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Maryland Climate Bulletin
April 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 April 2025 was warmer and drier than normal (i.e., 1991-2020 averages). Regionally, monthly mean temperatures were between 49 and 61°F, maximum temperatures in the 60–74°F range, and minimum temperatures were between 38 and 49°F. Monthly total precipitation was in the 2.1–5.4 inches range.

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

- The mean temperature was warmer than normal over the whole state, particularly over Garrett County (3.6 to 4.2°F), parts of Montgomery, Prince George's, Anne Arundel, Calvert, Charles, Saint Mary's, and Dorchester counties (3.3 to 3.6°F).

- The maximum temperature was warmer than normal over almost the entire state, especially over parts of Calvert, Saint Mary's, and Garrett counties (4.2 to 4.8°F), and Garrett County and parts of Prince George's, Anne Arundel, Charles, Talbot, and Dorchester counties (3.0 to 3.9°F). Slightly below-normal temperatures appeared in Harford and Kent counties.

- The minimum temperature was also warmer than normal throughout the whole state, notably over parts of Frederick, Montgomery, Prince George's, Charles counties (3.6 to 4.5°F), and Garrett County (3.6 to 4.2°F).

- Precipitation showed large areas of below and above normal precipitation. Below normal precipitation was observed over the central and western Piedmont, which extended to the western counties and the central Eastern Shore; the largest deficit appeared over Frederick, Montgomery, Carroll, and Howard counties (1.2 to 1.5 inches deficit). On the other hand, above-normal precipitation was observed over western Garrett County, Cecil, and portions of Harford and Kent counties, the southern half of the state on both sides of the Bay; the largest excess in precipitation appeared over Saint Mary's, Calvert, and Charles counties (1.2 to 1.5 inches). The regions with the largest deficit in precipitation (Frederick, Montgomery, Carroll, and Howard counties) received between 60 and 70% of their climatological precipitation for the month, while the regions with the largest excess in precipitation (Saint Mary's, Calvert, and Charles) received between 30 and 40% more than their climatological precipitation for the month.

- Drought conditions improved slightly by the end of April, as approximately 19% of the state was now drought-free, and the extent of the other drought categories had also diminished. Severe Drought occupied 43% of the state, around 10% less than at the start of April, primarily impacting the central and western Piedmont and western counties. Moderate Drought also decreased from 32% to 22% in the same period. Conditions improved over the southern Eastern Shore and northwestern Garrett County, which passed from Abnormally Dry to normal conditions. Streams and rivers had much below-normal streamflow in the central Piedmont, and below-normal streamflow in eastern Garrett County, Allegany, and Washington counties. Normal streamflow was present in western Garrett County, Charles, Saint Mary's counties, and the southern Eastern Shore.

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

- All climate divisions were warmer than normal, with Climate Division 3, Lower Southern, being the warmest (3.6°F). On the other hand, four of the eight climate divisions were drier than normal, with Climate Division 7, Appalachian Mountains, being the driest (0.78 inches deficit); in contrast, and among the other four climate divisions that were wetter than normal, Climate Division 3, was the wettest (0.67 in).

- The statewide temperature was warmer than normal (2.5°F) for a third month in April 2025. Statewide precipitation was slightly below normal (0.12 inches deficit) after a drier-than-normal March. In absolute values, April warm and dry anomalies were smaller than the preceding anomalies in 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 from January 1 to April 30 of 2025 there was a normal number of freezing days with minimum temperatures equal to or colder than 32°F (60), 1 fewer than normal freezing spell (i.e., two or more consecutive freezing days; 7 vs. 8) but with a normal mean duration (8). April only had two days with minimum temperatures equal to or colder than 32°F.

- Statewide daily total precipitation from January 1 to April 30 showed 2 fewer days with extreme precipitation (at least 0.64 inches; the 95th percentile in 1951−2000) than normal (4 vs. 6), and the last two were in April. The number of dry spells (two or more consecutive days with daily precipitation of no more than 0.04 inches) from January 1 to April 30 was fewer than normal by 2 spells (15 vs. 17), but they had a two-day longer-than-normal mean duration (6 vs. 4). The longest dry spell in April lasted 10 days and started on the 16th.

- The cumulative calendar year (January 1 to April 30) modified growing degree days (base 86/50°F) reached around 522°FDD by the end of April and have been greater than normal since the second week of March, with a departure above normal of 118°FDD by the end of April. Similarly, growing degree days (base 50°F) reached around 325°FDD by the end of April and have been above normal since the last week of March, with a departure from normal of 102°FDD by the end of April.

Historical Context (Figure 11, Tables A1 and A2)

- Statewide mean, maximum, and minimum temperatures in April 2025 (56.8, 67.8, 45.8°F) were above their long-term means (1895-2024); the mean temperature was

among the 10% of its highest values on record, while the minimum temperature was among the 5% of its highest values. The mean, maximum, and minimum temperatures were still far from their historical record highs of 59.5°F in 2017, 70.5°F in 2023, and 48.8°F in 2017, respectively. Statewide precipitation (3.40 inches) in April was slightly below the long-term mean but far from the record low of 0.67 inches in 1985.

- Statewide mean, maximum, and minimum temperatures showed that April 2025 was the eighth, seventeenth, and sixth warmest April since 1895, respectively. Fourteen of the counties got mean temperatures among the ten warmest on record; from these, Calvert, Charles, and Somerset reached their fifth warmest April, Prince George's County experienced its fourth warmest, and Saint Mary's County got its third warmest. Seven counties reached maximum temperatures among the ten warmest on record. On the other hand, twenty-one counties reached minimum temperatures among the ten warmest on record; from these, Calvert, Dorchester, and Saint Mary's counties reached their fifth warmest April on record, Carroll got its fourth warmest, and Charles, Howard, Montgomery, and Prince George's counties reached their third warmest.

- Statewide precipitation indicated that April 2025 was the sixty-eighth driest April (or sixty-fourth wettest) since 1895, with no county reaching the top thirty driest Aprils, and only Saint Mary's County reaching the twenty-sixth wettest on record.

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

- Statewide mean temperature and heating degree days in April showed significant trends: a warming trend (2.9°F/century) and a decreasing trend (−88.2°FDD/century), respectively. On the other hand, statewide precipitation had a non-significant small wetting trend (0.08 in/century).

- Regionally, April mean temperatures showed significant warming trends throughout the state, especially in the Piedmont over Baltimore City (4.0°F/century), Montgomery, Howard, and Baltimore counties, as well as parts of Frederick, Carroll, Prince George's, Anne Arundel, and Harford counties (3-3.8°F/century), and over Caroline, Talbot, Dorchester, Somerset, Wicomico, and Worcester counties (3-3.4°F).

- Regionally, April precipitation had significant wetting trends only in the western counties of Allegany and Garrett (0.6−0.7 in/century). Non-significant wetting trends are found in the northern counties of the Piedmont (0.1−0.3 in/century); non-significant drying trends are found over Charles, Saint Mary's Calvert, Prince George's, Anne Arundel, Kent, Queen Anne's, and Talbot counties of (0.1−0.3 in/century).

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 aims to document and characterize monthly surface climate conditions in the state, situating them within 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 April 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, as well as growing degree days, 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 percentage 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/data/nclimgrid-monthly/access/
  Data was downloaded on 5/8/2025.

- NOAA Monthly U.S. Climate *Divisional* Dataset (NClimDiv – Vose et al., 2014). It is available in a preliminary status (v1.0.0-20250506) at:
  https://www.ncei.noaa.gov/pub/data/cirs/climdiv/
  Data was downloaded on 5/8/2025.

- 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 5/8/2025.

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., April 2025) are the departures of the monthly value from the corresponding month's 30-year average (i.e., from the average of 30 Aprils) 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).
- Growing Degree Days. These are used to estimate the growth and development of plants and insects during the growing season under the idea that development will only occur if the temperature exceeds some minimum development threshold temperature or, in other words, if enough warmth is accumulated. Because the actual development will differ for different plants and insects, and the presence of weeds and precipitation can influence the development, a base temperature of 50°F is generally considered acceptable for all plants and insects (OSU 2024). However, this base temperature is best suited for the development of specific crops like corn, sweet corn, soybeans, tomatoes, and a few others.
    - Modified Growing degree days. The modified growing degree days are calculated by establishing base temperatures for the daily maximum and minimum temperatures before determining the daily mean temperature. When the base temperature for the daily maximum temperature is set to 86°F, and the base temperature for the daily minimum temperature is set to 50°F, the growing degree days are specific to corn development, as no appreciable growth is detected with temperatures lower than 50°F or greater than 86°F.

