MAINE MESONET

NRCC Webinar 9/29/2026

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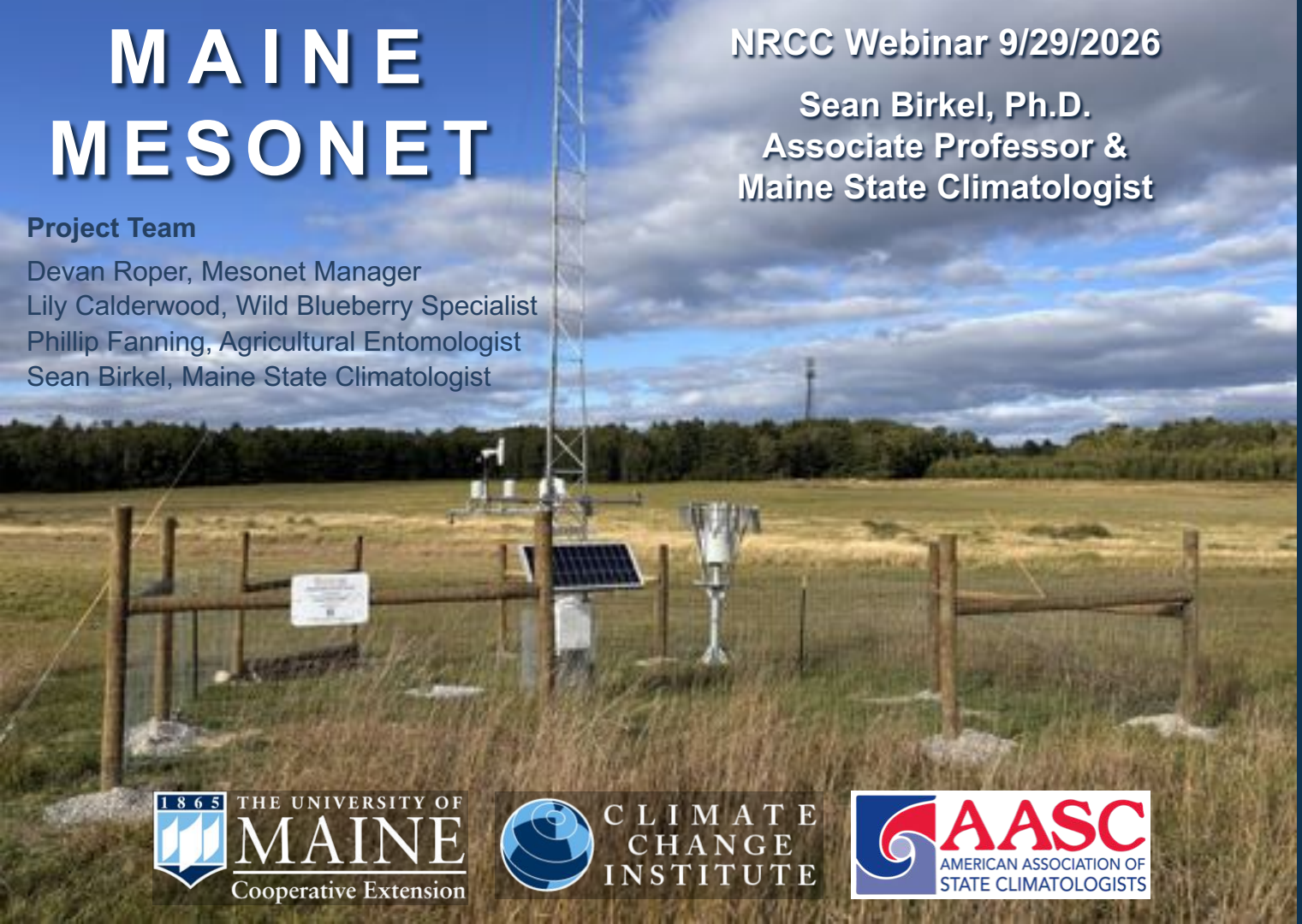
Associate Professor &
Maine State Climatologist

Project Team

Devan Roper, Mesonet Manager
Lily Calderwood, Wild Blueberry Specialist
Phillip Fanning, Agricultural Entomologist
Sean Birkel, Maine State Climatologist



CDS project supported by Sens. Collins & King

NOAA award NA24NWSX469G0010-T1-01

Partners:
New York State Mesonet
Maine Forest Service
NWS Caribou & Gray
National Mesonet Program
UVM, UNH, MWO, UMF
NRCC
NEWA

Photo by D. Roper

Maine Mesonet Key Points

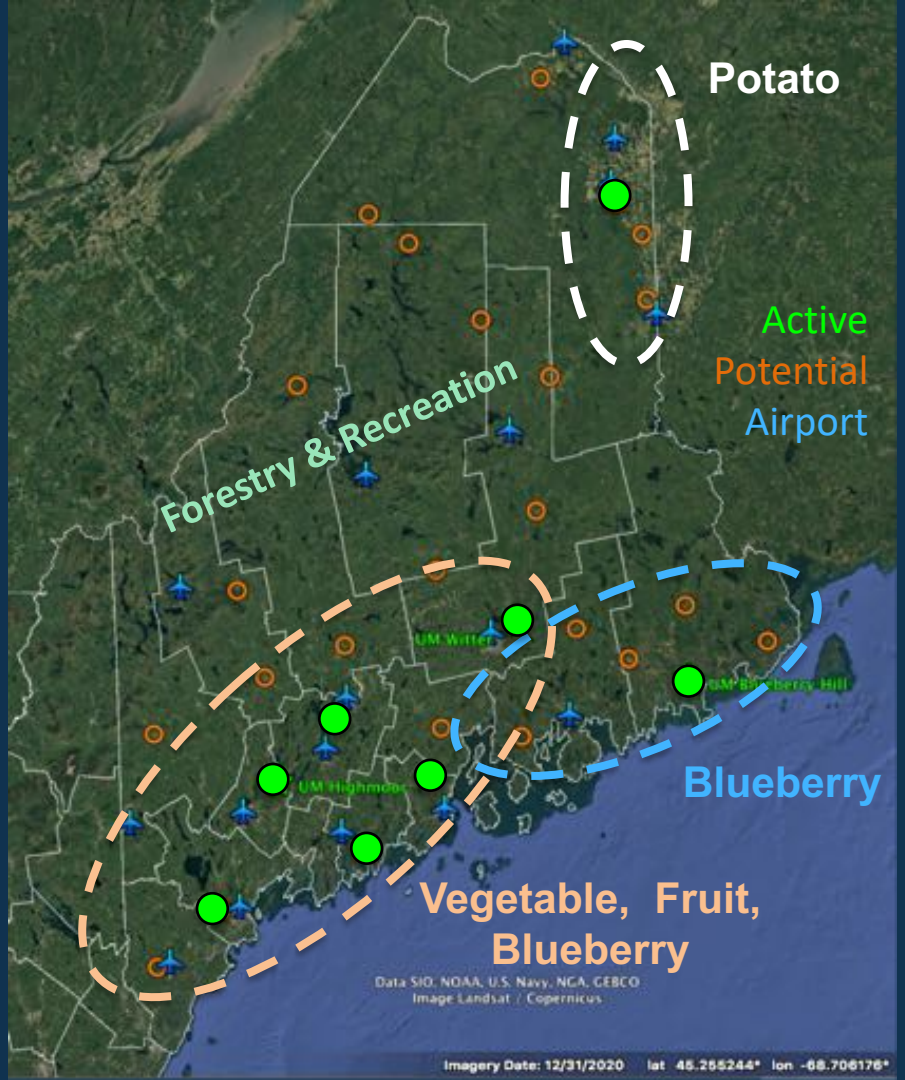
- UMaine-led $3.5 million Congressionally Directed Spending (CDS) project to build new 26-station weather monitoring network across Maine[1]. Supported by Sens. Collins and King. Administered via grant from NOAA.
- **Purpose:** Fill observational gaps and provide high-quality, real-time data for weather-based decision tools for agriculture & forestry
- Partnered with NY State Mesonet for data management
- Joined the National Mesonet Program to stream data to NOAA and the National Weather Service (NWS)
- Data also available to NEWA and ACIS
- Currently 8 stations online with network completion anticipated for 2028. Site selection ongoing with input from NWS, Maine Forest Service, agricultural stakeholders, and other partners.

