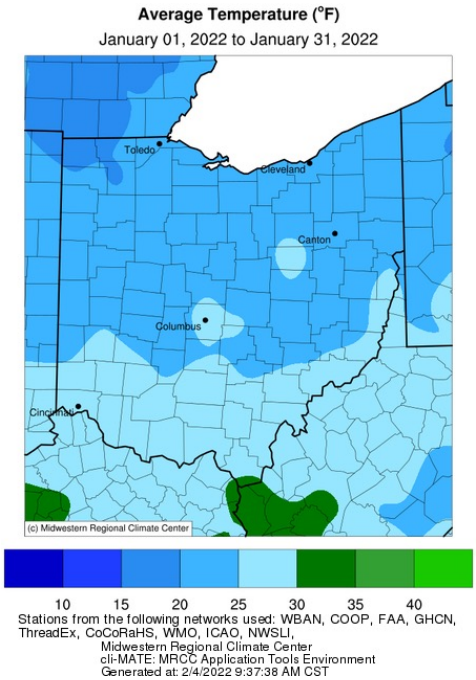
State of Ohio Monthly Climate Update

THE OHIO STATE UNIVERSITY

Review - January 2022

a)



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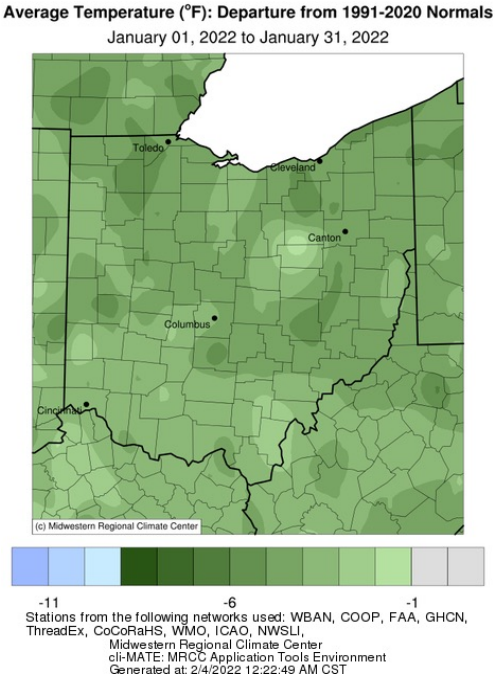

Figure 1a) Average temperature and 1b) Departures from Normal for the month of January 2022. Data courtesy of the Midwestern Regional Climate Center (http://mrcc.purdue.edu).

Temperature

After a remarkably warm December, a change in the jet stream allowed repeated bouts of polar airmasses to filter through the state during January. This resulted in below-average temperatures, especially during the latter half of the month. Several days featured highs in the 20s and lows in the single digits to teens. Monthly average temperatures ranged 20-30°F (Fig. 1a). Compared to 1991-2020 mean climate data, this put the region generally 2-4°F below normal for the month (Fig. 1b). County-by-county temperature ranks were mainly in the middle of the 128-year record, with most counties experiencing between their 30th and 40th coldest January (Fig. 2). The sustained cold had some impacts on soil and energy, discussed below.

