

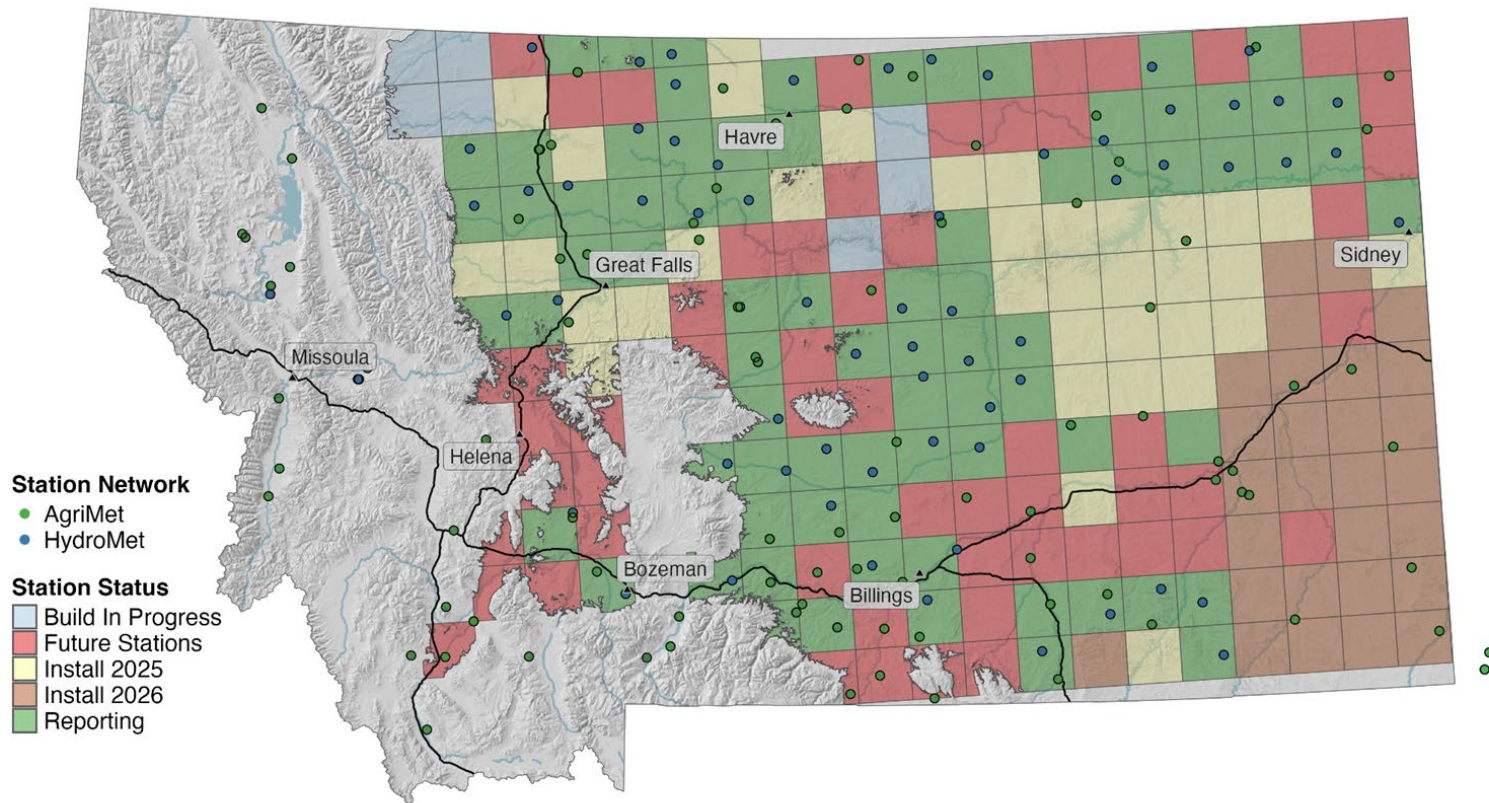
Montana Mesonet Tools: Open-Source Software for Accessing and Visualizing Montana's Weather Data



**Montana
Climate
Office**

Colin Brust, Kelsey Jencso, Kyle
Bocinsky, Zachary Hoylman

What is the Montana Mesonet?



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- Network of weather stations across Montana
- Comprised of two “sub-networks”:
 - **AgriMet**: Cost-effective and easy to deploy. Report every 15 minutes.