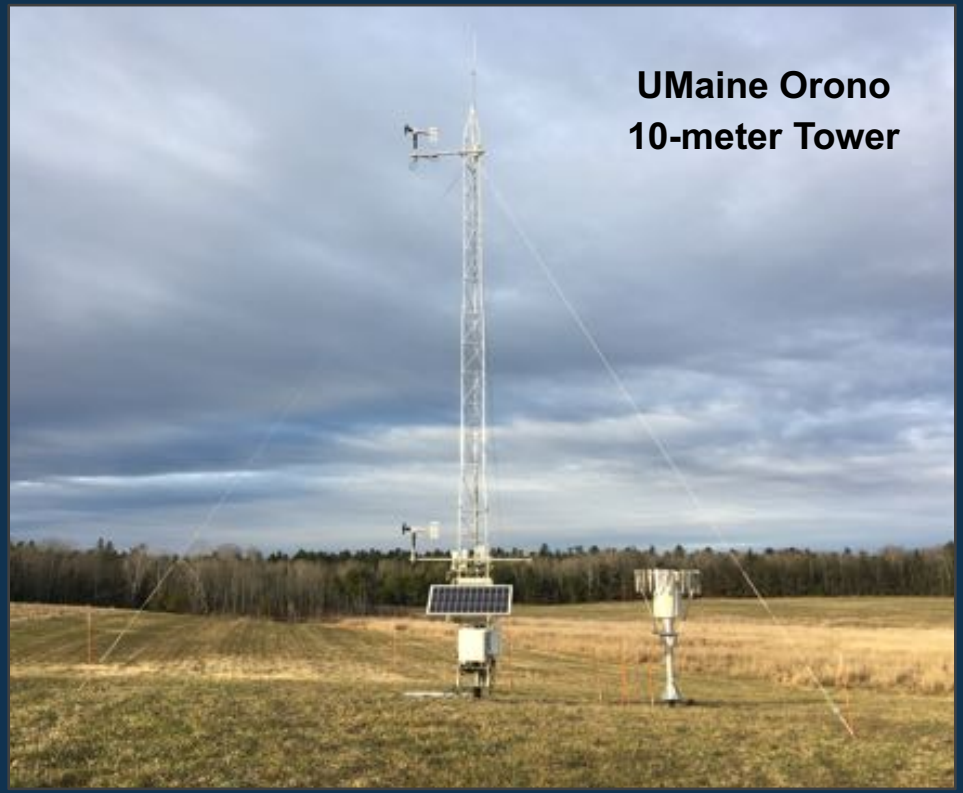
[1]Mesonet = mesoscale network; measures mesoscale weather events (typically 1–150 miles in size)
NEWA (Network for Environment & Weather Applications)
ACIS (Applied Climate Information System)