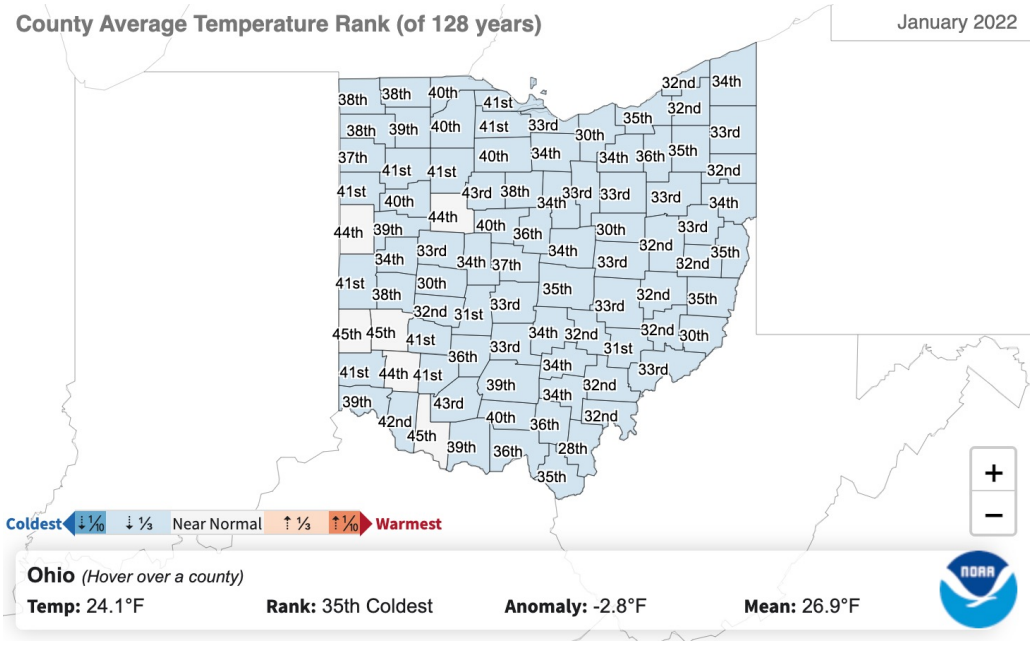

Figure 2). State of Ohio average temperature ranks by county for January 2022. Courtesy of the National Centers for Environmental Information (https://www.ncdc.noaa.gov/sotc/).

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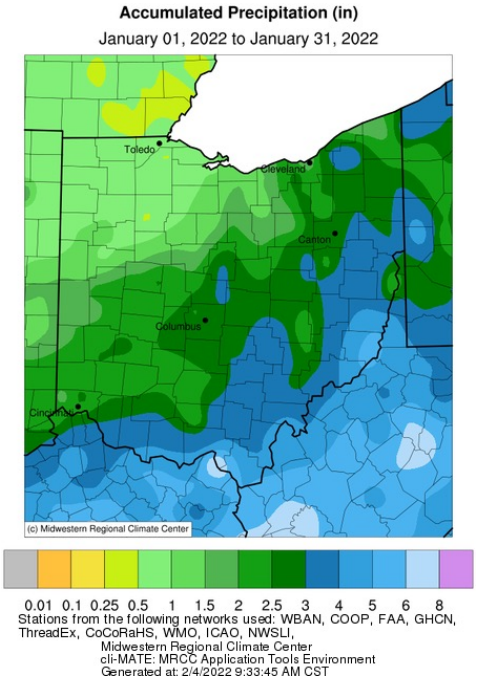

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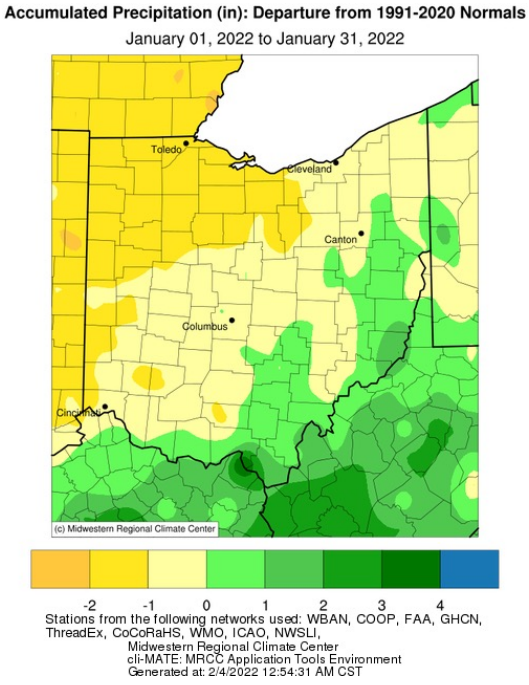


Figure 3a) Accumulated precipitation and 3b) Departures from Normal for the month of January 2022. Data courtesy of the Midwestern Regional Climate Center (http://mrcc.purdue.edu).