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. April 2025 Maps

A. Mean Temperatures

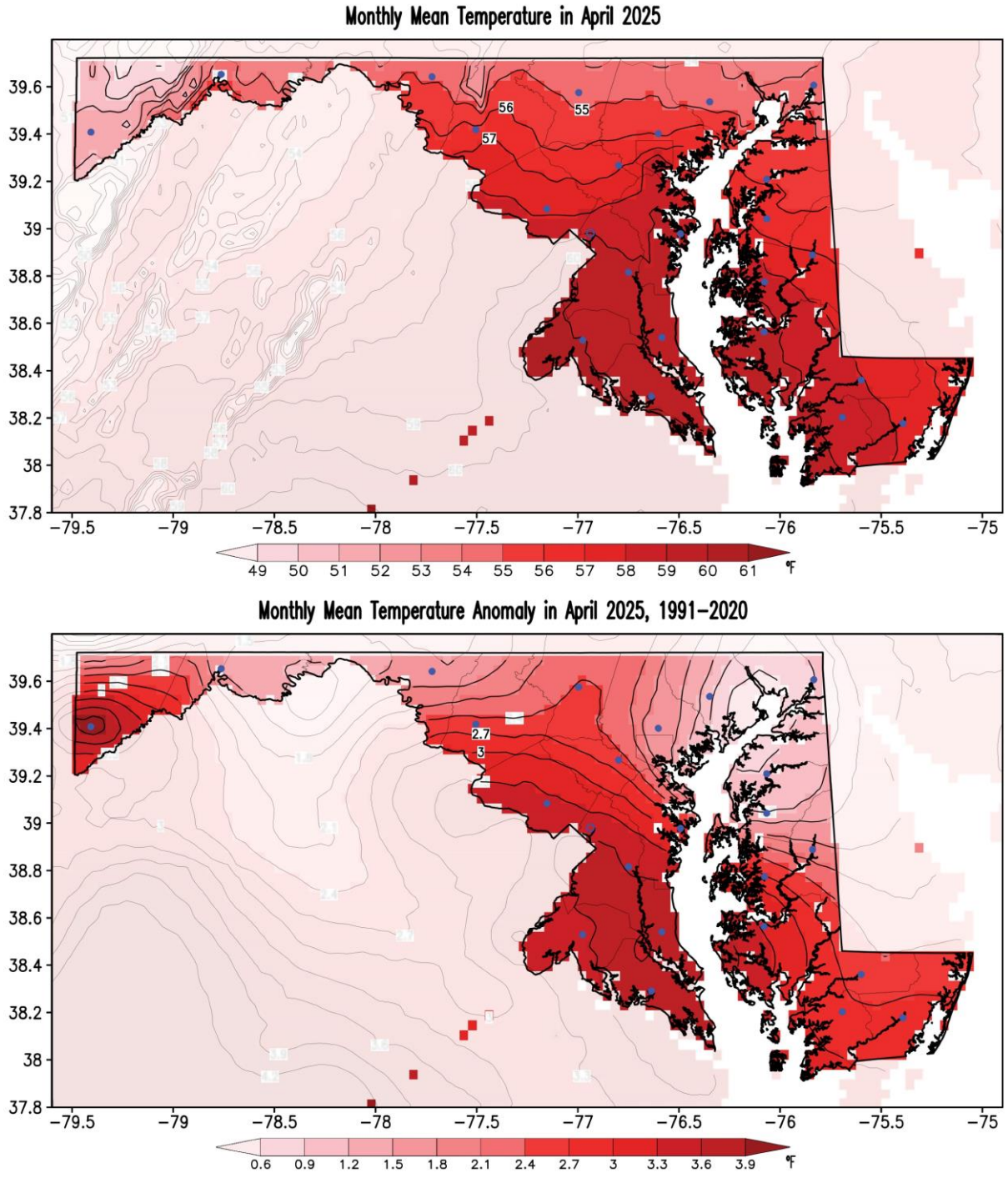

Figure 1. Monthly mean surface air temperature (top panel) and its anomaly with respect to the 1991-2020 climatology (bottom panel) for April 2025. Temperatures are in °F following the color bar. Red shading in the anomaly map marks warmer than normal conditions. Note shading outside the state has been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

B. Maximum Temperatures

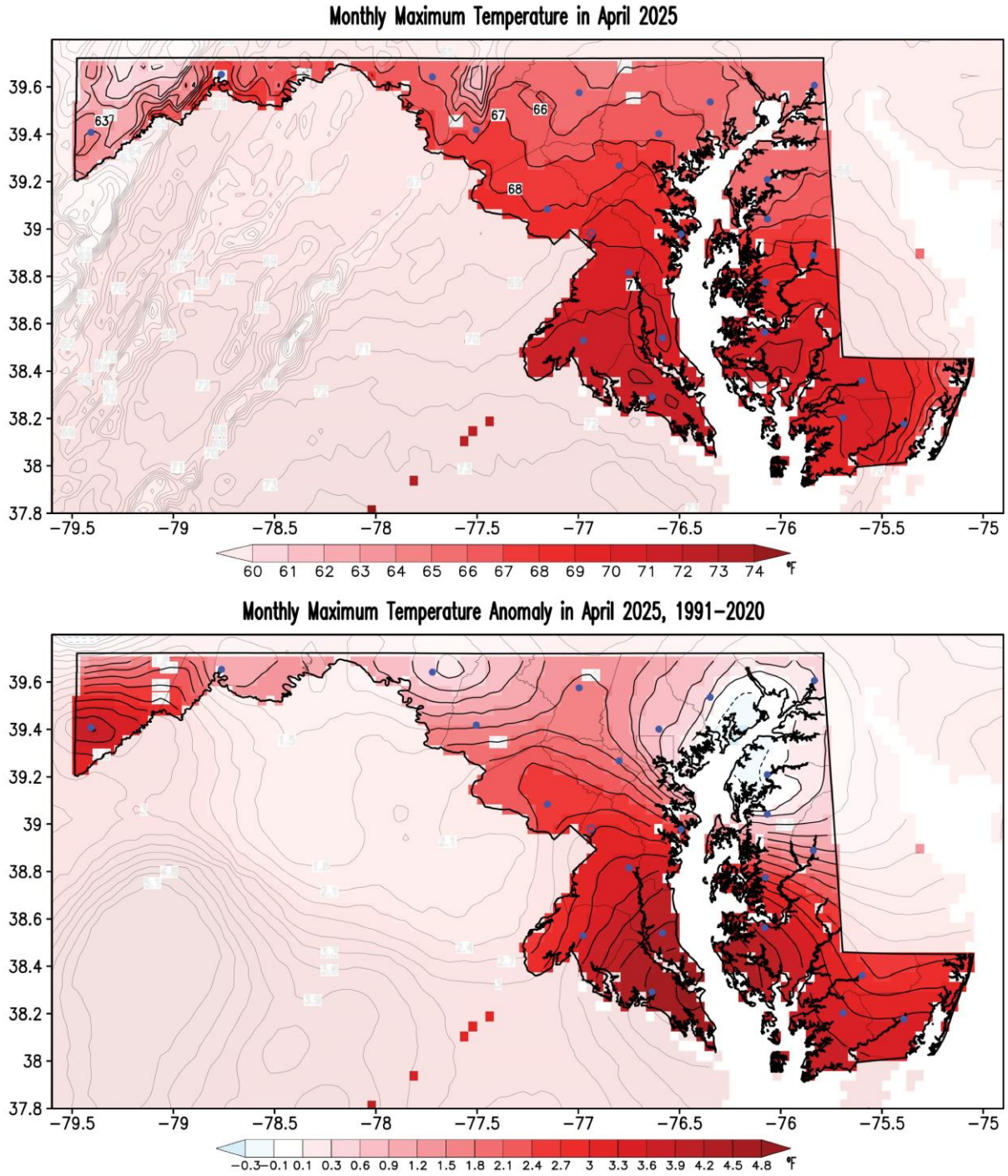

Figure 2. Monthly maximum surface air temperature (top panel) and its anomaly with respect to the 1991-2020 climatology (bottom panel) for April 2025. Temperatures are in °F following the color bar. Blue/red shading in the anomaly map marks colder/warmer than normal conditions. Note shading outside the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

C. Minimum Temperatures

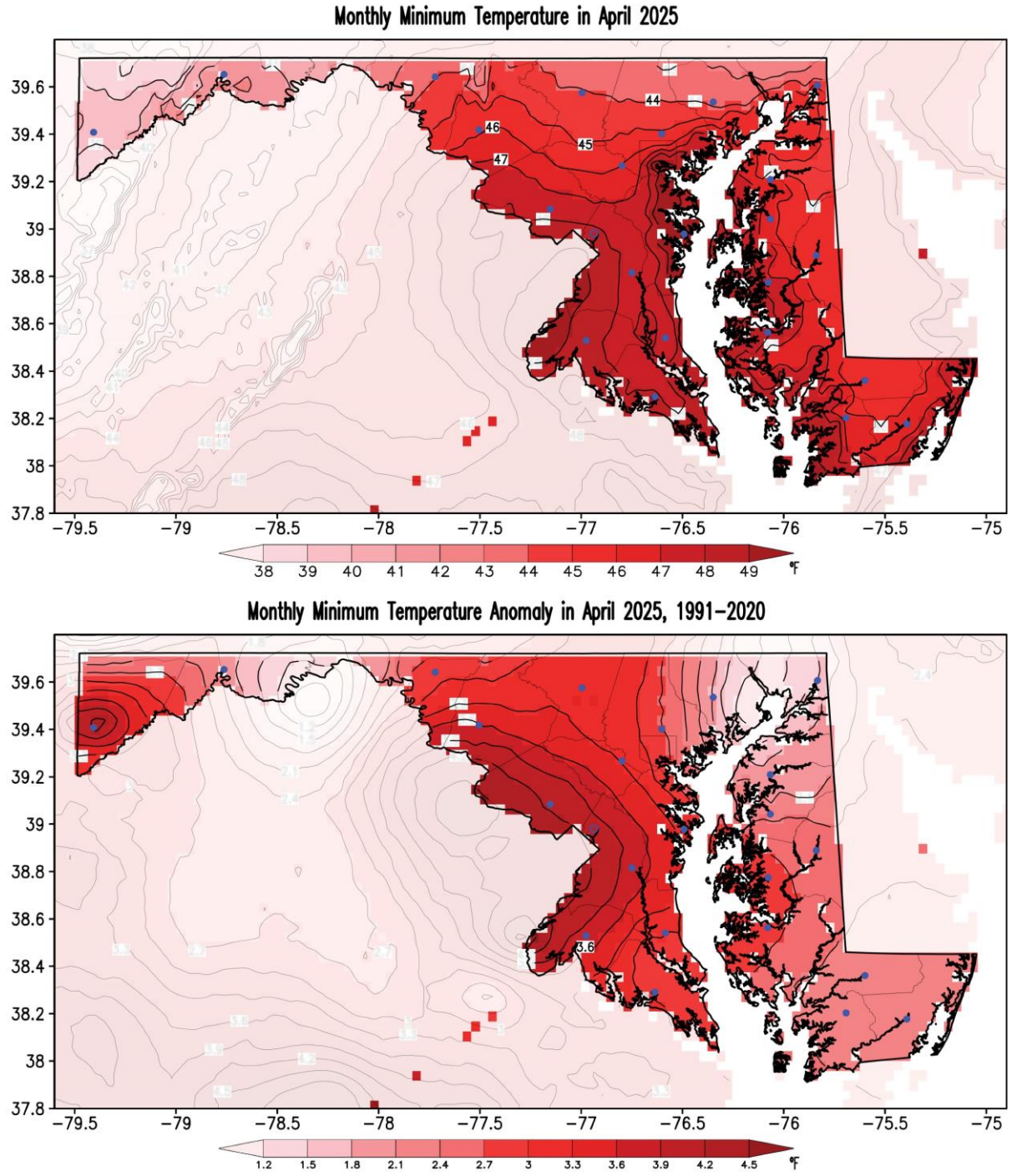

Figure 3. Monthly minimum surface air temperature (top panel) and its anomaly with respect to the 1991-2020 climatology (bottom panel) for April 2025. Temperatures are in °F following the color bar. Red shading in the anomaly map marks warmer than normal conditions. Note shading outside the state has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

