

## Review – April 2023

### Temperature

Temperatures in Ohio were variable during April as Ohio transitioned further into spring. The state saw extended stretches of both warm and dry, as well as cold and wet days throughout the month, culminating in standard average temperatures of around 50-55°F in the bulk of Ohio, with small pockets in the northwest and northeast averaging 45-50°F, and the far south averaging 55-60°F (Fig. 1a). With temperatures relatively consistent in the state, average temperature departures were minimal, with the entire state staying within 0-3°F of historical normal (Fig. 1b). Even more consistent was the southern half of Ohio, staying mostly within 1°F. At the county level, most of the state ranked within the warmest third, with areas along western and south-central Ohio near normal (Fig. 2). Wood, Lake, and Ashtabula Counties all ranked within in their warmest tenth of recorded Aprils.

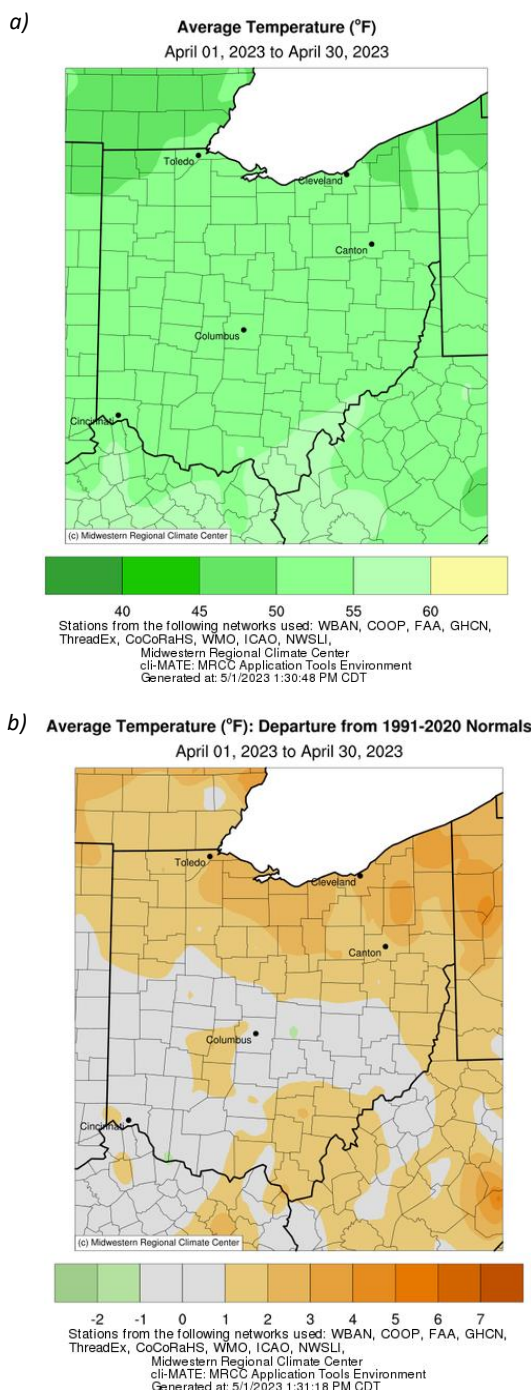


Figure 1a: Average temperature and 1b: Departure from Normal for the month of April 2023. Data courtesy of the Midwestern Regional Climate Center (<http://mrcc.purdue.edu>).

