Maryland Climate Bulletin Winter 2025-26

Prepared by
Dr. Alfredo Ruiz-Barradas
Maryland State Climatologist

This publication is available from:
https://mdsco.umd.edu/ClimateInfo/Bulletin.php

DEPARTMENT OF
ATMOSPHERIC &
OCEANIC SCIENCE
Sumant Nigam, Chair

Maryland
State
Climatologist
Office

Summary

Winter 2025-26 was colder and drier than normal (i.e., 1991-2020 averages) in Maryland, with these conditions persisting through December 2025, January, and February 2026. Regionally, winter mean temperatures were in the 26−36°F range, maximum temperatures were between 34 and 45°F, and minimum temperatures were in the 17−28°F range. Seasonal accumulated total precipitation was between 4.4 and 9.6 inches.

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

- The mean temperature was colder than normal in the entire state, especially in eastern Queen Anne's and Kent counties (4.4−4.6°F below), and parts of Harford, Cecil, Kent, Queen Anne's, Caroline, Talbot, Dorchester, and Worcester counties (4.0−4.4°F below).

- The maximum temperature was colder than normal across the state, too, notably in parts of Caroline, Queen Anne's, Kent, and Harford counties (4.5−4.8°F below), parts of Harford, Caroline, Talbot, Dorchester, Wicomico, and Calvert counties (3.9−4.5°F below), and parts of Baltimore and Anne Arundel counties (3.9−4.2°F below).

- The minimum temperature was also colder than normal across the state, particularly in Wicomico County (4.4−4.6°F below), Worcester, Somerset, and parts of Dorchester and Caroline counties (4.0−4.4°F below), and parts of Harford, Cecil, Kent, Queen Anne's, Caroline, Talbot, and Dorchester counties (3.8−4.0°F below).

- Precipitation was below normal in the entire state, notably over Garrett County (4.0–4.8 inches deficit), western Allegany County (3.6−4.0 inches deficit), and parts of Frederick, Montgomery, Carroll, Howard, Harford, Cecil, Kent, and Queen Anne's counties (3.2−3.6 inches deficit). Garret and Allegany counties received 40−44% less precipitation than normal for the month, while Frederick, Montgomery, Carroll, Howard, Harford, Cecil, Kent, and Queen Anne's counties got between 36 and 40% less than normal.

- The partial water year (October 2025 − February 2026) has been marked for below normal precipitation since October 2025, so it was below normal throughout the state, notably over the shared region of Frederick, Carroll, Montgomery, and Howard counties, and over southern Harford County (6.8−7.6 inches deficit), and Kent and Queen Anne's counties (6.4−6.8 inches deficit). These regions received between 40 and 46% less water than their climatological amount. The regions with less water deficit are southern Garrett County, eastern Caroline and Dorchester counties, and parts of Somerset and Worcester counties (28−32% less water than normal).

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

- All eight climate divisions experienced colder-than-normal conditions this winter 2025-26; Climate Division 5, Northeastern Shore, had the largest deviation from normal (4.4°F below), and Climate Division 8, Allegheny Plateau, had the smallest (2.2°F below). All climate divisions had drier-than-normal conditions this winter; Climate Division 8 had

the largest departure from normal (4.36 inches deficit), and Climate Division 2, Central Eastern Shore, had the smallest (1.75 inches deficit).

- Seasonally, statewide temperature anomalies have trended colder since summer 2025. Following a slightly warmer-than-normal summer (0.7°F) and fall (0.2°F), winter 2025-26 saw colder-than-normal conditions (3.5°F below). Statewide precipitation anomalies have been drier than normal since summer 2025. Following a relatively dry summer (1.36 inches deficit), the dry conditions intensified in the fall (4.78 inches deficit) and continued through the winter (2.79 inches deficit).

