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Maryland Climate Bulletin
March 2025

Prepared by
Dr. Alfredo Ruiz-Barradas
Maryland State Climatologist

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DEPARTMENT OF ATMOSPHERIC & OCEANIC SCIENCE
Sumant Nigam, Chair

Maryland State Climatologist Office

Summary

Statewide averages indicate that March 2025 was warmer and drier than normal (i.e., 1991-2020 averages). Regionally, monthly mean temperatures were in the 41–52°F range, maximum temperatures were between 54 and 66°F, and minimum temperatures were in the 29−40°F range. Monthly total precipitation was between 1.2 and 6.0 inches.

Maryland Regional Features (Figures 1-6, C1, and D1)

- The mean temperature was warmer than normal in the entire state, especially over Montgomery and Prince George's counties (6.6 to 6.9°F), Frederick, Carroll, Baltimore, Howard, Anne Arundel, Calvert, Charles and Saint Mary's counties (6.0 to 6.6°F), and Garrett County (5.7 to 6.0°F).

- The maximum temperature was warmer than normal over the whole state too, particularly over Garrett County (8.4 to 8.7°F), parts of Prince George's, Charles, Calvert, and Saint Mary's counties (8.4°F), and Frederick, Carroll, Baltimore, Howard, Anne Arundel, Calvert, Charles and Saint Mary's counties (7.8 to 8.4°F).

- The minimum temperature was also warmer than normal in the entire state, notably over Montgomery and Prince George's counties (4.8 to 5.4°F), and Frederick, Carroll, Baltimore, Howard, Anne Arundel, Calvert, and Charles counties (4.2 to 4.8°F).

- Precipitation, except for the southern Eastern Shore, was below normal, especially over Garrett County (2.4 to 3.0 inches deficit), parts of Montgomery, Frederick, Howard, and Carroll counties (2.1 to 2.4 inches deficit), and western Charles County (1.8 to 2.1 inches deficit). These regions received between 30 and 50% of their climatological precipitation for the month. On the other hand, it was wetter than normal over portions of Caroline and Talbot counties and especially over eastern Dorchester County, Wicomico, and northern Somerset and Worcester counties that received between 30 and 40% more than their climatological precipitation for the month.

- Drought conditions expanded to cover the entire state at the end of March 2025, with a 28% increase in the area affected by severe drought with respect to the end of February. The distribution of the anomalous precipitation for the month left its mark on the drought conditions. Garrett County's conditions deteriorated from no drought to abnormally dry and severe drought. Conditions in the central and western Piedmont and the western counties evolved from moderate to severe drought. Conditions improved over the southern Eastern Shore, from severe drought to abnormally dry conditions. Streams and rivers had much below-normal streamflow in all the moderate and severe drought-affected areas, but normal streamflow in the southern Eastern Shore under abnormally dry conditions.

Maryland Climate Divisions (Figures 7-8, B1, and B2)

- All climate divisions were warmer than normal, with Climate Division 4, Upper Southern, being the warmest (6.3°F). On the other hand, six of the eight climate

divisions were drier than normal, with Climate Division 8, Allegheny Plateau, being the driest (2.76 inches deficit); in contrast, of the two wetter than normal climate divisions, Climate Division 1, Southeastern Shore, was the wettest (1.25 in).

- Statewide temperature was warmer than normal (5.5°F) for a second month in March 2025. Statewide precipitation was below normal (0.96 inches deficit) after a slightly wetter than normal February. The warm and wet anomalies in February were very small compared to those in January and March. Climate Divisions 4 to 7 have been under drier-than-normal conditions since September 2024.

Extreme daily minimum temperatures and precipitation (Figures 9-10)

- Statewide minimum daily temperatures indicated that there were: 2 less freezing days with minimum temperatures equal or colder than 32°F (57 vs. 59), 3 fewer than normal freezing spells (i.e., two or more consecutive freezing days; 5 vs. 8) but with 3 more days than normal in their mean duration (11 vs. 8); a normal number of freezing days with minimum temperatures equal or colder than 28°F (41), 2 fewer spells than normal (6 vs. 8) but with 1 more day than normal in their mean duration (7 vs. 6 days); and 6 more freezing days with minimum temperatures equal or colder than 24°F (33 vs. 27), 1 fewer spell than normal (5 vs. 6) but with 3 more days than normal in their mean duration (7 vs. 4 days).

- Statewide daily total precipitation showed 2 fewer days with extreme precipitation (at least 0.64 inches; the 95th percentile in 1951−2000) than normal (2 vs. 4) by the end of March. The number of dry spells (two or more consecutive days with daily precipitation of no more than 0.04 inches) was fewer than normal by 2 spells (11 vs. 13) by the end of the month. However, the mean duration of the dry spells was larger than normal by 1 day (6 vs. 5). The longest dry spell in this period started on February 18 and lasted 5 days longer than normal (16 vs. 11).

Historical Context (Figure 11, Tables A1 and A2)

- Statewide mean, maximum, and minimum temperatures in March 2025 (49.1, 61.2, 37.0°F) were above their long-term means (1895-2024), and within their 10% of their highest values on record, but still far from their historical record highs of 53.0, 65.2, and 41.4°F set in 1921, 1945 and 2012, respectively. Statewide precipitation (3.00 inches) in March was below the long-term mean but far from the record low of 0.33 inches in 2006.

- Statewide mean, maximum, and minimum temperatures showed that March 2025 was the seventh, fourth, and thirteenth warmest March since 1895, respectively. Nineteen of the counties got mean temperatures among the ten warmest on record, and from these Carroll, Charles, and Saint Mary's reached their fifth warmest March, while Anne

Arundel, Calvert, Howard, Montgomery, and Prince George's counties got their fourth warmest. All the counties reached maximum temperatures among the ten warmest, and sixteen counties got maximum temperatures among the five warmest. On the other hand, six counties reached minimum temperatures among the ten warmest.

- Statewide precipitation indicated that March 2025 was the forty-sixth driest March since 1895. Among the counties, Garrett County got its third driest March on record, while Frederick and Montgomery counties reached their tenth driest.

Century-Plus Trends, 1895-2025 (Figures 12, 13)

- Statewide mean temperature and heating degree days in March showed significant trends: a warming trend (2.2°F/century) and a decreasing trend (−70.2°FDD/century), respectively. On the other hand, statewide precipitation had a non-significant small wetting trend (0.06 in/century).

- Regionally, March mean temperatures showed significant warming trends almost everywhere in the state, except for Garrett and Allegany counties. Notably, over Baltimore County and Baltimore City (2.8−3.0°F/century), and over the boundaries of Montgomery−Frederick and Carroll−Howard counties, as well as over Harford and Cecil counties (2.4−2.8°F/century). Trends larger than 2.2°F/century appear in the Eastern Shore along Caroline, Talbot, Dorchester, Somerset, Wicomico, and Worcester counties.

- Regionally, March precipitation had no significant trends. However, non-significant wetting trends are found over Baltimore County (0.3 to 0.4 in/century) and southern Worcester County (0.3 in/century); non-significant drying trends are found over western Maryland, especially Garrett County (–0.4 in/century) and in western Charles County.

Contents

1. Introduction

The Maryland Climate Bulletin is issued by the Maryland State Climatologist Office (MDSCO), which resides in the Department of Atmospheric and Oceanic Science at the University of Maryland, College Park. It documents the surface climate conditions observed across the state in a calendar month and is issued in the second week of the following month.

Maryland's geography is challenging, with the Allegheny and Blue Ridge mountains to the west, the Piedmont Plateau in the center, the Chesapeake Bay, and the Atlantic Coastal Plain to the east. The range of physiographic features and the state's eastern placement within the expansive North American continent contribute to a comparatively wide range of climatic conditions.

The bulletin seeks to document and characterize monthly surface climate conditions in the state, placing them in the context of regional and continental climate variability and change to help Marylanders interpret and understand recent climate conditions.

The monthly surface climate conditions for March 2025 are presented via maps of key variables, such as average surface air temperature, maximum surface air temperature, minimum surface air temperature, total precipitation, and their anomalies (i.e., departures from normal); they are complemented by drought conditions for the state, as given by the U.S. Drought Monitor, and streamflow anomalies as given by the U.S. Geological Survey Water Watch in Section 3. Statewide and climate division averages for the month are compared against each other via scatter plots in Section 4. Extreme daily minimum temperatures and precipitation are presented from the analysis of daily statewide averaged temperatures and precipitation in Section 5. Monthly statewide averages are placed in the context of the historical record via box and whisker plots in Section 6. Century-plus trends in statewide air temperature, heating degree days, precipitation, and state maps of air temperature and precipitation are presented in Section 7. Ancillary statewide, climate division, and county-level information is provided via tables and plots in Appendices A-B; climatology and variability maps are in Appendices C-D, including the percent of normal precipitation and normalized anomalies for the month.

2. Data & Methods

Surface air temperatures, total precipitation, and degree-days data in this report are from the following sources:

- NOAA Monthly U.S. Climate *Gridded* Dataset at 5-km horizontal resolution (NClimGrid – Vose et al., 2014). It is available in a preliminary status at: https://www.ncei.noaa.gov/pub/data/nidis/indices/nclimgrid-monthly/base-files/ Data was downloaded on 4/11/2025.

- NOAA Monthly U.S. Climate *Divisional* Dataset (NClimDiv – Vose et al., 2014). It is available in a preliminary status (v1.0.0-20250404) at: https://www.ncei.noaa.gov/pub/data/cirs/climdiv/

Data was downloaded on 4/9/2025.

- NOAA area averages of daily temperatures and precipitation dataset (nClimGrid−Daily −Durre et al., 2022). It is available in a preliminary status, v1.0.0, at: https://www.ncei.noaa.gov/products/land-based-station/nclimgrid-daily
  Data labeled as "scaled" was downloaded on 4/10/2025.

Drought conditions are from the U.S. Drought Monitor website: https://droughtmonitor.unl.edu/Maps/MapArchive.aspx

Streamflow conditions are from the U.S. Geological Survey Water Watch website: https://waterwatch.usgs.gov/index.php

Some definitions:

About climate and climatology. Weather and climate are closely related, but they are not the same. Weather represents the state of the atmosphere (temperature, precipitation, etc.) at any given time. On the other hand, climate refers to the time average of the weather elements when the average is over long periods. If the average period is long enough, we can start to characterize the climate of a particular region.

It is customary to follow the World Meteorological Organization (WMO) recommendation and use 30 years for the average. The 30-year averaged weather data is traditionally known as Climate Normal (Kunkel and Court, 1990) and is updated every ten years (WMO, 2017). Establishing a climate normal or climatology is important as it allows one to compare a specific day, month, season, or even another normal period with the current normal. Such comparisons characterize anomalous weather and climate conditions, climate variability and change, and help define extreme weather and climate events (Arguez et al., 2012). The current climate normal, or just the climatology, is defined for 1991–2020.

About the anomalies: Anomalies for a given month (e.g., March 2025) are the departures of the monthly value from the corresponding month's 30-year average (i.e., from the average of 30 Marches) during 1991-2020. When the observed monthly value exceeds its climatological value, it is referred to as above normal (e.g., warmer than normal or wetter than normal) or a positive anomaly. In contrast, when this value is smaller than its climatological value, it is referred to as below normal (e.g., colder than normal or drier than normal) or negative anomaly.

About variability. The monthly standard deviation of a climate variable measures its dispersion relative to its monthly mean and assesses its year-to-year, or interannual, variability. Anomalies are sometimes compared against that variability to identify extremes in the climate record. When the anomalies are divided by the standard deviation, they are named standardized anomalies.