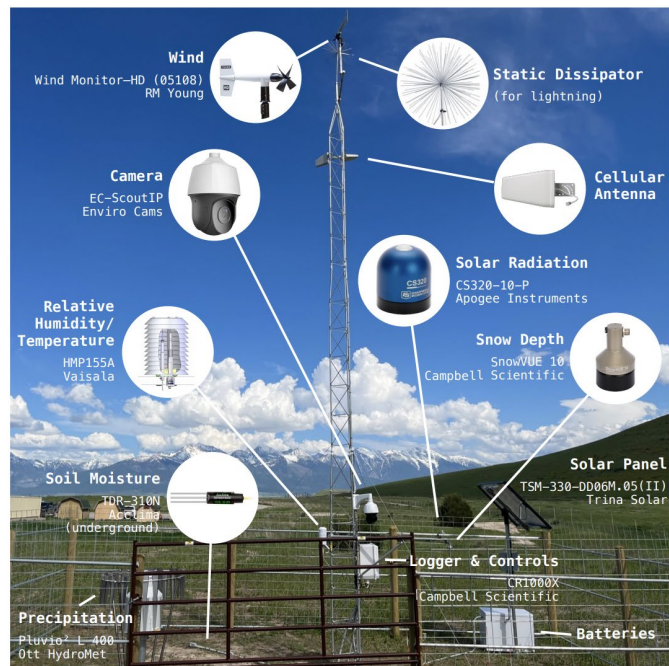
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- Each station records soil moisture, air temperature, solar radiation, ...



 **Station ID**
csktbira

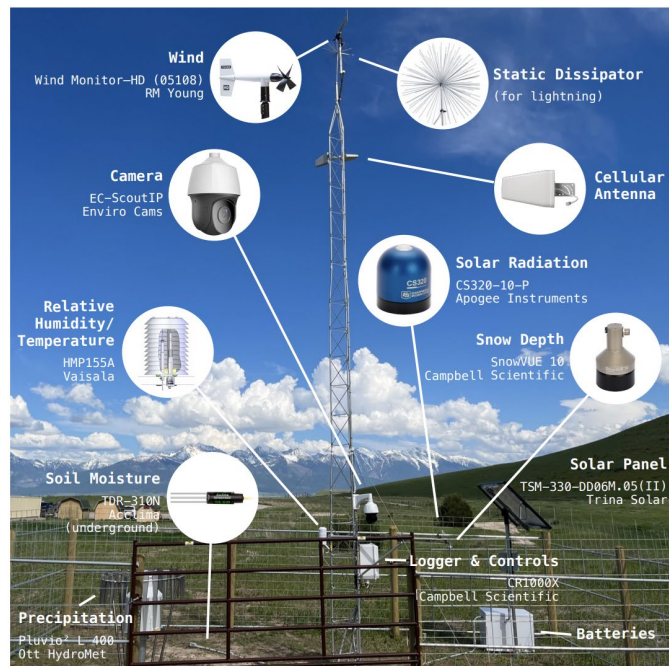
 **Data Dashboard**
<https://mesonet.climate.umt.edu/dash/csktbira>

 **Questions / Assistance**
mesonet@umontana.edu


 **API**
<https://mesonet.climate.umt.edu/api/docs>


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- All station data is freely available to the public



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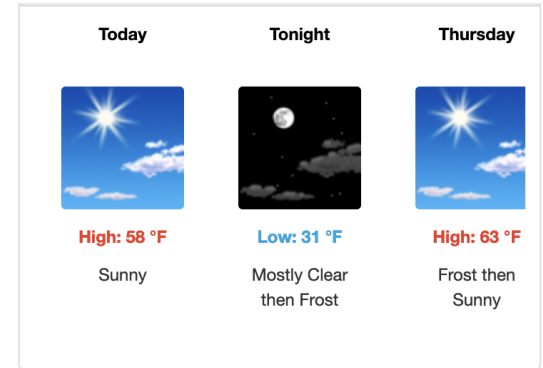
Importance of Mesonet Data

- Data used by farmers and ranchers to make informed decisions



Importance of Mesonet Data

- Data used by farmers and ranchers to make informed decisions
- Data from HydroMet stations can be used to inform weather models and forecasts



Detailed Forecast

Today

Sunny, with a high near 58. West southwest wind 7 to 9 mph, with gusts as high as 24 mph.