Historical Context (Figure 8, Tables A1 and A2)

- Statewide mean, maximum, and minimum temperatures this winter (32.5, 41.4, and 23.7°F) were below their long-term (1896-2025) averages (34.3, 43.2, and 25.4°F), but very far from their coldest records of 26.7, 35.5, and 17.9°F, established in 1918. The statewide precipitation for this winter (6.82 inches) was below the long-term average (9.49 inches) and within 10% of the driest values (6.92 inches and below), but far from the driest winter on record, which was 4.75 inches in 2002.

- Statewide mean, maximum, and minimum temperatures indicated this winter was the thirty-fourth, thirty-ninth, and thirty-fourth coldest winter since 1895-96, respectively. This winter ranked among the top twenty coldest in a few counties since 1895-96. Mean temperatures placed it as the twenty-seventh coldest for Kent and Queen Anne's counties, which also experienced their twenty-second and twenty-fifth coldest maximum temperatures, respectively. Regarding minimum temperatures, this winter was the twenty-first coldest in Wicomico County and the twenty-third in Somerset and Worcester counties.

- Statewide precipitation showed that winter 2025-26 was the twelfth driest winter on record. This winter ranked among the top twenty driest in thirteen counties, and among the top ten driest in six since 1895-96. It was the tenth driest in Allegany and Frederick counties, the ninth driest in Garrett, Harford, and Kent counties, and the eighth driest in Carroll County.

Century-Plus Trends, 1896-2026 (Figures 9, 10)

- Statewide mean temperature and heating degree days showed significant trends: a warming trend (3.1°F/century), and a decreasing heating trend (−286.4°FDD/century). On the other hand, precipitation and the partial water year (October 2025 to February 2026) showed non-significant trends: a negligible drying trend (−0.02 in/century) and a small increasing water year trend (1.00 in/century), respectively.

- Regionally, winter mean temperatures showed significant warming trends throughout the state. The largest trends were identified in northern Harford and Cecil counties (3.4–3.6°F/century), southern Frederick and northern Montgomery counties, western Baltimore City and southwestern Baltimore County (3.4°F/century), and the rest of the counties in the Piedmont, and the counties in the Eastern Shore (3.0− 3.4°F/century).

- Regionally, accumulated total precipitation in winter displayed non-significant trends in the whole state with alternating regions of wetting and drying trends. The largest wetting trends were found over Garrett County, southwestern Baltimore County, and southern Somerset and Worcester counties (0.4–0.5 in/century). The largest drying trends were in Kent and Queen Anne's counties (−0.8 to −0.9 in/century).

Chesapeake Bay Sea Surface Temperatures (Figures 11, 12, F1)

- Sea surface temperatures in the Chesapeake Bay this winter were in the 36–48°F range. Regionally, temperatures were below their 2007-2020 mean across the Bay, especially in the Chincoteague Bay, Pocomoke and Tangier sounds, Eastern Bay, and at the mouth of the Choptank, Chester, Patapsco, and Back rivers, and in the northern portion of the Potomac River (3.6–3.9°F below). In general, the waters along the Eastern Shore had the largest departures from the mean (3.0–3.9°F below). The winter 2025-26 all-basin mean temperature of 37.9°F was below the 20-year (2007−2026) mean of the dataset (41.1°F) but close to the coldest winter temperature on record of 37.4°F, set in 2011. However, the Upper Basin (35.4°F) and Middle Basin (36.1°F) experienced their coldest winter since 2007.

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 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 seasonal surface climate conditions, situating them within 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 2025-26 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 the partial water year conditions for the state in Section 3. Statewide and climate division averages for the season are compared using scatter plots in 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. Seasonal sea surface temperatures (SST) in the Chesapeake Bay are presented in Section 7. Ancillary statewide, climate division, and county-level information is provided via tables and plots in Appendices A and B; climatology and variability maps are included in Appendices C-E; mean and variability of the sea surface temperatures in the Chesapeake Bay are displayed in Appendix F.

