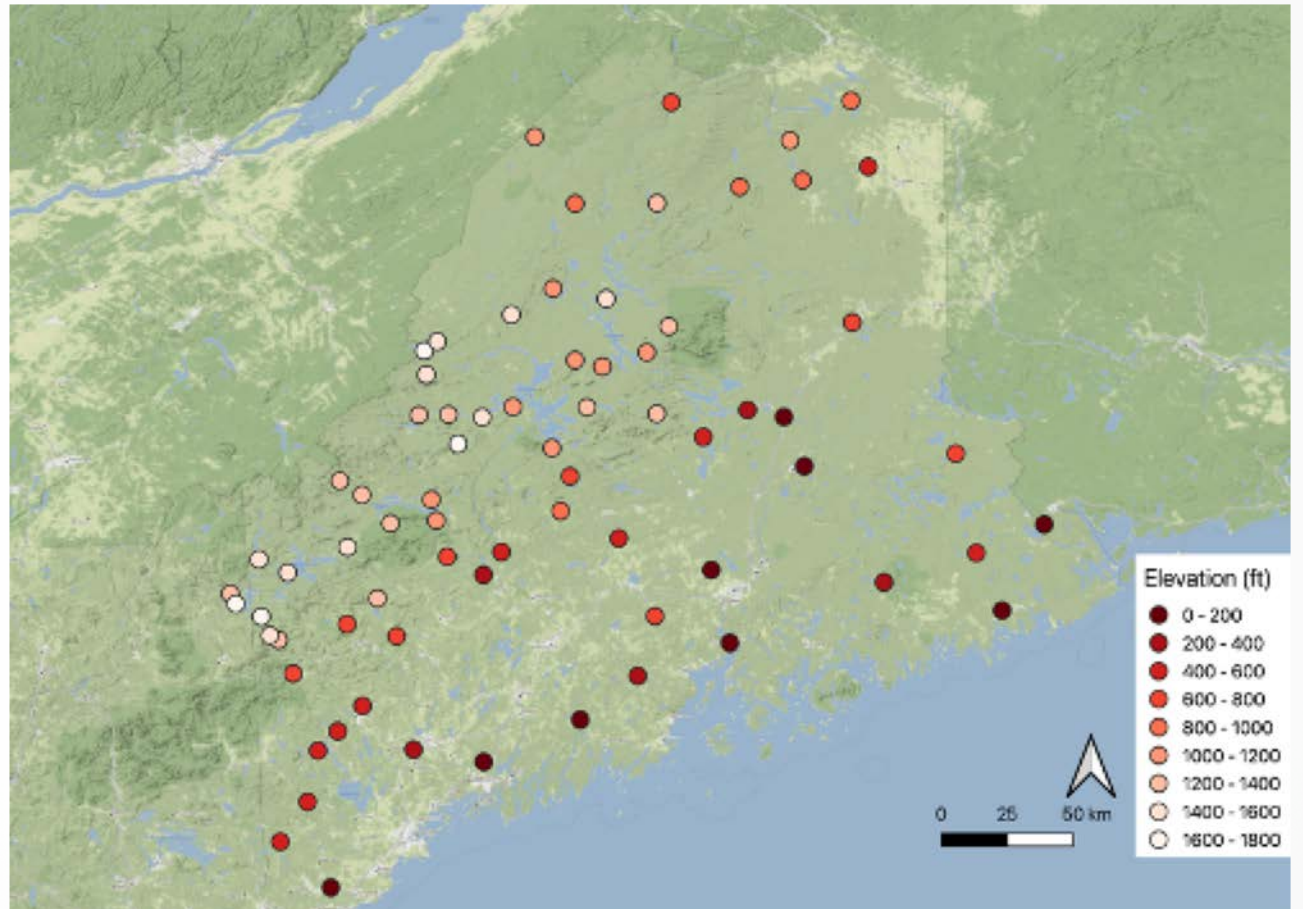
- Individual years of snow data were read into python
- Years appended to create one file
- QC of snow depth and SWE:
 - $\text{Depth} > \text{SWE}$
 - If $\text{SWE} > 0$, Depth must also be > 0
 - Depth : SWE (ratio should always be between 40 and 2)
- '-999' is inserted for missing or erroneous data



Data and Methods (Cont.)

