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Maryland Climate Bulletin
Winter 2024-25

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Summary

Winter 2024-25 was colder and drier than normal (i.e., 1991-2020 averages) in Maryland, with warmer and wetter-than-normal conditions in February, but colder and drier-than-normal conditions in January and December. Seasonal mean temperatures ranged from 26 to 38°F, with maximum temperatures between 34 and 47°F, and minimum temperatures between 18 and 30°F. Seasonal accumulated total precipitation ranged from 5.5 to 12 inches.

Maryland Regional Features (Figures 1-5, C1, and E1)

- The mean temperature was colder than normal everywhere in the state, especially in southeastern Baltimore and Harford counties, Kent, Queen Anne's counties (2.4–2.8°F below), Caroline County, and portions of Talbot, Dorchester, Wicomico and Worcester counties (2.2–2.6°F below), and Garrett County (2.2–2.4°F below).

- The maximum temperature was also colder than normal throughout the entire state, particularly in Allegany and Garrett counties, southeastern Baltimore and Harford counties, Kent and Queen Anne's counties, and northern Caroline County (2.6–3.0°F below).

- The minimum temperature was colder than normal in all the state as well, notably over Wicomico, and in parts of Worcester, Somerset, Dorchester and Caroline counties (2.6–3.0°F below), southeastern Baltimore and Harford counties, and parts of Kent and Queen Anne's counties (2.0−2.4°F below), and Garrett County (2.0−2.2°F below).

- Precipitation was below normal over almost the entire state, particularly in Harford and Kent Counties, portions of Cecil and Queen Anne's counties (4–4.8 inches below), and counties in the Piedmont (2.8–3.6 inches below). The regions with the maximum deficit over the northeast of the state received around 55−60% of their climatological winter precipitation. Allegany and Washington counties received 60−65% of theirs, and the counties over the Piedmont received no more than 65−75%. On the other hand, precipitation in the southern portions of Somerset and Worcester counties was above normal (0.4−0.8 inches) and received up to 10% more of their climatological precipitation.

- The partial water year 2025 (October 2024 − February 2025) was below normal across the entire state, especially over Harford, Kent, Queen Anne's, and northern Caroline counties (8−9 inches below); this region received 45−50% of its climatological water amount. The counties in the central and western Piedmont, as well as Washington and eastern Allegany counties, received 50−55% of their normal water amount. Somerset and Wicomico counties received 70−75% of their climatological water amount, while Garrett County got 80−95% of its normal water amount.

Maryland Climate Divisions (Figures 6-7, B1, and B2)

- All eight climate divisions experienced colder and drier-than-normal conditions during winter 2024-25. Climate division 5, the Northeastern Shore, had the largest mean temperature departure from normal (2.5°F below), while climate division 3, Lower Southern, had the smallest (1.1°F below). Climate Division 5 also had the largest departure from normal precipitation (3.91 inches below), while Climate Division 1, Southeastern Shore, had the smallest departure (0.93 inches below).

- Seasonally, statewide mean temperature anomalies in winter 2024-25 were colder than normal (1.7°F below), following warmer-than-normal conditions in fall and summer 2024 (1.6°F above). Statewide precipitation anomalies were below normal (2.52 inches below) and have remained below normal since summer 2024 (1.92 inches below) after reaching the largest departures from normal in fall (6.25 inches below).

Historical Context (Figure 8, Tables A1 and A2)

- Winter 2024-25's statewide mean, maximum, and minimum temperatures (34.4, 43.1, and 25.6°F) were very close to the long-term (1896-2024) averages (34.3, 42.9, and 25.4°F). These temperatures were very far from their coldest records of 26.7, 35.5, and 17.9°F, established in 1918, respectively. The statewide precipitation for winter 2024-25 (7.09 in) was below the long-term average (9.51 in) and within 25% of the smallest values on record, but still not as dry as the record low of 4.75 inches in 2002.
- Statewide mean temperatures showed that winter 2024-25 was the seventy-second coldest winter (or fifty-ninth warmest) since 1896. Statewide maximum temperatures indicated that this winter was the sixty-ninth coldest (or sixty-second warmest), while statewide minimum temperatures showed this winter was the seventy-fourth coldest (or fifty-seventh warmest) winter on record.
- Statewide precipitation revealed that winter 2024-25 was the nineteenth driest winter and among the ten driest for four counties. It was the seventh driest winter for Carroll and Harford counties and the fifth driest for Kent and Queen Anne's counties. This winter was also the twelfth driest for Talbot and Washington counties and the eleventh for Baltimore and Caroline counties.

Century-Plus Trends, 1896-2025 (Figures 9, 10)

- Statewide mean temperatures and heating degree days showed significant trends: a warming trend (3.0°F/century) and a decreasing trend (−286.0°FDD/century). However, precipitation and partial water year (October 2024 to February 2025) showed no significant trends: a negligible drying trend (−0.02 in/century) and a small increasing water year trend (1.21 in/century), respectively.

- Regionally, winter mean temperatures exhibited significant warming trends throughout the state. The largest trends (3.4−3.6°F/century) were observed in the Piedmont, specifically between the southern halves of Frederick, Carroll, and Baltimore counties, and the northern halves of Montgomery and Howard counties, as well as in the northern halves of Baltimore, Harford, and Cecil counties. The smallest trends (1.8−2.2°F/century) were identified over Garrett County.
- Regionally, the accumulated total precipitation in winter showed non-significant trends throughout the state. The largest wetting trends were observed over Garrett County, the central Piedmont counties, and southern Somerset and Worcester counties (0.5°F/century). The largest drying trends were in Kent and Queen Anne's counties (−0.8 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. This is the seasonal version of the bulletin.

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 eastern placement of the state within the expansive North American continent contribute to a comparatively wide range of climatic conditions.

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

The seasonal surface climate conditions for winter 2024-25 are presented via maps of key variables, such as average surface air temperature, maximum surface air temperature, minimum surface air temperature, accumulated total precipitation, and their anomalies (i.e., departures from normal); they are complemented by partial water year conditions for the state (Section 3). Statewide and climate division averages for the season are compared against each other via scatter plots (Section 4). The seasonal statewide averages are placed in the context of the historical record via box and whisker plots in Section 5. Century-plus trends in statewide air temperature, heating degree-days, accumulated total precipitation, partial water year, and state maps of air temperature and accumulated total precipitation are presented in Section 6. Ancillary statewide, climate division, and county-level information are provided via tables and plots in Appendices A-B; climatology and variability maps are in Appendices C-E.

2. Data & Methods

Surface air temperatures, total precipitation, and cooling 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 3/13/2025.

- NOAA Monthly U.S. Climate *Divisional* Dataset (NClimDiv – Vose et al., 2014). It is available in a preliminary status (v1.0.0-20250306) at: https://www.ncei.noaa.gov/pub/data/cirs/climdiv/
  Data was downloaded on 3/11/2025.

Some definitions:

About the seasons: Seasons are defined following the common three-month meteorological definitions. Spring includes March, April, and May; summer includes June, July, and August; fall includes September, October, and November; and winter includes December, January, and February. Seasonal temperatures are calculated as the mean of the temperatures in the three months, while seasonal precipitation and degree days are calculated as the sum of their values in the three months, which in turn were obtained by summing their daily values.

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 weather elements when the average is over long periods. If the average period is sufficiently long, we can begin 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), which 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 season (e.g., winter 2024-25) are the departures of the seasonal value from the corresponding climatology; in this case, the 1991-2020 climatology. When the observed seasonal 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 anomalies are divided by the standard deviation, they are referred to as standardized anomalies.

About degree days. Degree days are the difference between the daily mean temperature (calculated by averaging the high and low temperatures) and a predefined base temperature. Since energy demand is cumulative, degree-day totals are typically calculated on a daily, monthly, seasonal, and annual basis.

- *Heating and cooling degree days.* These are used to obtain a general idea of the energy 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 the water year. The water year is the sum of total precipitation from October 1st to September 30th of the following year and is labeled by the year in which the measurements end. Therefore, the water year 2025 started in October 2024 and will end in September 2025. Total precipitation for the entire water year reflects both winter snow accumulation and summer rainfall. Precipitation that falls during a water year reflects the amount of water that will contribute to actual stream flow and groundwater inputs for that year. This issue presents only the partial water year from October 2024 to February 2025, based on the total monthly precipitation data.