2.   Data and Methods

Surface air temperatures, total precipitation, and heating 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 from 1895 to the present at: https://www.ncei.noaa.gov/data/nclimgrid-monthly/access/
  Data was downloaded on March 10, 2026.

- NOAA Monthly U.S. Climate *Divisional* Dataset (NClimDiv – Vose et al., 2014). It is available in a preliminary status from 1895 to the present (v1.0.0-20260205) at: https://www.ncei.noaa.gov/pub/data/cirs/climdiv/
  Data was downloaded on March 9, 2026.

Data and sources for the Chesapeake Bay are the following:

- Satellite-based sea surface temperatures from NOAA's CoastWatch Program. The data was made available by the Program's East Coast Node. This satellite-based sea surface temperature data uses data from the Advanced Very High Resolution Radiometer (AVHRR) on the European MetOp satellites, and the Visible Infrared Imaging Radiometer Suite (VIIRS) on the U.S. SNPP and NOAA JPSS satellites. In creating this product, nighttime overpasses for the U.S. East Coast are used, thereby avoiding daytime solar heating of the ocean surface and the associated warm bias in the data. In particular, the product acquired is the monthly sea surface temperatures for the Chesapeake and Delaware Bays, with a nominal horizontal resolution of 750 m. Please be advised that although a seasonal resolution version of the data set exists at the East Coast Node, for consistency with the analysis of surface atmospheric parameters in this Bulletin, the monthly version was preferred to derive the seasonal version of the data set in-house, as the seasonal resolution of the data at the East Coast Node was obtained from daily resolution data. It is available from 2007 to the present at: https://eastcoast.coastwatch.noaa.gov/data/avhrr-viirs/sst-ngt Data was downloaded on March 2, 2026.

- A shapefile of watersheds for the state from the Maryland Department of the Environment and the Department of Natural Resources: the Maryland Watersheds – 8 Digit Watersheds. It contains 138 separate watersheds, identified with an 8-digit numeric code from which three are on the main steam of the Chesapeake Bay: the Upper Chesapeake Bay (code: 02139996; from the mouth of the Susquehanna River to northern side of the mouth of the Gunpowder River), the Middle Chesapeake Bay (code: 02139997; from the Gunpowder River to the mouth of the Chester River), and the Lower Chesapeake Bay (code: 02139998; from the south side of the mouth of the Chester River to the mouth of the Potomac River), which in turn are used to create a one-watershed shapefile for the entire basin. These four watersheds are used to create area-averaged sea surface temperatures for the Bay. It is available at: https://data.imap.maryland.gov/datasets/maryland::maryland-watersheds-8-digit-watersheds/about

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 over 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 long-term average of weather elements. 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 average 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 because 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 simply the climatology, is defined for the period 1991–2020.

It should be noted that the satellite-based sea surface temperature data set has a short temporal coverage of 20 years, from 2007 to the present, which prevents the calculation of its current climate normal (1991-2020). In this case, a 2007-2020 mean is used as a base of comparison in the calculation of anomalies. This will be referred to as the 2007-2020 mean and not as a climatology. Because of the short record, the winter of 2007 is calculated as the mean of the two months of January and February 2007; this was preferred over using one fewer year in the winter climatology.

About the anomalies: Anomalies for a given season (e.g., winter 2025-26) 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 a negative anomaly. In the case of the sea surface temperature anomalies, they are calculated with respect to their 2007-2020 mean.