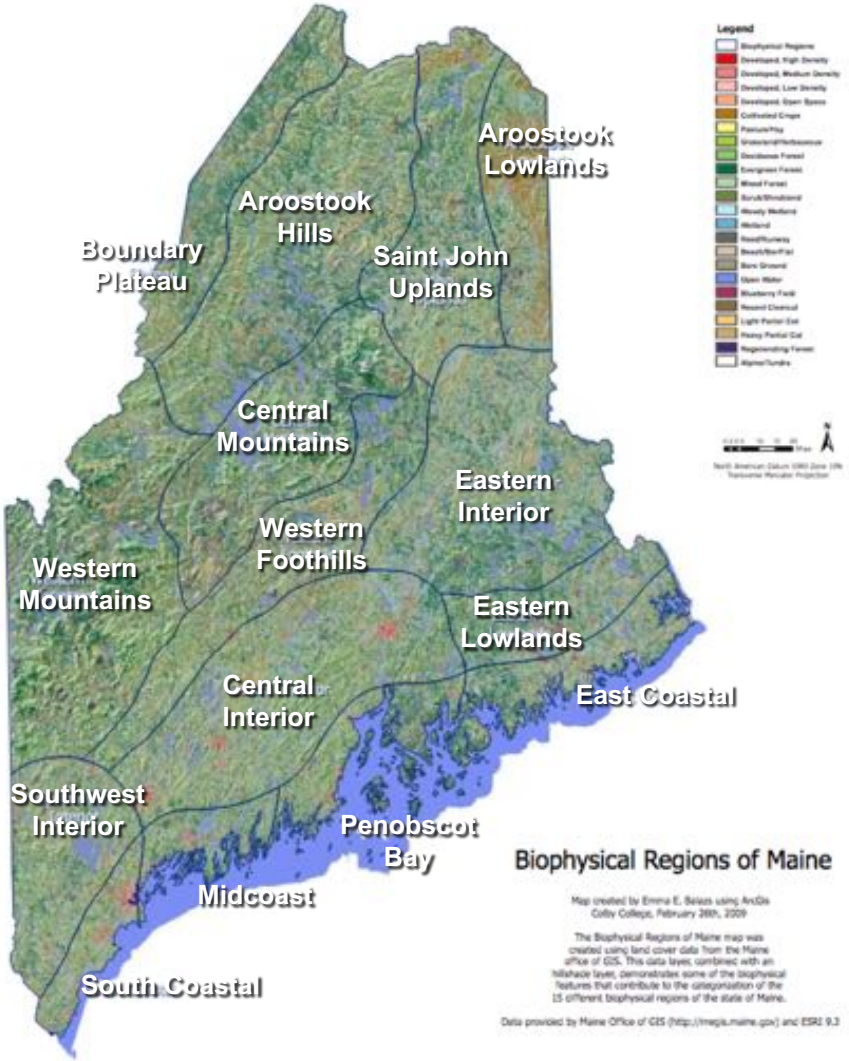
MAINE MESONET

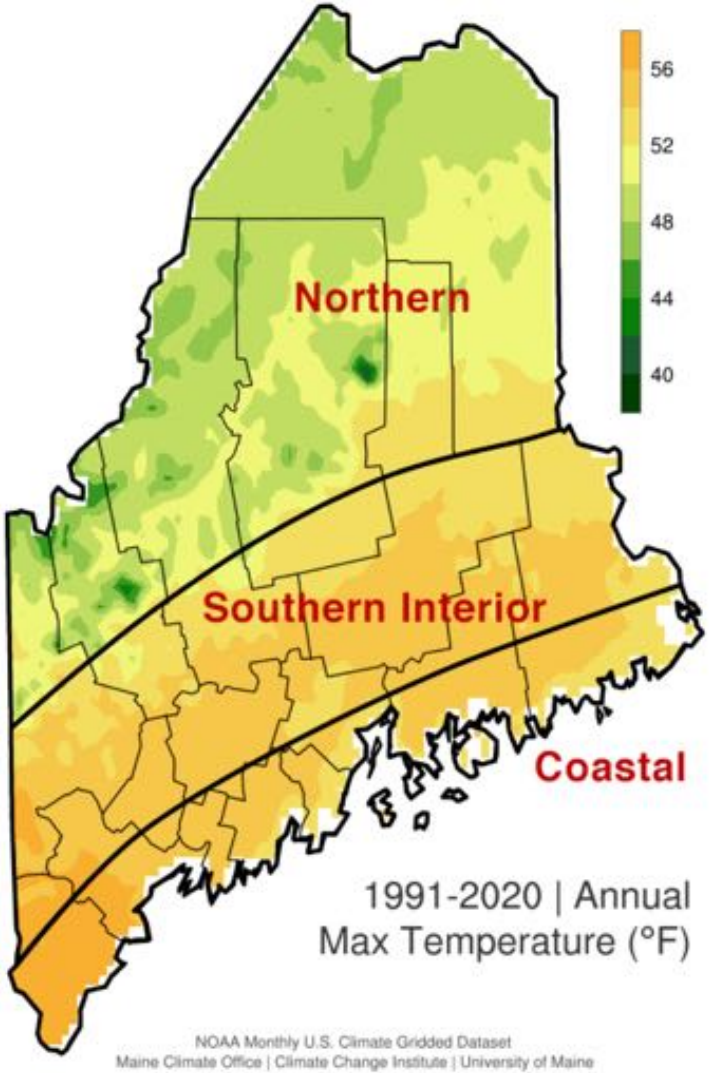
10-meter Tower

3-meter Tripod


Potato
Active
Potential
Airport
Forestry & Recreation
UM Witter
UM Blueberry Hill
UM Highmoor
Blueberry
Vegetable, Fruit,
Blueberry
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image Landsat / Copernicus
Imagery Date: 12/31/2020 lat 45.255244° lon -68.706176°


UMaine Orono
10-meter Tower

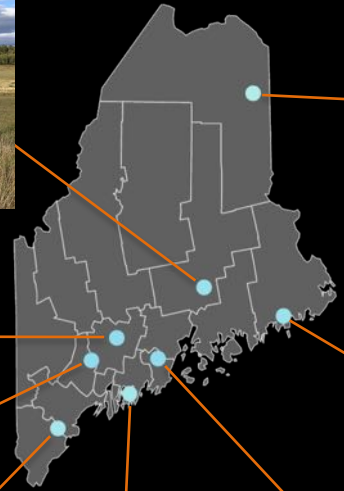

Aroostook Lowlands
Aroostook Hills
Boundary Plateau
Saint John Uplands
Central Mountains
Eastern Interior
Western Foothills
Western Mountains
Eastern Lowlands
Central Interior
East Coastal
Southwest Interior
Penobscot Bay
Midcoast
South Coastal
Legend
Biophysical Regions of Maine
Map created by Emma E. Baiass using ArcGis
Colby College, February 26th, 2009
The Biophysical Regions of Maine map was created using land cover data from the Maine office of GIS. This data layer, combined with an hillshade layer, demonstrates some of the biophysical features that contribute to the categorization of the 15 different biophysical regions of the state of Maine.
Data provided by Maine Office of GIS (http://megis.maine.gov) and ESRI 9.3


56
52
48
44
40
Northern
Southern Interior
Coastal
1991-2020 | Annual
Max Temperature (°F)
NOAA Monthly U.S. Climate Gridded Dataset
Maine Climate Office | Climate Change Institute | University of Maine