Tonight

Widespread frost, mainly after 3am. Otherwise, mostly clear, with a low around 31. West wind around 6 mph becoming calm in the evening. Winds could gust as high as 18 mph.

Thursday

Widespread frost before 9am. Otherwise, sunny, with a high near 63. Calm wind.

Thursday Night

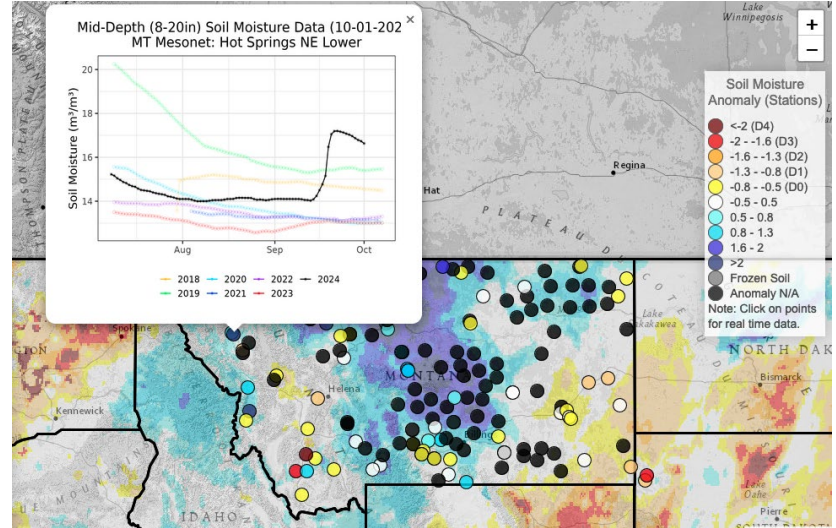
Partly cloudy, with a low around 36. Calm wind.

Friday

Sunny, with a high near 74. Light and variable wind becoming west southwest 8 to 13 mph in the afternoon. Winds could gust as high as 26 mph.

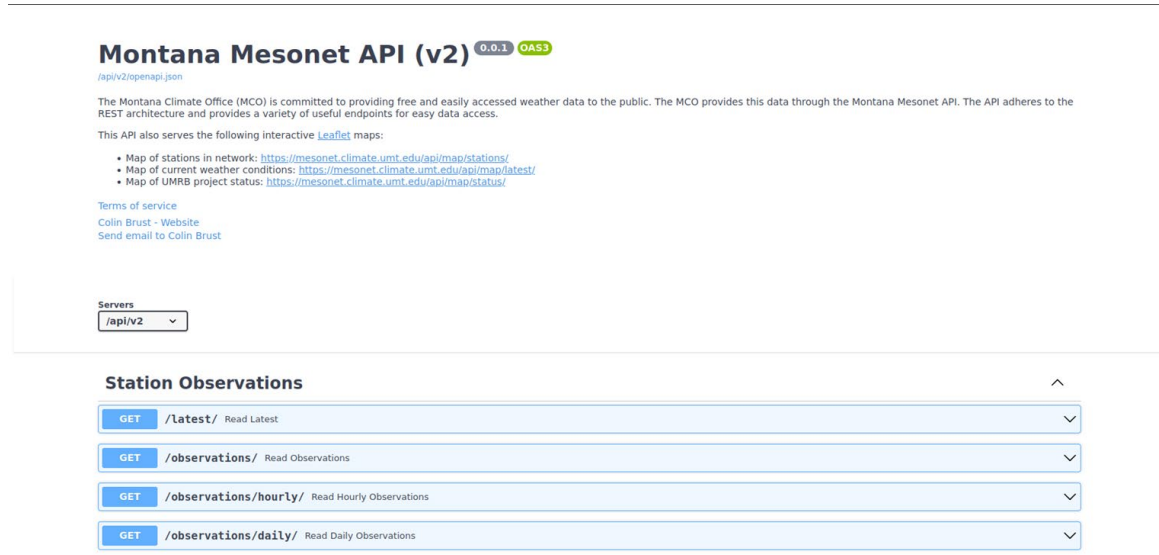
Importance of Mesonet Data

- Data used by farmers and ranchers to make informed decisions
- Data from HydroMet stations is used to inform weather models and forecasts
- Data used for drought monitoring and mapping



The Montana Mesonet API: Documentation

- API = Application Programming Interface: Interface that allows users to access and interact with data.
- <https://mesonet.climate.umt.edu/api/>



Montana Mesonet API (v2) 0.0.1 OAS3

[/api/v2/openapi.json](#)

The Montana Climate Office (MCO) is committed to providing free and easily accessed weather data to the public. The MCO provides this data through the Montana Mesonet API. The API adheres to the REST architecture and provides a variety of useful endpoints for easy data access.