About variability. The seasonal standard deviation of a climate variable measures its dispersion relative to its seasonal 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 2026 started in October 2025 and will end in September 2026. 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 2025 to February 2026, 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
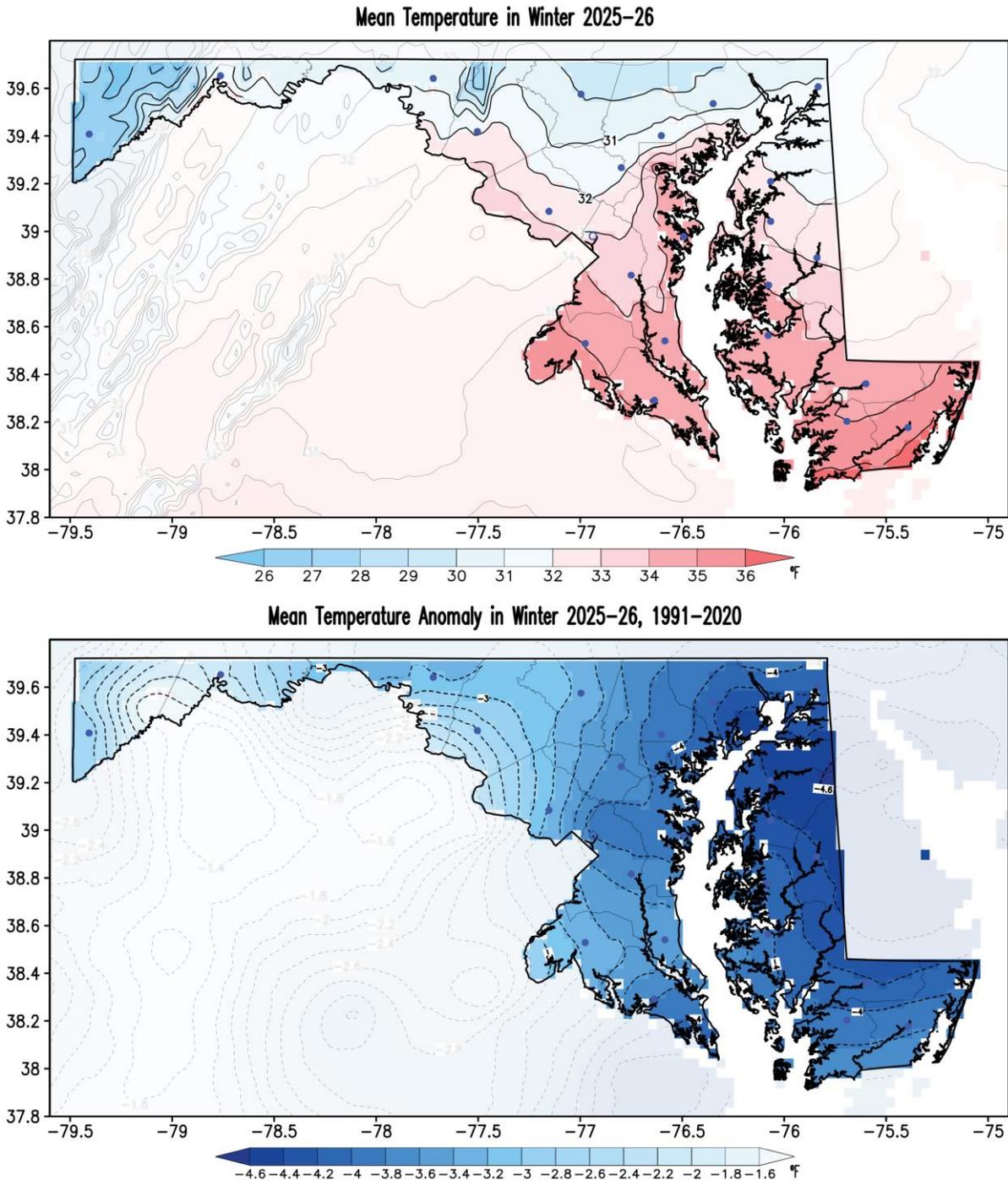
portion of 6 include the *Upper Coastal Plain Province*, and Climate