Orono

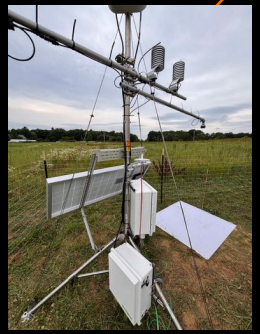
Presque Isle

Sidney



Monmouth

Jonesboro



Scarborough

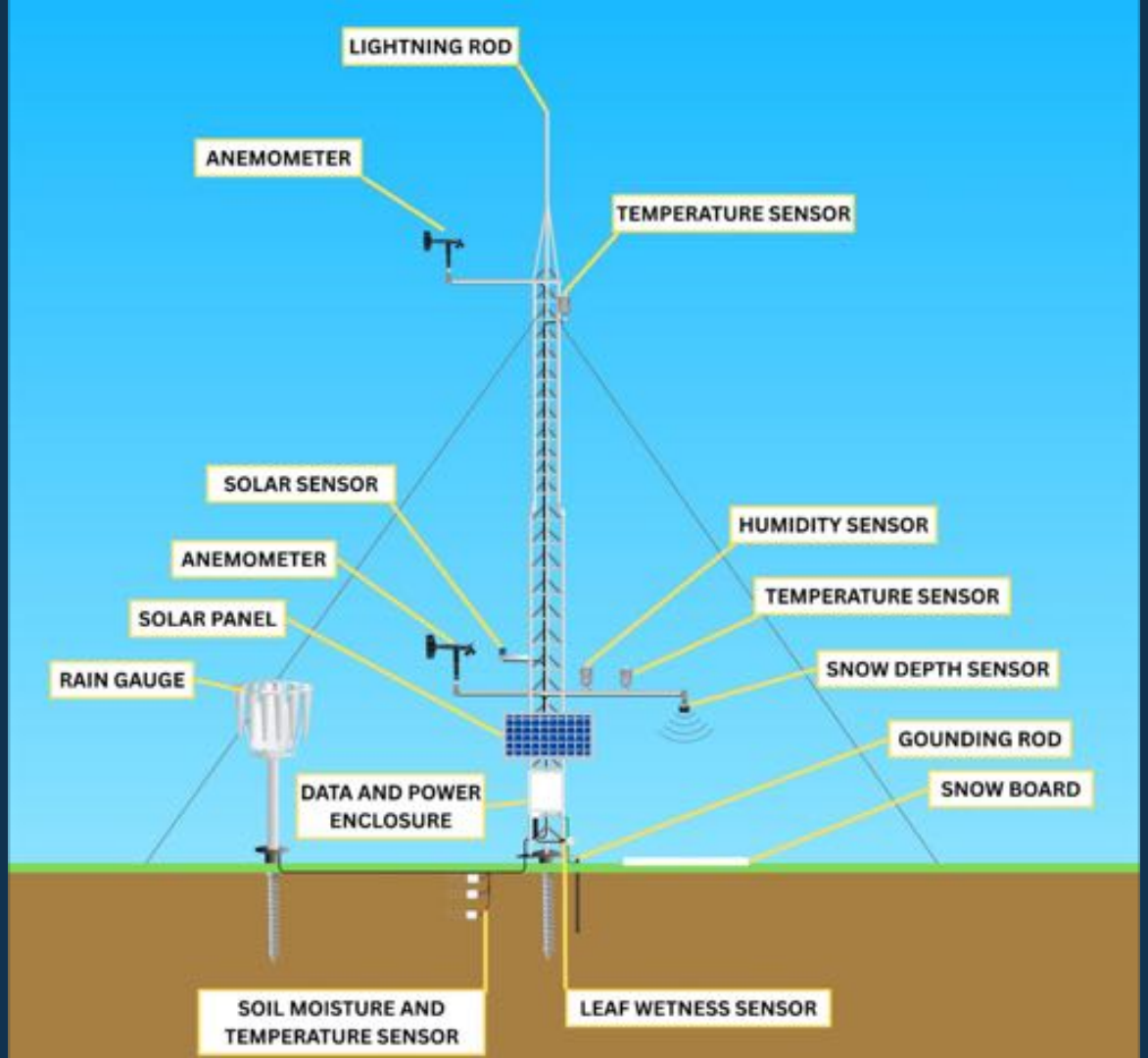
Walpole

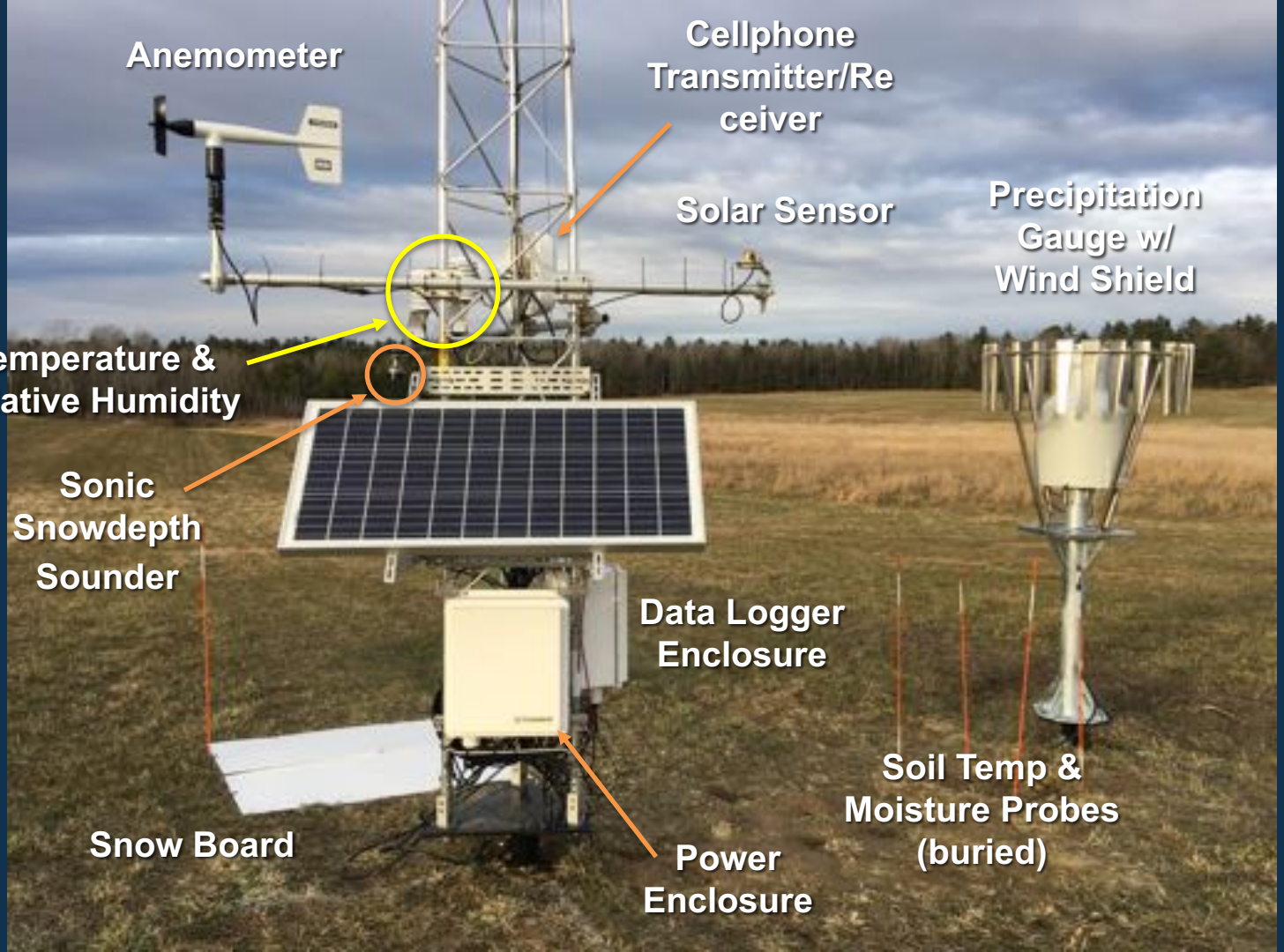
Hope

Installations

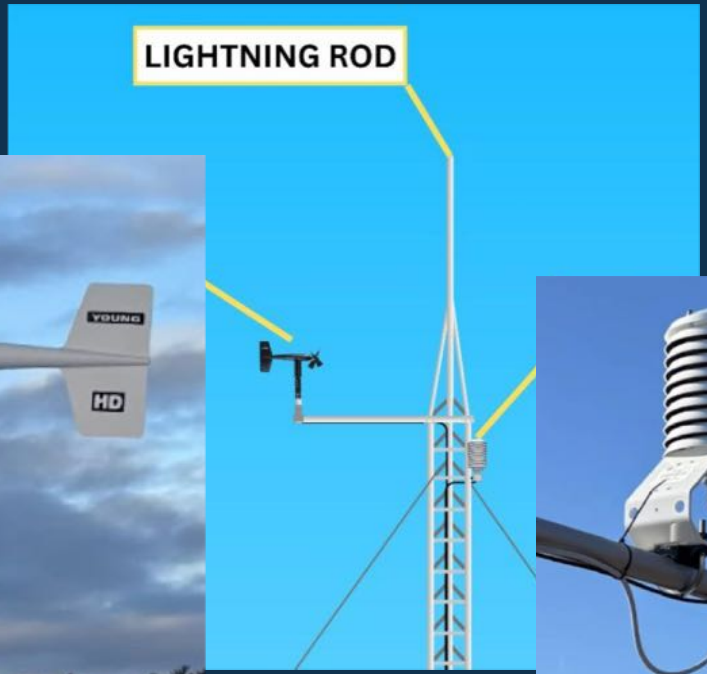
- October 2025: Campbell Scientific provided data logger training & help setting up first 2 tower stations
- November 2025: setup UMaine Orono station, led by our full-time Mesonet Manager, Devan Roper
- June–July 2026: 5 stations installed with help from students
- Tower installs take 7–8 hours with 5 or 6 people; tripods ~5 hours with 4 people
- Each weather station setup is preceded by ground screw installations for the tower and precip gauge, done by contractor
- Current locations: 4 at UMaine research farms, 3 on private farms, and 1 at a middle school
- Following AASC best practices