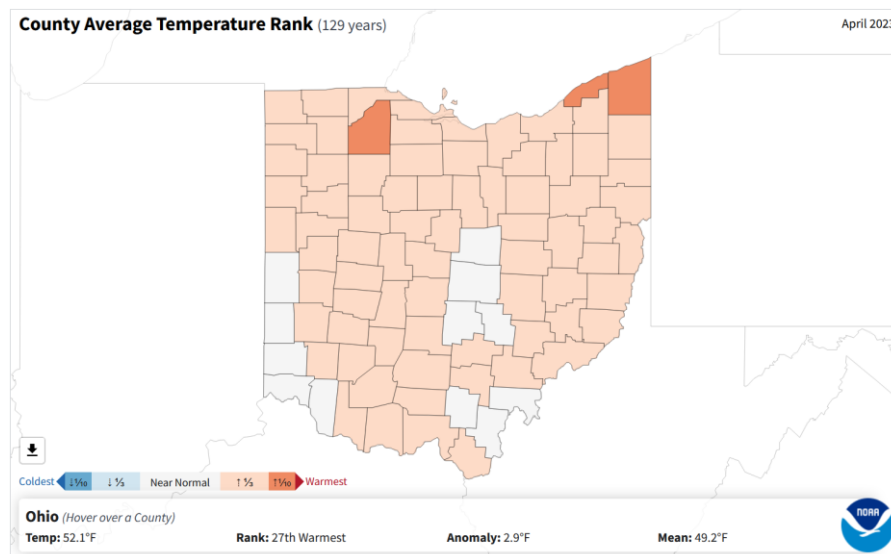


Figure 2: State of Ohio average temperature ranks by county for April 2023. Courtesy of the National Centers for Environmental Information (<https://www.ncdc.noaa.gov/sotc/>).

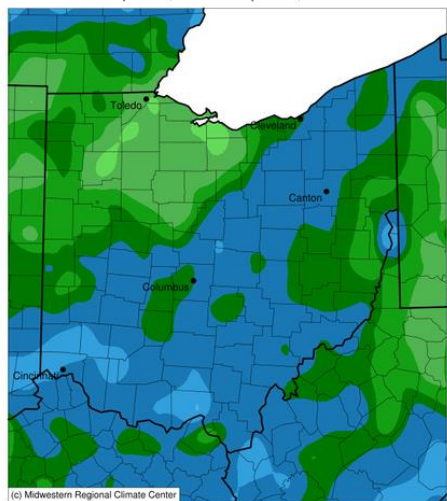
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### Precipitation

Despite multiple significant rain events in April, Ohio fell short of the month's normal accumulation totals. Much of south and northeast Ohio saw 3-4 inches of accumulated precipitation, while the northwest and far east totaled around 1-3 inches (Fig. 3a). Compared to the historical record, most of the state received 0.5-1.5 inches less accumulated precipitation than normals, with the north-central region seeing 1.5-3 inches less (Fig. 3b). Conversely, small localities along the Ohio River totaled 0-2 inches more accumulated precipitation than normals. Despite ranking in the drier third of the historical record in the north and the wetter third in the far south, most Ohio counties ranked near normal for precipitation in April (Fig. 4). While no county reached either the driest or wettest tenth of the record, the furthest departure was seen in Ottawa County, which recorded its 19<sup>th</sup> driest April on record.

a)

**Accumulated Precipitation (in)**  
April 01, 2023 to April 30, 2023

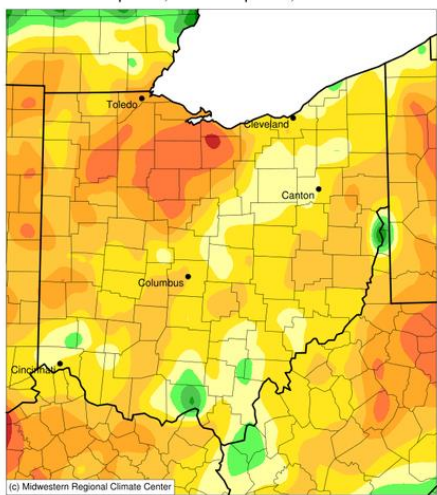


(c) Midwestern Regional Climate Center

0.01 0.1 0.25 0.5 1 1.5 2 2.5 3 4 5 6 8  
Stations from the following networks used: WBAN, COOP, FAA, GHCN, ThreadEx, CoCoRaHS, WMO, ICAO, NWSLI,  
Midwestern Regional Climate Center  
cli-MATE: MRCC Application Tools Environment  
Generated at: 5/1/2023 1:29:55 PM CDT

b)