D. Precipitation

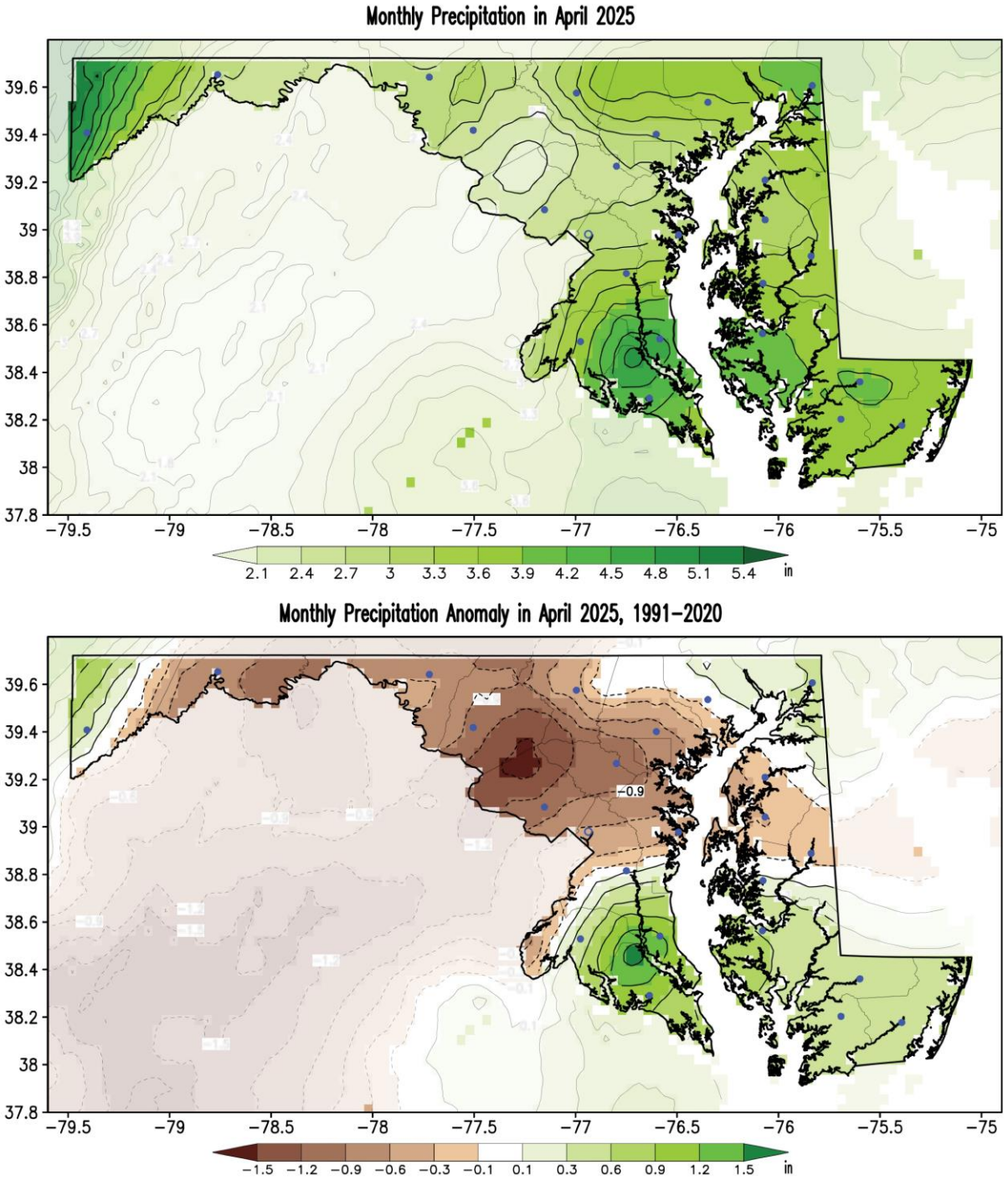

Figure 4. Monthly total precipitation (top panel) and its anomaly with respect to the 1991-2020 climatology (bottom panel) for April 2025. Precipitation is in inches following the color bar. Brown/green shading in the anomaly map marks drier/wetter than normal conditions. Note shading outside the state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

E. Drought

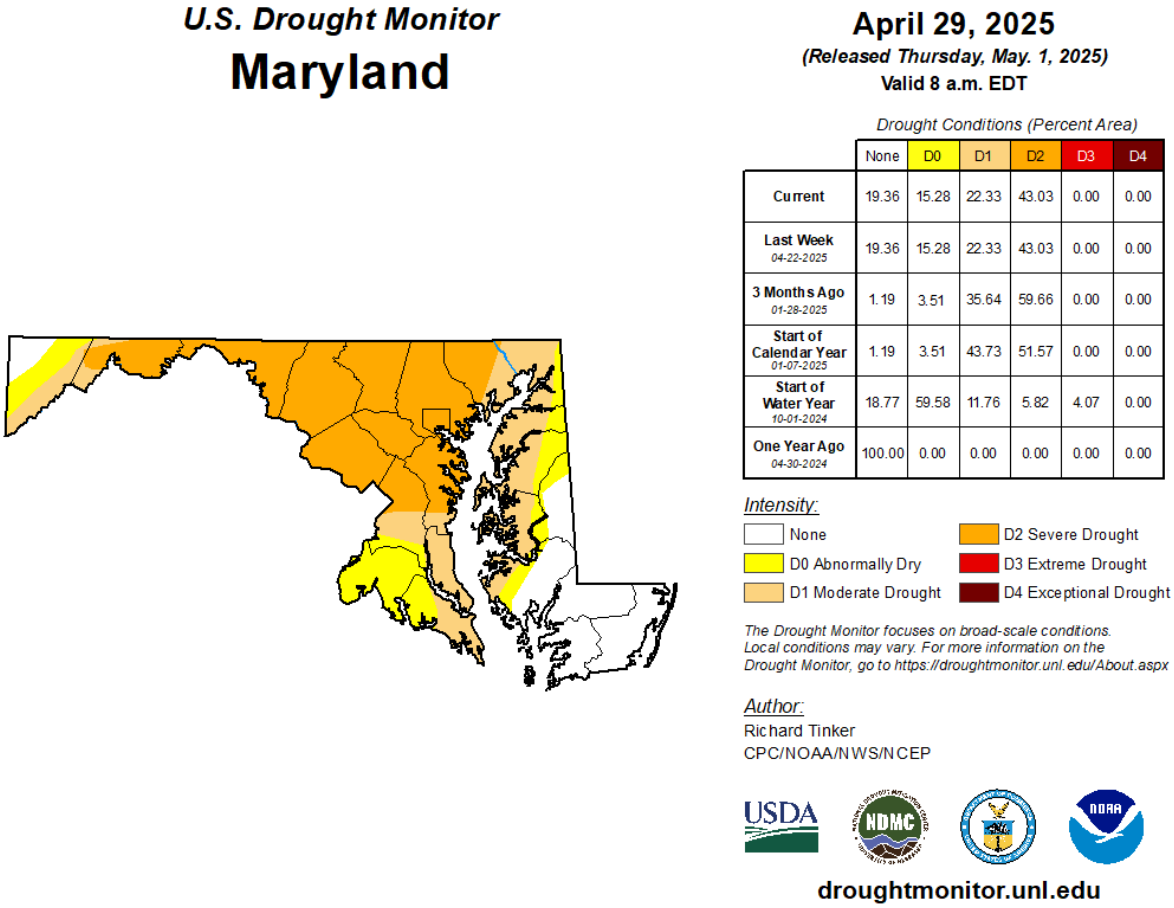

Figure 5. Drought conditions as reported by the U.S. Drought Monitor on April 29, 2025. Conditions have improved slightly, as around 19% of the state is free of drought, and the extent of the other drought categories has also diminished at this time. Severe Drought occupied 43% of the state, around 10% less than at the start of April, impacting the central and western Piedmont, and western counties; Moderate Drought also diminished from 32% to 22% in the same period. Conditions improved over the southern Eastern Shore and northwestern Garrett County, which passed from Abnormally Dry to normal 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. If interested, you can help monitor drought conditions by submitting a report of your local soil conditions through the National Drought Mitigation Center's Drought Impact Toolkit by using the Condition Monitoring Observer Reports system.

F. Streamflow

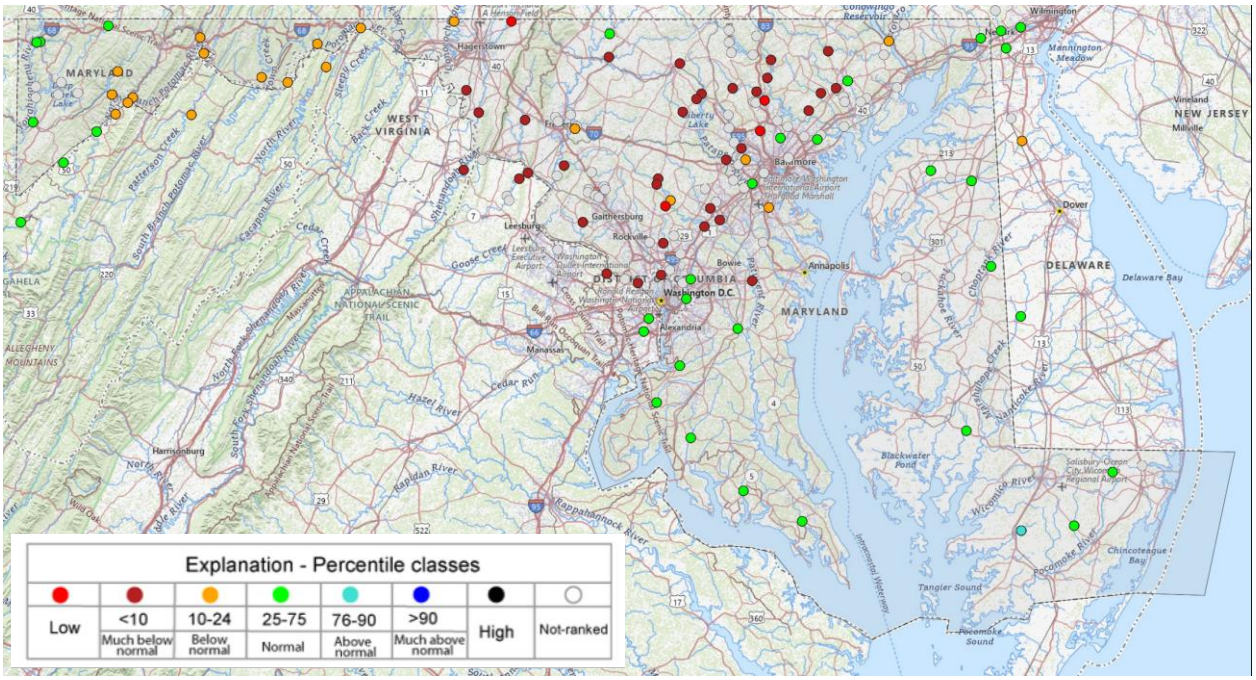

Figure 6. Monthly averaged streamflow class anomalies as reported by the U.S. Geological Survey (USGS) Water Watch for April 2025. Orange to red-filled circles denote below-normal streamflow conditions, cyan to black-filled circles denote above-normal streamflow conditions, and green-filled circles represent normal streamflow conditions. Streams and rivers had much below-normal streamflow in the central Piedmont, and below-normal streamflow in eastern Garrett County, Allegany, and Washington counties. Normal streamflow was present in western Garrett County, Charles, Saint Mary's counties, and the southern Eastern Shore. Current conditions can be monitored from the U. S. Geological Survey website.