Fencing

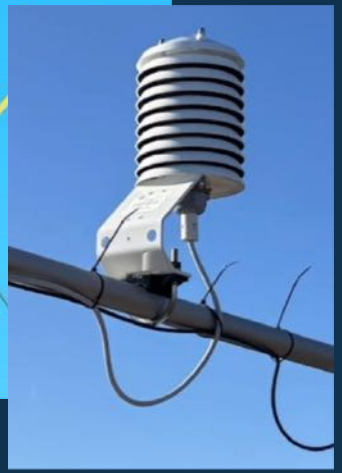

LIGHTNING ROD
ANEMOMETER
TEMPERATURE SENSOR
SOLAR SENSOR
ANEMOMETER
HUMIDITY SENSOR
TEMPERATURE SENSOR
SOLAR PANEL
RAIN GAUGE
SNOW DEPTH SENSOR
GOUNDING ROD
DATA AND POWER ENCLOSURE
SNOW BOARD
SOIL MOISTURE AND TEMPERATURE SENSOR
LEAF WETNESS SENSOR
10 meters
2 meters
Surface
Subsurface


Anemometer
Cellphone Transmitter/Receiver
Solar Sensor
Precipitation Gauge w/ Wind Shield
Temperature & Relative Humidity
Sonic Snowdepth Sounder
Data Logger Enclosure
Soil Temp & Moisture Probes (buried)
Snow Board
Power Enclosure

Top of the Tower (10 meters)



Anemometor



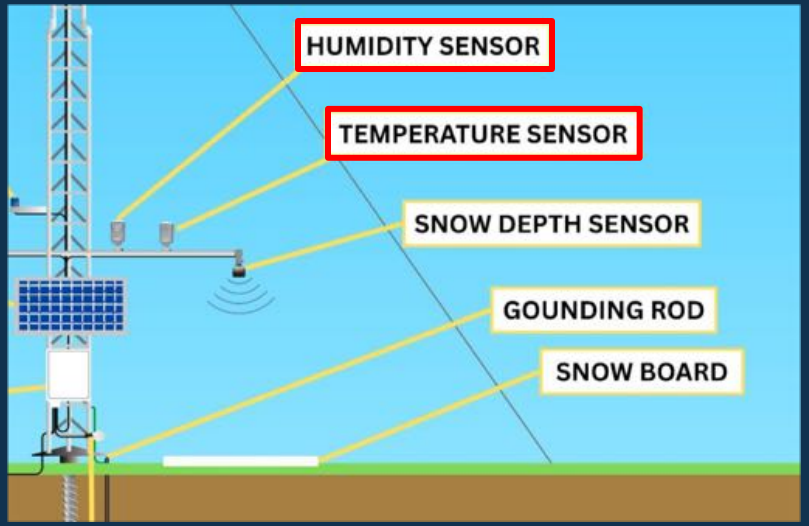
Temperature with Sheilding

Why install a 10-meter tower instead of a tripod?

- Temperature inversion monitoring, especially during frost season
- 10 meters is the standard height for wind observation defined by the World Meteorological Organization (WMO)
- 10-meter wind observations are useful for IPM
- Towers are ideal for ag and forestry applications, but not always suitable depending on space and cost

2-meter Temp & Humidity

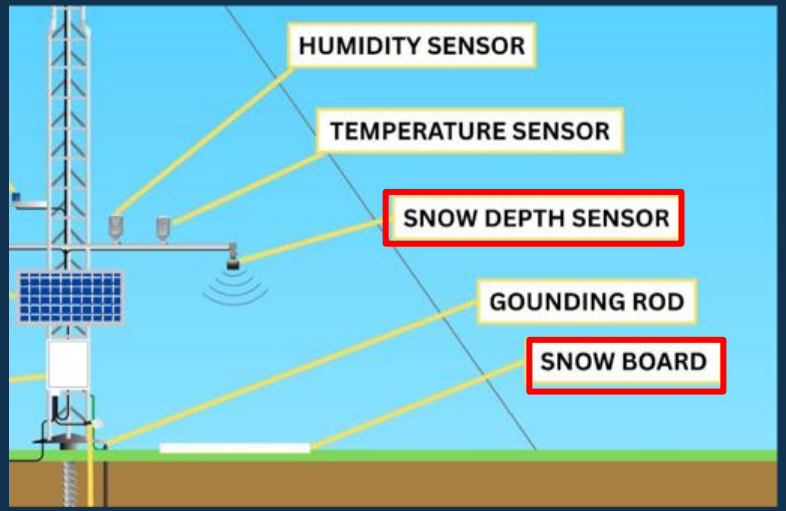
- Standard WMO measurement height
- Inside solar radiation shields to prevent measurement bias from direct sunlight



- 2-meter temperature & humidity are used to calculate dewpoint temperature

Snow Depth Sensor

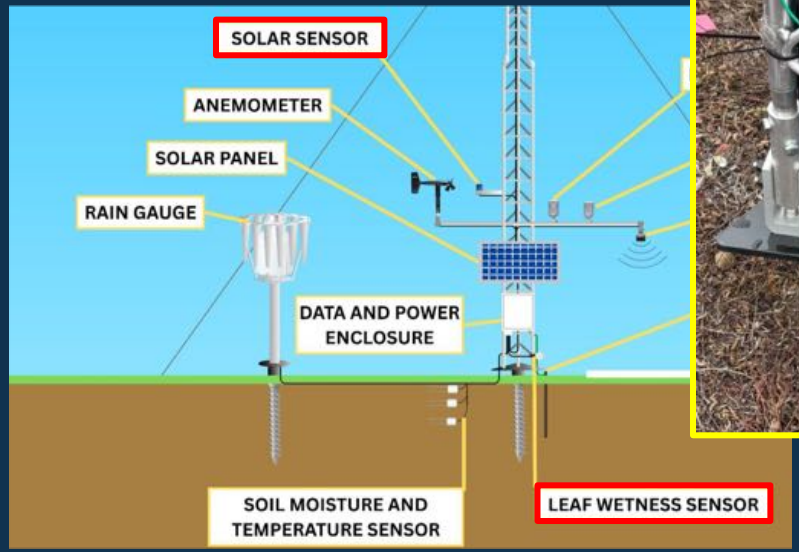
- Uses sound waves to measure physical snow depth
- Requires flat snow board to provide distance reference



Precipitation Gauge

- High-accuracy OTT Pluvio^2 weighing precipitation gauge
- All-season with heated ring at opening to prevent snow or ice bridges
- Heated ring regulated by temperature to conserve battery use
- Holds up to 30 liters (8 gallons) of liquid precipitation
- Contains non-toxic antifreeze that must be changed yearly