About freezing days. Freezing temperatures affect people's health, comfort, and livelihood by impacting crops, livestock, infrastructure, water and energy resources, etc. Here, freezing temperatures are tracked by the count of days when daily minimum temperatures are equal to or below 32°F, 28°F, and 24°F (originally used to categorize agricultural impacts, USDA, 2024) and their consecutive occurrence. When these conditions persist for two or more days, they define freezing day spells. These threshold values correspond to the 28th, 19th, and 12th percentiles of statewide daily minimum temperature for the period 1951−2000.

About degree days. Degree days are the difference between the daily mean temperature (high temperature plus low temperature divided by two) and a predefined base temperature; because energy demand is cumulative, degree-day totals are usually calculated on a daily, monthly, seasonal, and annual basis.

- *Heating and cooling degree days.* These are used to get a general idea of how much energy is required to warm or cool buildings. The base temperature used for this purpose is 65°F, which is considered tolerable for human comfort (CPC, 2023).

About extreme precipitation. This is defined as the yearly number of days with statewide averaged daily total precipitation equal to or greater than 0.64 inches. This threshold value represents the 95th percentile of statewide averaged daily total precipitation for 1951-2000.

About the dry day spells. A dry day is defined as a day with precipitation below 0.04 inches. These conditions are named dry spells if they persist for two or more days. The number of dry spells and their duration are particularly important during the vegetation period (Tschurr et al., 2020).

About NOAA's Climate Divisions. The term "climate division" refers to one of the eight divisions in the state that represent climatically homogeneous regions, as determined by NOAA: https://www.ncei.noaa.gov/access/monitoring/dyk/us-climate-divisions

The eight climate divisions in Maryland are:

- Climate Division 1: Southeastern Shore. It includes the counties of Somerset, Wicomico, and Worcester.
- Climate Division 2: Central Eastern Shore. It includes the counties of Caroline, Dorchester, and Talbot.
- Climate Division 3: Lower Southern. It includes the counties of Calvert, Charles, and St. Mary's.
- Climate Division 4: Upper Southern. It includes the counties of Anne Arundel and Prince George's.

- Climate Division 5: Northeastern Shore. It includes the counties of Kent and Queen Anne's.
- Climate Division 6: North Central. It includes the counties of Baltimore, Carroll, Cecil, Frederick, Harford, Howard, Montgomery, and the city of Baltimore.
- Climate Division 7: Appalachian Mountains. It includes the counties of Allegany and Washington.
- Climate Division 8: Allegheny Plateau. It includes Garrett County.

Note that these Climate Divisions do not correspond with the *Physiographic Provinces* in the state, as the former follow county lines. Climate Division 8 follows the *Appalachian Plateau Province*, Climate Division 7 follows the *Ridge and Valley Province*; however, Climate Division 6 includes the *Blue Ridge and the Piedmont Plateau provinces*, Climate Divisions 3, 4, and a portion of 6 include the *Upper Coastal Plain Province*, and Climate Divisions 1, 2, 5, and a portion of 6 include the *Lower Coastal Plain (or Atlantic Continental Shelf) Province*.

3. March 2025 Maps

A. Mean Temperatures

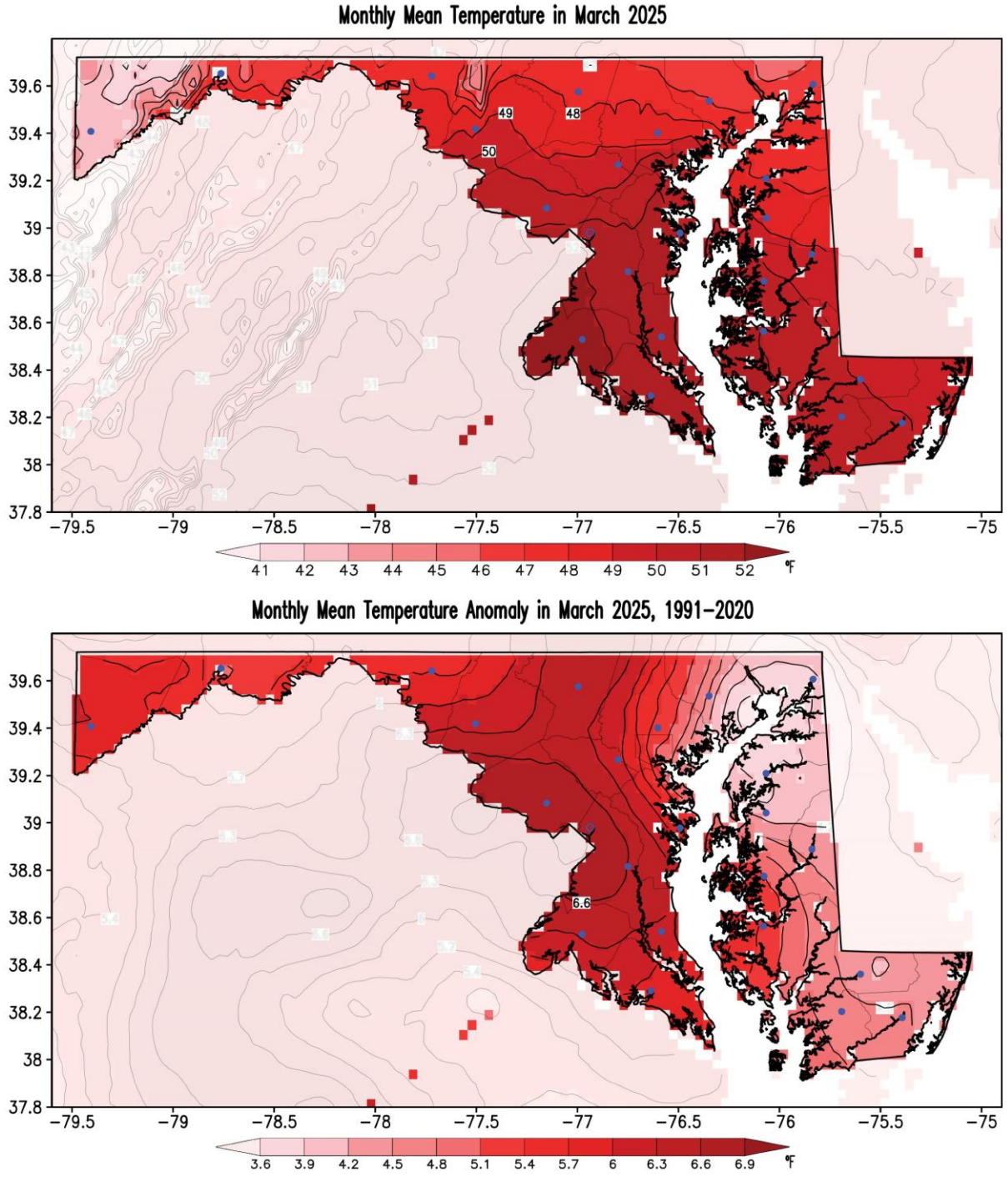

Figure 1. Monthly mean surface air temperature (top panel) and its anomaly with respect to the 1991-2020 climatology (bottom panel) for March 2025. Temperatures are in °F following the color bar. Red shading in the anomaly map marks warmer than normal conditions. Note shading outside the state has been washed out to facilitate focusing on Maryland. Filled blue circles mark the county seats.

B. Maximum Temperatures

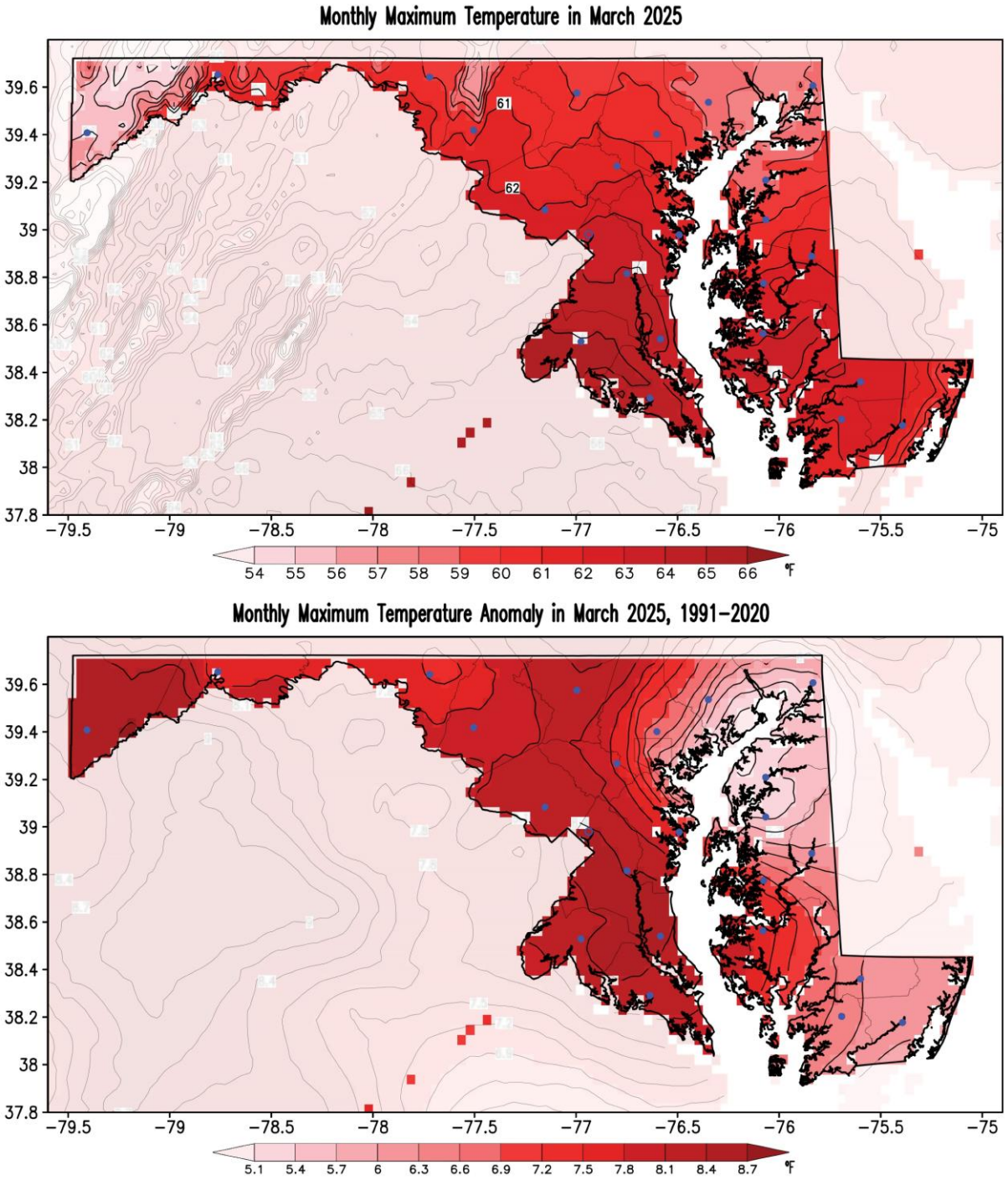

Figure 2. Monthly maximum surface air temperature (top panel) and its anomaly with respect to the 1991-2020 climatology (bottom panel) for March 2025. Temperatures are in °F following the color bar. Red shading in the anomaly map marks warmer than normal conditions. Note shading outside the state has been washed out to facilitate focusing on Maryland. Filled blue circles mark the county seats.