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. Winter 2024-25 Maps

A. Mean Temperatures

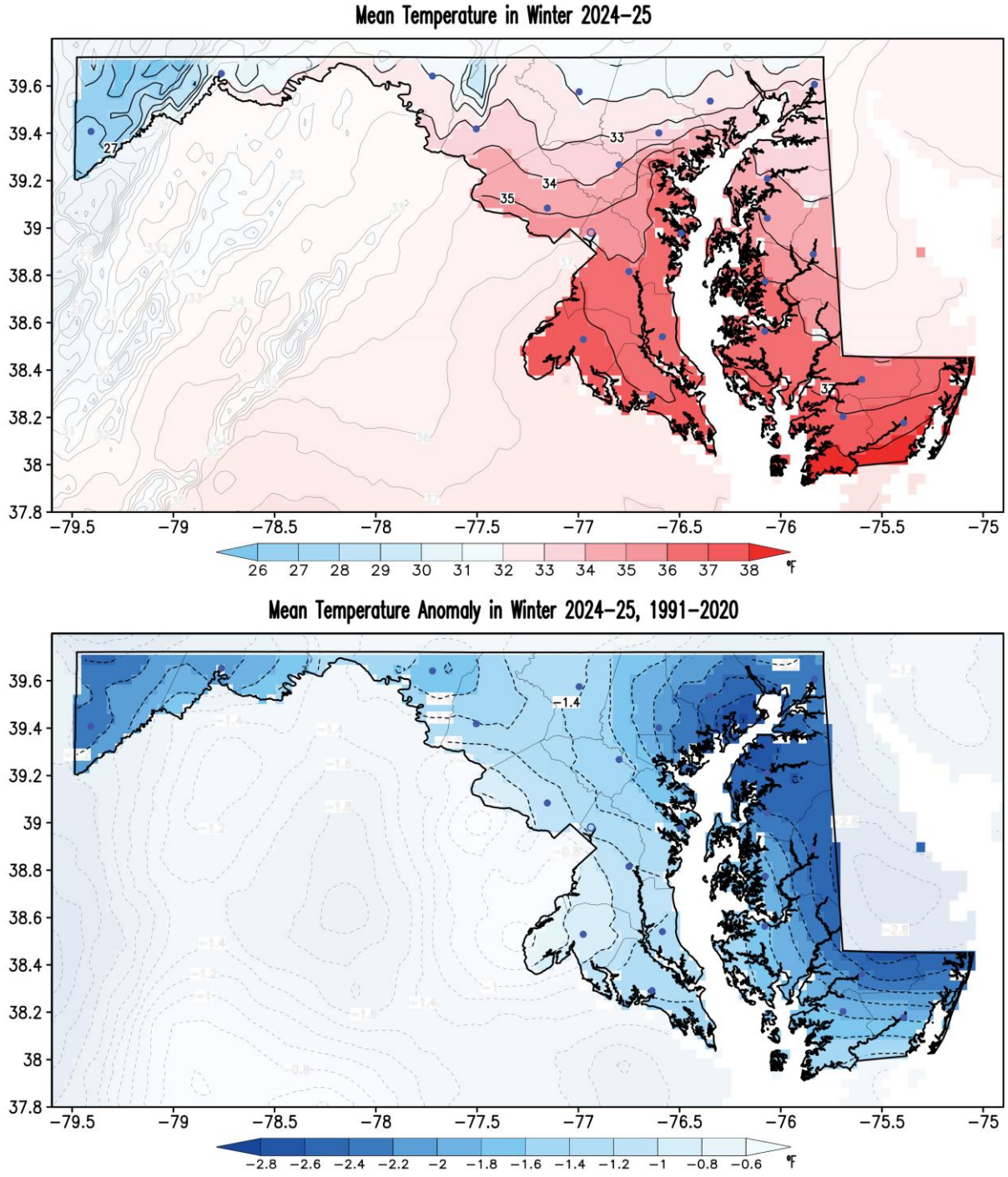

Figure 1. Seasonal mean surface air temperature (top panel) and its anomaly with respect to the 1991-2020 climatology (bottom panel) for winter 2024-25. Temperatures are in °F following the color bar. Blue/red shading in the temperature map shows temperatures below/above 32°F. Blue shading in the anomaly map marks colder 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

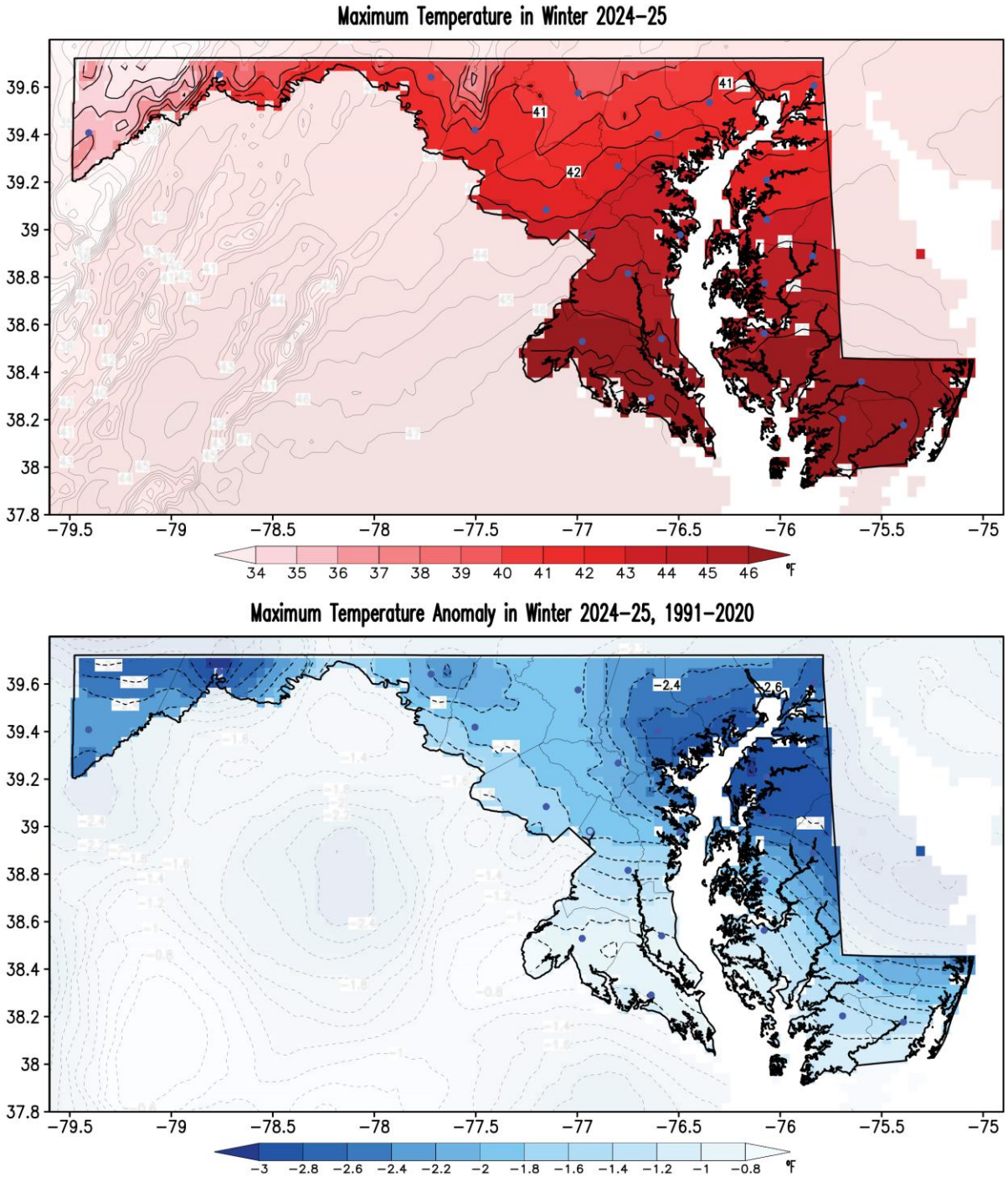

Figure 2. Seasonal maximum surface air temperature (top panel) and its anomaly with respect to the 1991-2020 climatology (bottom panel) for winter 2024-25. Temperatures are in °F following the color bar. Blue shading in the anomaly map marks colder than normal conditions. Note shading outside the state has been washed out to facilitate focusing on Maryland. Filled blue circles mark the county seats.