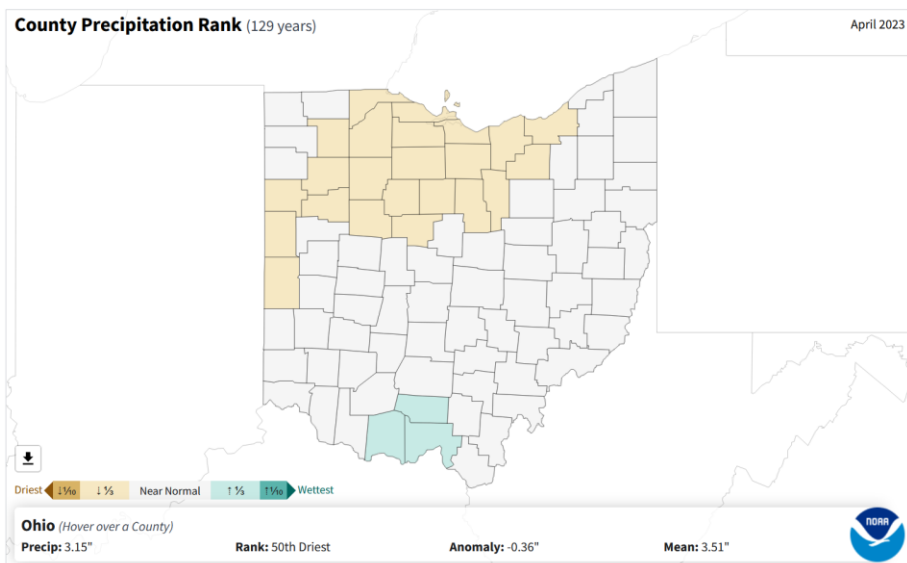
**Accumulated Precipitation (in): Departure from 1991-2020 Normals**  
April 01, 2023 to April 30, 2023



(c) Midwestern Regional Climate Center

-3 -2.5 -2 -1.5 -1 -0.5 0 0.5 1 1.5 2 2.5 3  
Stations from the following networks used: WBAN, COOP, FAA, GHCN, ThreadEx, CoCoRaHS, WMO, ICAO, NWSLI,  
Midwestern Regional Climate Center  
cli-MATE: MRCC Application Tools Environment  
Generated at: 5/1/2023 1:30:29 PM CDT

**Figure 3a: Accumulated precipitation and 3b: Departures from Normal for the month of April 2023.** Data courtesy of the Midwestern Regional Climate Center (<http://mrcc.purdue.edu>).



**Figure 4: State of Ohio precipitation ranks by county for April 2023.** Courtesy of the National Centers for Environmental Information (<https://www.ncdc.noaa.gov/sotc/>).

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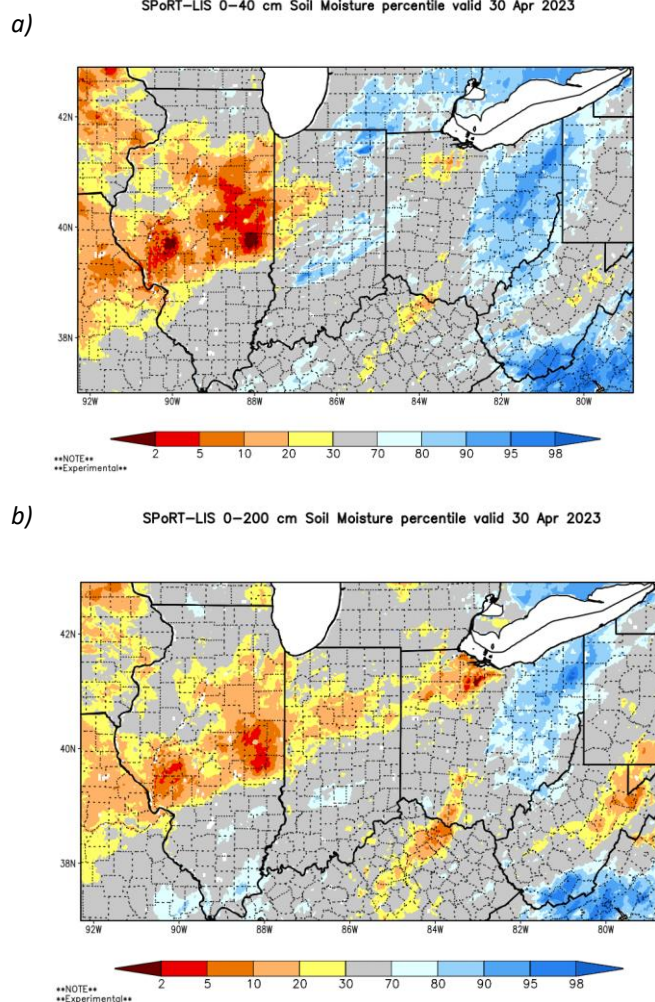