C. Minimum Temperatures

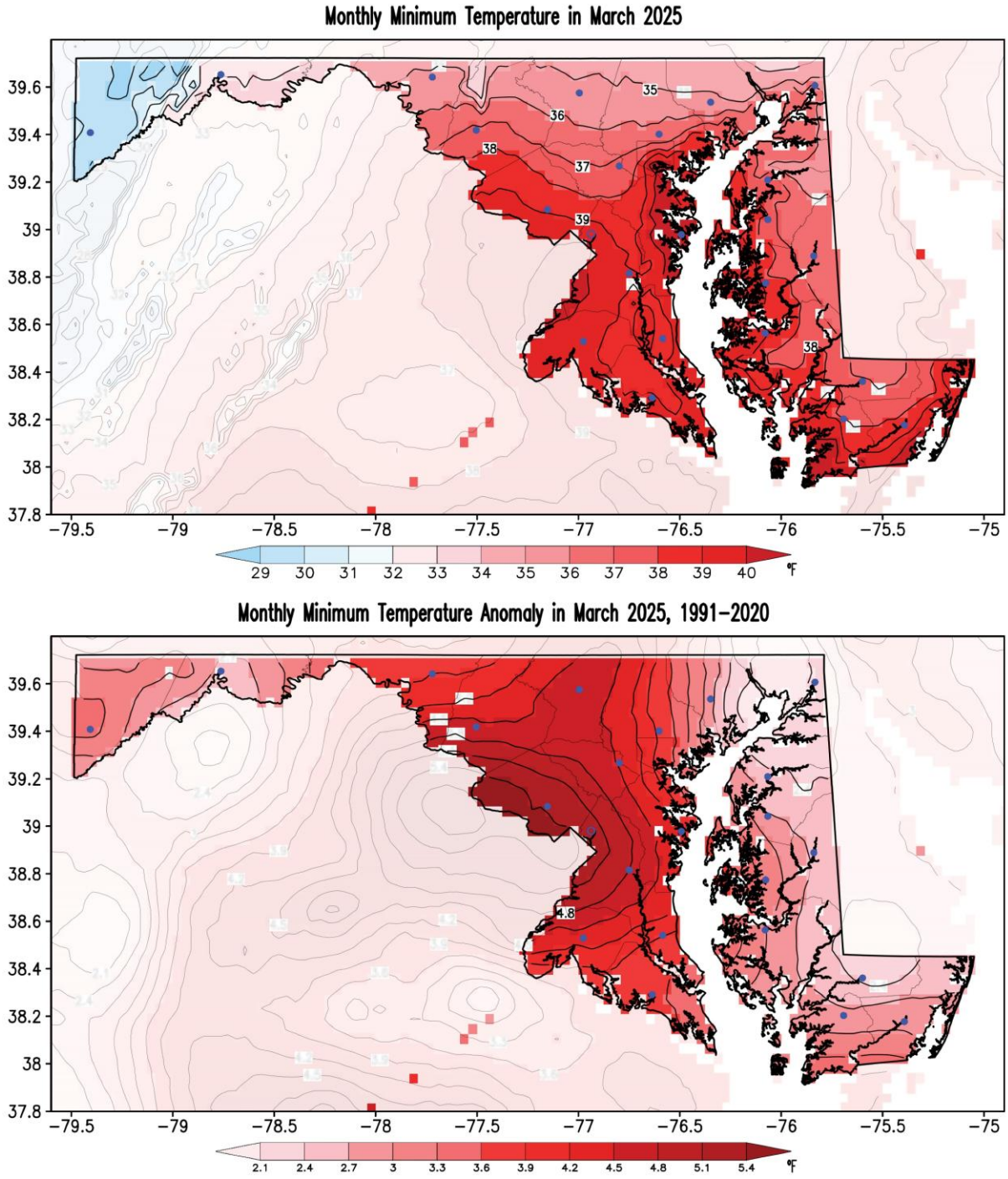

Figure 3. Monthly minimum surface air temperature (top panel) and its anomaly with respect to the 1991-2020 climatology (bottom panel) for March 2025. Temperatures are in °F following the color bar. Blue/red shading in the temperature map shows temperatures below/above 32°F. Red shading in the anomaly map marks warmer than normal conditions. Note shading outside the state has been washed out to facilitate focusing on Maryland. Filled blue circles mark the county seats.

D. Precipitation

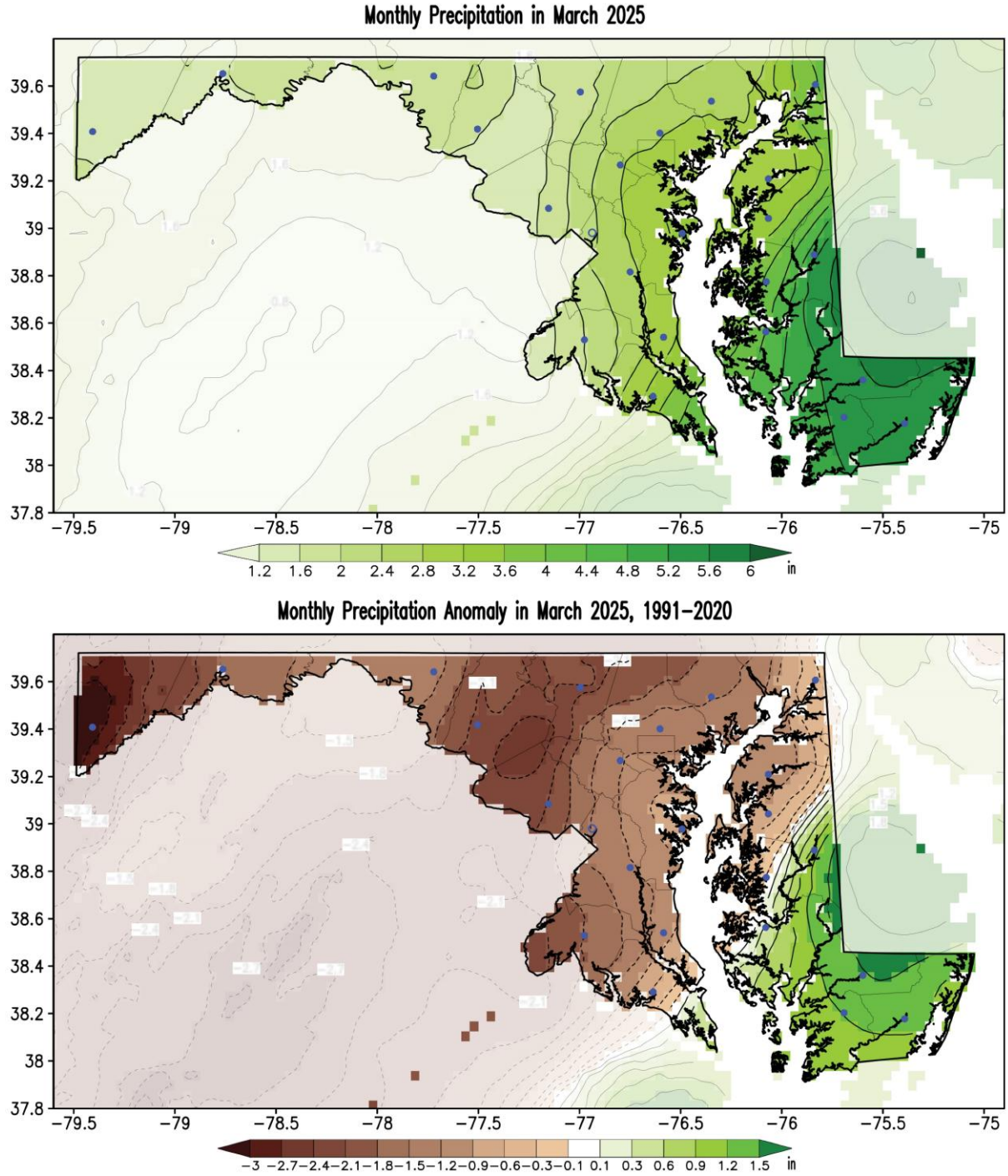

Figure 4. Monthly total precipitation (top panel) and its anomaly with respect to the 1991-2020 climatology (bottom panel) for March 2025. Precipitation is in inches following the color bar. Brown/green shading in the anomaly map marks drier/wetter than normal conditions. Note shading outside the state has been washed out to facilitate focusing on Maryland. Filled blue circles mark the county seats.

E. Drought

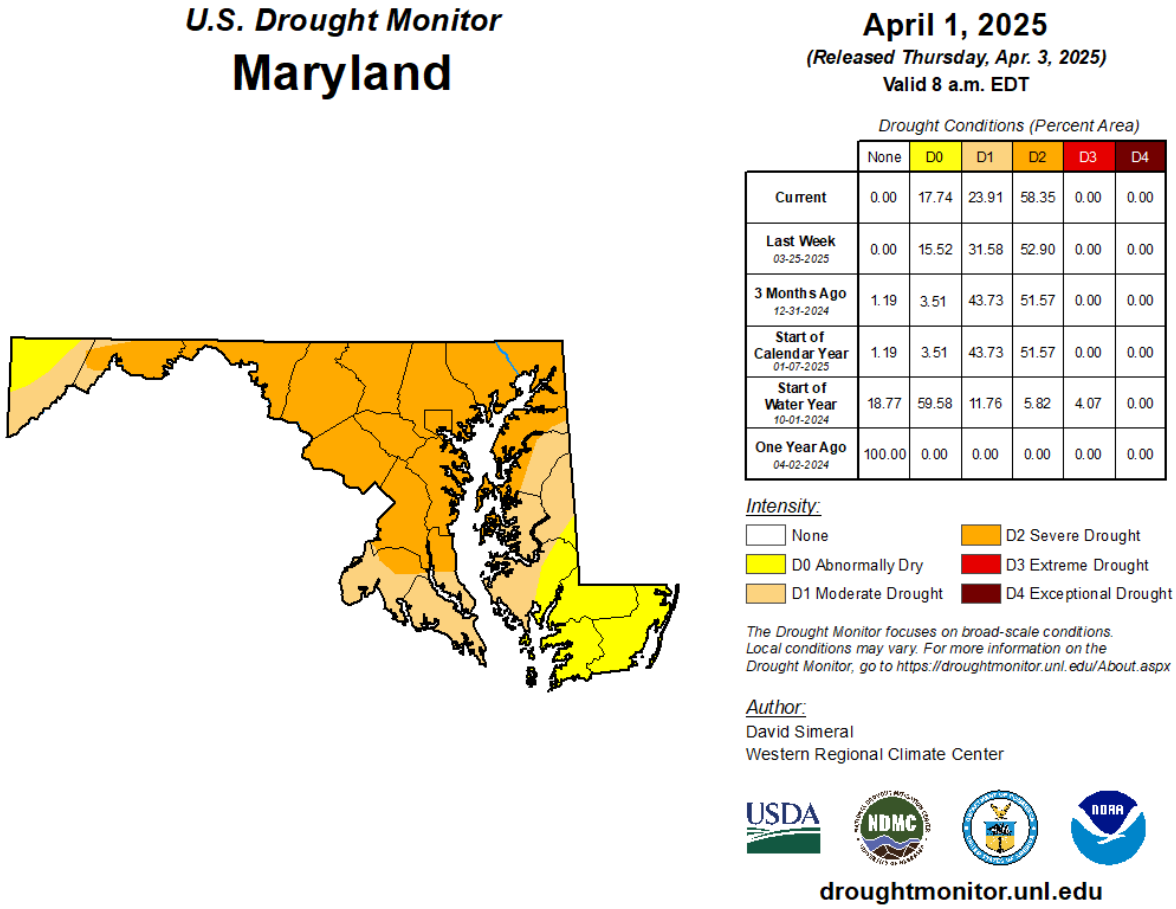

Figure 5. Drought conditions as reported by the U.S. Drought Monitor on April 1, 2025. The entire state was under some drought category, 5% more than at the end of February. Severe Drought occupied 58% of the state, around 28% more than at the end of February. Conditions deteriorated in Garrett County from no drought to Abnormally Dry and Severe Drought conditions as well as in the central and western Piedmont, and western counties, which transitioned from Moderate to Severe Drought. Conditions improved over the southern Eastern Shore, which passed from Severe Drought to Abnormally Dry conditions. Yellow shading indicates abnormally dry regions, light orange shading shows regions under a moderate drought, and darker orange shading marks regions under severe drought according to the drought intensity key. Numbers in the table indicate the percentage of the state covered under the particular drought conditions at the time (in the left column). Areas shown in yellow (Abnormally Dry) indicate land that is going into or coming out of drought. Light orange areas (Moderate Drought) highlight land that may experience low water supply and damage to crops and pastures. Orange areas (Severe Drought) show land with water shortages and an increased likelihood of crop and pasture losses. Current conditions can be monitored from the U. S. Drought Monitor website.