C. Minimum Temperatures

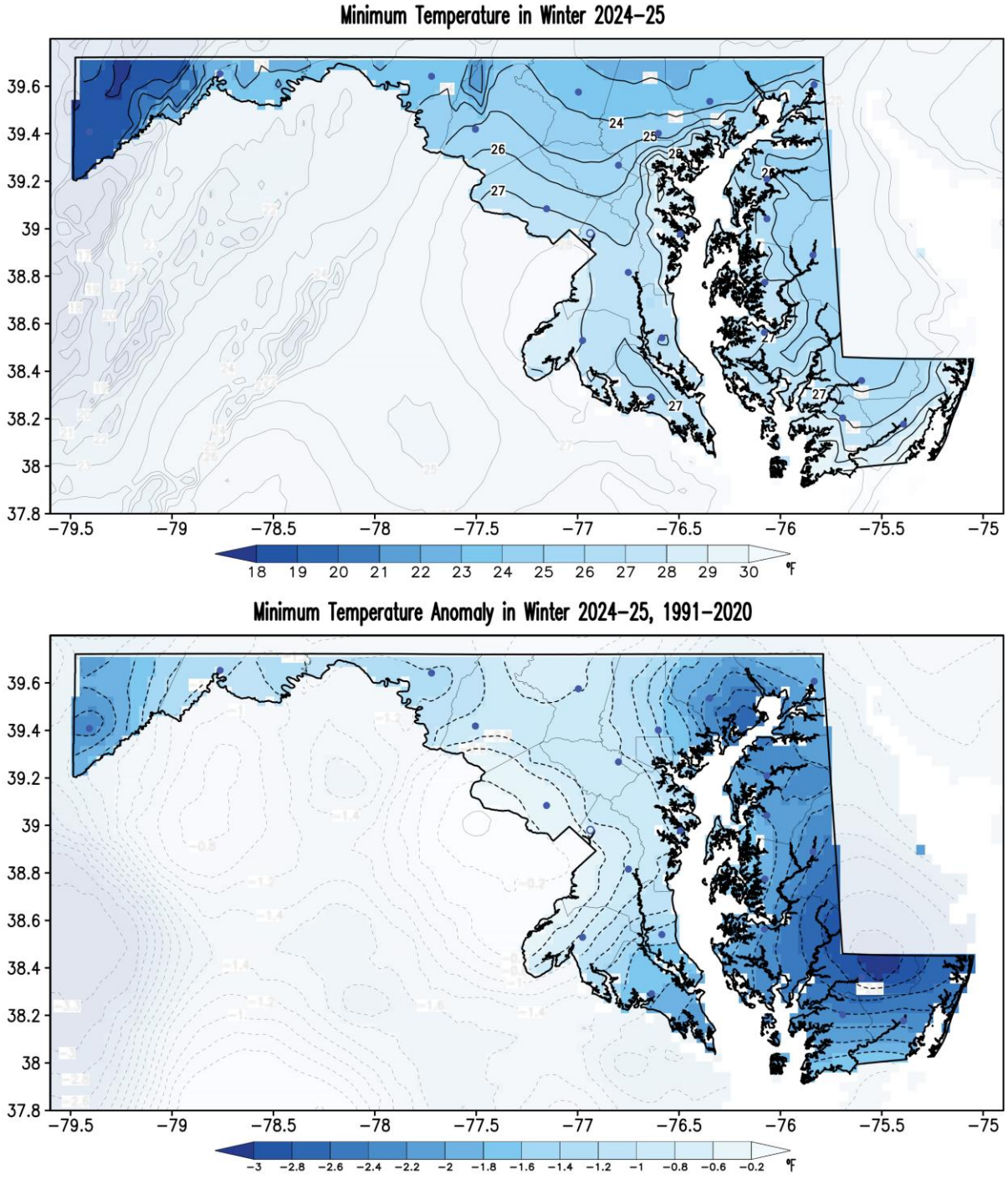

Figure 3. Seasonal minimum surface air temperature (top panel) and its anomaly with respect to the 1991-2020 climatology (bottom panel) for winter 2024-25. Temperatures are in °F following the color bar. Blue shading in the anomaly map marks colder than normal conditions. Note shading outside the state has been washed out to facilitate focusing on Maryland. Filled blue circles mark the county seats.

D. Precipitation

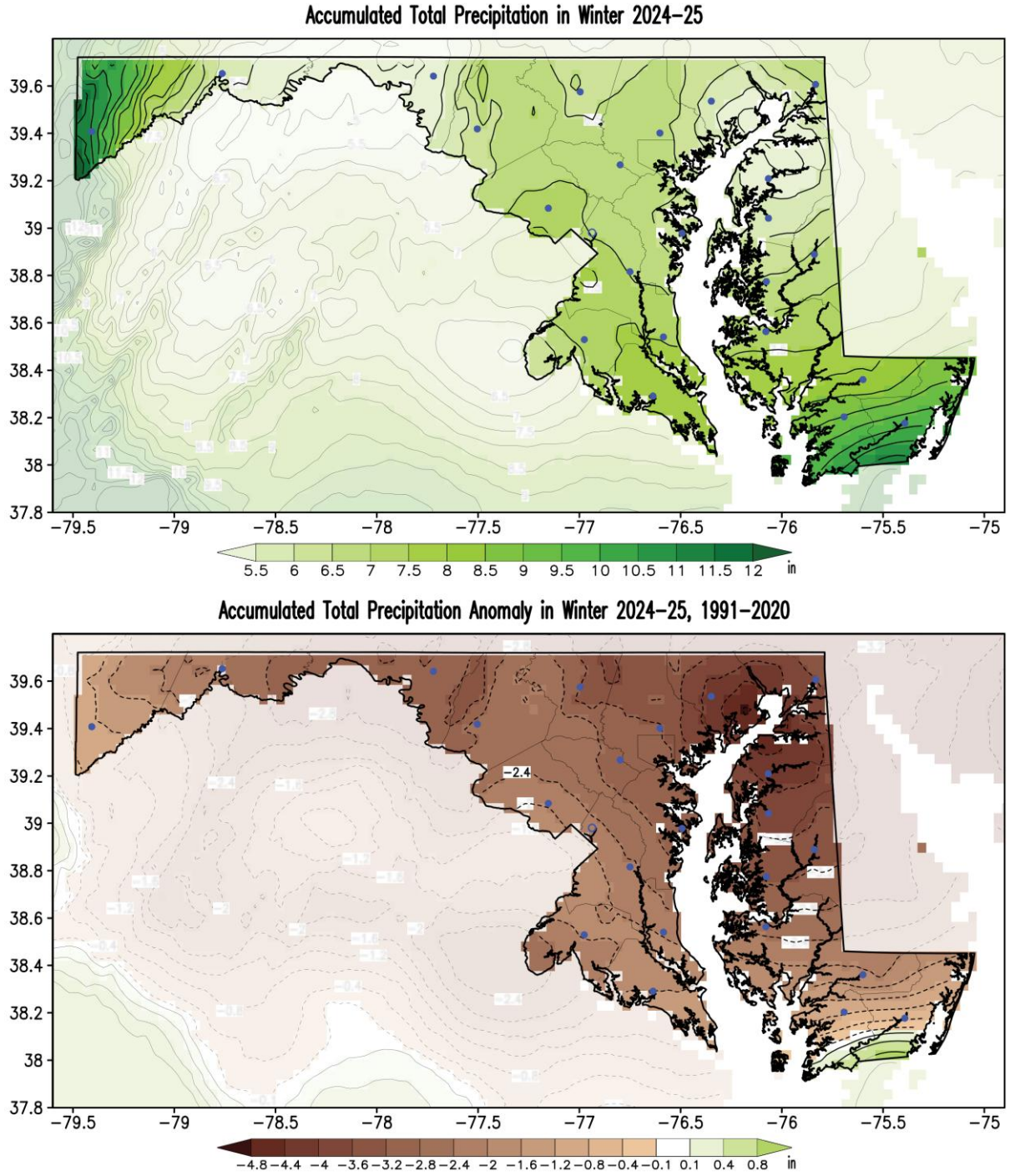

Figure 4. Seasonal accumulated total precipitation (top panel) and its anomaly with respect to the 1991-2020 climatology (bottom panel) for winter 2024-25. Precipitation is in inches following the color bar. Brown/green shading in the anomaly map marks drier/wetter than normal conditions. Note shading outside the state has been washed out to facilitate focusing on Maryland. Filled blue circles mark the county seats.

E. Partial Water Year (October 2024 – February 2025)

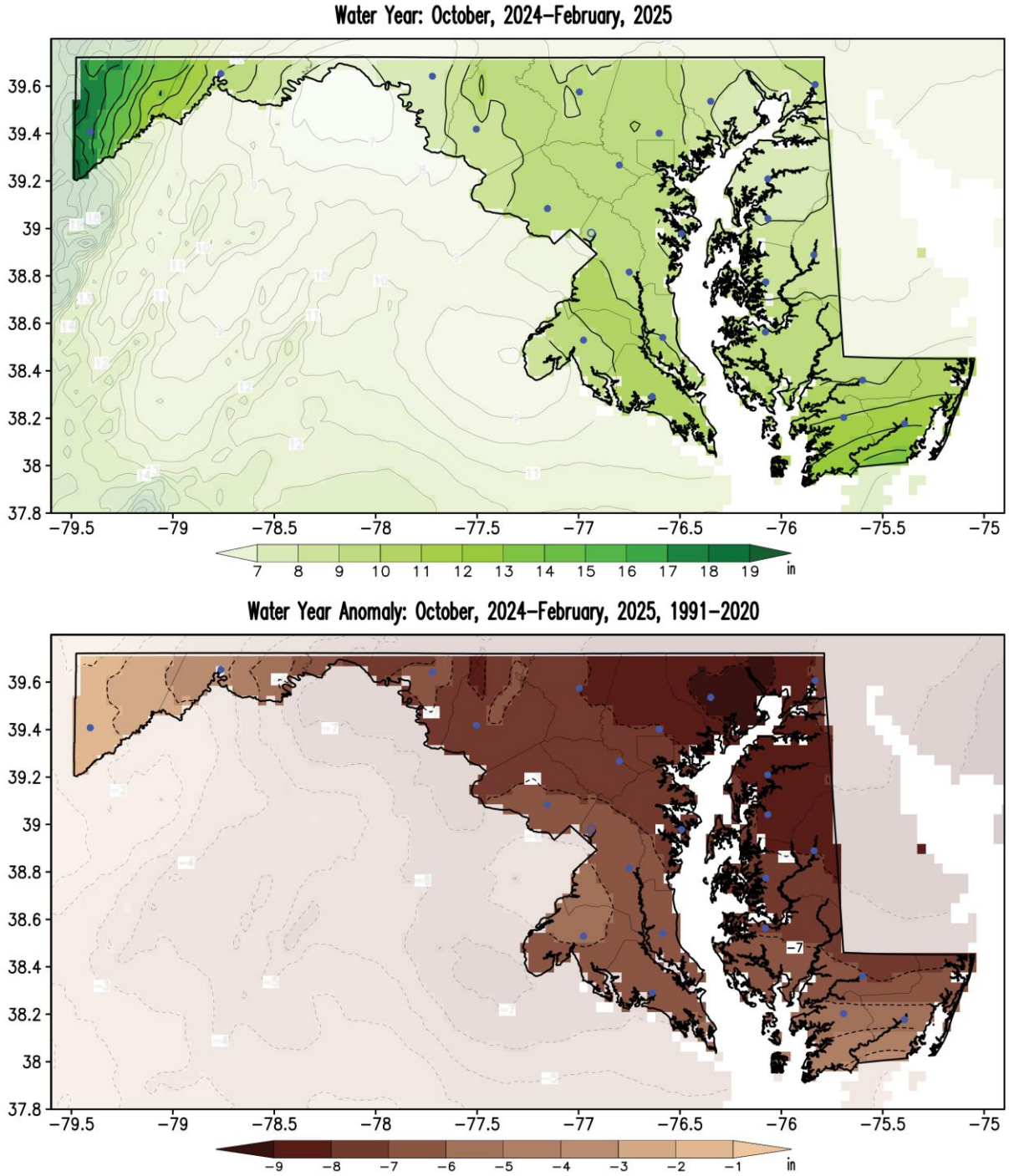

Figure 5. Partial water year until February 2025 (top panel), and its anomaly with respect to the 1991-2020 climatology (bottom panel). Water year is in inches following the color bar. Brown shading in the anomaly map marks drier than normal conditions. The current maps display the partial conditions from October 2024 to February 2025. Note shading outside the state has been washed out to facilitate focusing on Maryland. Filled blue circles mark the county seats.