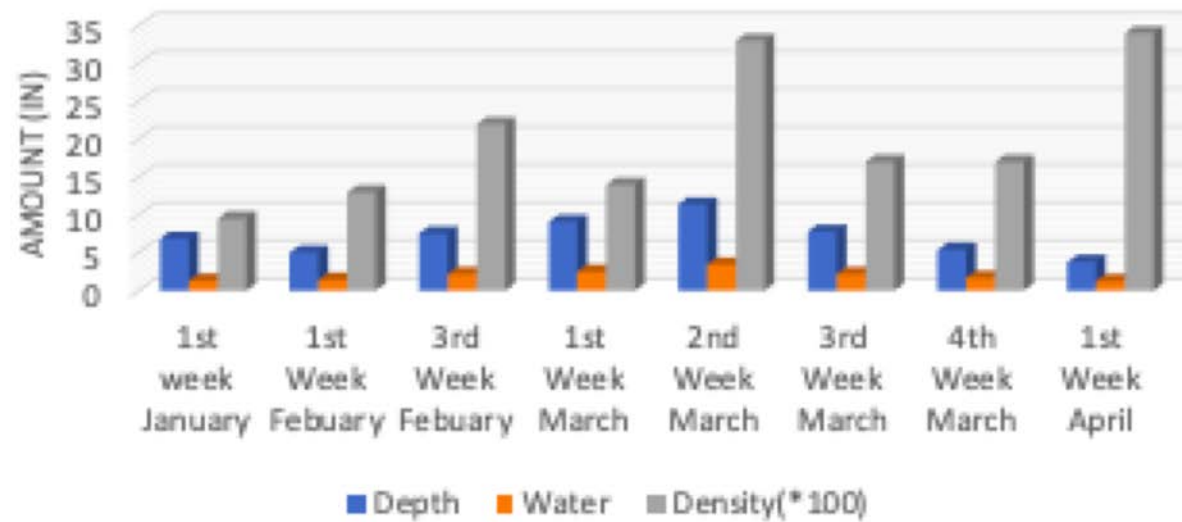
- Eligible stations contain a sufficient number of yearly surveys for at least 28 years within the new climatological normal period of record (1991-2020).
- Standard snow survey procedures for frequency of measurements.
 - Once every two weeks in January and February
 - Once every week in March until melt out