F. Streamflow

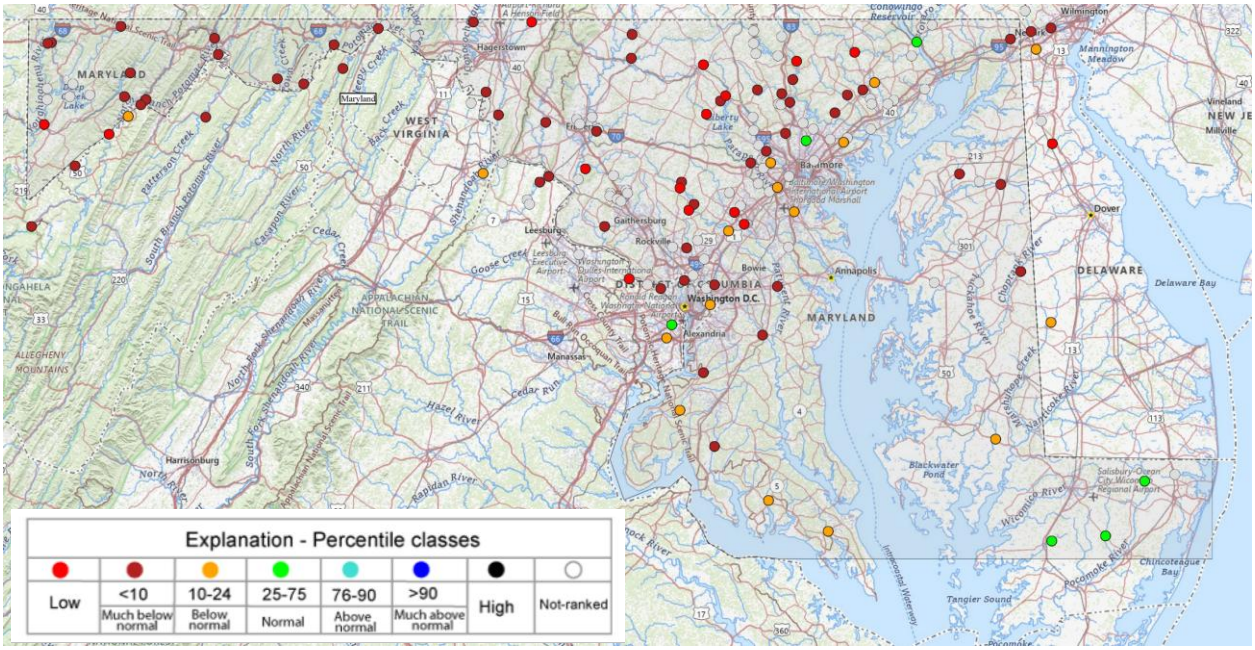

Figure 6. Monthly averaged streamflow class anomalies as reported by the U.S. Geological Survey (USGS) Water Watch for March 2025. Orange to red-filled circles denote below-normal streamflow conditions, cyan to black-filled circles denote above-normal streamflow conditions, and green-filled circles represent normal streamflow conditions. Streams and rivers had much below-normal streamflow in the entire state, except those in the southern Eastern Shore. Current conditions can be monitored from the U. S. Geological Survey website.

4. March and JFM 2025 Climate Divisions Averages

A. March 2025 Scatter Plots

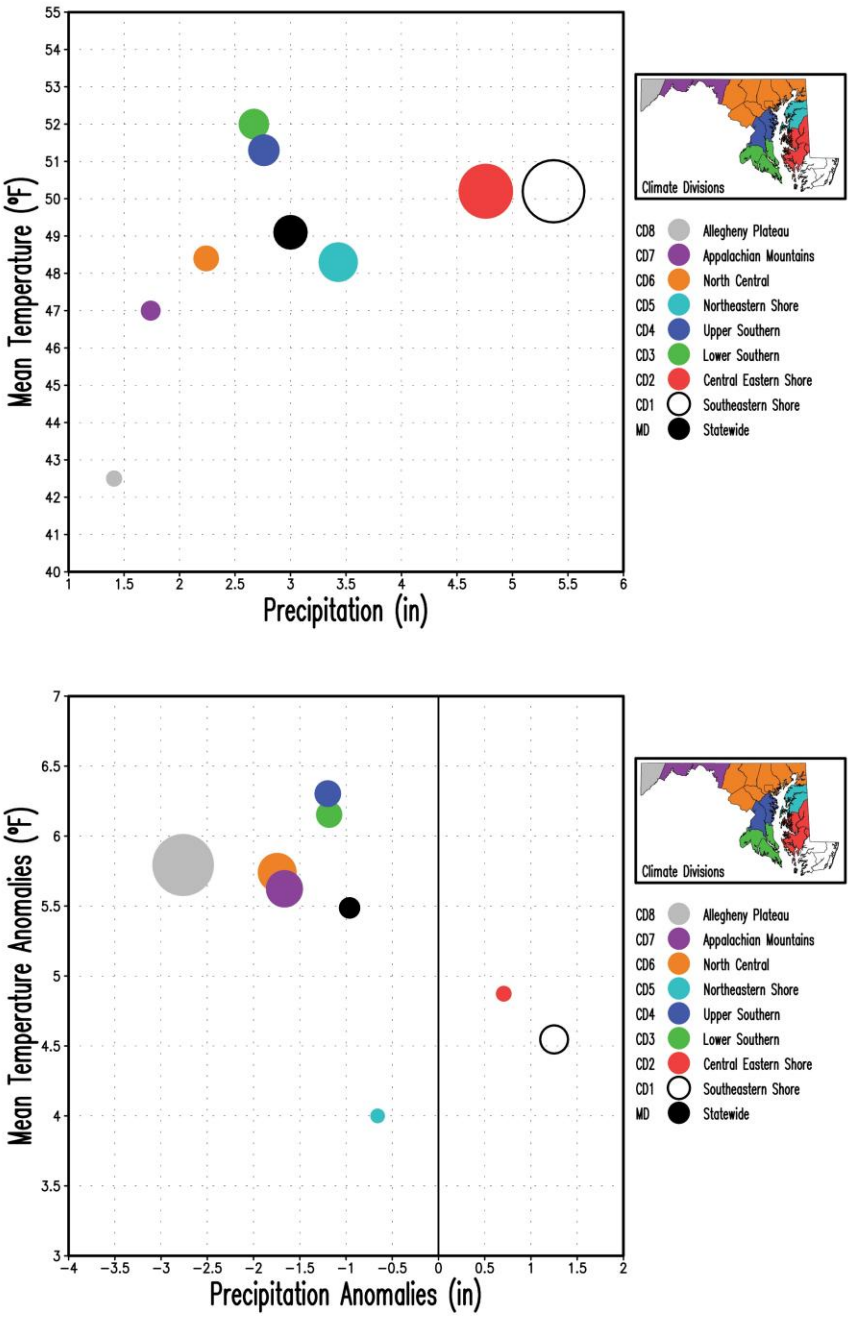

Figure 7. Scatter plots of Maryland (statewide) and Climate Divisions (CD#) monthly mean surface air temperature vs. total precipitation for March 2025. The upper panel shows the mean temperature and total precipitation, and the bottom panel displays their anomalies with respect to the 1991-2020 climatology. Temperatures are in °F and precipitation is in inches. The size of the circles is proportional to the total precipitation scaled down by the maximum precipitation (5.37 inches in CD1, top panel) and by the maximum precipitation anomaly (|–2.76| inches in CD8, bottom panel) among the nine regions. Note that the color of the filled circles corresponds to the color in the Climate Divisions according to the inset map.

B. January – March 2025 Scatter Plots

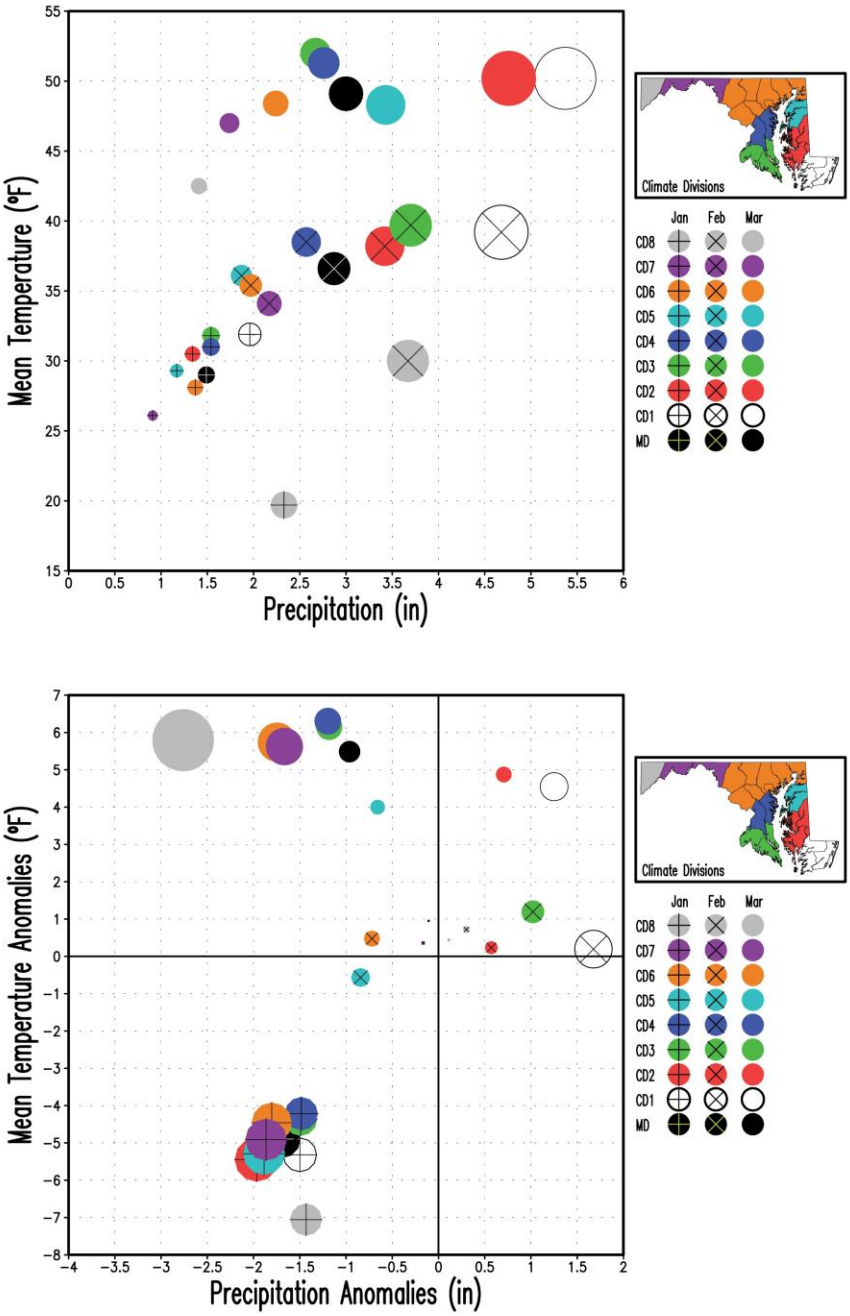

Figure 8. Scatter plots of Maryland (statewide) and Climate Divisions (CD#) monthly mean surface air temperature vs. total precipitation for January, February and March 2025. The upper panel shows the mean temperature and total precipitation, and the bottom panel displays their anomalies with respect to the 1991-2020 climatology. Temperatures are in °F, and precipitation is in inches. The size of the circles is proportional to the total precipitation scaled down by the maximum precipitation (5.37 inches in CD1 in March, top panel) and by the maximum precipitation anomaly (|−2.76| inches in CD8 in March, bottom panel) among the nine regions and three months. March is displayed with filled circles only, while February and January are displayed with superposed multiplication and addition signs, respectively.