4. Winter 2024-25 and Summer 2024 – Winter 2024-25 Climate Divisions Averages

A. Winter 2024-25 Scatter Plots

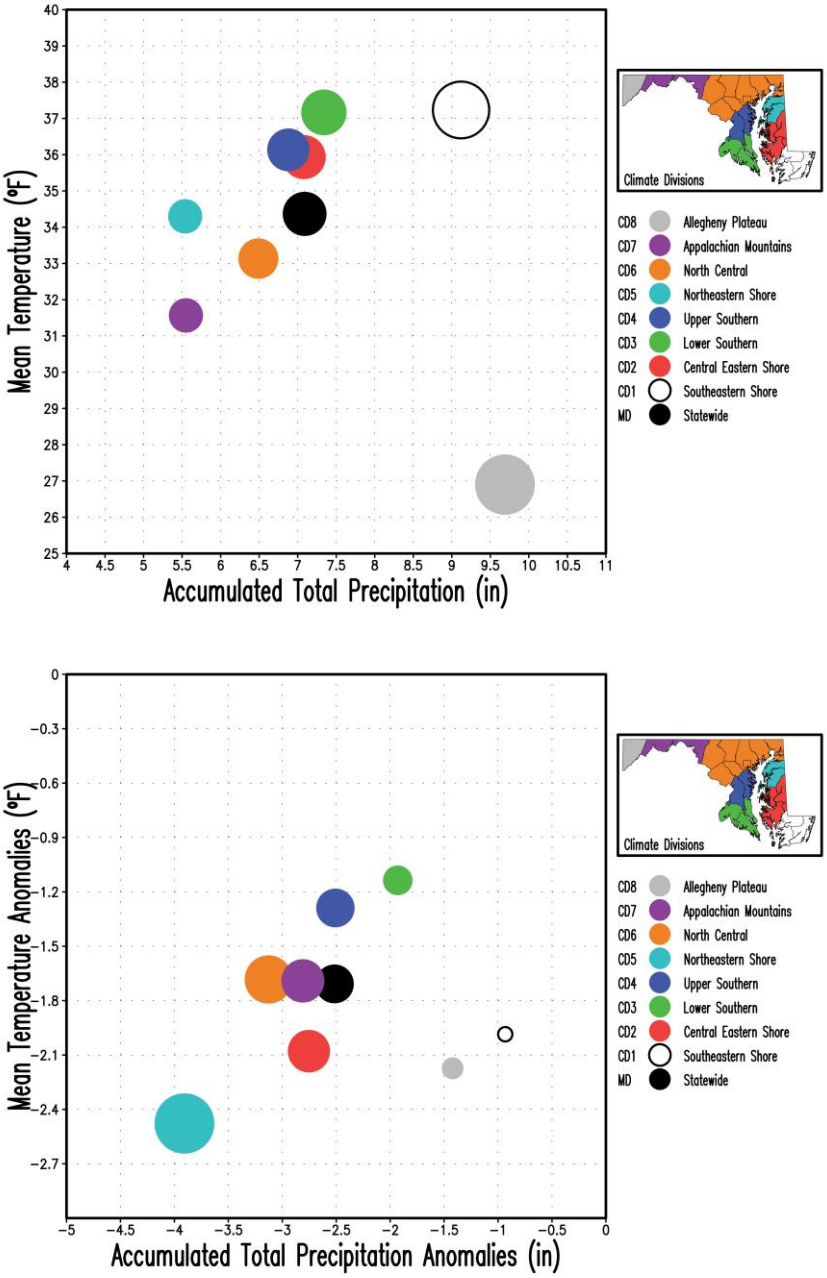

Figure 6. Scatter plots of Maryland (statewide) and Climate Divisions (CD#) seasonal mean surface air temperature vs. accumulated total precipitation for winter 2024-25. The upper panel shows the mean temperature and total precipitation, and the bottom panel displays their anomalies with respect to the 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 (9.69 inches in CD8, top panel) and by the maximum precipitation anomaly (|−3.91| inches in CD5, 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. Summer 2024 to Winter 2024-25 Scatter Plots

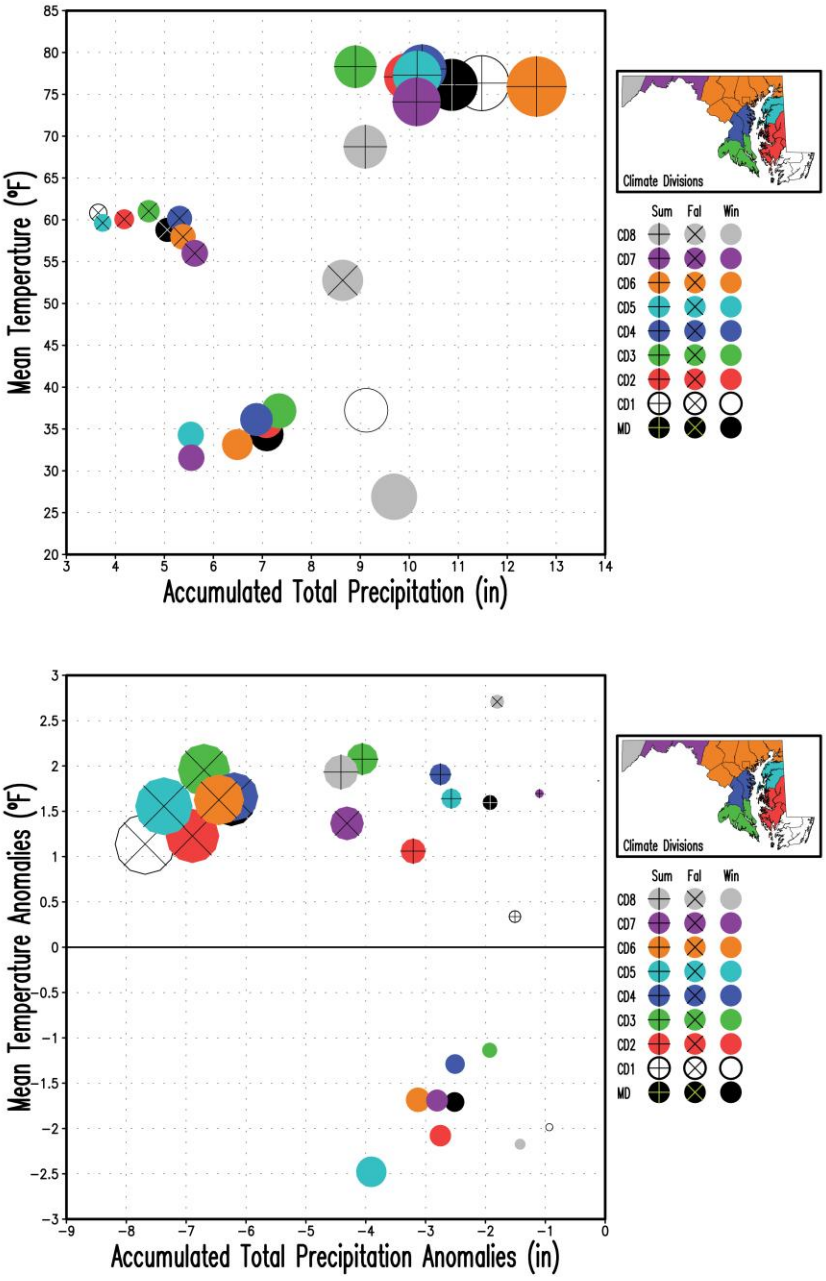

Figure 7. Scatter plots of Maryland (statewide) and Climate Divisions (CD#) seasonal mean surface air temperature vs. accumulated total precipitation for summer, fall 2024 and winter 2024-25. The upper panel shows the mean temperature and total precipitation, and the bottom panel displays their anomalies 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 (12.60 inches in CD6 in summer, top panel) and by the maximum precipitation anomaly (|–7.69| inches in CD1 in fall, bottom panel) among the nine regions and three months. Winter 2024-25 is displayed with filled circles only, while fall and summer 2024 are displayed with superposed multiplication and addition signs, respectively.