Precipitation

Much of the region received average to below average liquid-equivalent precipitation in January, with limited areas seeing above-normal values. Northern and western counties received between 0.5” and 2.5” of precipitation (Fig. 3a), well below average for January standards (Fig. 3b). Southern and eastern counties received 3-5” of precipitation (Fig. 3a). Several counties across northwest Ohio ended the month with their top 10 driest Januarys on record, with Ottawa and Defiance counties in particular notching their 2nd driest January in the 128-year record (Fig. 4). This came after one of the wettest autumns on record for these same counties. Dryness across the northwest will be something to watch if it lingers into the warmer months ahead.

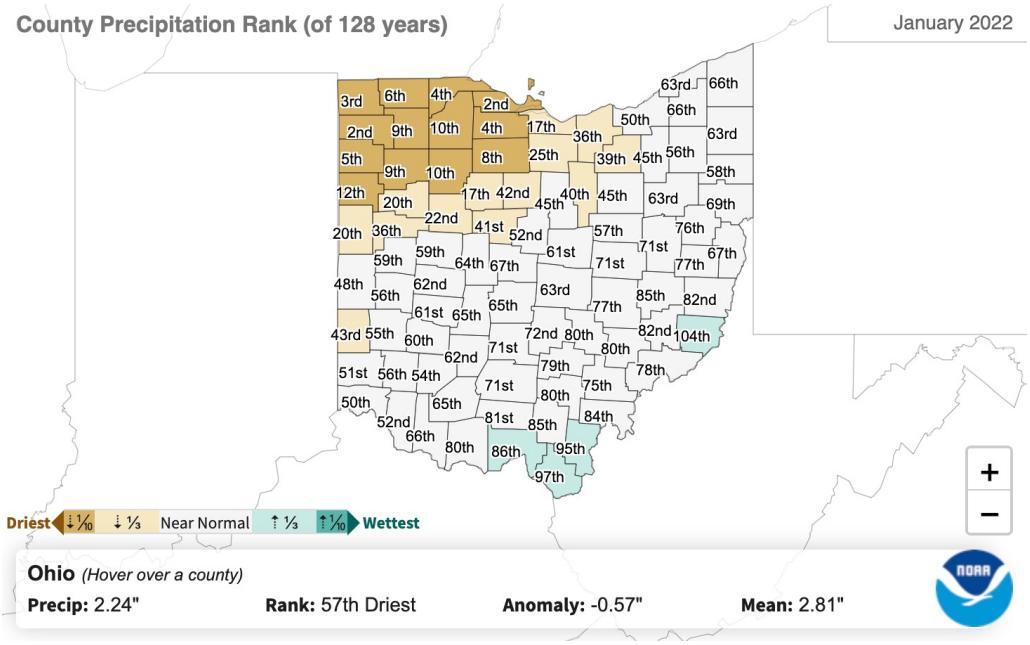
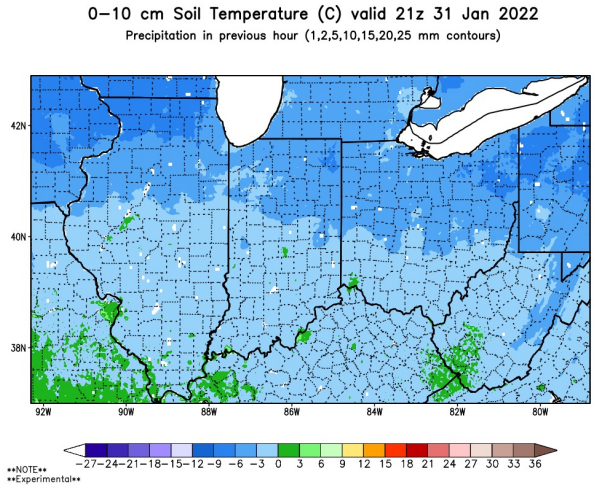