5. Extremes

A. Freezing Days

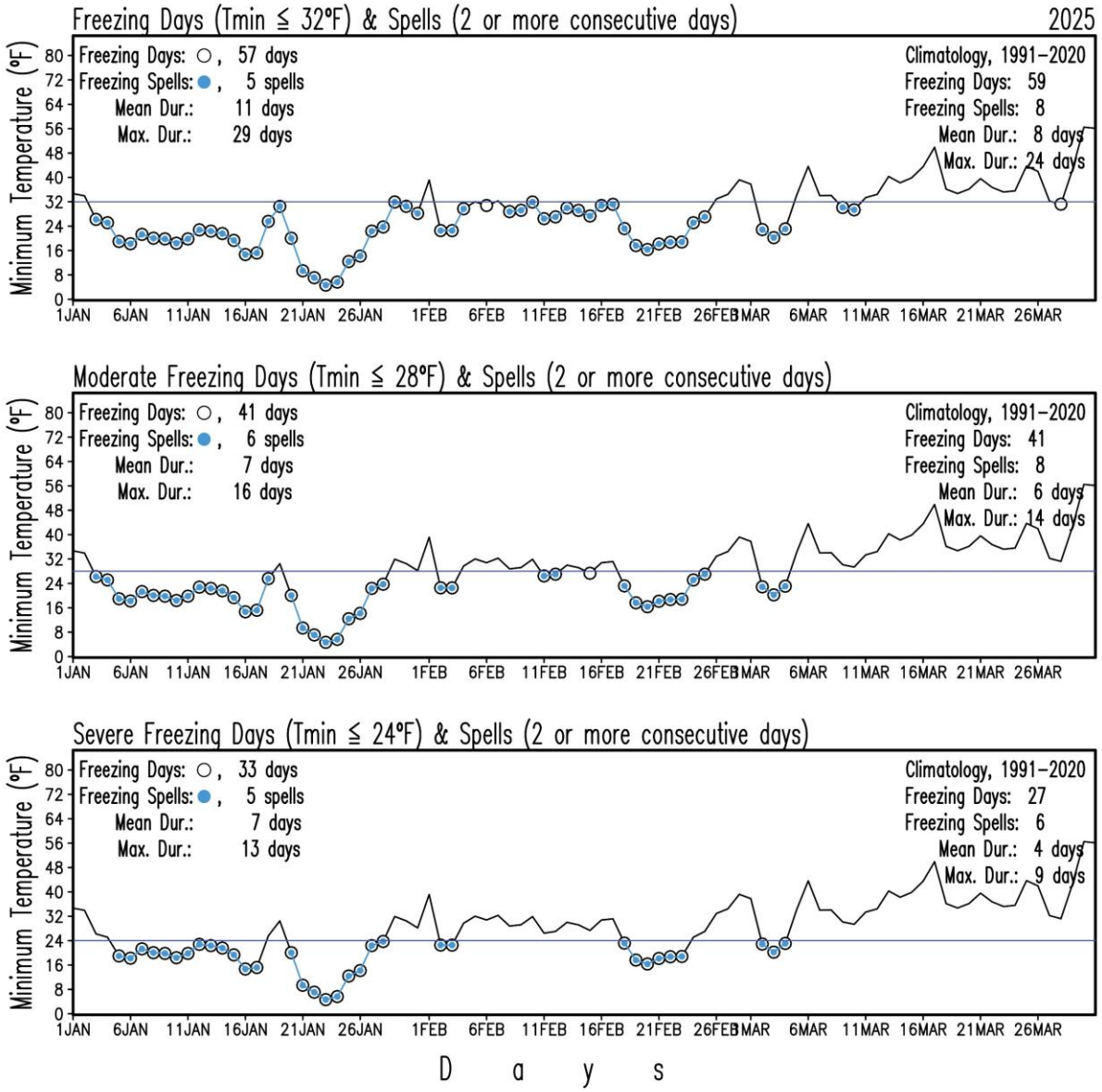

Figure 9. Maryland (statewide) number of freezing days, and their consecutive occurrence for the period January 1 – March 31, 2025. The panels show freezing days in open circles and spells of freezing days in blue-filled circles from statewide daily minimum temperatures. The upper panel displays freezing days and spells when statewide daily minimum temperatures are equal to or below 32°F. The middle panel shows freezing days and spells when statewide daily minimum temperatures are equal to or lower than 28°F. The lower panel shows freezing days and spells when statewide daily minimum temperatures are equal to or below 24°F. The blue line in each panel marks the threshold temperatures of 32°F, 28°F, and 24°F for each case. Figures at the county and climate division level and summary tables can be found on the MDSCO website.

B. Extreme Precipitation and Dry Spells

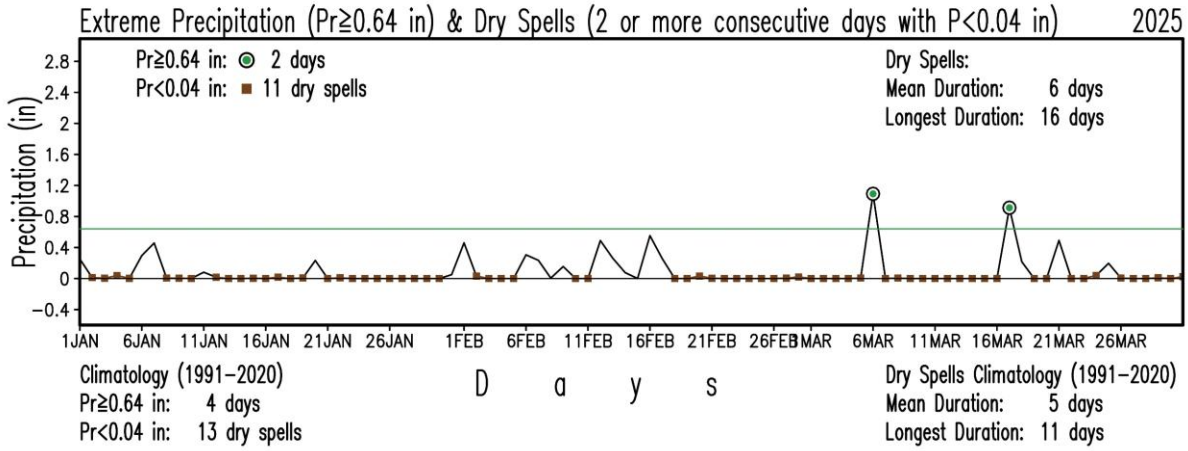

Figure 10. Maryland (statewide) number of days with extreme precipitation and dry day spells for the period January 1 – March 31, 2025. Extreme precipitation days (precipitation equal to or larger than 0.64 in) are identified by green-filled circles. Dry spells (consecutive days with daily total precipitation less than or equal to 0.04 in) are shown by brown-filled squares. Both extremes are identified from the statewide area-averaged total daily precipitation. Figures at the county and climate division levels and summary tables can be found on the MDSCO website.

6. March 2025 Statewide Averages in the Historical Record

A. Box and Whisker Plots

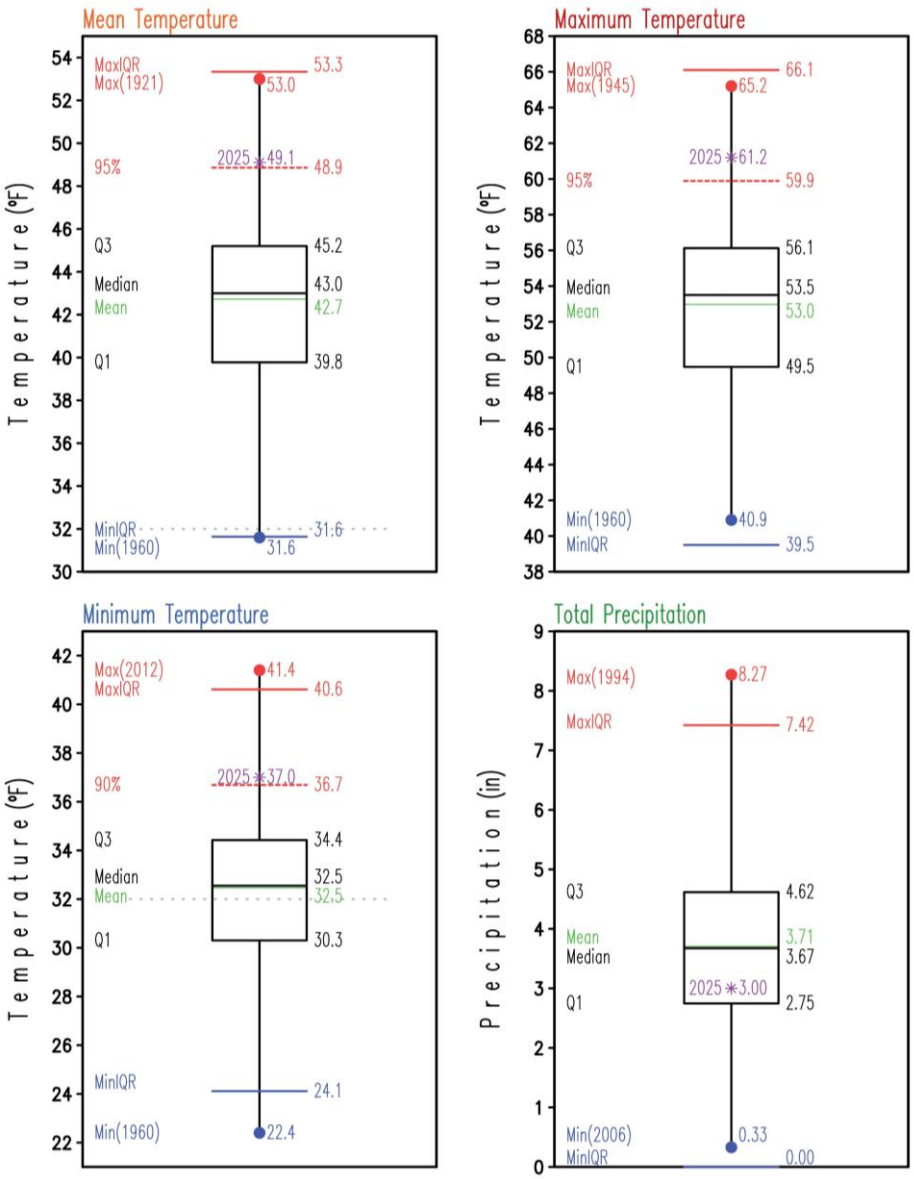

Figure 11. Box and Whisker plots of Maryland (statewide) monthly mean (upper left), maximum (upper right), minimum (lower left) surface air temperatures, and total precipitation (lower right) for March for the period 1895-2024. The label and asterisk in purple represent conditions for March 2025. Statistics for the period 1895-2024 are labeled at the left side of each box and whisker plot and their values at their right. Temperatures are in °F, and precipitation is in inches. The mean is the green line within the box, while the median is the black line within the box. The lower (Q1) and upper (Q3) quartiles, indicating the values of the variable that separate 25% of the smallest and largest values, are the lower and upper horizontal black lines of the box, respectively. For reference, the 32°F temperature is displayed with a horizontal dotted, gray line, the 5th percentile in mean and maximum temperatures and the 10th percentile in the minimum temperature are displayed with a red dashed line. The blue and red dots mark the minimum and maximum values in the period at the end of the whiskers; the year of occurrence is shown in parenthesis. The blue and red horizontal lines represent extreme values defined by Q1-1.5×(Q3-Q1) and Q3+1.5×(Q3-Q1), respectively.