5. Winter 2024-25 Statewide Averages in the Historical Record

A. Box and Whisker Plots

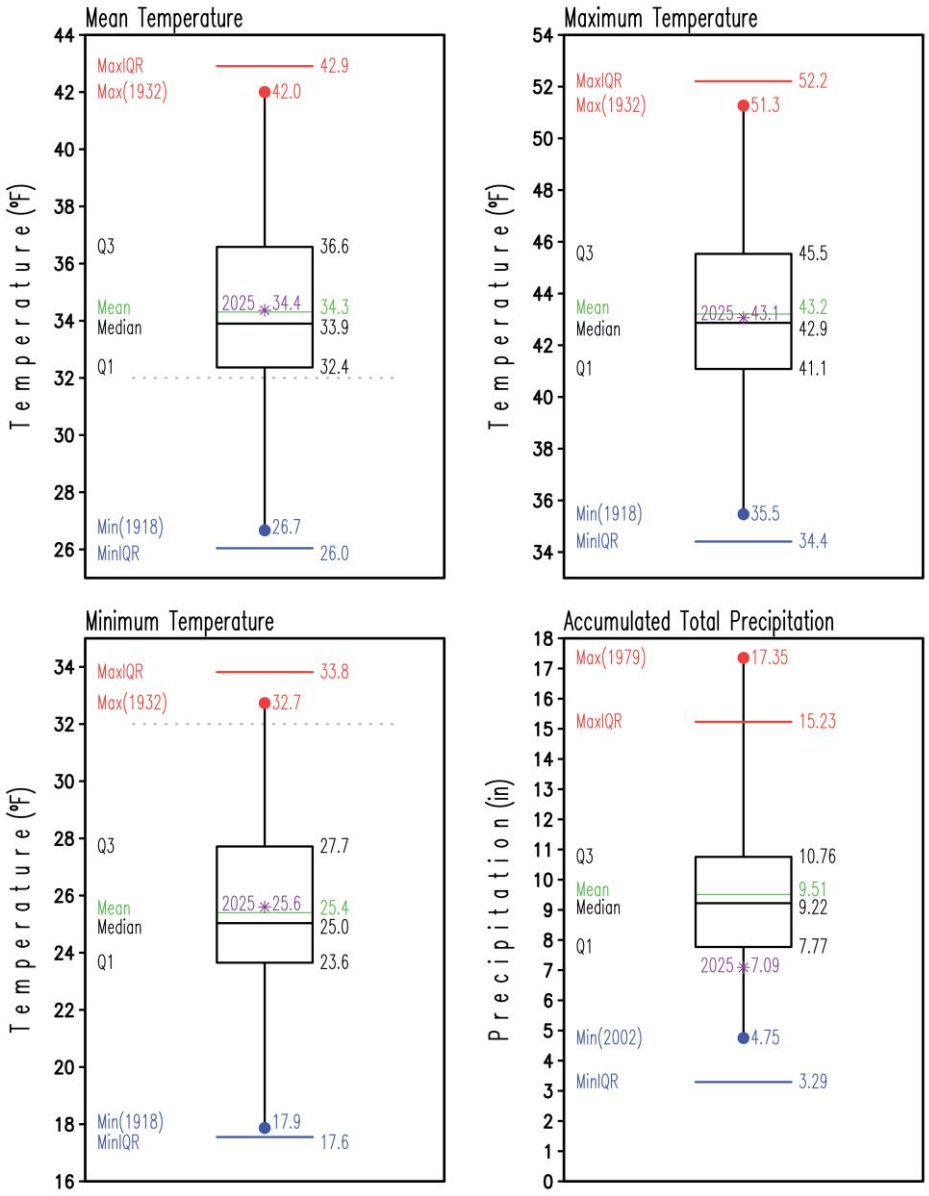

Figure 8. Box and Whisker plots of Maryland (statewide) seasonal mean (upper left), maximum (upper right), minimum (lower left) surface air temperatures, and accumulated total precipitation (lower right) for winter for the period 1896-2024. The label and asterisk in purple represent conditions for winter 2024-25. Statistics for the period 1896-2024 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 smaller and larger values are the lower and upper horizontal black lines of the box, respectively. 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.

6. 1896-2025 Trends

A. Statewide Mean Temperature, Heating Degree-Days, Accumulated Total Precipitation, and Partial Water Year (October 2024-February 2025)

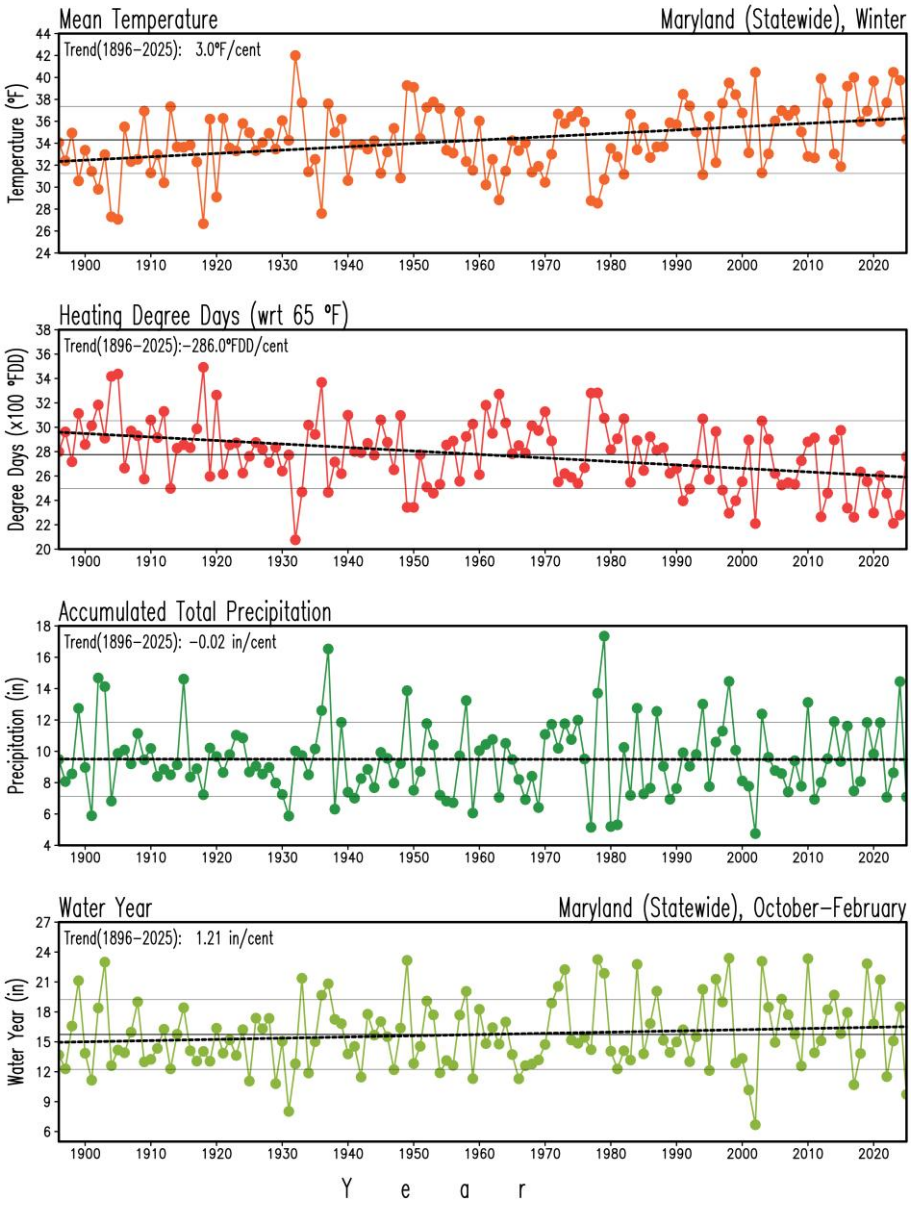

Figure 9. Maryland (statewide) mean surface air temperature, heating degree-days, accumulated total precipitation in winter, and partial water year (October 2024 – February 2025) for the period 1896-2025. Temperature is in °F, heating degree-days is in °F degree-days (°FDD), and precipitation is in inches. The thin, continuous black lines in each panel display the long-term means (34.3°F, 2775.4°FDD, 9.49 in, and 15.73 in, 1896-2025), and the double thin, continuous gray lines indicate the standard deviation (3.1°F, 278.1°FDD, 2.36 in, and 3.49 in) above/below the long-term mean. The thick dashed black lines show the long-term linear trend. The warming temperature trend (3.0°F/century), the decreasing heating degree-days trend (–286.0°FDD/century) are statistically significant at the 95% level (*Student's t-test* −Santer et al. 2000), but not the miniscule drying precipitation trend (–0.02 in/century), and the increasing water year trend (1.21 in/century).