4. April and FMA 2025 Climate Divisions Averages

A. April 2025 Scatter Plots

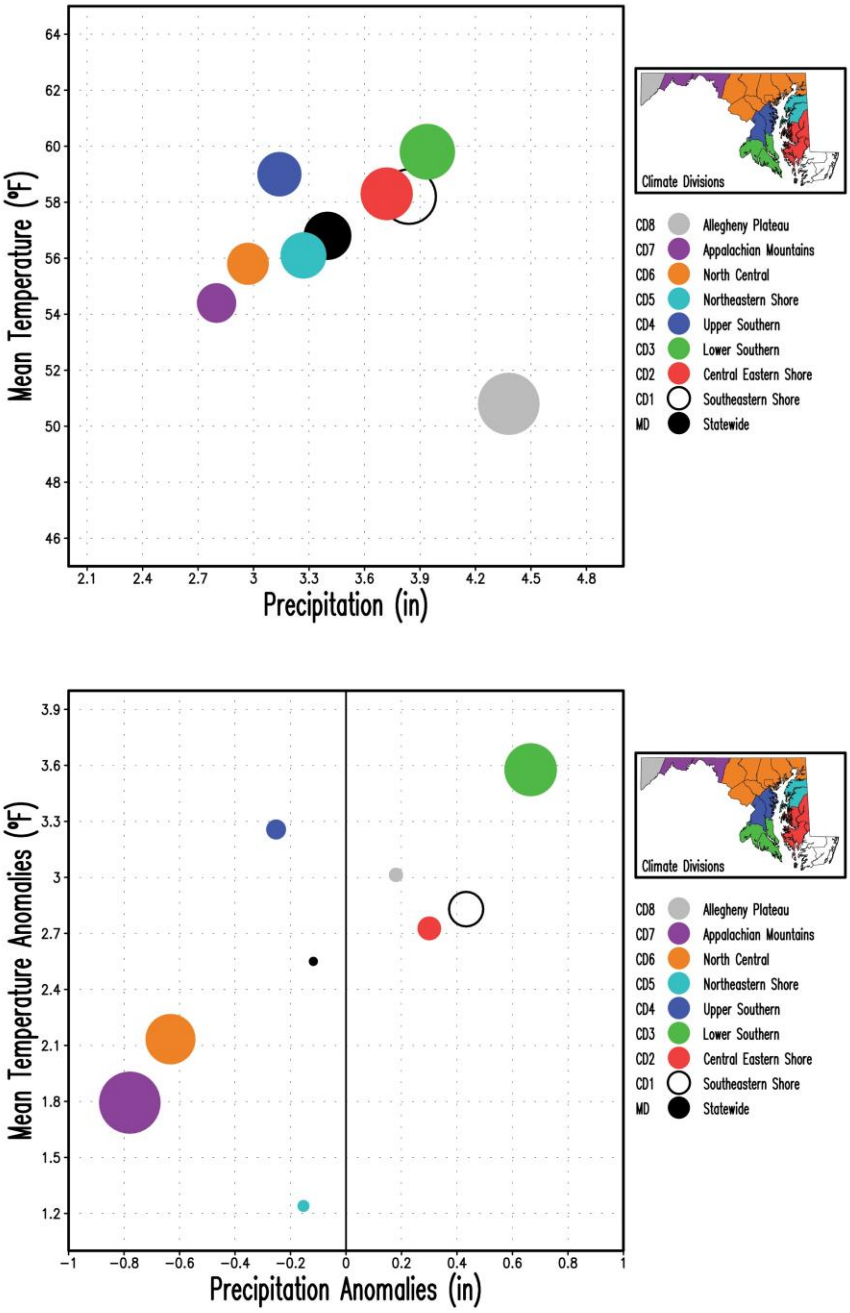

Figure 7. Scatter plots of Maryland (statewide) and Climate Divisions (CD#) monthly mean surface air temperature vs. total precipitation for April 2025. The upper panel shows the mean temperature and total precipitation, and the bottom panel displays their anomalies with respect to the 1991-2020 climatology. 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 (4.38 inches in CD8, top panel) and by the maximum precipitation anomaly (|–0.78| inches in CD7, 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. February – April 2025 Scatter Plots

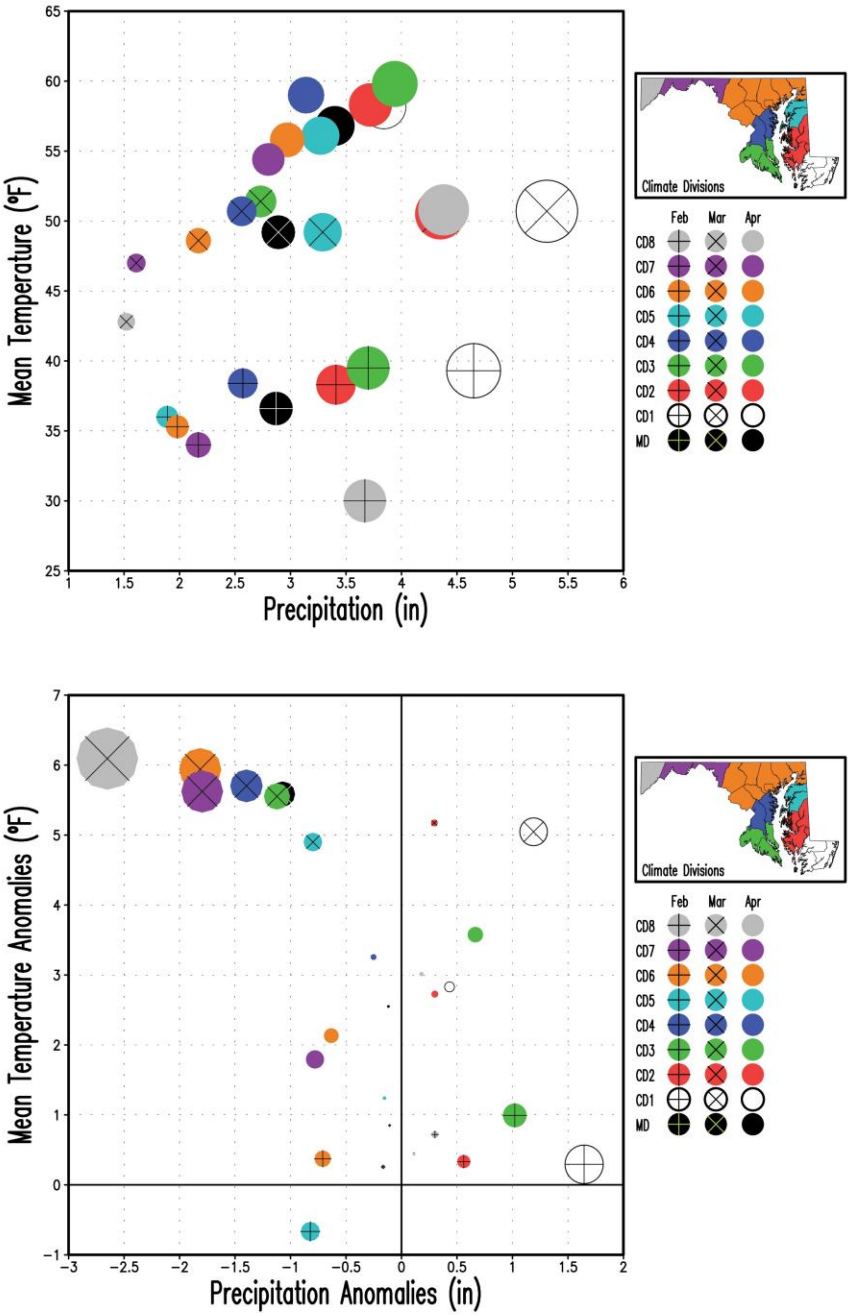

Figure 8. Scatter plots of Maryland (statewide) and Climate Divisions (CD#) monthly mean surface air temperature vs. total precipitation for February, March and April 2025. The upper panel shows the mean temperature and total precipitation, and the bottom panel displays their anomalies with respect to 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 (5.31 inches in CD1 in March, top panel) and by the maximum precipitation anomaly (|−2.65| inches in CD8 in March, bottom panel) among the nine regions and three months. April is displayed with filled circles only, while March and February are displayed with superposed multiplication and addition signs, respectively.