7. 1895-2025 March Trends

A. Statewide Mean Temperature, Heating Degree-Days, and Precipitation

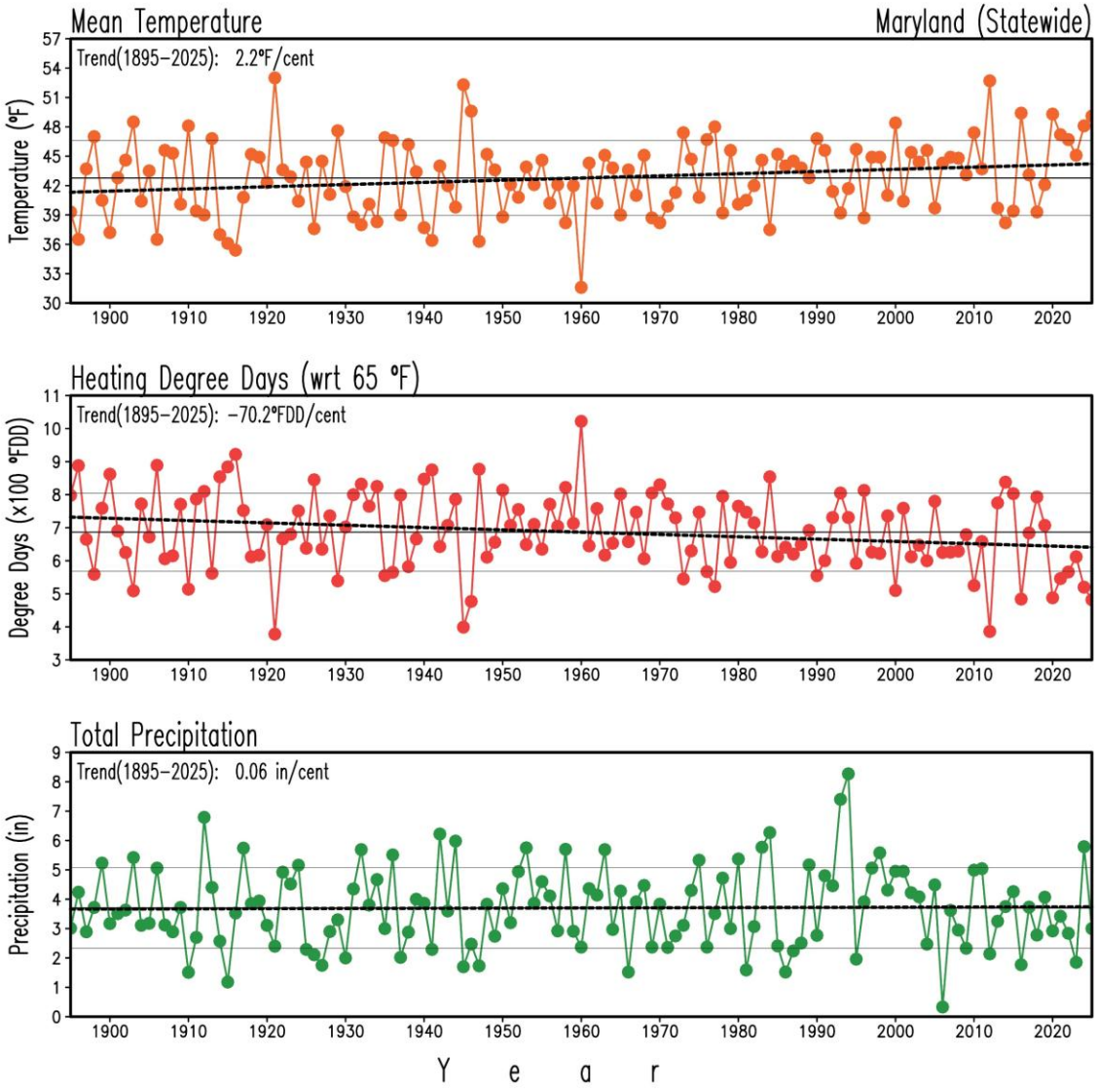

Figure 12. Maryland (statewide) mean surface air temperature, heating degree days, and precipitation in March for the period 1895-2025. Temperature is in °F, heating degree-days is in °F degree-days (°FDD), and precipitation is in inches. The thin, continuous black lines in each panel display the long-term means (42.8°F, 686.5°FDD and 3.70 in, 1895-2025), and the double thin, continuous gray lines indicate the standard deviation (3.8°F, 118.2°FDD and 1.37 in) above/below the long-term mean. The thick dashed black lines show the long-term linear trend. The warming temperature trend (2.2°F/century), the decreasing heating degree-days trend (−70.2°FDD/century) are statistically significant at the 95% level (*Student's t-test* −Santer et al. 2000) but not the small precipitation wetting trend (0.06 in/century).

B. Temperature and Precipitation Maps

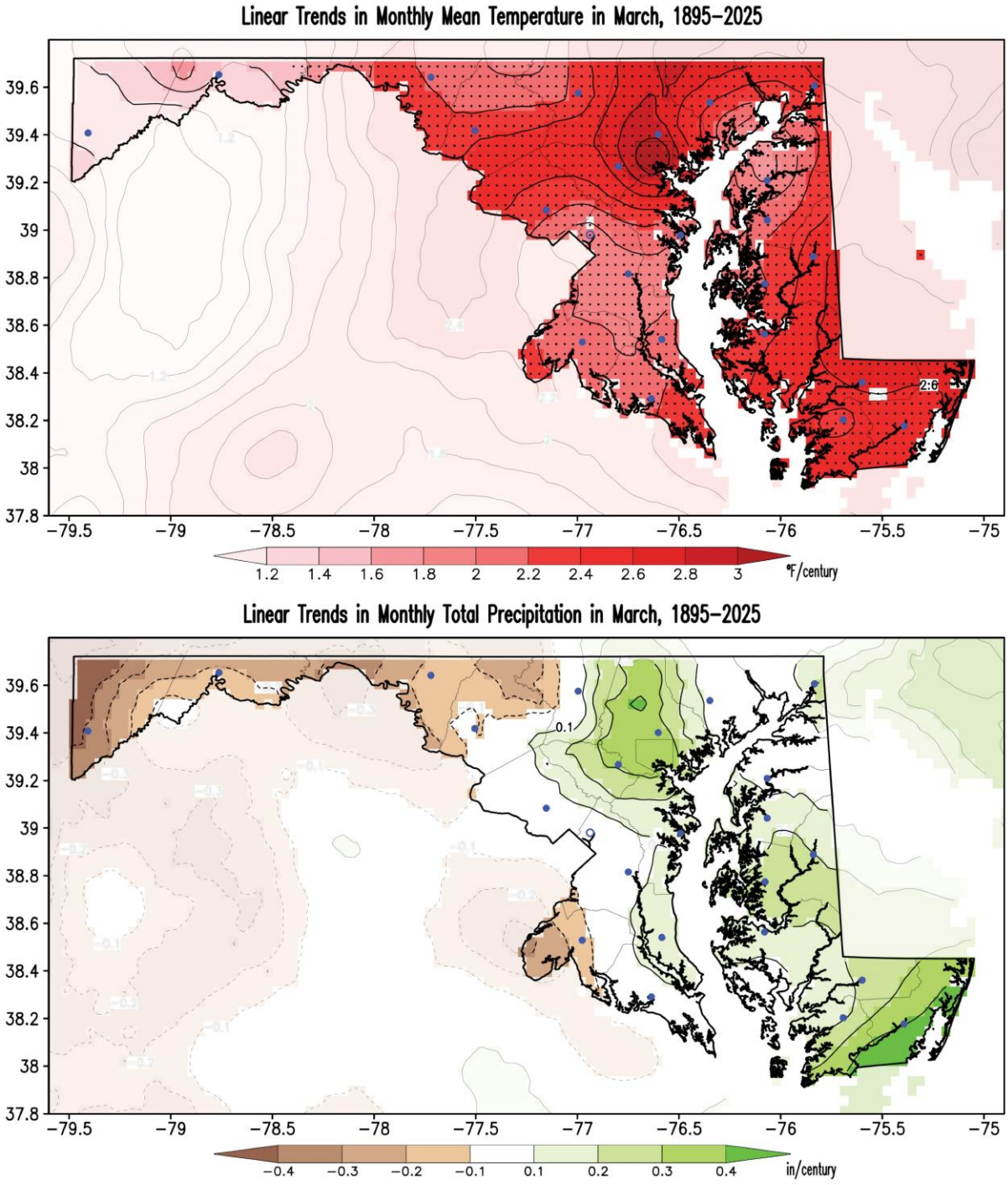

Figure 13. Linear trends in surface air mean temperature and precipitation in March for the period 1895-2025. Temperatures are in °F/century, and precipitation is in inches/century following the color bars. Red shading in the temperature map marks warming trends. Brown/green shading in the precipitation map shows drying/wetting trends. Stippling in the maps shows regions where trends are statistically significant at the 95% level (*Student's t-test* −Santer et al. 2000). Note that shading outside the state has been washed out to facilitate focusing on Maryland. Filled blue circles mark the county seats.

Appendix A. March 2025 Data Tables: Statewide, Climate Divisions, and Counties

A. Mean Temperature and Precipitation

Region	Mean Air Temperature (°F)	Rank (#)
Statewide	49.1	125
Climate Division 1	50.2	125
Climate Division 2	50.2	125
Climate Division 3	52.0	127
Climate Division 4	51.3	128
Climate Division 5	48.3	118
Climate Division 6	48.4	125
Climate Division 7	47.0	124
Climate Division 8	42.5	122
Allegany	46.2	122
Anne Arundel	51.1	128
Baltimore	48.3	125
Baltimore City	49.9	125
Calvert	51.5	128
Caroline	49.2	123
Carroll	47.9	127
Cecil	46.6	117
Charles	52.3	127
Dorchester	50.8	125
Fredrick	48.4	126
Garrett	42.6	122
Harford	47.0	119
Howard	49.4	128
Kent	48.0	118
Montgomery	50.4	128
Prince George's	51.6	128
Queen Anne's	48.7	120
Saint Mary's	51.8	127
Somerset	50.8	125
Talbot	50.4	125
Washington	47.8	124
Wicomico	50.0	125
Worcester	49.9	125

Region	Total Precipitation (in)	Rank (#)
Statewide	3.00	46
Climate Division 1	5.37	107
Climate Division 2	4.76	96
Climate Division 3	2.67	37
Climate Division 4	2.76	43
Climate Division 5	3.43	60
Climate Division 6	2.24	25
Climate Division 7	1.74	15
Climate Division 8	1.41	3
Allegany	1.59	12
Anne Arundel	3.06	51
Baltimore	2.57	36
Baltimore City	2.87	50
Calvert	3.17	55
Caroline	5.01	100
Carroll	1.86	13
Cecil	3.47	57
Charles	1.92	16
Dorchester	4.75	97
Fredrick	1.63	10
Garrett	1.41	3
Harford	2.65	41
Howard	2.34	29
Kent	3.19	55
Montgomery	1.66	10
Prince George's	2.52	33
Queen Anne's	3.51	62
Saint Mary's	3.43	63
Somerset	5.19	105
Talbot	4.06	76
Washington	1.89	20
Wicomico	5.47	107
Worcester	5.44	107

Table A1. Monthly mean surface air temperature (left) and total precipitation (right) at Maryland (statewide), climate division, and county levels for March 2025. Temperatures are in °F, and precipitation is in inches. The rank is the order that the variable for March 2025 occupies among the 131 Marches after the 131 values have been arranged from the lowest to the highest in the *standard competition ranking method*. The closer to 131 the rank is, the larger (i.e., the warmer/wetter) the value of the surface variable is in the record; similarly, the closer to 1 the rank is, the smaller (i.e., the colder/drier) the value of the surface variable is in the record.