Figure 4). State of Ohio precipitation ranks by county for January 2022. Courtesy of the National Centers for Environmental Information (https://www.ncdc.noaa.gov/sotc/).

a)



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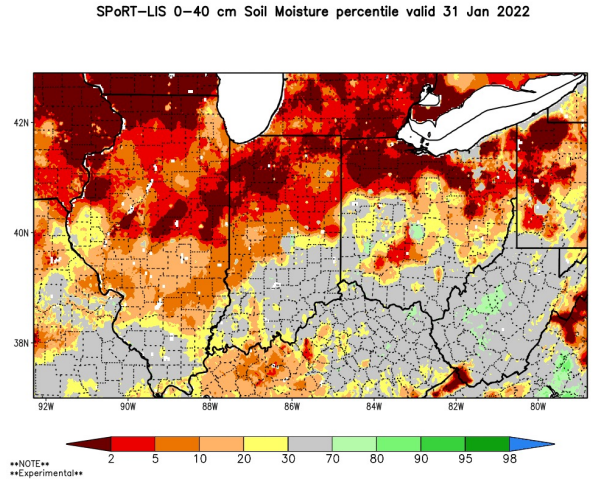


Figure 5a: Snapshot 0-10 cm soil temperature the afternoon of 31 Jan across the region, 5b: 0-40 cm soil moisture percentile across the region at the end of January. Courtesy of NASA SPoRTLIS (https://weather.msfc.nasa.gov/sport/case_studies/lis_IN.html).

Soil and Energy

The prevalence of near- to below-average temperatures led to some notable changes in both soil and energy. On soil, continued cold weather led to frozen ground and sub-surface layers across almost the entire state. The result of this is well represented in a snapshot of 0-10cm soil temperatures on the afternoon of Jan 31 (Fig. 5a). Cold and frozen ground also has a lower capacity of moisture, resulting in relatively low readings of soil moisture especially across the north and northwest part of the state (Fig. 5b). The highest amounts of moisture, found in the south and southwest, were due to increased precipitation as discussed on Page 2. Likewise, most low values were found in the northwest where very little precipitation occurred.

On the energy side, colder weather meant an increase in 'heating degree days' (HDDs) across the state. All major climate divisions in Ohio recorded a notable increase in HDDs. In short: an increase in HDDs means that more energy is required to heat the insides of homes and businesses across the region (Fig. 6).

Climate Division	Heating Degree Days	Normal (1991-2020)	Departure	Cooling Degree Days	Normal (1991-2020)	Departure
1	1330	1212	118	0	0	0
2	1308	1194	114	0	0	0
3	1339	1191	148	0	0	0
4	1299	1183	116	0	0	0
5	1262	1144	118	0	0	0
6	1321	1183	138	0	0	0
7	1302	1159	143	0	0	0
8	1190	1092	98	0	0	0
9	1153	1036	117	0	0	0
10	1228	1095	133	0	0	0
Statewide	1276	1152	124	0	0	0

Figure 6: (Left) January 2022 heating & cooling degree days. (Right) Corresponding Ohio Climate Divisions . Data courtesy of the Midwestern Regional Climate Center (http://purdue.mrcc.edu).

Notable Events

January was quiet in terms of significant weather events in the region. Northwest flow due to an amplified jet stream kept moisture limited, though a string of Alberta Clipper systems passed through early in the month and produced scattered snowfalls. A significant system impacted the region during January 16-18. A low-pressure system riding through the Ohio Valley allowed polar air and Gulf moisture to meet, resulting in an impactful swath of snow and mixed precipitation stretching from west to east across the region. Eastern counties received hefty snowfall totals, with 10-20" observed across many areas, and a maximum 27" of snow observed in Ashtabula, OH (Fig. 7). Central and southern Ohio received less amounts, in the 3-7" range. The snow, while plentiful, was also quite dry and powdery, signaling a high snow to liquid ratio (Fig. 8.) As a result, the ensuing melt did not contributor any major flood concerns for the region.