5. Extremes & Growing Degree Days

A. Freezing Days

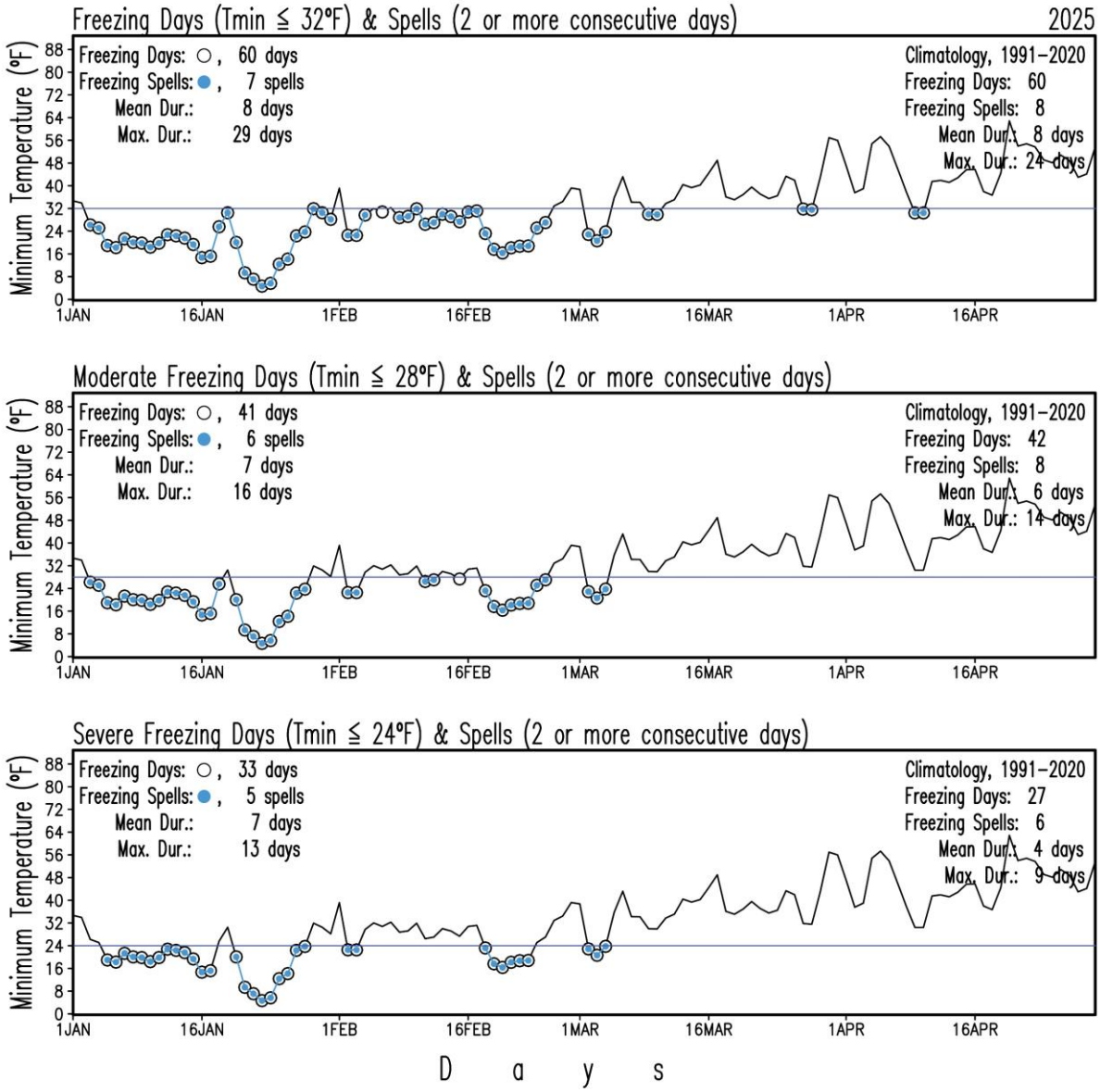

Figure 9. Maryland (statewide) number of freezing days, and their consecutive occurrence for the period January 1 – April 30, 2025. The panels show freezing days in open circles and spells of freezing days in blue-filled circles from statewide daily minimum temperatures. The upper panel displays freezing 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 levels and summary tables can be found on the MDSCO website.

B. Extreme Precipitation and Dry Spells

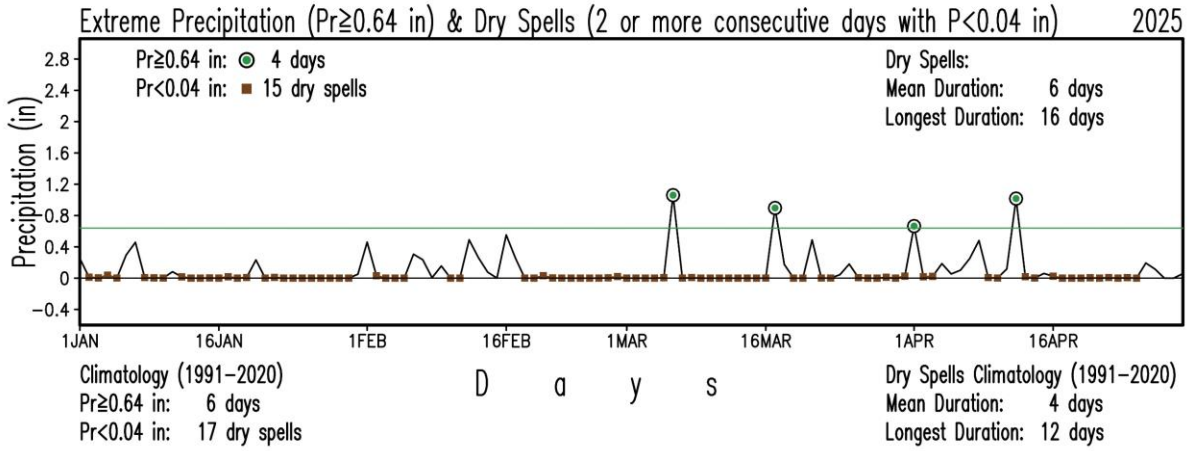

Figure 10. Maryland (statewide) number of days with extreme precipitation and dry day spells for the period January 1 – April 30, 2025. Extreme precipitation days (precipitation equal to or larger than 0.64 in) are identified by green-filled circles. Dry spells (consecutive days with daily total precipitation 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.

C. Growing Degree Days

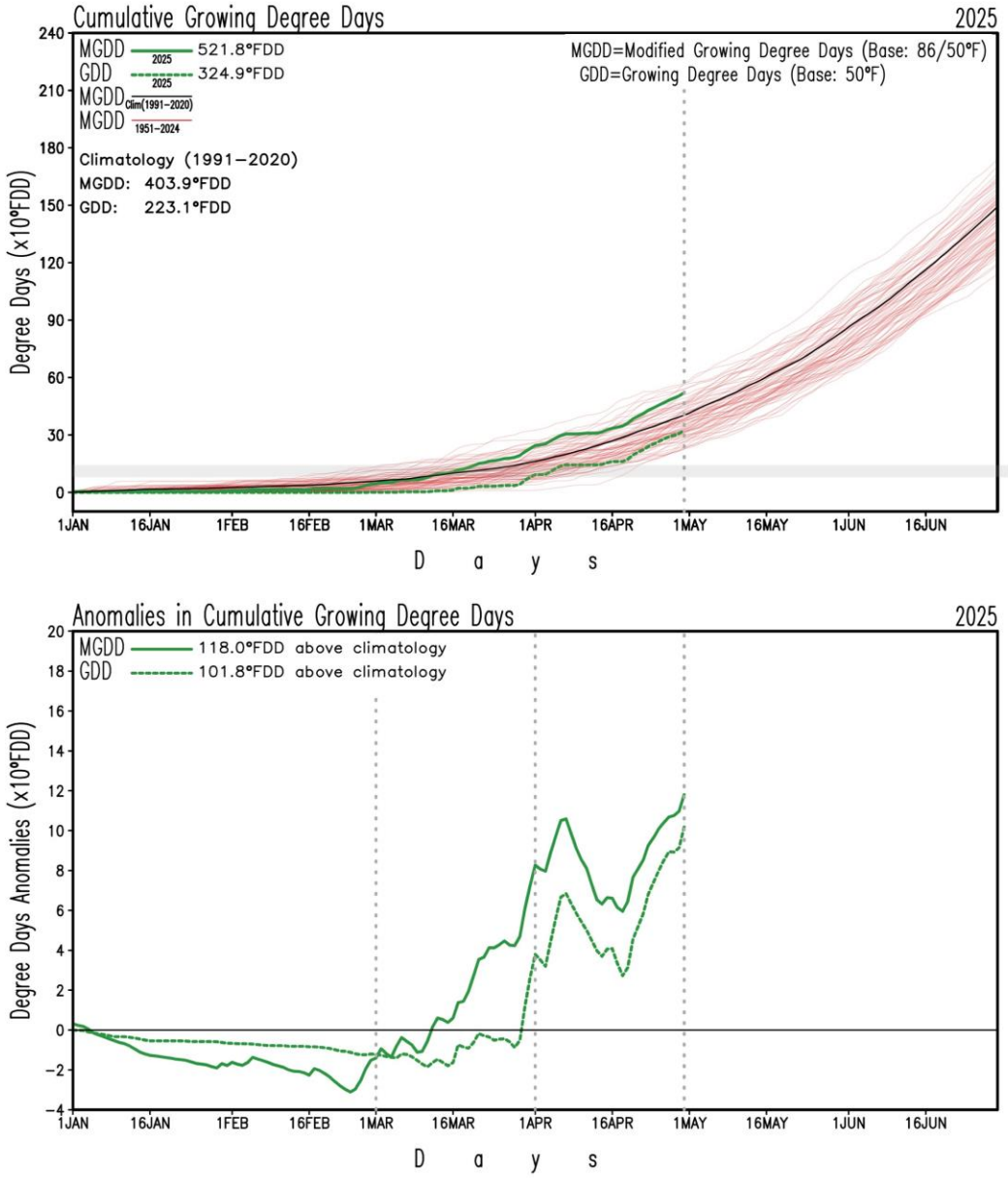

Figure 11. Maryland (statewide) cumulative growing degree days (upper panel) and its anomaly with respect to the 1991-2020 climatology (lower panel) for the period January 1 - April 30, 2025. The growing degree days are displayed with the dashed green line, while the modified growing degree days are shown with the continuous green line in the upper panel; the black line shows the 1991-2020 climatology of the cumulative modified growing degree days; the thin red lines display the cumulative modified growing degree days every year from 1951 to 2024. The gray shaded area marks a range of values for emergence (82-140) in corn development (IPAD, 2023). Anomalies with respect to the 1991-2020 climatology in the cumulative modified growing degree days (bottom panel) are displayed with the continuous green line, while those for the cumulative growing degree days are shown with the dashed green line. The vertical dotted gray lines mark the start of March and start and end of April. The accumulated growing degree days and their anomalies in April 30 are displayed at the top left in each panel. Figures at the county and climate division level and summary tables can be found on the MDSCO website.