This API also serves the following interactive [Leaflet](#) maps:

- Map of stations in network: <https://mesonet.climate.umt.edu/api/map/stations/>
- Map of current weather conditions: <https://mesonet.climate.umt.edu/api/map/latest/>
- Map of UMRB project status: <https://mesonet.climate.umt.edu/api/map/status/>

Terms of service
Colin Brust - Website
Send email to Colin Brust

Servers
/api/v2

Station Observations

- [GET /latest/](#) Read Latest
- [GET /observations/](#) Read Observations
- [GET /observations/hourly/](#) Read Hourly Observations
- [GET /observations/daily/](#) Read Daily Observations

The Montana Mesonet API: Stations

<https://mesonet.climate.umt.edu/api/stations>

station	name	date_installed	sub_network	longitude	latitude	elevation
aceabsar	Absarokee	2021-06-02	HydroMet	-109.61	45.56	1400.40
aceashla	Ashland E	2023-08-27	HydroMet	-106.14	45.57	971.00
acebento	Benton Lake W	2022-10-21	HydroMet	-111.47	47.69	1129.00
acebigsa	Big Sandy NW	2024-07-17	HydroMet	-110.32	48.24	871.00
acebigtl	Big Timber SE	2022-08-23	HydroMet	-109.83	45.74	1347.00
acebilli	Billings S	2024-07-11	HydroMet	-108.49	45.63	1231.00
acebowma	Bowmans Corner NW	2023-10-22	HydroMet	-112.17	47.31	1301.00
acebozem	Bozeman	2020-10-30	HydroMet	-111.07	45.66	1495.09
acebrady	Brady NE	2023-06-27	HydroMet	-111.66	48.10	1029.00
acebrede	Bredette NE	2024-09-20	HydroMet	-105.26	48.55	787.00
acebroad	Broadview	2021-08-14	HydroMet	-108.76	46.13	1239.41
acebsase	Big Sandy SE	2024-09-10	HydroMet	-110.04	48.03	945.00
acebusby	Busby S	2023-08-26	HydroMet	-106.93	45.52	1092.00
acebynum	Bynum W	2023-06-21	HydroMet	-112.49	47.96	1353.00
acecarte	Carter N	2024-07-15	HydroMet	-110.99	48.02	1064.00
acechest	Chester SW	2023-06-28	HydroMet	-111.04	48.45	946.00
acechris	Christina W	2024-07-11	HydroMet	-109.52	47.42	1099.00
acecoffe	Coffee Creek N	2022-09-19	HydroMet	-110.11	47.39	1136.00
aceconra	Conrad N	2024-08-07	HydroMet	-111.92	48.31	1132.03