B. Temperature and Precipitation Maps

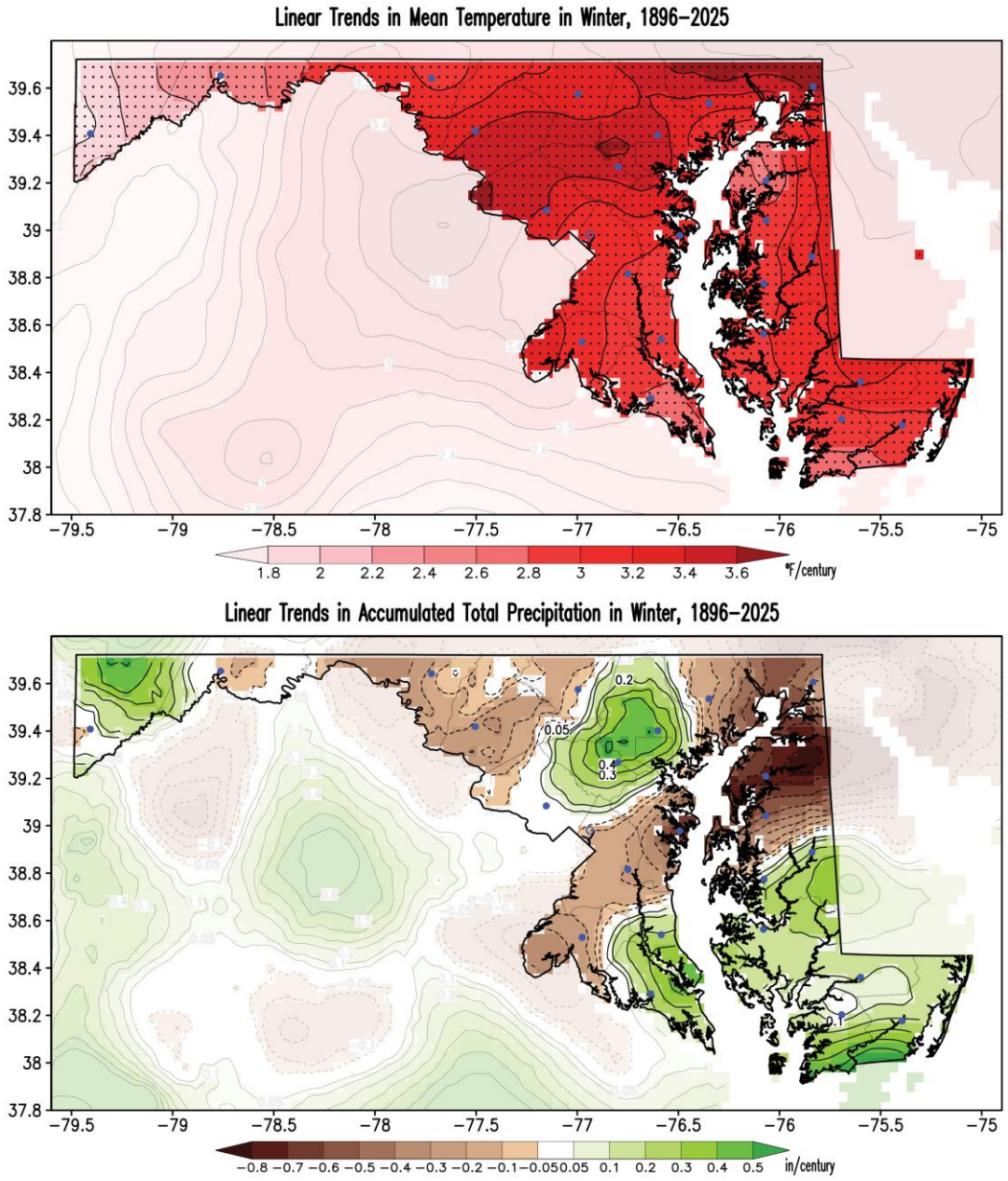

Figure 10. Linear trends in winter surface air mean temperature and accumulated total precipitation for the period 1896-2025. Temperatures are in °F/century, and precipitation is in inches/century following the color bars. Red shading in the temperature map marks warming trends. Brown/green shading in 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. Winter 2024-25 Tables: Statewide, Climate Divisions, and Counties

A. Mean Temperature and Precipitation

Region	Mean Air Temperature (°F)	Rank (#)
Statewide	34.4	72
Climate Division 1	37.2	69
Climate Division 2	35.9	70
Climate Division 3	37.2	74
Climate Division 4	36.1	73
Climate Division 5	34.3	58
Climate Division 6	33.1	73
Climate Division 7	31.6	67
Climate Division 8	26.9	51
Allegany	30.8	64
Anne Arundel	36.1	73
Baltimore	33.0	69
Baltimore City	35.0	69
Calvert	36.7	72
Caroline	34.9	65
Carroll	32.1	72
Cecil	33.0	70
Charles	37.4	76
Dorchester	36.5	70
Fredrick	32.8	74
Garrett	26.9	51
Harford	32.6	64
Howard	33.7	74
Kent	34.1	56
Montgomery	34.6	76
Prince George's	36.2	74
Queen Anne's	34.6	63
Saint Mary's	37.2	73
Somerset	37.6	72
Talbot	36.0	70
Washington	32.3	73
Wicomico	36.5	67
Worcester	37.5	69

Region	Acc. Total Precipitation (in)	Rank (#)
Statewide	7.09	19
Climate Division 1	9.12	53
Climate Division 2	7.08	18
Climate Division 3	7.34	29
Climate Division 4	6.88	18
Climate Division 5	5.54	5
Climate Division 6	6.49	13
Climate Division 7	5.55	16
Climate Division 8	9.69	55
Allegany	5.76	23
Anne Arundel	6.59	16
Baltimore	6.57	11
Baltimore City	6.66	13
Calvert	7.42	26
Caroline	6.59	11
Carroll	6.56	16
Cecil	6.00	7
Charles	7.01	26
Dorchester	7.51	22
Fredrick	6.60	20
Garrett	9.67	55
Harford	5.79	7
Howard	6.81	19
Kent	5.28	5
Montgomery	6.99	28
Prince George's	7.15	30
Queen Anne's	5.70	5
Saint Mary's	7.78	38
Somerset	9.43	63
Talbot	6.58	12
Washington	5.32	12
Wicomico	8.16	32
Worcester	9.59	58

Table A1. Seasonal mean surface air temperature (left) and accumulated total precipitation (right) in Maryland (statewide), climate division, and county levels for winter 2024-25. Temperatures are in °F, and precipitation is in inches. The rank is the order that the variable for winter 2024-25 occupies among the 130 winters since 1896 after the 130 values have been arranged from the lowest to the highest in the *standard competition ranking method*. The closer to 130 the rank is, the larger (i.e., 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	43.1	69
Climate Division 1	46.8	74
Climate Division 2	45.3	71
Climate Division 3	46.7	76
Climate Division 4	44.5	70
Climate Division 5	42.8	59
Climate Division 6	41.4	66
Climate Division 7	40.0	57
Climate Division 8	35.1	42
Allegany	39.1	43
Anne Arundel	44.2	66
Baltimore	41.4	61
Baltimore City	42.9	63
Calvert	46.0	75
Caroline	44.3	66
Carroll	40.4	65
Cecil	41.1	61
Charles	46.8	77
Dorchester	46.2	76
Fredrick	40.9	71
Garrett	35.1	41
Harford	41.1	58
Howard	42.2	69
Kent	42.3	54
Montgomery	42.5	70
Prince George's	44.9	71
Queen Anne's	43.2	61
Saint Mary's	46.8	77
Somerset	47.0	74
Talbot	44.8	72
Washington	40.8	66
Wicomico	46.6	73
Worcester	46.8	74

Region	Minimum Air Temperature (°F)	Rank (#)
Statewide	25.6	74
Climate Division 1	27.6	54
Climate Division 2	26.5	56
Climate Division 3	27.7	72
Climate Division 4	27.7	80
Climate Division 5	25.8	65
Climate Division 6	24.9	78
Climate Division 7	23.1	76
Climate Division 8	18.8	62
Allegany	22.6	78
Anne Arundel	28.0	76
Baltimore	24.6	78
Baltimore City	27.2	77
Calvert	27.4	69
Caroline	25.5	59
Carroll	23.8	79
Cecil	24.8	73
Charles	27.9	78
Dorchester	26.8	52
Fredrick	24.7	78
Garrett	18.8	61
Harford	24.1	68
Howard	25.3	80
Kent	25.9	63
Montgomery	26.7	85
Prince George's	27.4	82
Queen Anne's	26.1	67
Saint Mary's	27.4	62
Somerset	28.3	63
Talbot	27.3	61
Washington	23.7	75
Wicomico	26.4	48
Worcester	28.1	57

Table A2. Seasonal maximum (left) and minimum (right) surface air temperatures in Maryland (statewide), climate division, and county levels for winter 2024-25. Temperatures are in °F. The rank is the order that the variable for winter 2024-25 occupies among the 130 winters since 1896 after the 130 values have been arranged from the lowest to the highest using the *standard competition ranking method*. The closer to 130 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. Winter 2024-25 Bar Graphs: Statewide, Climate Divisions, and Counties