Figure 5a: 0-40 cm and 5b: 0-200 cm soil moisture percentile across the region at the end of April. Courtesy of NASA SPoRTLIS ([https://weather.msfc.nasa.gov/sport/case\\_studies/lis\\_IN.html](https://weather.msfc.nasa.gov/sport/case_studies/lis_IN.html)).

## Soil and Energy

Rains from March and April, combined with reduced evaporation thanks to cool April temperatures, led to increased soil moisture across Ohio. At both 0-40cm and 0-200cm layers, the eastern half of the state recorded significant soil moisture (Figure 5a and 5b). While some pockets in the northwest and southwest recorded moderate soil dryness, most of western Ohio's soil moisture was around average on the last day of April. Despite temperatures warming in April, Heating Degree Days (HDDs) still dominate during this time of year, although every region in Ohio, save for the southwest, recorded fewer HDDs than normal. Cooling Degree Days (CDDs), while already sparse in April, were also fewer than normal in every region except for north-central Ohio (Fig. 6).

**Product Note:** This past winter season, a warm bias in the 2-meter temperature forcing of soil moisture product we use for our summaries was introduced due to changes to the upstream processing at the National Centers for Environmental Prediction. This resulted in an under-representation of snow cover and significantly impacted the SPoRT-LIS soil moisture analyses and percentiles resulting in drier than normal depictions of soil moisture, primarily in the northern tier of the United States and southern Canada. Corrective measures have taken place. We apologize for any inconvenience this may have caused. For more information, please contact A. Wilson, [wilson.1010@osu.edu](mailto:wilson.1010@osu.edu).

| Climate Division | Heating Degree Days | Normal | Departure | Cooling Degree Days | Normal | Departure |
|------------------|---------------------|--------|-----------|---------------------|--------|-----------|
| 1                | 432                 | 479    | -48       | 3                   | 5      | -1        |
| 2                | 412                 | 474    | -62       | 6                   | 5      | 0         |
| 3                | 442                 | 506    | -64       | 2                   | 4      | -1        |
| 4                | 405                 | 424    | -19       | 0                   | 6      | -6        |
| 5                | 386                 | 401    | -14       | 1                   | 6      | -5        |
| 6                | 407                 | 453    | -46       | 1                   | 4      | -4        |
| 7                | 399                 | 440    | -41       | 0                   | 4      | -4        |
| 8                | 378                 | 368    | 9         | 2                   | 8      | -6        |
| 9                | 324                 | 342    | -18       | 4                   | 9      | -5        |
| 10               | 363                 | 387    | -24       | 1                   | 6      | -5        |
| Statewide        | 393                 | 424    | -31       | 2                   | 6      | -4        |



Figure 6: (Left) April 2023 heating & cooling degree days. (Right) Corresponding Ohio Climate Divisions. Data courtesy of the Midwestern Regional Climate Center (<http://mrcc.purdue.edu>).