6. April 2025 Statewide Averages in the Historical Record

A. Box and Whisker Plots

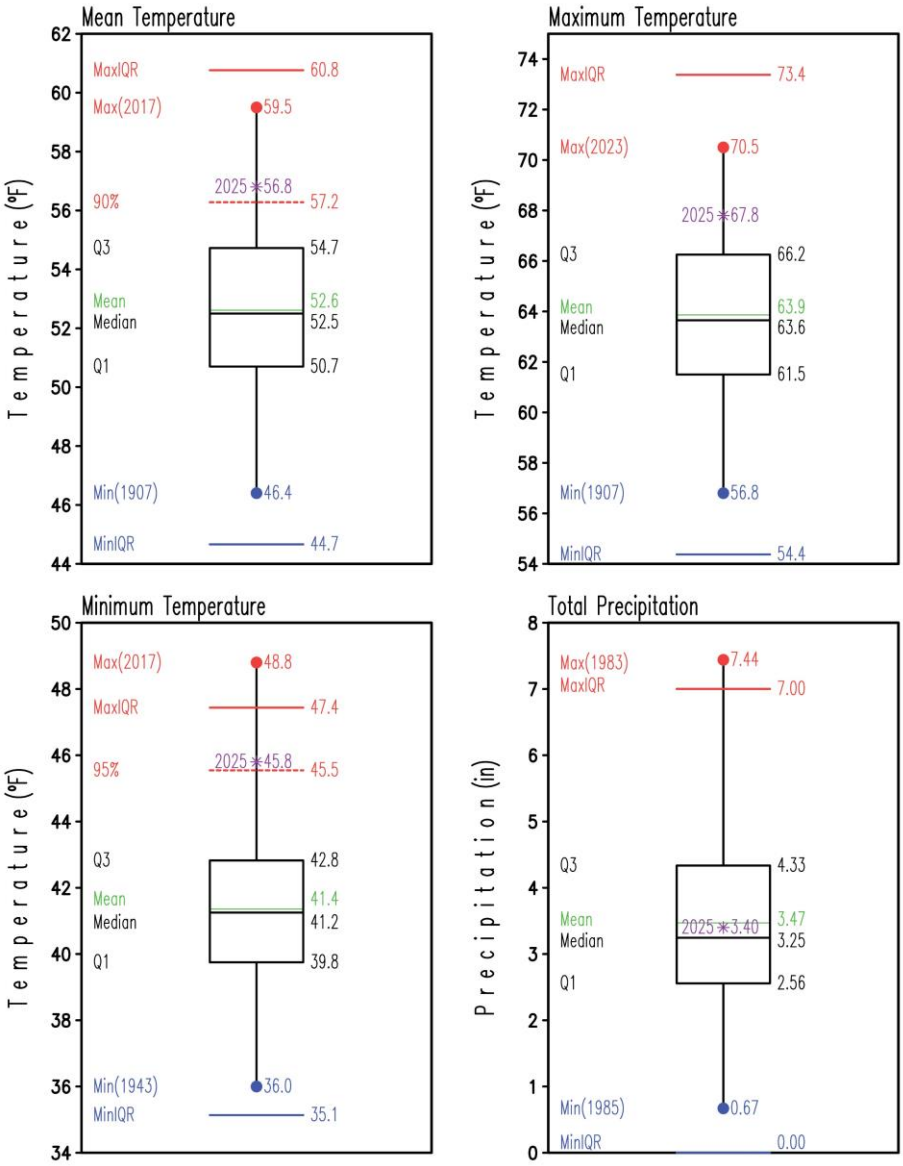

Figure 12. Box and Whisker plots of Maryland (statewide) monthly mean (upper left), maximum (upper right), minimum (lower left) surface air temperatures, and total precipitation (lower right) for April for the period 1895-2024. The label and asterisk in purple represent conditions for April 2025. Statistics 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 90th percentile in mean temperature and the 95th 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 April Trends

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

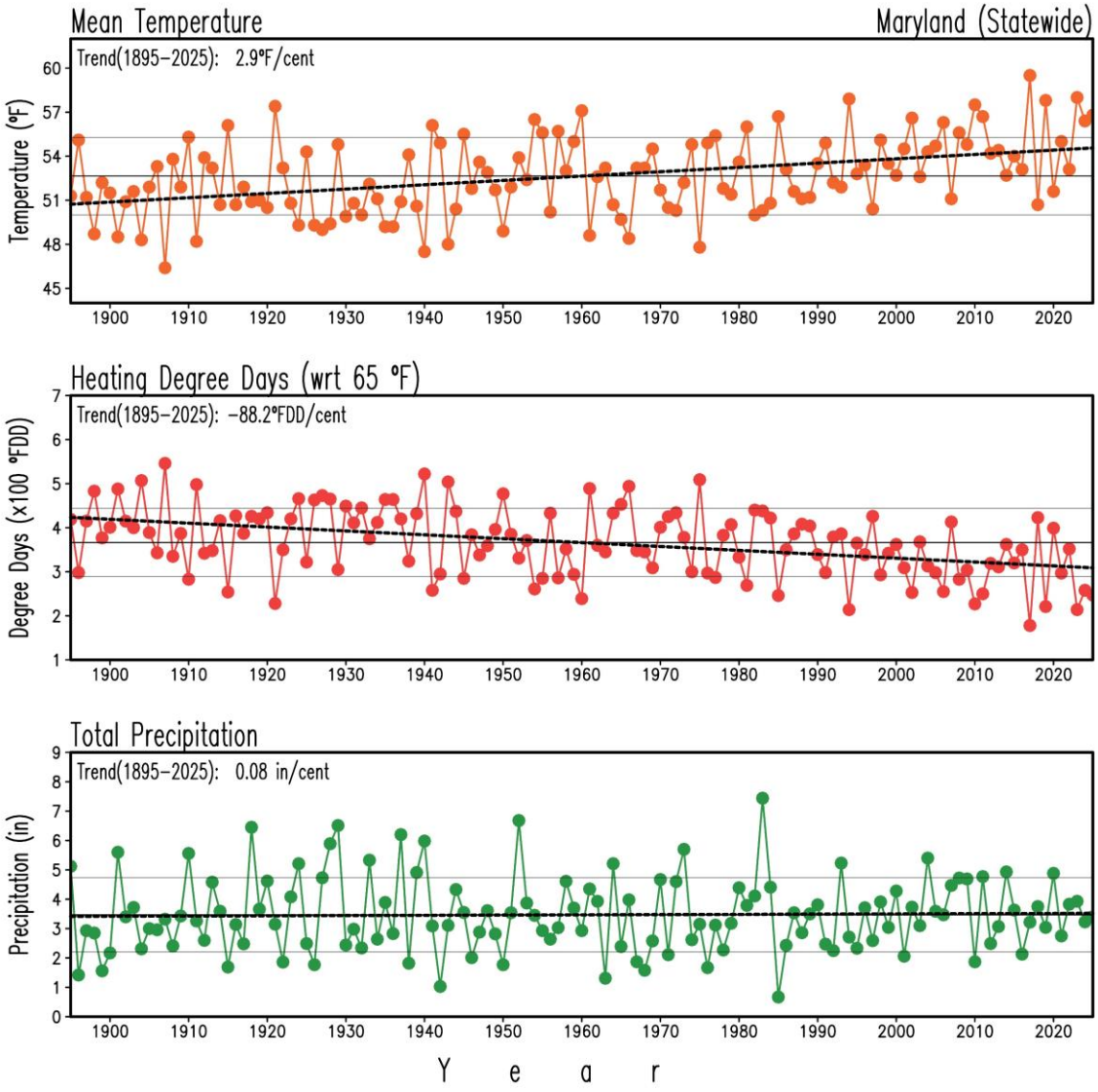

Figure 13. Maryland (statewide) mean surface air temperature, heating degree days, and precipitation in April for the period 1895-2025. Temperature is in °F, heating degree-days is in °F degree-days (°FDD), and precipitation is in inches. The thin, continuous black lines in each panel display the long-term means (52.6°F, 366.2°FDD and 3.47 in, 1895-2025), and the double thin, continuous gray lines indicate the standard deviation (2.6°F, 77.5°FDD and 1.27 in) above/below the long-term mean. The thick dashed black lines show the long-term linear trend. The warming temperature trend (2.9°F/century), the decreasing heating degree-days trend (−88.2°FDD/century) are statistically significant at the 95% level (*Student's t-test* −Santer et al. 2000) but not the small precipitation wetting trend (0.08 in/century).

B. Temperature and Precipitation Maps

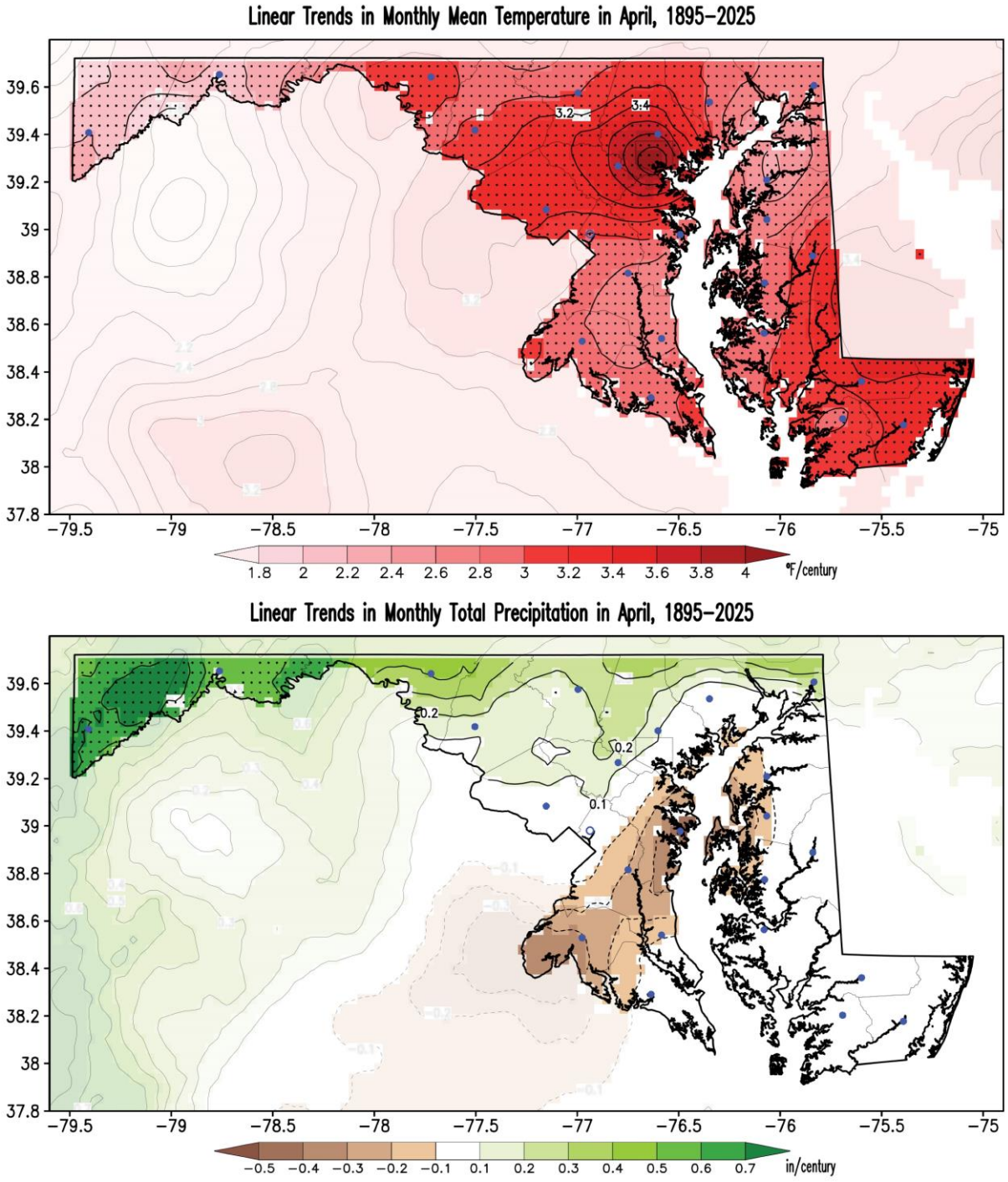

Figure 14. Linear trends in surface air mean temperature and precipitation in April for the period 1895-2025. Temperatures are in °F/century, and precipitation is in inches/century following the color bars. Red shading in the temperature map marks warming trends. Brown/green shading in the precipitation 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. April 2025 Data Tables: Statewide, Climate Divisions, and Counties