Solar Radiation Sensor

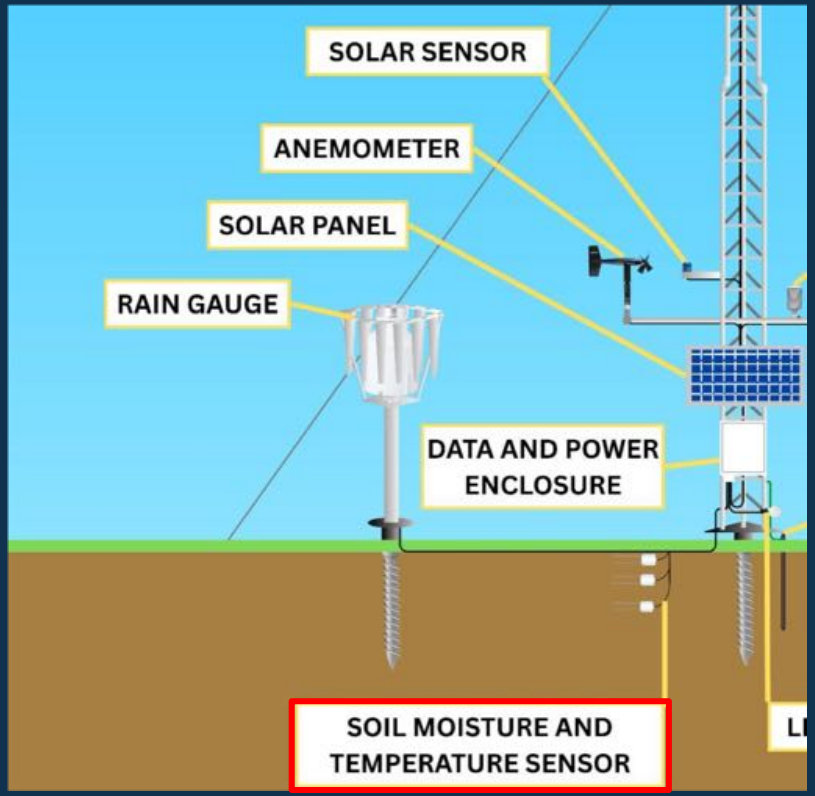


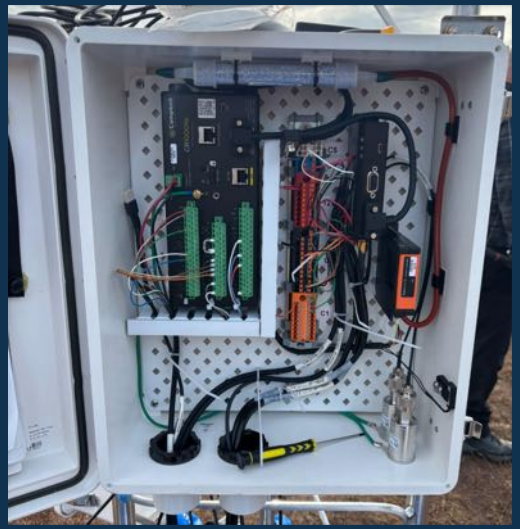
Leaf Wetness Sensor

- Measures vegetation wetness near the surface
- Shaped & textured like a leaf

Soil Temp & Moisture

- Probes placed at 5, 25, and 50 cm (~ 2, 10, and 20 in)
- Drought & fire risk monitoring





Data Logger Enclosure

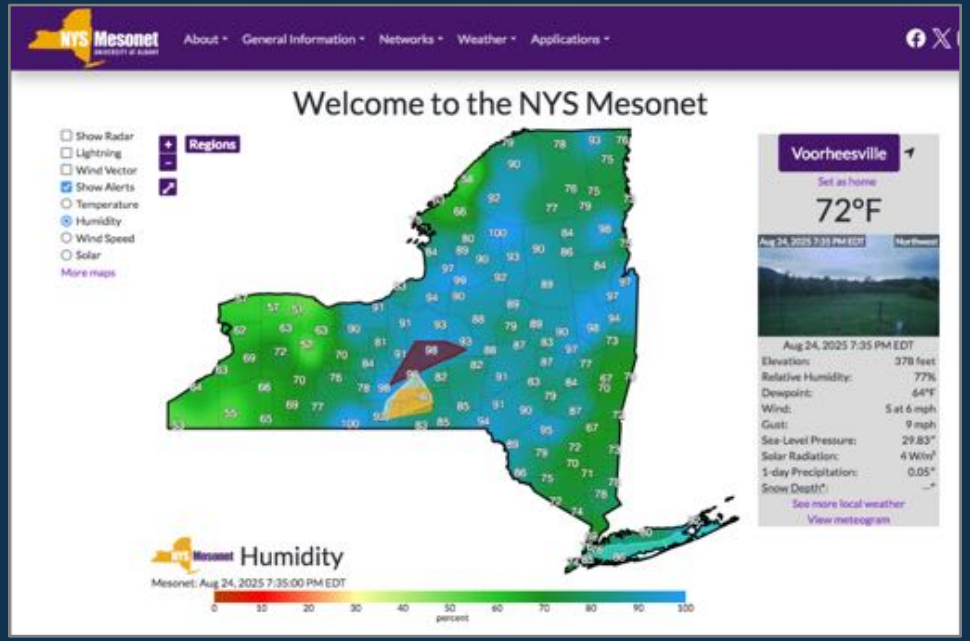
- Data logger
- Cellular comms
- Pressure sensor

Power Enclosure

- Battery
- Charge regulator

Data Access

- Partnering with New York State Mesonet (NYSM) for data management
- NYSM collects obs from Maine Mesonet stations every 5 min, quality checks, & archives
- MM data available from NYSM from 5 min, hourly, & daily APIs
- The Maine Climate Office webserver retrieves data and provides access via interactive charts
- Our data also distributed to the National Mesonet Program, NOAA Applied Climate Information System (ACIS), and Network for Environment & Weather Applications (NEWA)



MAINE Climate Office

University of Maine Cooperative Extension Climate Change Institute

Climate ▾ Forecasts ▾ Mesonet Outlooks & Ag ▾ Pubs ▾ About

MAINE MESONET

The **Maine Mesonet** is a University of Maine led congressionally-funded project to expand weather monitoring across Maine. Learn more here.

University of Maine
Orono, ME

ID: ORNO
Lat/Lon: 44.90414°N, 68.65534°W
Period: 202511 – 202608
Elevation: 102 ft
Station Type: 10m Tower

Choose Station: Orono

74°F

N 11 E W S

Winds
NW 11 mph
Gusting 20 mph

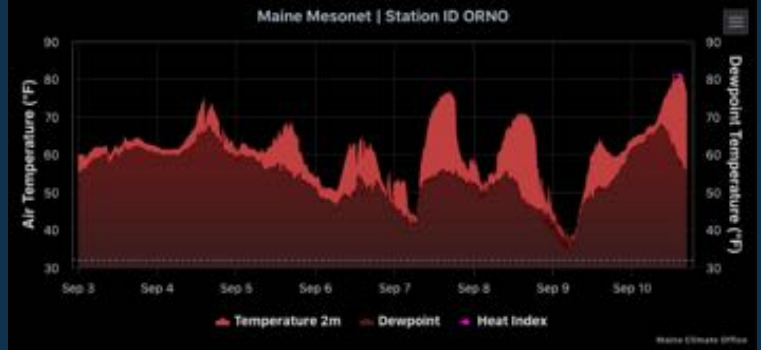
Latest Obs: 2026/09/10 1820 ET
Updates every 5 minutes