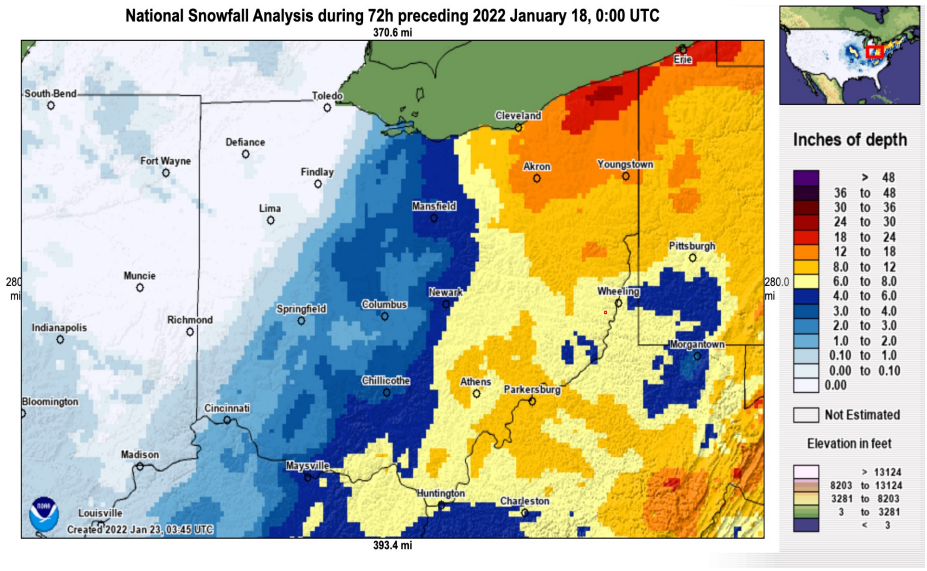


Figure 7: Statewide snowfall analysis for the 72-hour period preceding January 18, 2022. Courtesy of NOAA's National Operational Hydrologic Remote Sensing Center (NOHRSC) (https://www.nohrsc.noaa.gov/nsa/).

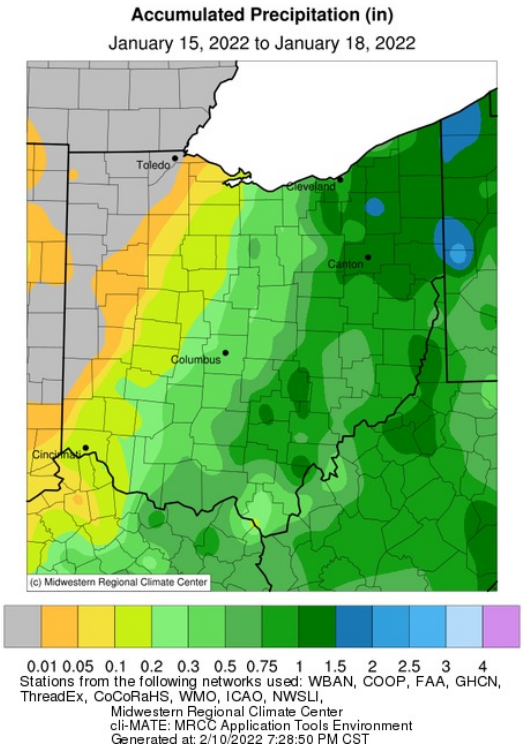
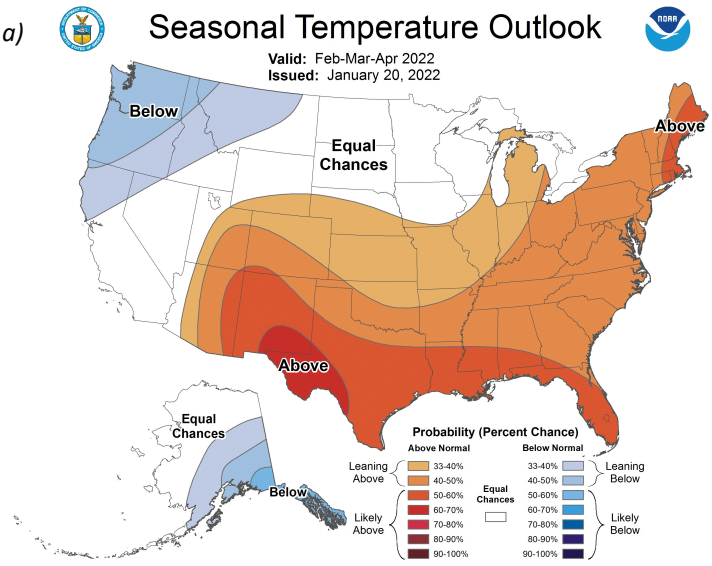