A. Mean Temperature and Precipitation

Region	Mean Air Temperature (°F)	Rank (#)
Statewide	56.8	124
Climate Division 1	58.2	125
Climate Division 2	58.3	124
Climate Division 3	59.8	127
Climate Division 4	59.0	125
Climate Division 5	56.1	110
Climate Division 6	55.8	117
Climate Division 7	54.4	113
Climate Division 8	50.8	123
Allegany	53.8	111
Anne Arundel	58.8	124
Baltimore	55.7	116
Baltimore City	57.5	118
Calvert	59.4	127
Caroline	57.1	120
Carroll	54.9	120
Cecil	54.4	101
Charles	60.0	127
Dorchester	59.0	126
Fredrick	55.8	123
Garrett	50.8	122
Harford	54.6	102
Howard	56.7	124
Kent	55.7	106
Montgomery	57.7	125
Prince George's	59.2	128
Queen Anne's	56.4	113
Saint Mary's	59.8	129
Somerset	58.9	127
Talbot	58.5	124
Washington	54.9	114
Wicomico	58.1	124
Worcester	57.6	125

Region	Total Precipitation (in)	Rank (#)
Statewide	3.40	68
Climate Division 1	3.84	86
Climate Division 2	3.72	82
Climate Division 3	3.94	92
Climate Division 4	3.14	66
Climate Division 5	3.27	67
Climate Division 6	2.97	50
Climate Division 7	2.80	58
Climate Division 8	4.38	88
Allegany	2.79	56
Anne Arundel	2.99	59
Baltimore	3.26	60
Baltimore City	2.79	46
Calvert	4.27	98
Caroline	3.43	69
Carroll	2.98	50
Cecil	3.87	81
Charles	3.57	79
Dorchester	3.93	93
Fredrick	2.55	37
Garrett	4.37	88
Harford	3.56	69
Howard	2.49	34
Kent	3.27	66
Montgomery	2.30	34
Prince George's	3.31	71
Queen Anne's	3.25	67
Saint Mary's	4.27	106
Somerset	3.85	89
Talbot	3.59	78
Washington	2.80	56
Wicomico	3.88	87
Worcester	3.81	89

Table A1. Monthly mean surface air temperature (left) and total precipitation (right) at Maryland (statewide), climate division, and county levels for April 2025. Temperatures are in °F, and precipitation is in inches. The rank is the order that the variable for April 2025 occupies among the 131 Aprils 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	67.8	115
Climate Division 1	69.4	123
Climate Division 2	69.8	121
Climate Division 3	71.3	126
Climate Division 4	69.6	116
Climate Division 5	66.2	91
Climate Division 6	66.2	108
Climate Division 7	66.2	101
Climate Division 8	62.4	112
Allegany	66.3	102
Anne Arundel	69.1	116
Baltimore	66.3	104
Baltimore City	67.5	104
Calvert	70.9	126
Caroline	68.5	113
Carroll	65.6	109
Cecil	64.6	90
Charles	71.3	123
Dorchester	70.7	124
Fredrick	66.2	111
Garrett	62.4	111
Harford	65.2	89
Howard	67.5	116
Kent	65.5	87
Montgomery	68.0	116
Prince George's	70.3	121
Queen Anne's	66.7	94
Saint Mary's	71.5	126
Somerset	70.1	124
Talbot	69.3	118
Washington	66.2	102
Wicomico	69.9	123
Worcester	68.4	122

Region	Minimum Air Temperature (°F)	Rank (#)
Statewide	45.8	126
Climate Division 1	46.9	125
Climate Division 2	46.9	125
Climate Division 3	48.4	129
Climate Division 4	48.3	129
Climate Division 5	45.9	124
Climate Division 6	45.3	126
Climate Division 7	42.5	121
Climate Division 8	39.2	126
Allegany	41.2	116
Anne Arundel	48.4	126
Baltimore	45.0	124
Baltimore City	47.5	124
Calvert	48.0	127
Caroline	45.7	125
Carroll	44.2	128
Cecil	44.3	119
Charles	48.7	129
Dorchester	47.3	126
Fredrick	45.4	127
Garrett	39.2	126
Harford	44.1	119
Howard	46.0	129
Kent	46.0	124
Montgomery	47.4	129
Prince George's	48.1	129
Queen Anne's	46.2	124
Saint Mary's	48.2	127
Somerset	47.7	124
Talbot	47.6	124
Washington	43.7	125
Wicomico	46.3	125
Worcester	46.8	125

Table A2. Monthly maximum (left) and minimum (right) surface air temperatures at Maryland (statewide), climate division, and county levels for April 2025. Temperatures are in °F. The rank is the order that the variable for April 2025 occupies among the 131 Aprils 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. April 2025 Bar Graphs: Statewide, Climate Divisions, and Counties

A. Temperatures and Precipitation

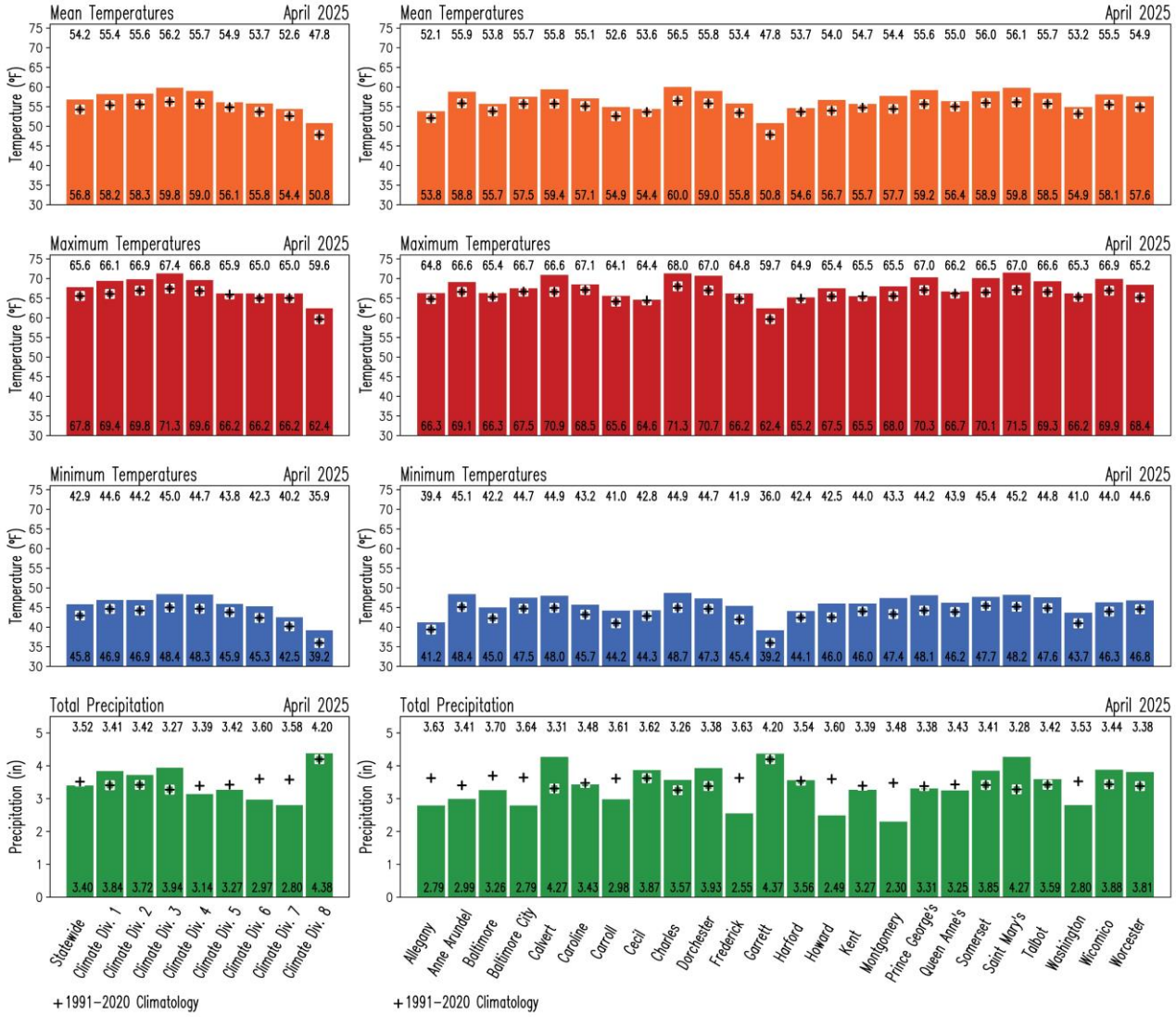

Figure B1. Monthly surface variables in Maryland for April 2025. Color bars represent the variables as follows: mean surface air temperature (orange), maximum surface air temperature (red), minimum surface air temperature (blue), and total precipitation (green) at statewide and climate division (left 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 April 2025. For comparison, the corresponding 1991-2020 climatological values for April are displayed as black addition signs, and their magnitudes are shown at the top of the panels.