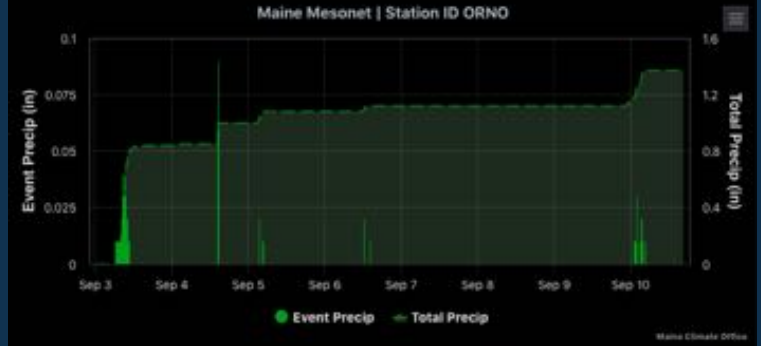
Above-Surface Measurements	
Relative Humidity	47 %
Dewpoint Temp	52 °F
Station Pressure	1000 hPa
Sea Level Pressure	1003 hPa
Solar Radiation	41 W/m^2
Snow Depth	-- in
Elevation	102 ft

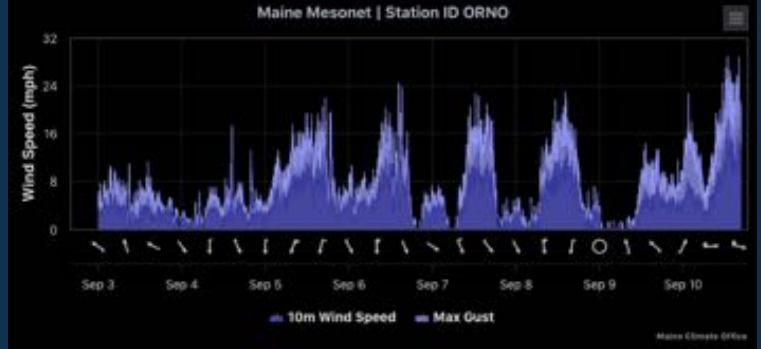
Liquid Equivalent Precipitation	
6 hour	0.0 in
24 hour	0.2 in
3 day	0.2 in
7 day	1.4 in

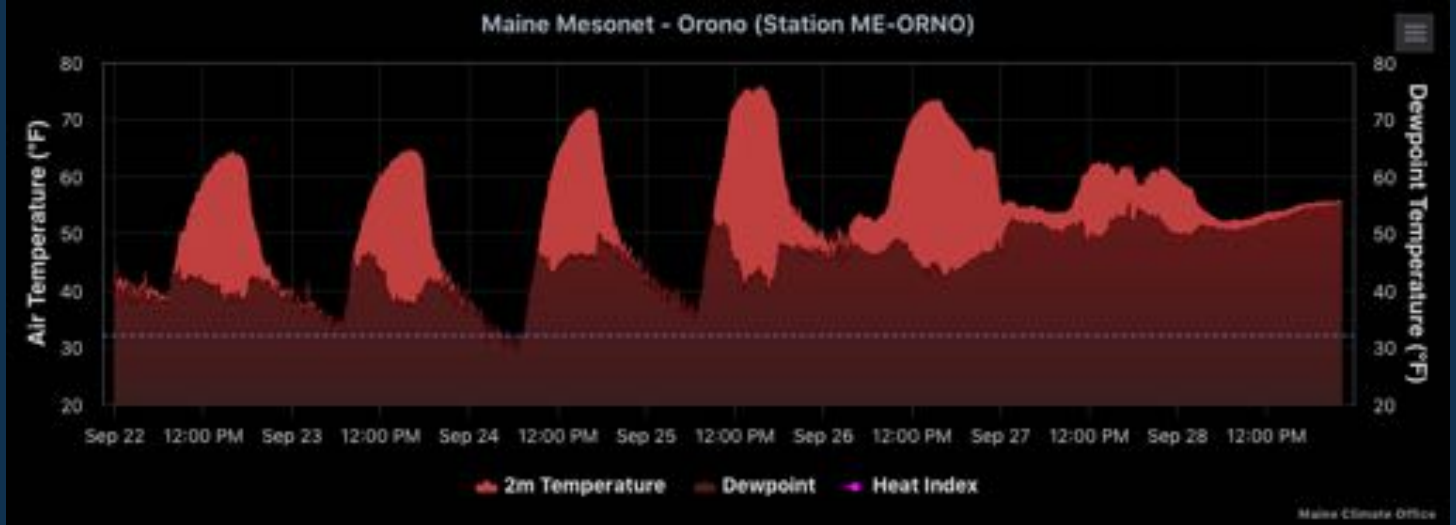
Soil Temp & Moisture		
2 in	68.7 °F	11.5 %
10 in	65.6 °F	9.1 %
20 in	61.7 °F	6.7 %