76 Maine, New Hampshire, and Canada sites were identified for use in a 30-year climatology.

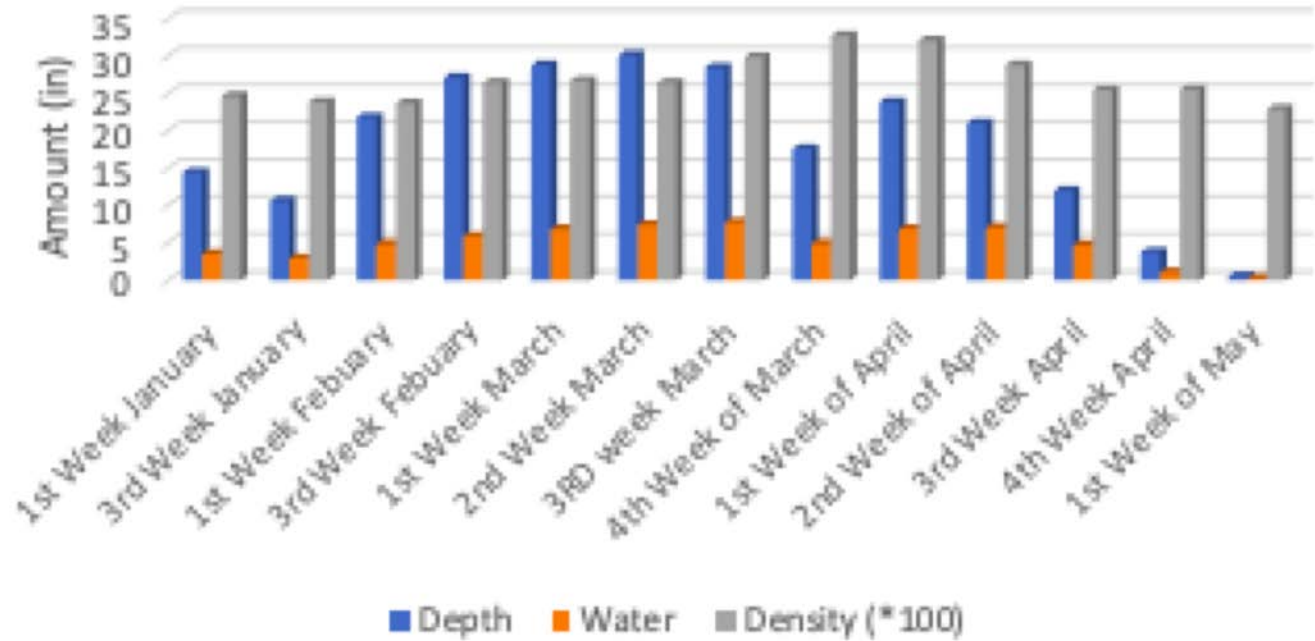


Excel Version:

South Lebanon Snow and Water Equivalent Data

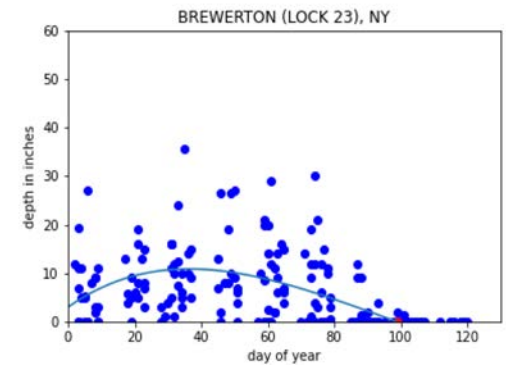
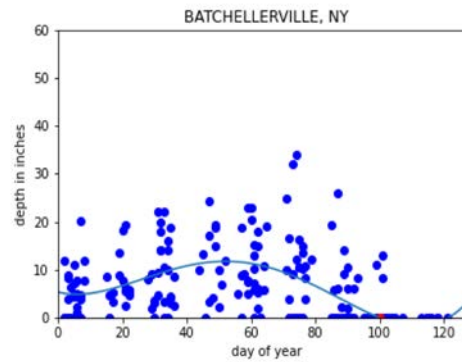
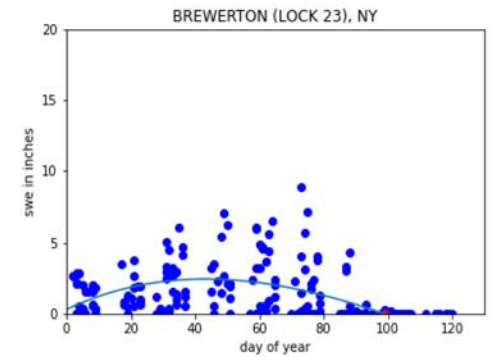
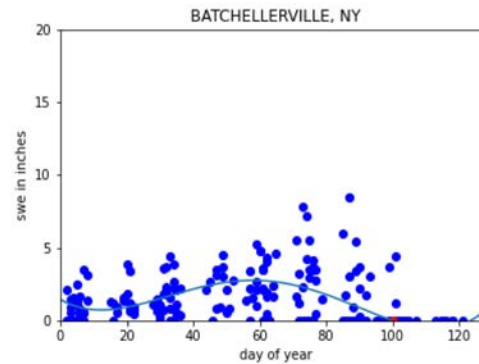