B. Temperatures and Precipitation Anomalies

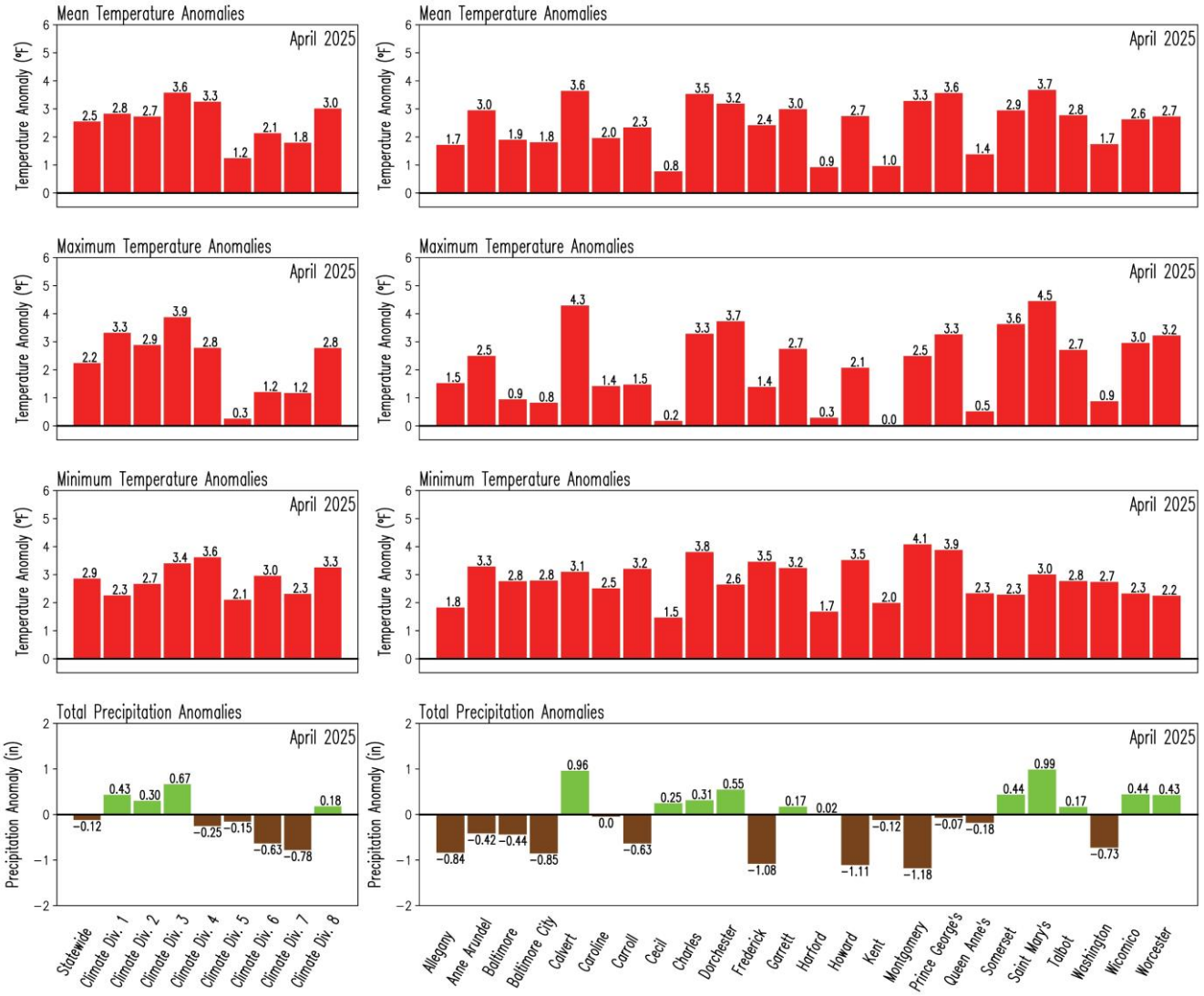

Figure B2. Anomalies of the monthly surface variables in Maryland for April 2025. Anomalies are with respect to the 1991-2020 climatology. Red color represents positive (warmer than normal) anomalies for mean surface air temperature (upper row), maximum surface air temperature (second row from top), 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 April 2025.

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

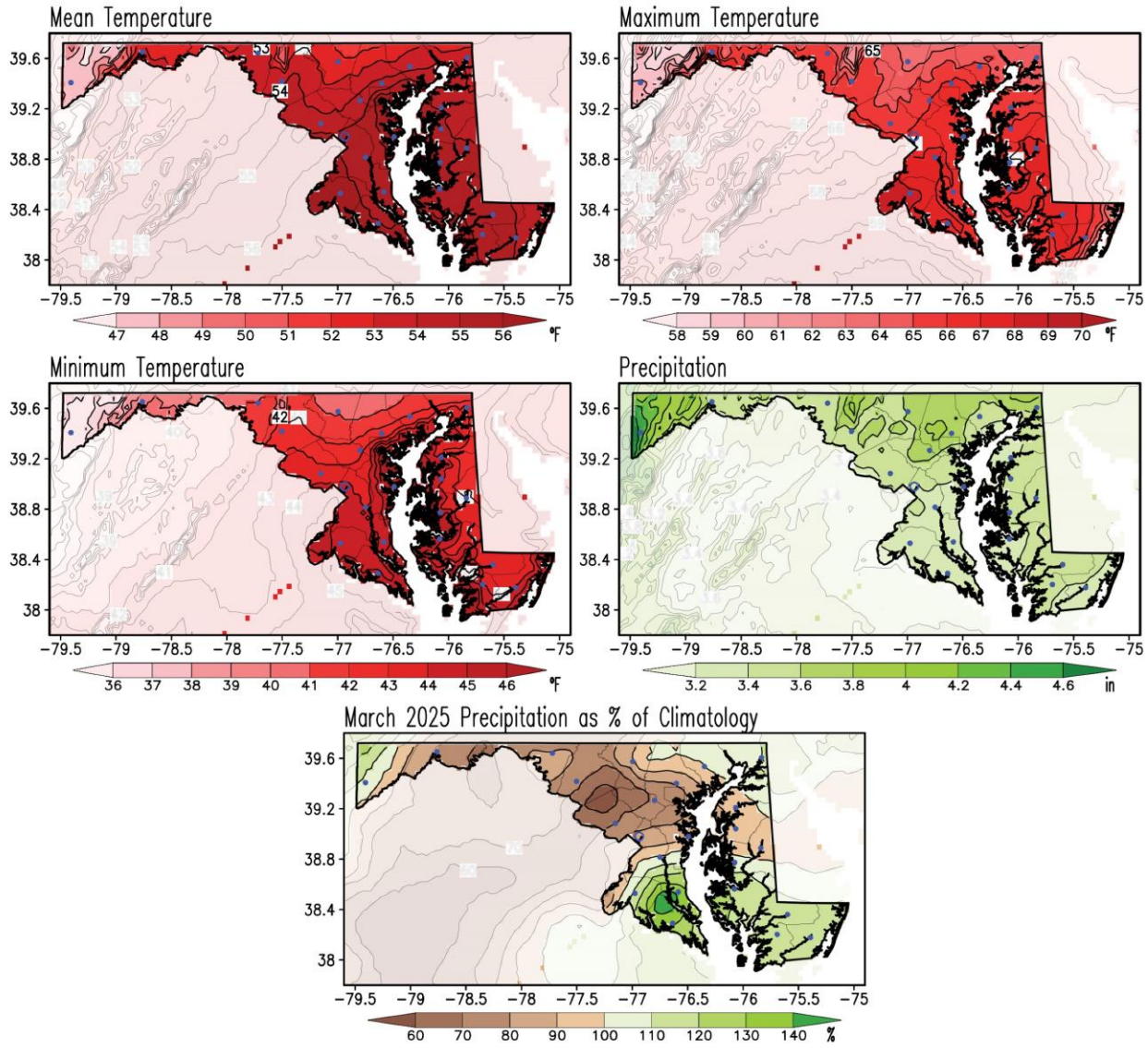

Figure C1. April climatology of the monthly mean, maximum, and minimum surface air temperatures, and total precipitation for the period 1991-2020 (upper and middle rows), and precipitation in April 2025 as a percentage of climatology (bottom row). Temperatures are in °F, and precipitation is in inches according to the color bars. This is the current climate normal against which the April 2025 conditions are compared to obtain the April 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. Note that shading outside the state has been washed out to facilitate focusing on Maryland. Filled blue circles mark the county seats.

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

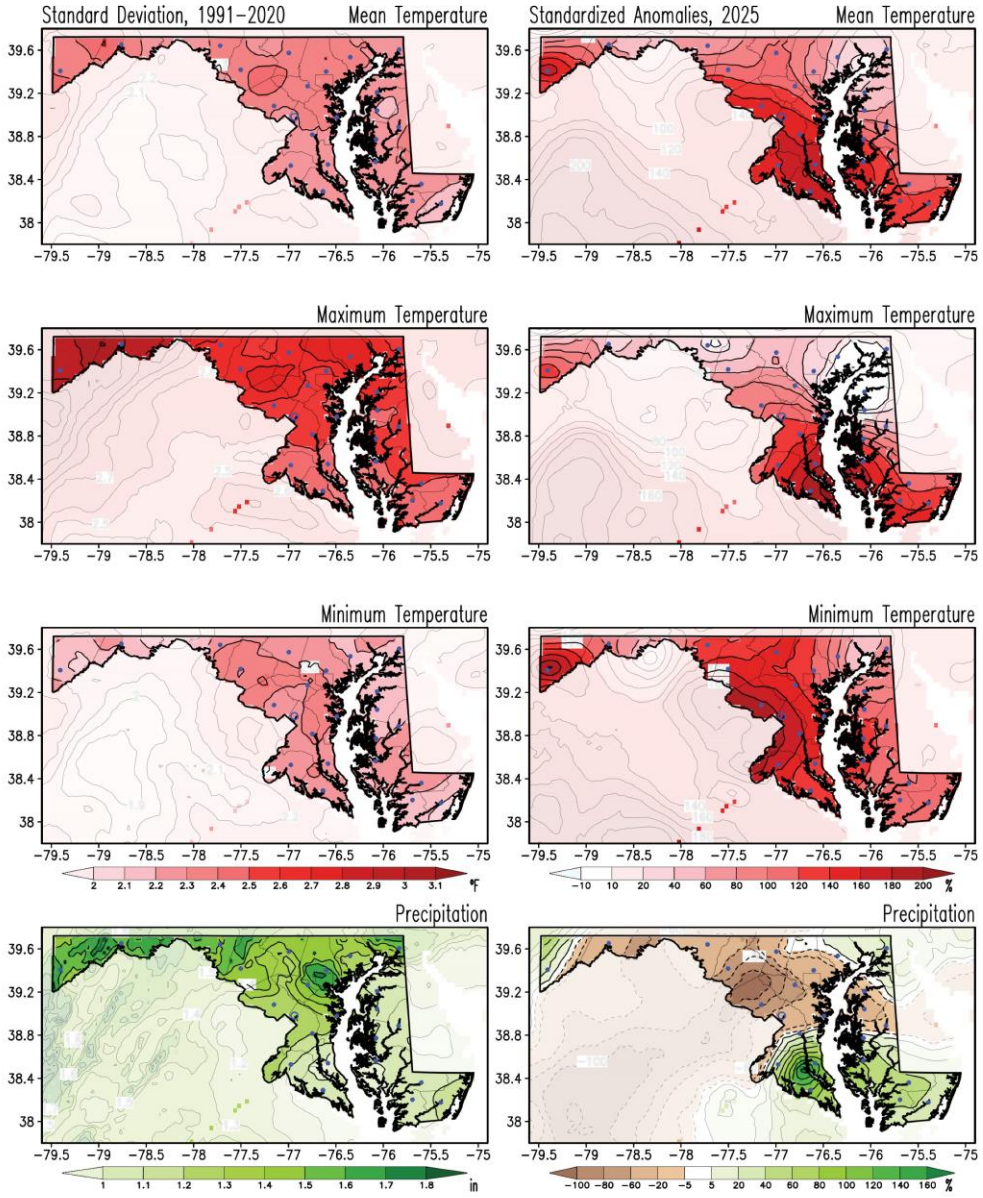

Figure D1. Standard deviation for April and standardized anomalies of temperatures and precipitation for April 2025. Standard deviations for monthly mean, maximum, and minimum surface air temperatures and total precipitation were obtained from the 1991-2020 period (left column). Anomalies for April 2025 (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. Blue/red shading in the anomaly temperature maps marks colder/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.

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