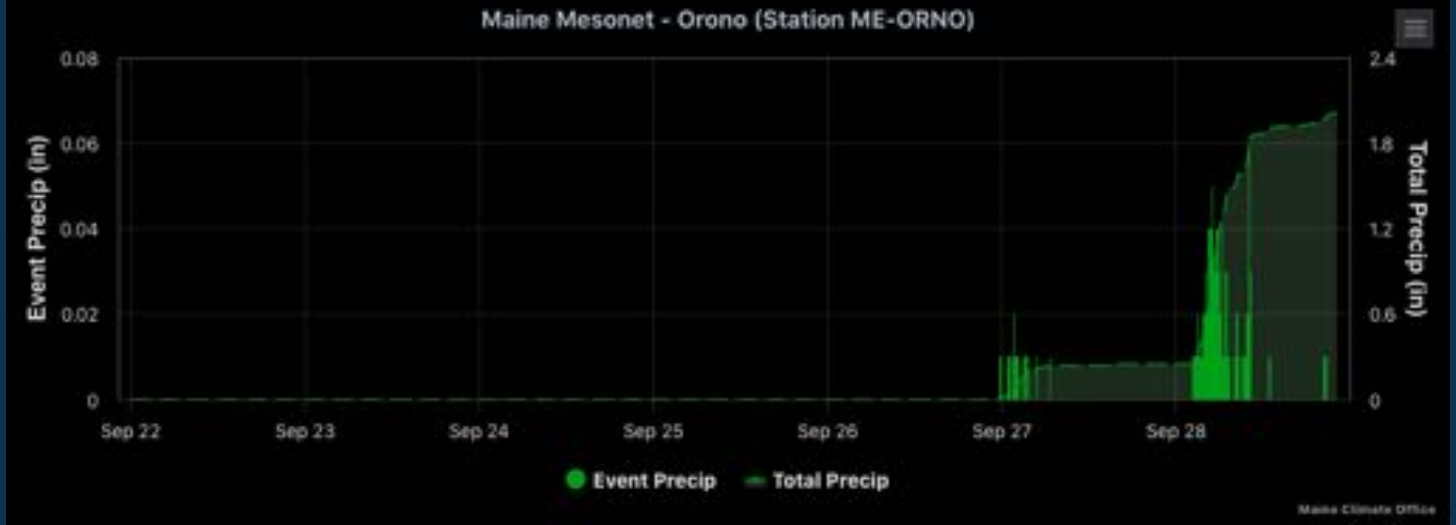
Scroll to Meteograms

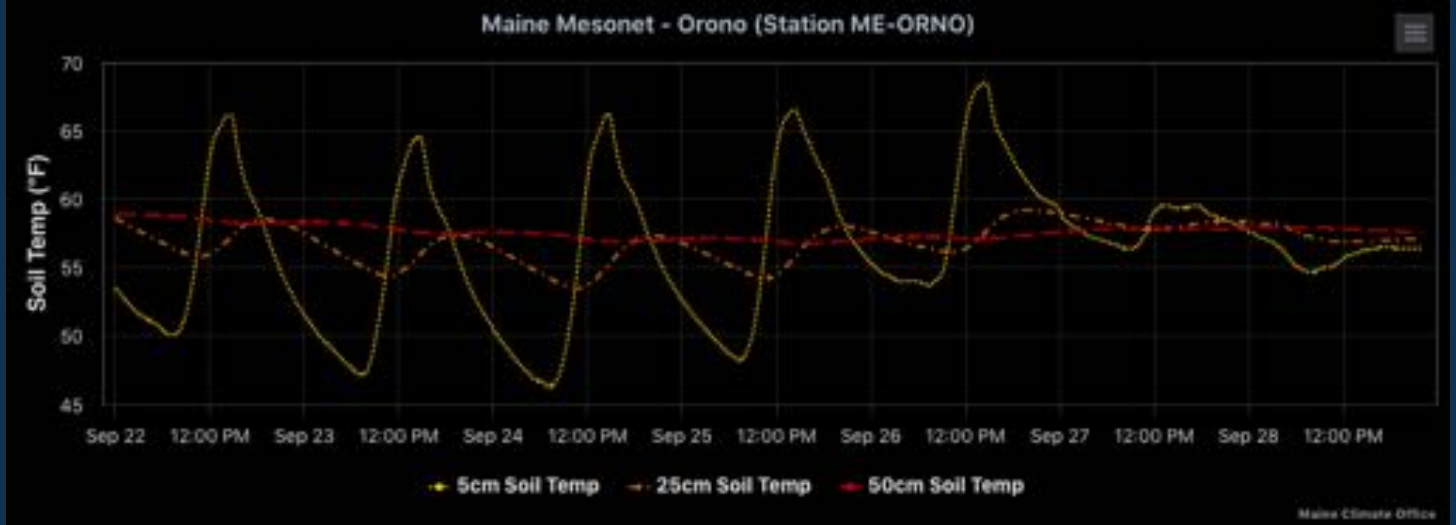


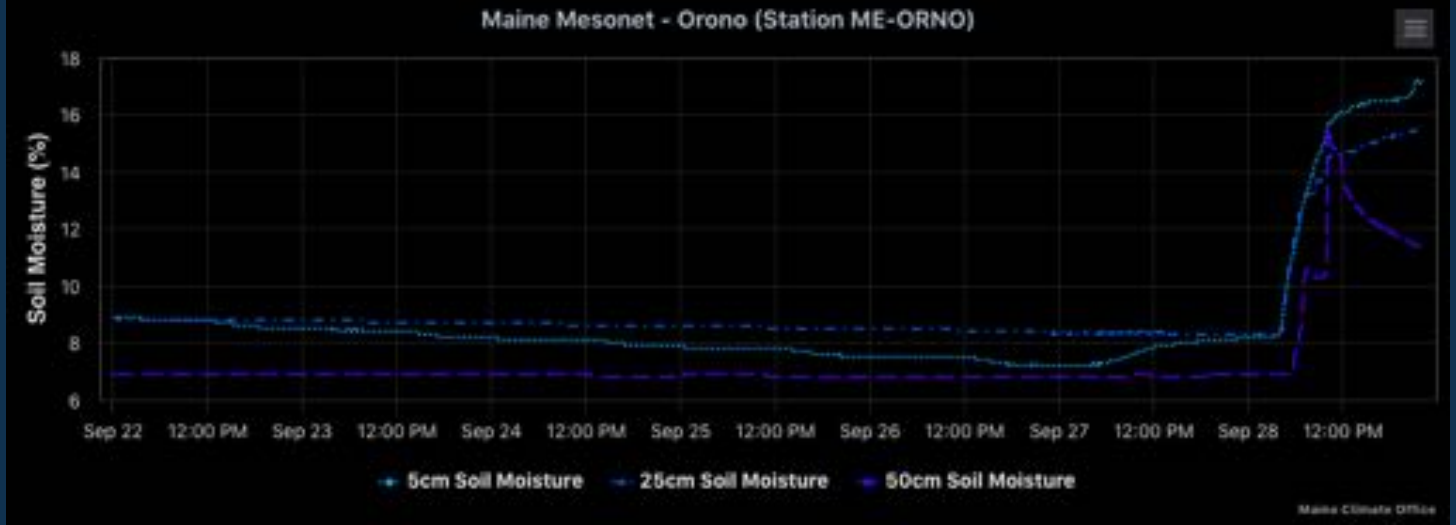





Maine Mesonet - Orono (Station ME-ORNO)
Air Temperature (°F)
Dewpoint Temperature (°F)
80
70
60
50
40
30
20
Sep 22
12:00 PM
Sep 23
12:00 PM
Sep 24
12:00 PM
Sep 25
12:00 PM
Sep 26
12:00 PM
Sep 27
12:00 PM
Sep 28
12:00 PM
2m Temperature
Dewpoint
Heat Index
Maine Climate Office


Maine Mesonet - Orono (Station ME-ORNO)
Event Precip (in)
Total Precip (in)
0.08
0.06
0.04
0.02
0
2.4
1.8
1.2
0.6
0
Sep 22
Sep 23
Sep 24
Sep 25
Sep 26
Sep 27
Sep 28
Event Precip
Total Precip
Maine Climate Office


Maine Mesonet - Orono (Station ME-ORNO)
Soil Temp (°F)
70
65
60
55
50
45
Sep 22
12:00 PM
Sep 23
12:00 PM
Sep 24
12:00 PM
Sep 25
12:00 PM
Sep 26
12:00 PM
Sep 27
12:00 PM
Sep 28
12:00 PM
5cm Soil Temp
25cm Soil Temp
50cm Soil Temp
Maine Climate Office


Maine Mesonet - Orono (Station ME-ORNO)
Soil Moisture (%)
18
16
14
12
10
8
6
Sep 22
12:00 PM
Sep 23
12:00 PM
Sep 24
12:00 PM
Sep 25
12:00 PM
Sep 26
12:00 PM
Sep 27
12:00 PM
Sep 28
12:00 PM
5cm Soil Moisture
25cm Soil Moisture
50cm Soil Moisture
Maine Climate Office

Ongoing Work

- **Fall 2026 –** end of season station servicing & maintenance
- **Winter/Spring 2027 –** site license agreement, data vis development, educational outreach, grant writing
    - Recent subaward to UVM-led NSF EPSCoR project for snow monitoring – 4 of Maine Mesonet stations will have snow pillows for SWE measurements
- **Summer/Fall 2027–** station buildout continues!

10-meter Tower

3-meter Tripod

Thank You

Sean Birkel
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Maine State Climatologist
birkel@maine.edu

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Photo by D. Roper

1865 THE UNIVERSITY OF MAINE Cooperative Extension

CLIMATE CHANGE INSTITUTE

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