B. Maximum and Minimum Temperatures

Region	Maximum Air Temperature (°F)	Rank (#)
Statewide	61.2	128
Climate Division 1	61.8	128
Climate Division 2	62.5	128
Climate Division 3	64.7	128
Climate Division 4	63.2	128
Climate Division 5	59.7	124
Climate Division 6	60.2	127
Climate Division 7	60.0	126
Climate Division 8	55.5	126
Allegany	59.7	126
Anne Arundel	62.6	128
Baltimore	60.3	127
Baltimore City	61.0	126
Calvert	64.0	128
Caroline	61.7	127
Carroll	60.2	127
Cecil	57.9	123
Charles	65.1	128
Dorchester	63.2	128
Fredrick	60.4	127
Garrett	55.5	126
Harford	58.5	124
Howard	61.6	128
Kent	59.0	122
Montgomery	62.0	128
Prince George's	63.9	128
Queen Anne's	60.2	125
Saint Mary's	64.5	128
Somerset	62.1	128
Talbot	62.1	128
Washington	60.3	126
Wicomico	62.5	128
Worcester	61.0	128

Region	Minimum Air Temperature (°F)	Rank (#)
Statewide	37.0	119
Climate Division 1	38.6	115
Climate Division 2	37.9	115
Climate Division 3	39.2	121
Climate Division 4	39.5	123
Climate Division 5	37.0	114
Climate Division 6	36.5	121
Climate Division 7	33.9	118
Climate Division 8	29.5	113
Allegany	32.6	112
Anne Arundel	39.6	123
Baltimore	36.3	121
Baltimore City	38.6	121
Calvert	39.1	122
Caroline	36.7	113
Carroll	35.5	121
Cecil	35.4	108
Charles	39.4	121
Dorchester	38.4	116
Fredrick	36.5	120
Garrett	29.6	113
Harford	35.5	115
Howard	37.2	124
Kent	37.0	113
Montgomery	38.7	124
Prince George's	39.3	125
Queen Anne's	37.2	114
Saint Mary's	39.2	122
Somerset	39.4	117
Talbot	38.7	118
Washington	35.2	118
Wicomico	37.5	110
Worcester	38.8	116

Table A2. Monthly maximum (left) and minimum (right) surface air temperatures at Maryland (statewide), climate division, and county levels for March 2025. Temperatures are in °F. The rank is the order that the variable for March 2025 occupies among the 131 Marches after the 131 values have been arranged from the lowest to the highest using the *standard competition ranking method*. The closer to 131 the rank is, the larger (i.e., the warmer) the value of the surface variable is in the record; similarly, the closer to 1 the rank is, the smaller (i.e., the colder) the value of the surface variable is in the record.

Appendix B. March 2025 Bar Graphs: Statewide, Climate Divisions, and Counties

A. Temperatures and Precipitation

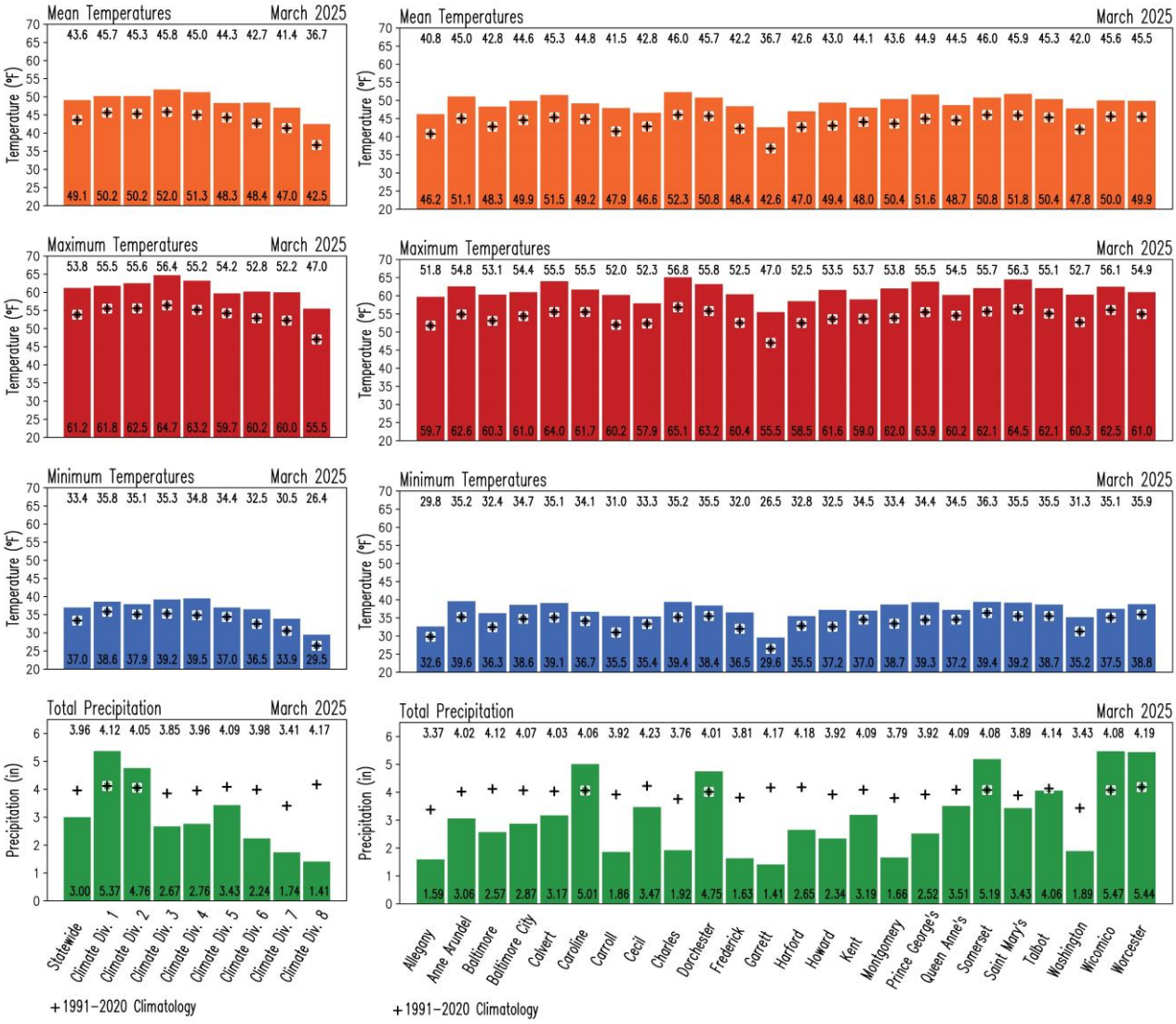

Figure B1. Monthly surface variables in Maryland for March 2025. Color bars represent the variables as follows: mean surface air temperature (orange), maximum surface air temperature (red), minimum surface air temperature (blue), and total precipitation (green) at statewide and climate division (left column), and county (right column) levels. Temperatures are in °F, and precipitation is in inches. The numbers at the base of the bars indicate the magnitude of the variable for March 2025. For comparison, the corresponding 1991-2020 climatological values for March are displayed as black addition signs, and their magnitudes are shown at the top of the panels.

B. Temperatures and Precipitation Anomalies

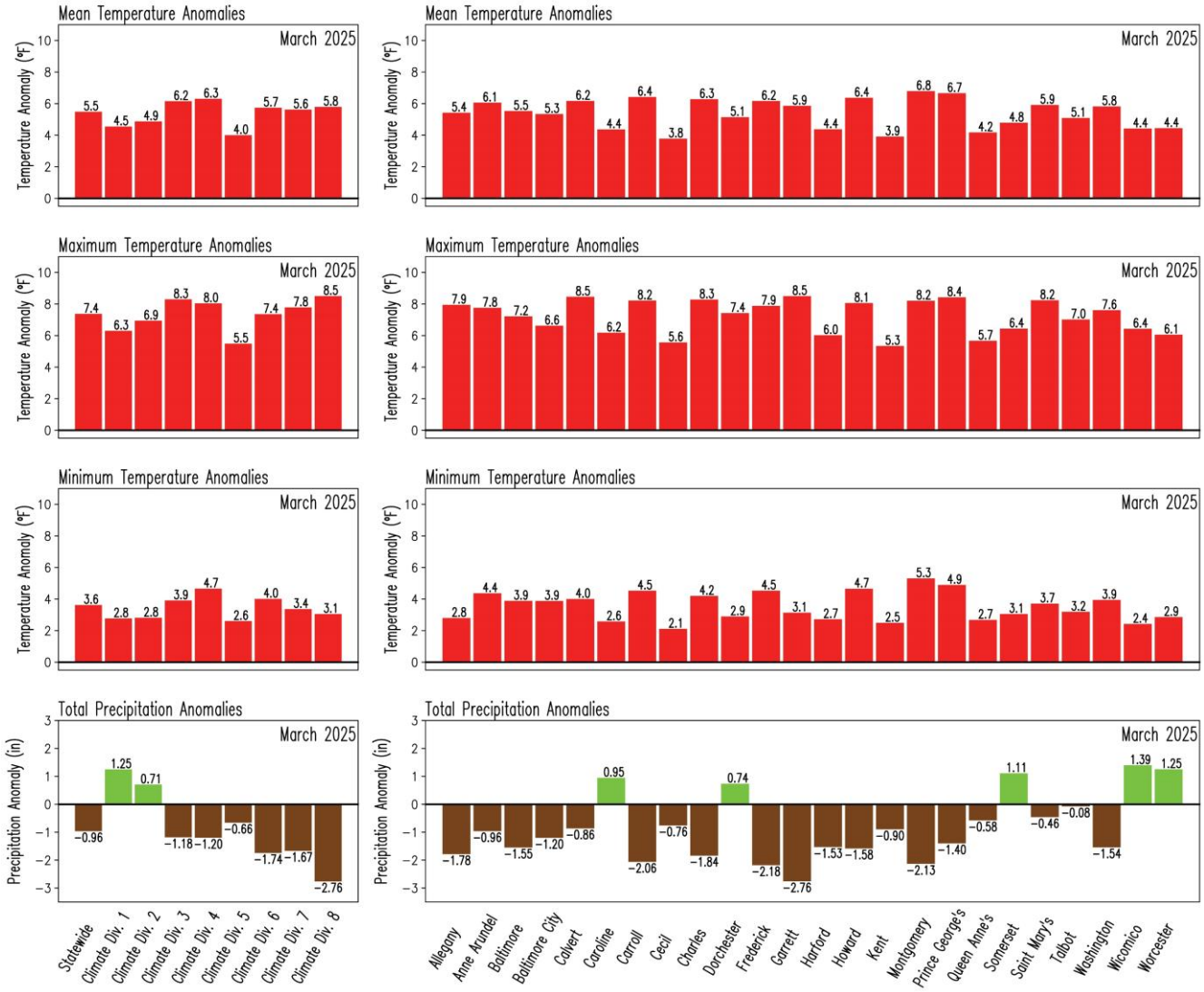

Figure B2. Anomalies of the monthly surface variables in Maryland for March 2025. Anomalies are with respect to the 1991-2020 climatology. Red color represents positive (warmer than normal) anomalies for mean surface air temperature (upper row), maximum surface air temperature (second row from top), and minimum surface air temperature (third row from top), while green/brown color indicates positive/negative (wetter/drier than normal) anomalies in total precipitation (bottom row) at statewide and climate division (left column) and county (right column) levels. Temperatures are in °F, and precipitation is in inches. The numbers outside the bars indicate the magnitude of the anomaly for March 2025.