Machias Lake Snow and Water Equivalent

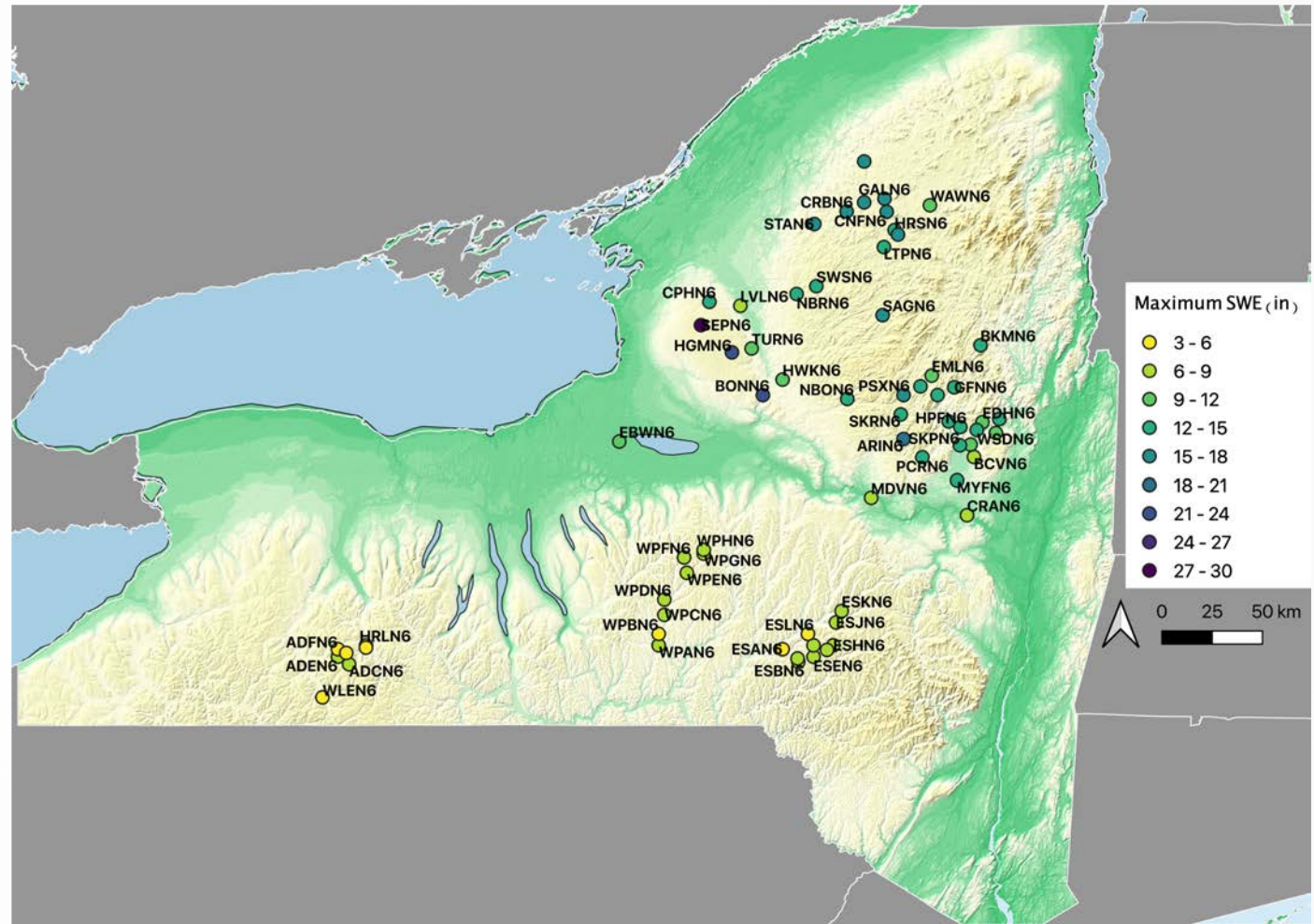


Data and Methods (Cont.)

- ▶ Scatter plots of each sites snow depth and SWE were produced and fitted with a 4-degree polynomial
- ▶ Daily climatological values and their dates were extracted from polynomial equations



Maximum Observed SWE



► **Products Produced:**

- Quality-controlled metadata sheets for New York and Western Maine.
- 1991-2020 quality-controlled snow depth and SWE data sheet for New York.
- QGIS plots and climatological products for New York

Future Work:

- Produce climatological products for Vermont and Western, ME.