A. Temperatures and Precipitation

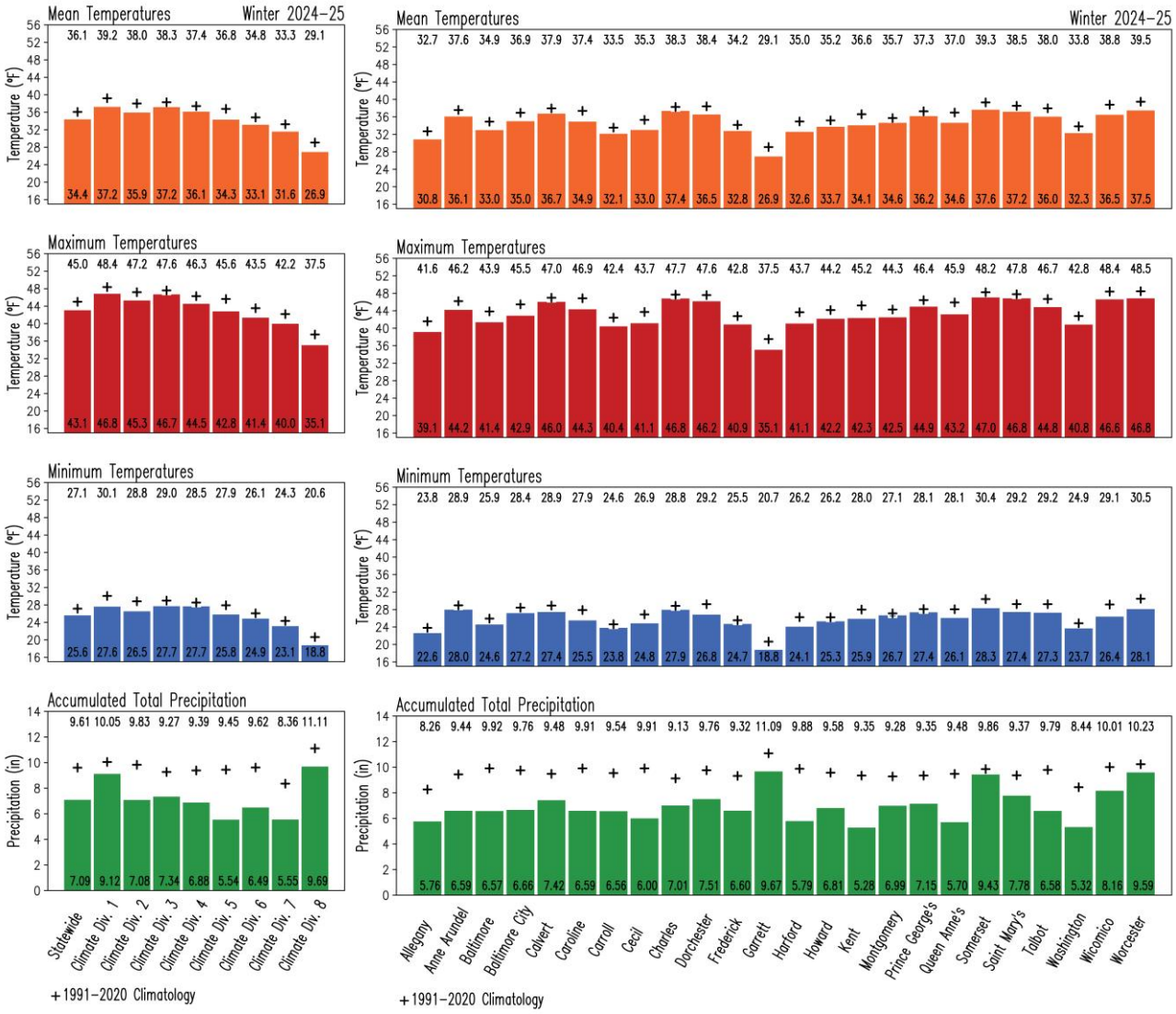

Figure B1. Seasonal surface variables in Maryland for winter 2024-25. Color bars represent the variables as follows: mean surface air temperature (orange), maximum surface air temperature (red), minimum surface air temperature (blue), and accumulated total precipitation (green) at statewide and climate division (left column), and at 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 winter 2024-25. For comparison, the corresponding 1991-2020 climatological values for winter are displayed as black addition signs, and their magnitudes are shown at the top of the panels.

B. Temperature and Precipitation Anomalies

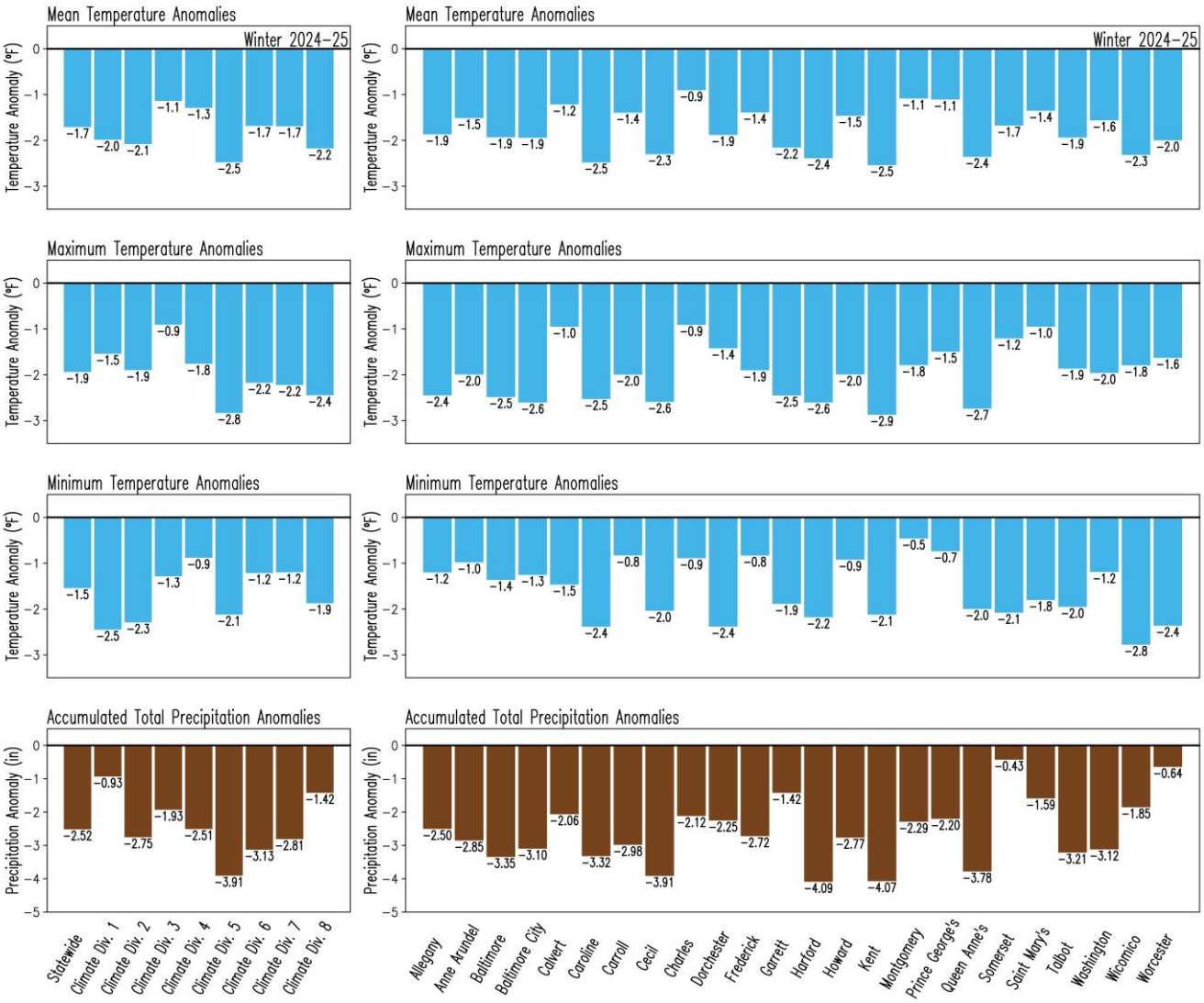

Figure B2. Anomalies of the seasonal surface variables in Maryland for winter 2024-25. Anomalies are with respect to the 1991-2020 climatology. The blue color represents colder than normal anomalies for mean surface air temperature (upper row), maximum surface air temperature (second row from top), and minimum surface air temperature (third row from top), while the brown color indicates drier than normal anomalies in accumulated total precipitation (bottom row) at statewide and climate division (left column), and at 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 winter 2024-25.

Appendix C. Winter 1991-2020 Climatology Maps and Winter 2024-25 Precipitation as Percentage of Climatology

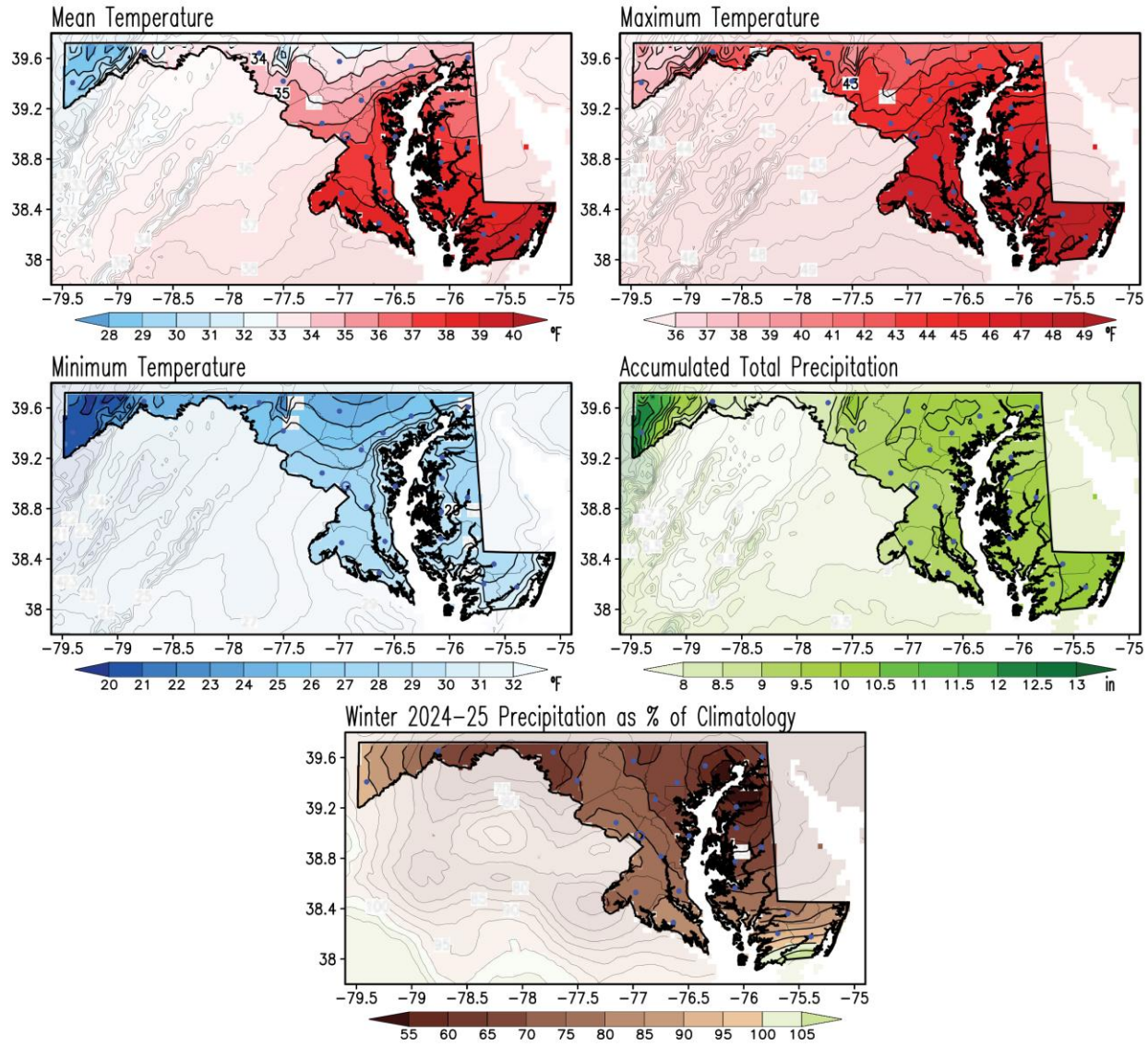

Figure C1. Winter climatology of the seasonal mean, maximum and minimum surface air temperatures, and accumulated total precipitation for the period 1991-2020 (upper and middle rows), and precipitation in winter 2024-25 as a percentage of climatology (bottom row). Temperatures are in °F, and precipitation is in inches according to the color bars. This is the current climate normal against which the winter 2024-25 conditions are compared to obtain the winter anomalies (from Figure 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: The Water Year 1991-2020 Climatology, and October 2024 – February 2025 as Percentage of Climatology