The Montana Mesonet API: Observations

<https://mesonet.climate.umt.edu/api/observations>

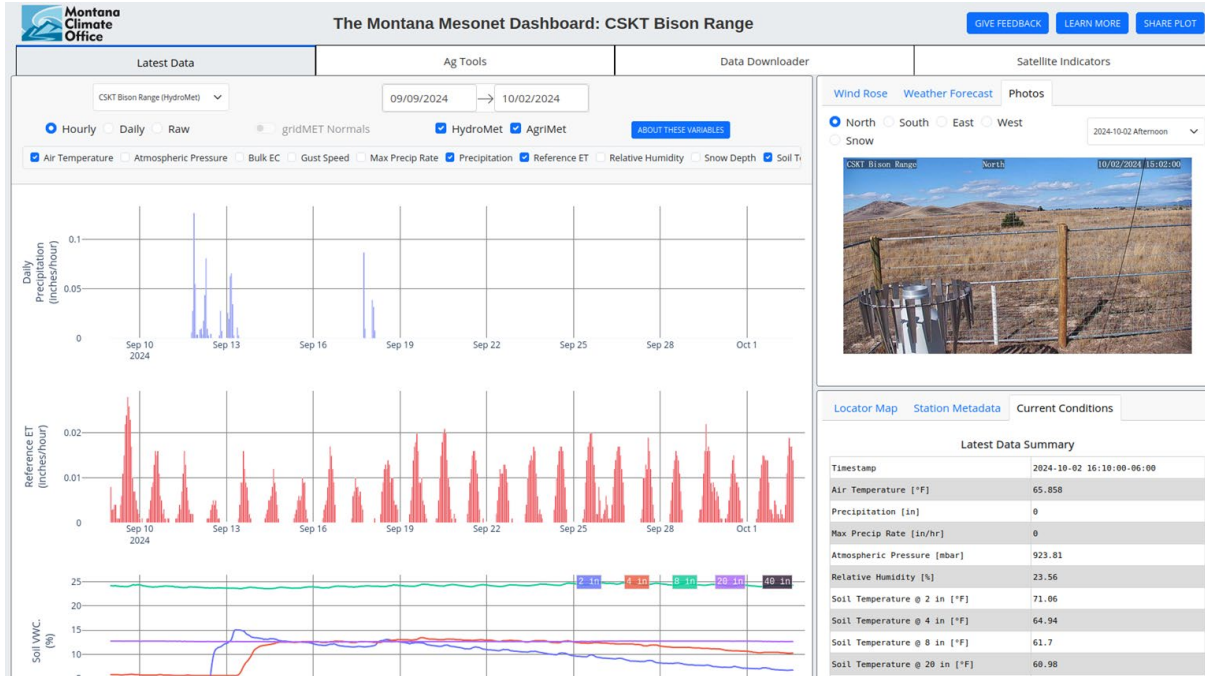
station	datetime	Air Temperature @ 2 m [°F]	Air Temperature @ 8 ft [°F]	Precipitation [in]	Max Precip Rate [in/hr]	Atmospheric Pressure [mbar]	Relative Humidity [%]
aceabsar	2024-10-02 15:25:00-06:00	76.388		0.0	0.0	852.61	15.06
aceashla	2024-10-02 15:25:00-06:00	74.120		0.0	0.0	898.50	22.48
acebento	2024-10-02 15:25:00-06:00	59.378		0.0	0.0	885.20	40.14
acebigsa	2024-10-02 15:25:00-06:00	57.578		0.0	0.0	915.06	37.90
acebigti	2024-10-02 15:25:00-06:00	75.398		0.0	0.0	860.52	14.18
acebilli	2024-10-02 15:25:00-06:00	70.322		0.0	0.0	872.50	27.51
acebowma	2024-10-02 15:25:00-06:00	61.034		0.0	0.0	867.59	35.56
acebozem	2024-10-02 15:25:00-06:00	72.230		0.0	0.0	846.35	15.74
acebrady	2024-10-02 15:25:00-06:00	57.614		0.0	0.0	893.91	42.66
acebrede	2024-10-02 15:25:00-06:00	58.892		0.0	0.0	920.39	37.60
acebroad	2024-10-02 15:25:00-06:00	67.424		0.0	0.0	871.80	34.24
acebsase	2024-10-02 15:25:00-06:00	56.804		0.0	0.0	905.80	43.02
acebusby	2024-10-02 15:25:00-06:00	74.516		0.0	0.0	885.46	21.35
acebynum	2024-10-02 15:25:00-06:00	55.490		0.0	0.0	861.66	40.66
acecarte	2024-10-02 15:25:00-06:00	56.678		0.0	0.0	893.22	43.86
acechest	2024-10-02 15:25:00-06:00	58.694		0.0	0.0	904.79	41.31
acechris	2024-10-02 15:25:00-06:00	59.738		0.0	0.0	887.81	38.02
acecoffe	2024-10-02 15:25:00-06:00	57.632		0.0	0.0	885.57	42.68

The Montana Mesonet API: Flexible Interface

https://mesonet.climate.umt.edu/api/observations/?stations=csktbira&start_time=2024-10-01&end_time=2024-10-02&elements=air_temp