Figure 8: Statewide liquid-equivalent precipitation analysis for the 72-hour period between January 15-18, 2022, showing the disparity between the large amounts of snow received versus resulting liquid water. Courtesy of the Midwestern Regional Climate Center (https://mrcc.purdue.edu).

Forecast - February - April

a)



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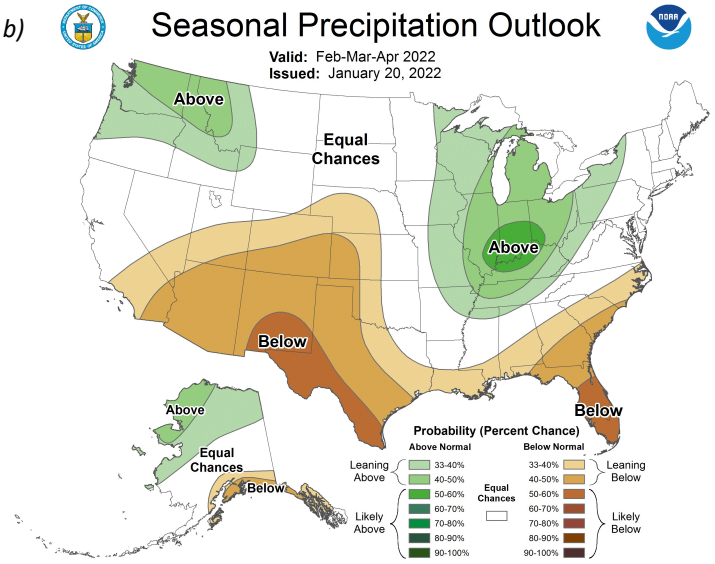

Figure 9a: Nationwide Seasonal Temperature and 9b: Precipitation Outlook for February-April 2022. Courtesy of the Climate Prediction Center (https://www.cpc.ncep.noaa.gov/).

Looking Ahead

Thus far, the trend of cold and unsettled weather has continued into February. However, a bit of a thaw has taken hold of the region, with temperatures reaching 40 °F in many areas once again for the first time in a few weeks. According to medium-range guidance from the Climate Prediction Center, there are signs for a continued warmer pattern. A shift in the jet stream will allow for more southerly air to move into the region occur compared to the cold northwesterly flow we have experienced as of late. The result will be slightly increased chances for warmer than average temperatures as we finish out the month and head toward March and April (Fig. 9a). Chances for increased precipitation also remain in the picture with an active storm track. Note the greatest probabilities for increased precipitation lie firmly in the Ohio Valley region, while weaker probabilities spread outward into the Great Lakes (Fig. 9b). This is a typical late winter "La Nina" signal, where cooler waters in the tropical Pacific influence local weather and climate here in Ohio. This pattern is expected to continue into spring and will be most notable in its influence on precipitation.

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