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#### Notable Events

In the early morning hours of April 1<sup>st</sup>, a historic storm system passed over Ohio, impacting nearly every part of the state. Though weakened after dropping more than 100 confirmed tornadoes throughout the Midwest and Southeast on March 31<sup>st</sup>, the system produced ten confirmed tornadoes in Ohio, rated as EF-0s and EF-1s (Fig. 7). The most significant hazard related to the storm in Ohio was damaging winds, with dozens of reports throughout the state, though mostly concentrated in the north. Maximum wind gusts of up to 70 miles per hour were recorded near Cleveland, along with maximum gusts of at least 47 miles per hour all around Ohio, knocking out power to more than 90,000 homes (Fig. 8).

While none occurred in Ohio, the storm resulted in 27 tornado-related deaths, primarily in Tennessee, Arkansas, Indiana, and Illinois. The storm did cause one non-tornado related death in Ohio. It ranks third worldwide for producing the most tornadoes in a 24-hour period, totaling 145 confirmed tornadoes on March 31 - April 1.

Ohio Severe Weather Reports: April 1, 2023

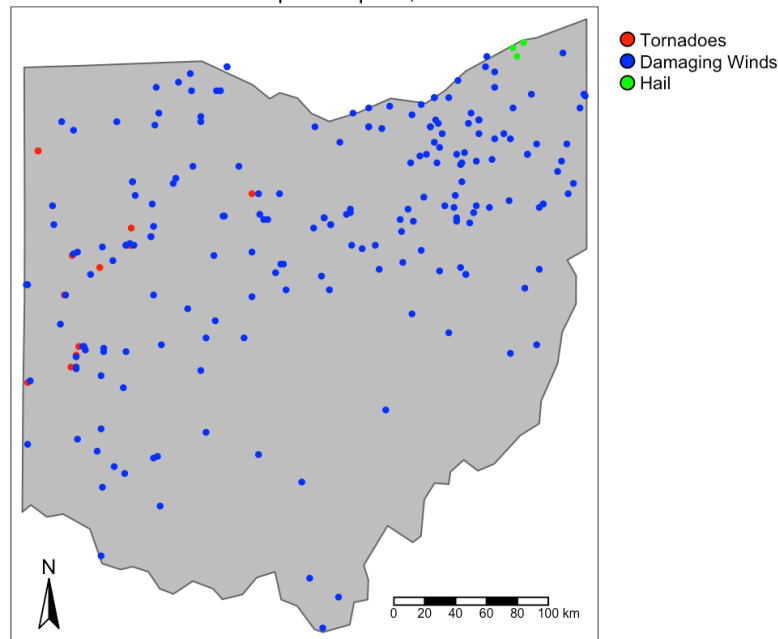
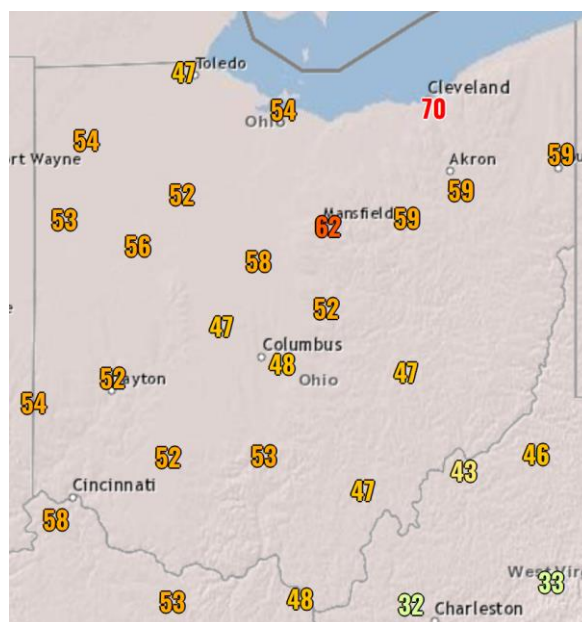
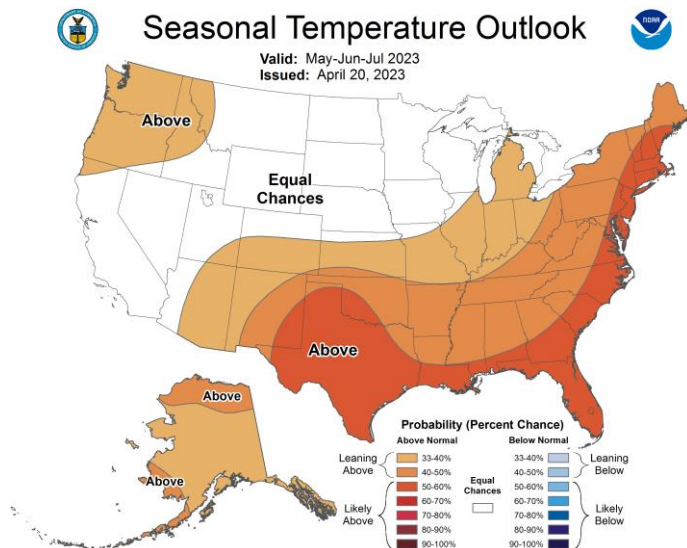