Appendix C. March 1991-2020 Climatology Maps and March 2025 Precipitation as Percentage of Climatology

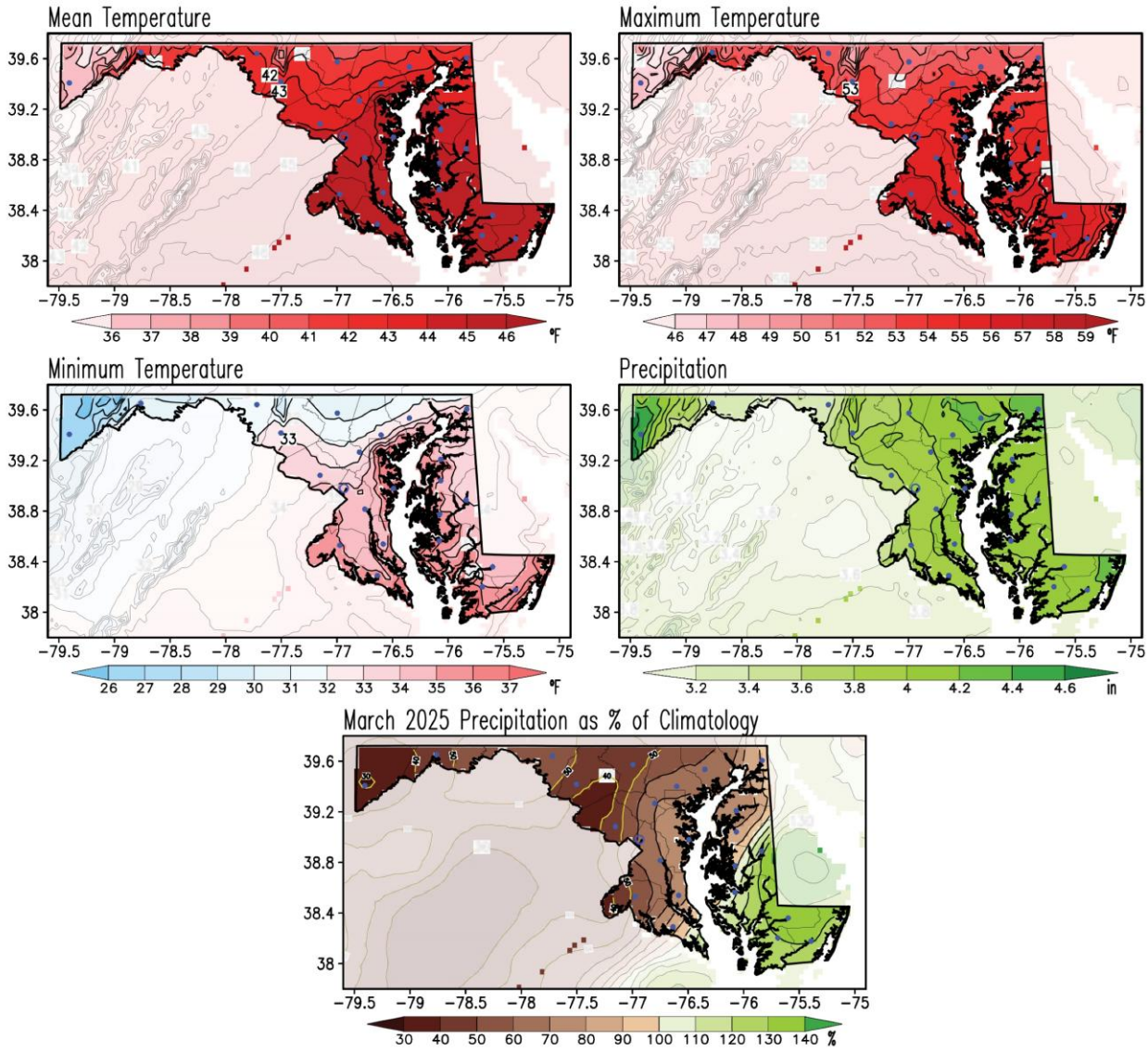

Figure C1. March climatology of the monthly mean, maximum and minimum surface air temperatures, and total precipitation for the period 1991-2020 (upper and middle rows), and precipitation in March 2025 as a percentage of climatology (bottom row). Temperatures are in °F, and precipitation is in inches according to the color bars. This is the current climate normal against which the March 2025 conditions are compared to obtain the March 2025 anomalies (from Figures 1 to 4). The precipitation as a percentage is obtained by dividing the total precipitation (from Figure 4) by the climatology (from the middle right panel) and multiplying that ratio by 100 so units are in percent of climatology (%); brown/green shading in this map shows drier/wetter than normal conditions, and yellow isolines are for percentages equal to or less than 50%. Note that shading outside the state has been washed out to facilitate focusing on Maryland. Filled blue circles mark the county seats.

Appendix D. March Standard Deviation and March 2025 Standardized Anomalies Maps

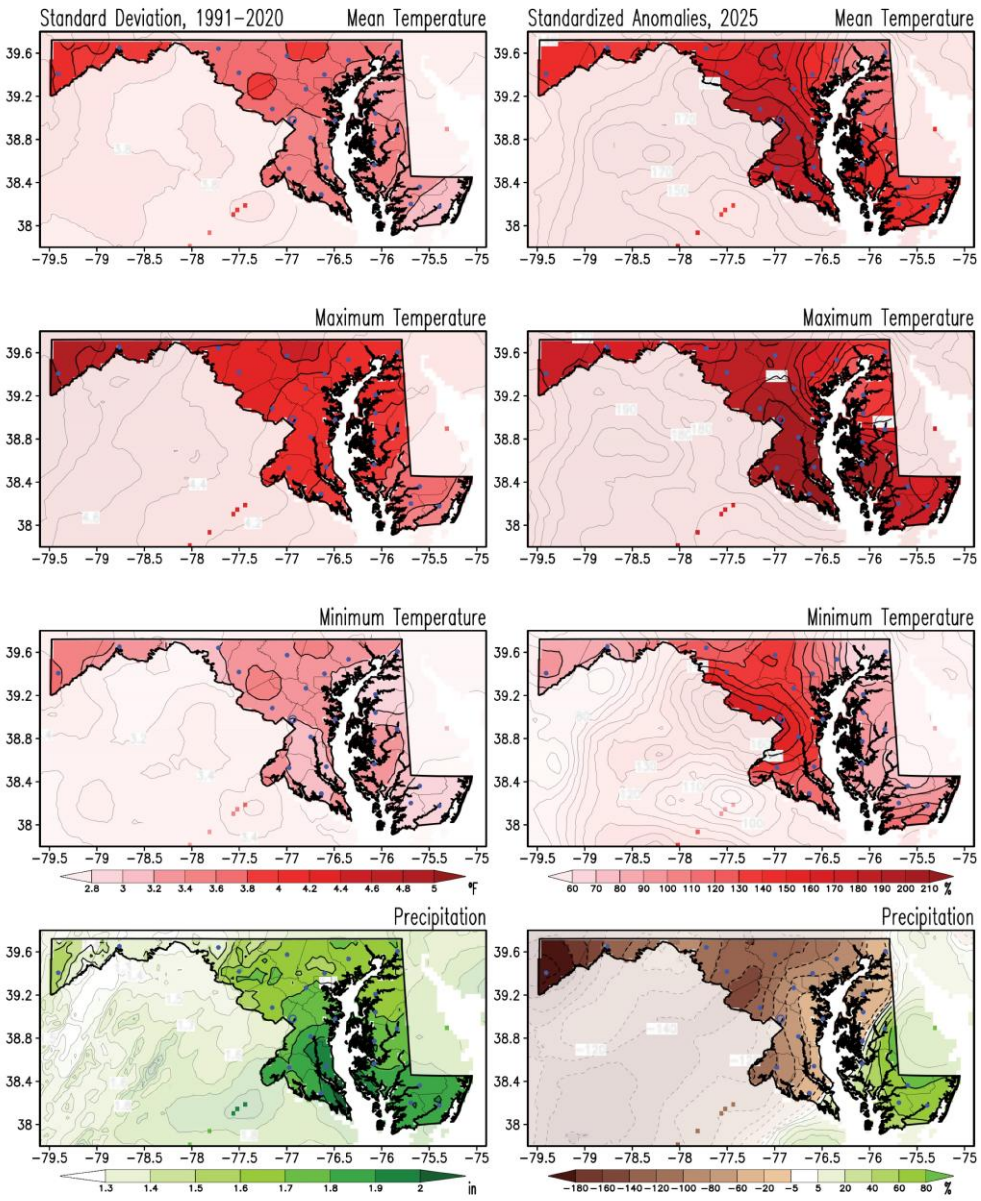

Figure D1. Standard deviation for March and standardized anomalies of temperatures and precipitation for March 2025. Standard deviations for monthly mean, maximum, and minimum surface air temperatures and total precipitation were obtained from the 1991-2020 period (left column). Anomalies for March 2025 (right column) are obtained as a percentage of the standard deviations. The standard deviations in temperatures are in °F, and those in precipitation are in inches according to the color bars. Red shading in the anomaly temperature maps marks warmer than normal conditions; brown/green shading in the anomaly precipitation map marks drier/wetter than normal conditions. The standardized anomalies are obtained by dividing the raw anomalies (from Figures 1 to 4) by the standard deviation (from left column panels) and multiplying that ratio by 100; hence, units are in percent (%). Note that shading outside the state has been washed out to facilitate focusing on Maryland. Filled blue circles mark the county seats.

References

Arguez A., I. Durre, S. Applequist, R. S. Vose, M. F. Squires, X. Yin, R. R. Heim Jr, and T. W. Owen, 2012. NOAA's 1981-2010 U. S. Climate Normals. An Overview. *Bulletin of the American Meteorological Society*. 93, 1687-1697, doi:10.1175/BAMS-D-11-00197.1 https://www1.ncdc.noaa.gov/pub/data/normals/1981-2010/documentation/1981-2010-normals-overview.pdf.

Barriopedro, D., R. García-Herrera, C. Ordóñez, D. G. Miralles, and S. Salcedo-Sanz, 2023: Heat waves: Physical understanding and scientific challenges. Reviews of Geophysics, 61, e2022RG000780. https://doi.org/10.1029/2022RG000780.

CPC, Climate Prediction Center, 2023. Degree Days Explanation. https://www.cpc.ncep.noaa.gov/products/analysis_monitoring/cdus/degree_days/ddayexp.shtml

Durre, I., A. Arguez, C. J. Schreck III, M. F. Squires, and R. S. Vose, 2022: Daily high-resolution temperature and precipitation fields for the Contiguous United States from 1951 to Present. Journal of Atmospheric and Oceanic Technology, doi:10.1175/JTECH-D-22-0024.1

Kunkel, K. E., and A. Court, 1990. Climatic Means and Normals—A Statement of the American Association of State Climatologists (AASC), *Bulletin of the American Meteorological Society*, 71(2), 201-204. Retrieved Aug 20, 2022, from https://journals.ametsoc.org/view/journals/bams/71/2/1520-0477-71_2_201.xml

Santer, B. D., and co-authors, 2000: Statistical significance of trends and trend differences in layer-averaged atmospheric temperature time series. *J. Geophys. Res.*, 105, 7337–7356, doi:10.1029/1999JD901105.

Tschurr, F., I. Feigenwinter, A. M. Fischer, and S. Kotlarski, 2020:. Climate Scenarios and Agricultural Indices: A Case Study for Switzerland. Atmosphere, 11, 535. https://doi.org/10.3390/atmos11050535

USDA, 2024. United States Department of Agriculture, Growing Season Dates and Length. https://www.nrcs.usda.gov/programs-initiatives/sswsf-snow-survey-and-water-supply-forecasting-program/wetlands-climate-tables

Vose and co-authors, 2014. NOAA Monthly U.S. Climate Gridded Dataset (NClimGrid), Version 3. *NOAA National Centers for Environmental Information*. DOI:10.7289/V5SX6B56.

WMO, 2017. WMO Guidelines on the Calculation of Climate Normals. WMO-No. 1203, Series. 29pp. https://library.wmo.int/doc_num.php?explnum_id=4166.