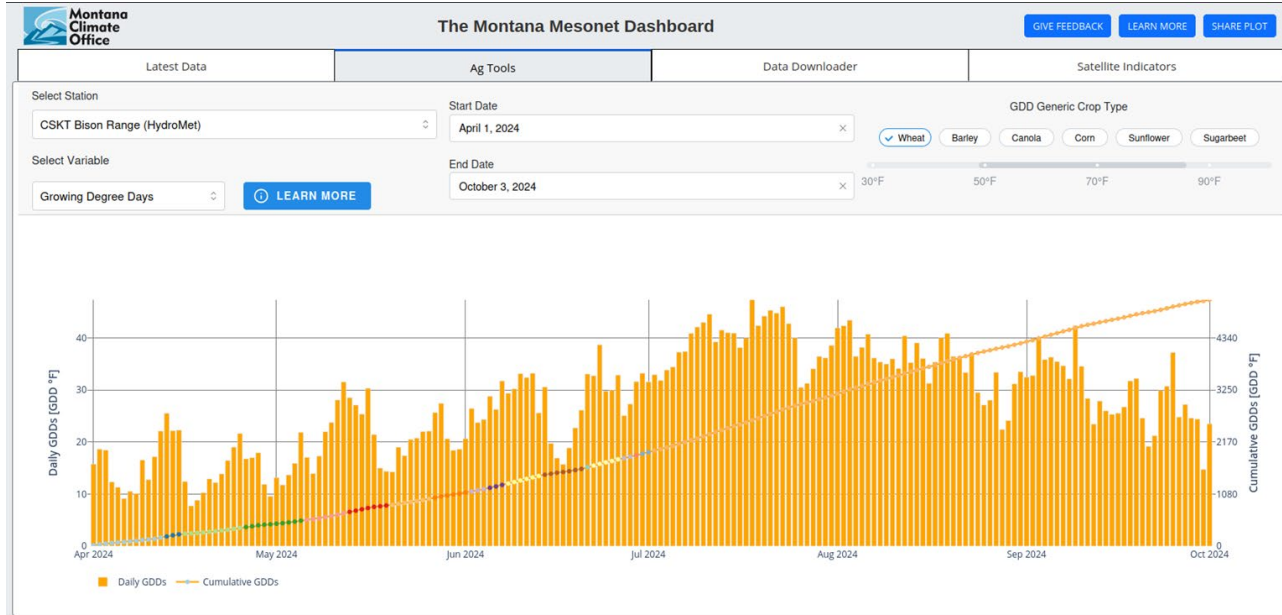
station	datetime	Air Temperature @ 2 m [°F]
csktbira	2024-10-01 00:00:00-06:00	35.029
csktbira	2024-10-01 00:05:00-06:00	35.958
csktbira	2024-10-01 00:10:00-06:00	36.214
csktbira	2024-10-01 00:15:00-06:00	35.929
csktbira	2024-10-01 00:20:00-06:00	35.065
csktbira	2024-10-01 00:25:00-06:00	36.149
csktbira	2024-10-01 00:30:00-06:00	36.633

The Montana Mesonet Dashboard



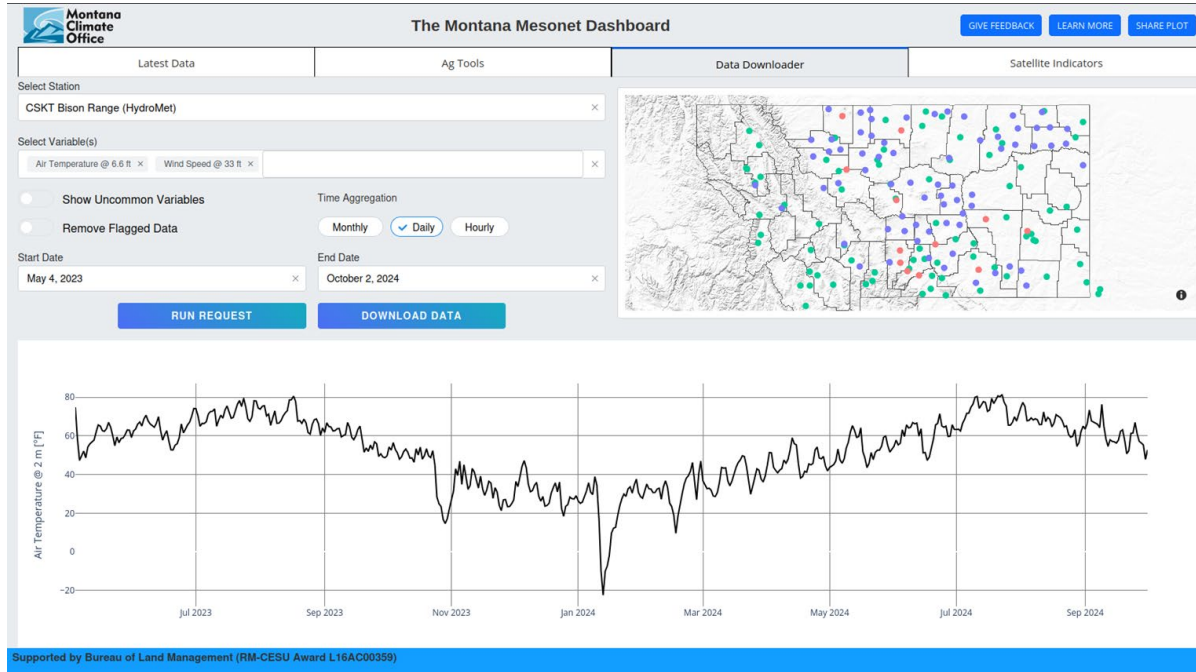
<https://mesonet.climate.umt.edu/dash/csktbira>