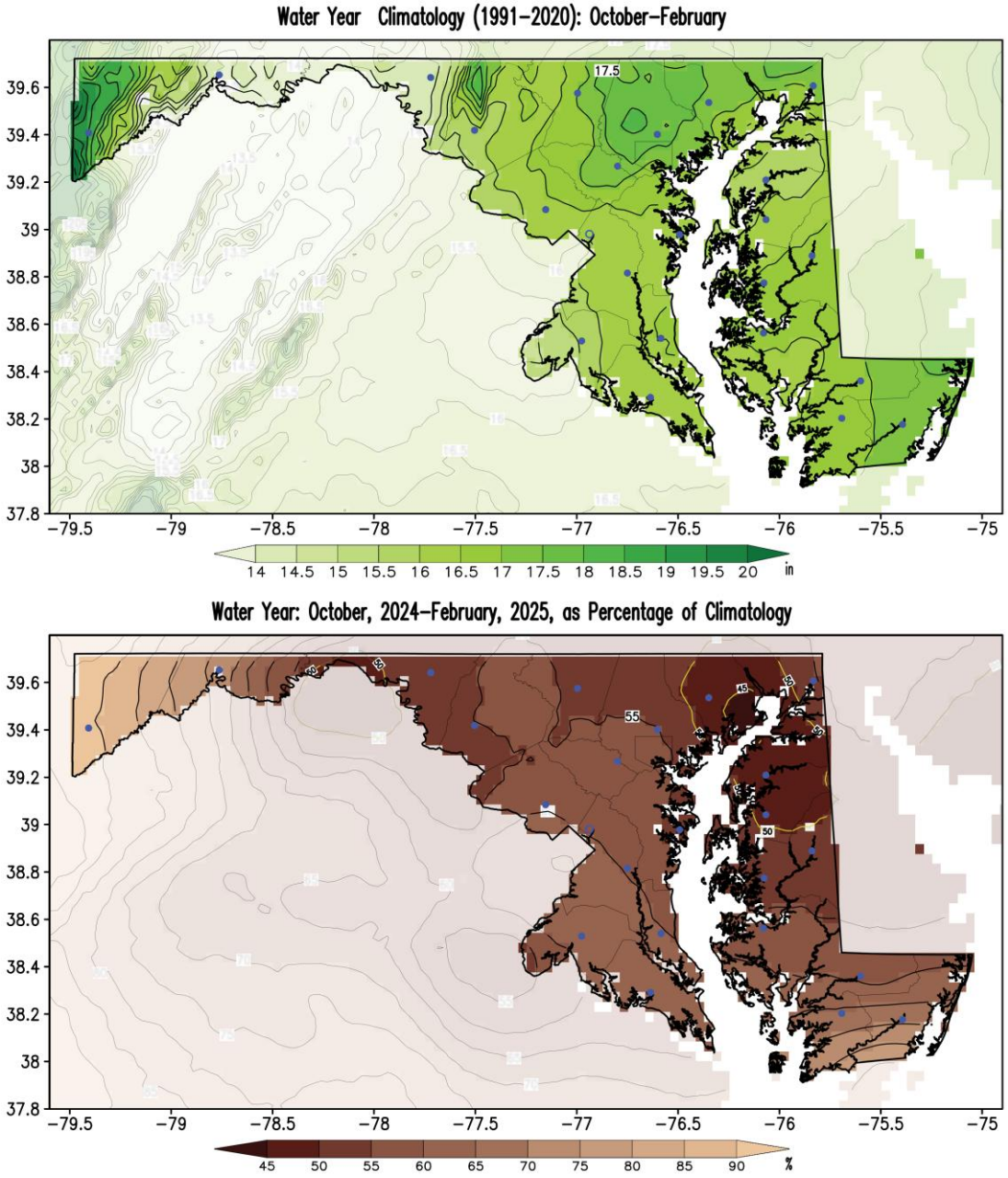

Figure D1. Climatology of the partial water year (October – February, top panel), and current partial water year (October 2024 – February 2025) as a percentage of the climatology (bottom panel). Climatology is for the period 1991-2020. The water year climatology is in inches, following the color bar. The current water year as a percentage of climatology is obtained by dividing the current water year (Figure 5 upper panel) by the climatology (upper panel) and multiplying the ratio by 100; hence, units are in percent (%). Brown shading in the percentage map highlights regions where the current water year is drier than normal, and yellow isolines show 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 E. Winter Standard Deviation and Winter 2024-25 Standardized Anomalies Maps

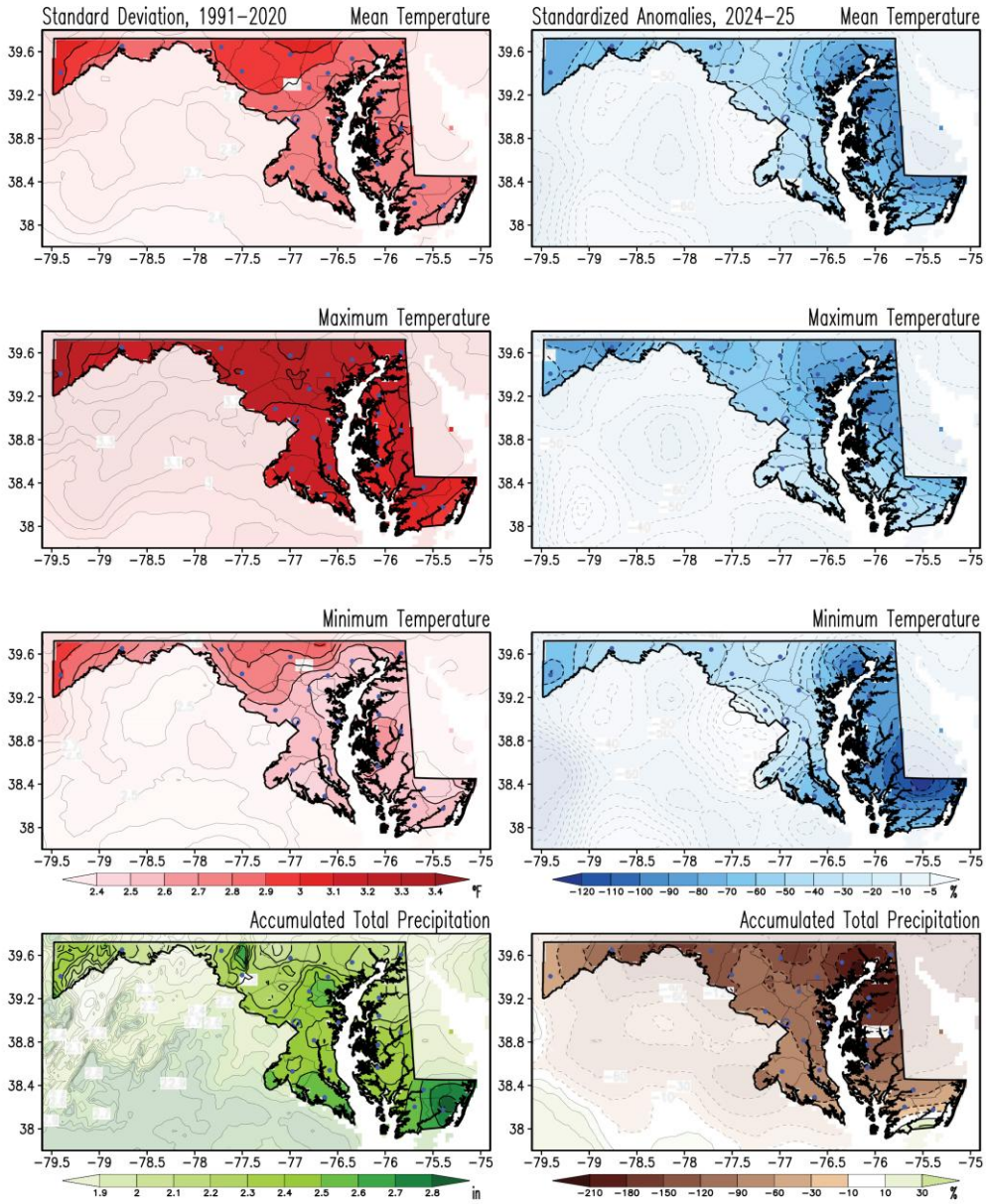

Figure E1. Standard deviation for winter and standardized anomalies of temperatures and precipitation for winter 2024-25. Standard deviations for seasonal mean, maximum, and minimum surface air temperatures and accumulated total precipitation were obtained for the 1991-2020 period (left column). Anomalies for winter 2024-25 (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 shading in the anomaly temperature maps marks colder 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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