Figure 7: Statewide severe weather reports for April 1, 2023, including damaging winds, hail, and tornadoes (above) and Figure 8: Statewide maximum wind gust (mph) observations for April 1, 2023 (below). Data courtesy of the National Weather Service Local Storm Report archive, accessed via Iowa Environmental Mesonet (<https://mesonet.agron.iastate.edu/>) and the National Weather Service Weather & Hazards Data Viewer (<https://www.wrh.noaa.gov/map/>).



## Forecast: May - July 2023

a)



b)

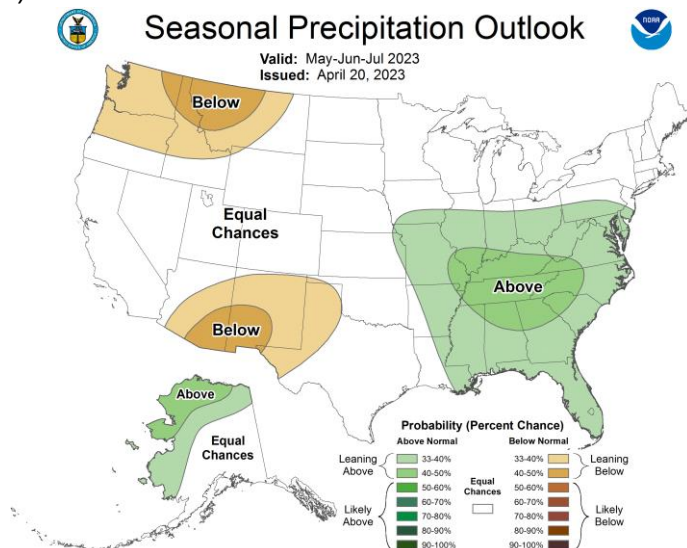


Figure 9a: Nationwide Seasonal Temperature and 9b: Precipitation Outlook for May-July. Courtesy of the Climate Prediction Center (<https://www.cpc.ncep.noaa.gov/>).

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## Looking Ahead

The CPC's 3-month outlooks continue to predict warm and wet conditions in the upcoming months, though conditions may begin to shift in the summer and fall months. While the whole state is predicted to have above-normal temperatures from May until July, most of the state's forecast comes with low confidence, save for the far east (Fig. 9a). Meanwhile, most of Ohio is predicted with low confidence to have above normal precipitation into summer, with the northern edge having equal chances of above or below normal precipitation during the period (Fig. 9b). While the United States has experienced a significant stretch of La Niña conditions that have brought wet and variable conditions to the Ohio Valley and defined 3-month outlooks since December, the CPC is now predicting an increased chance of El Niño development in May-July 2023, with odds increasing further through the fall and winter. Should El Niño develop over the summer, this may shift further outlooks toward warm and dry conditions for the remainder of this year and into 2024 in the Ohio Valley.

*Note: these outlooks do not provide the quantity of above or below normal conditions, just the likelihood of occurrence (i.e., the probability).*