The Montana Mesonet Dashboard: Ag Tools



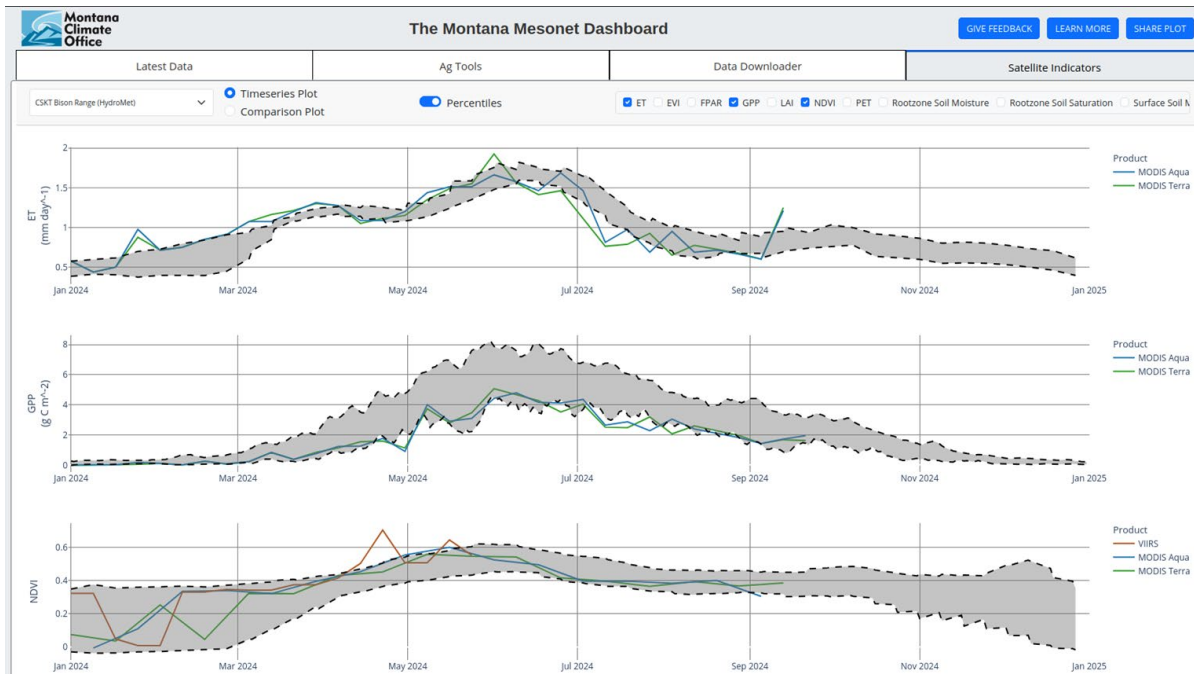
<https://mesonet.climate.umt.edu/dash/#ag>

The Montana Mesonet Dashboard: Data Downloader



<https://mesonet.climate.umt.edu/dash/#downloader>

The Montana Mesonet Dashboard: Satellite Indicators



<https://mesonet.climate.umt.edu/dash/#satellite>

Thank you!

Montana Mesonet Resources:

- MCO Website: <https://climate.umt.edu>
- Mesonet API: <https://mesonet.climate.umt.edu/api/>
- Mesonet Dashboard: <https://mesonet.climate.umt.edu/dash/>
- MCO GitHub: <https://github.com/mt-climate-office>