Divisions 1, 2, 5, and a portion of 6 include the *Lower Coastal Plain (or Atlantic Continental Shelf) Province*.
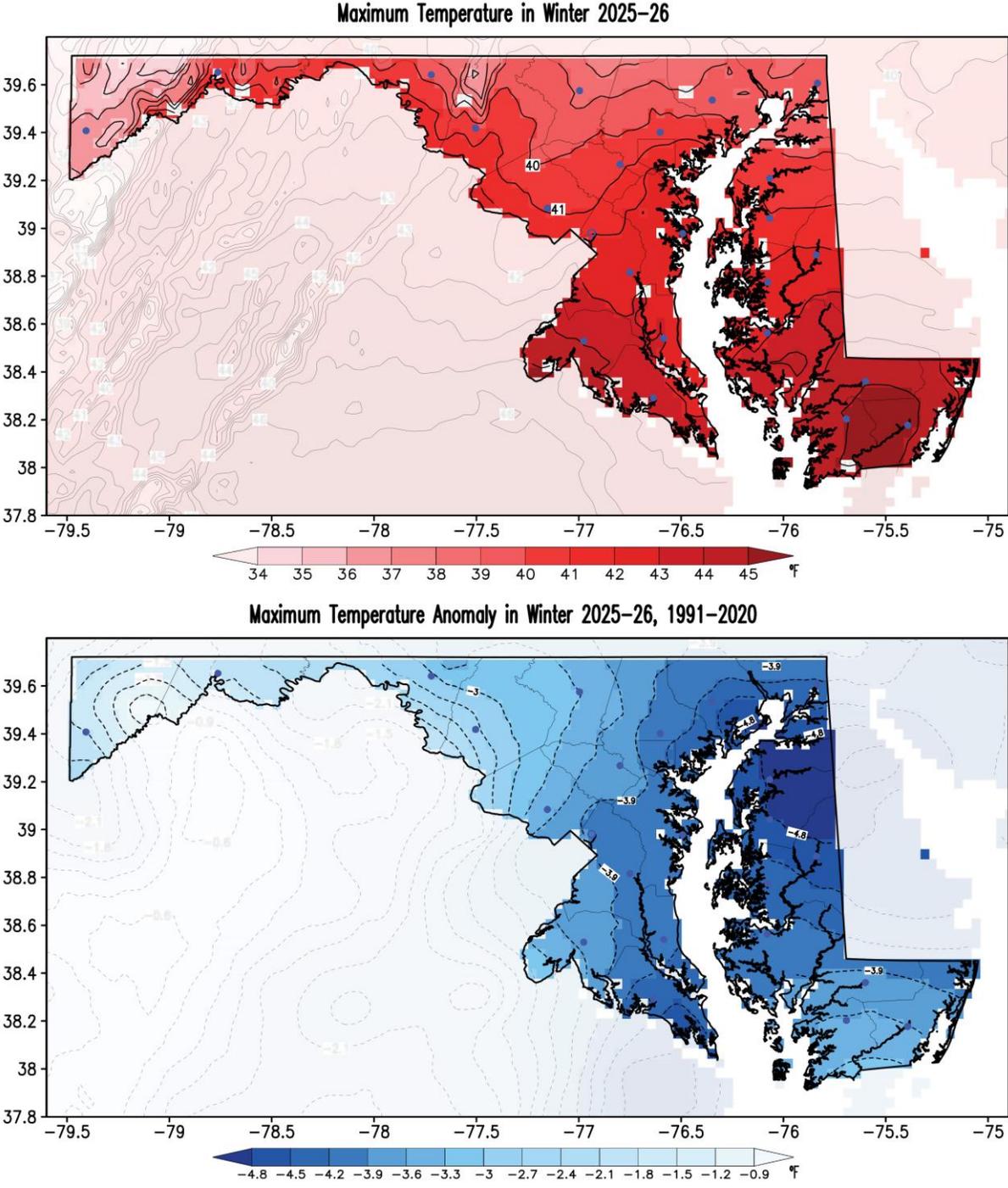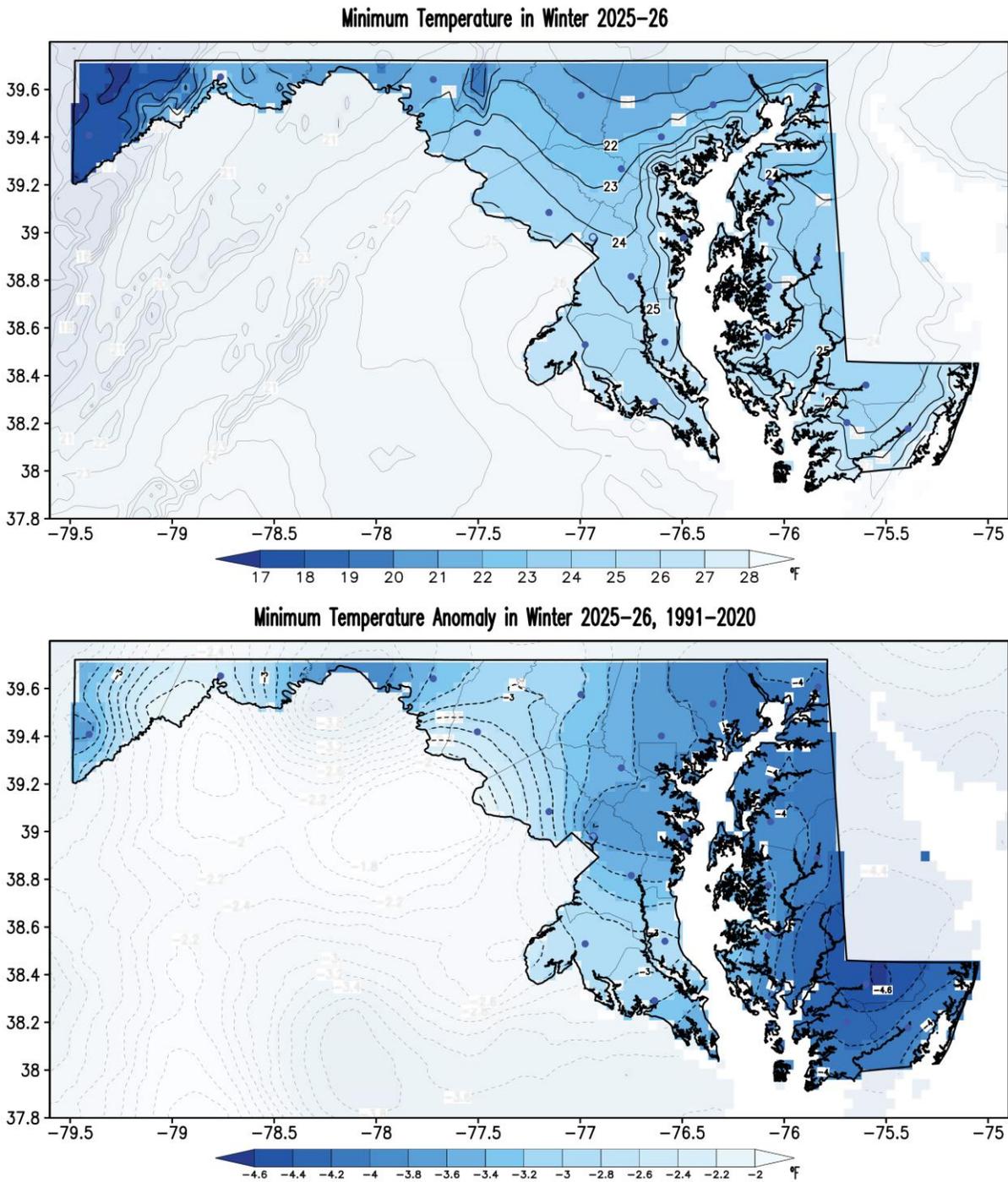
3.   Winter 2025-26 Maps

A.   Mean Temperatures
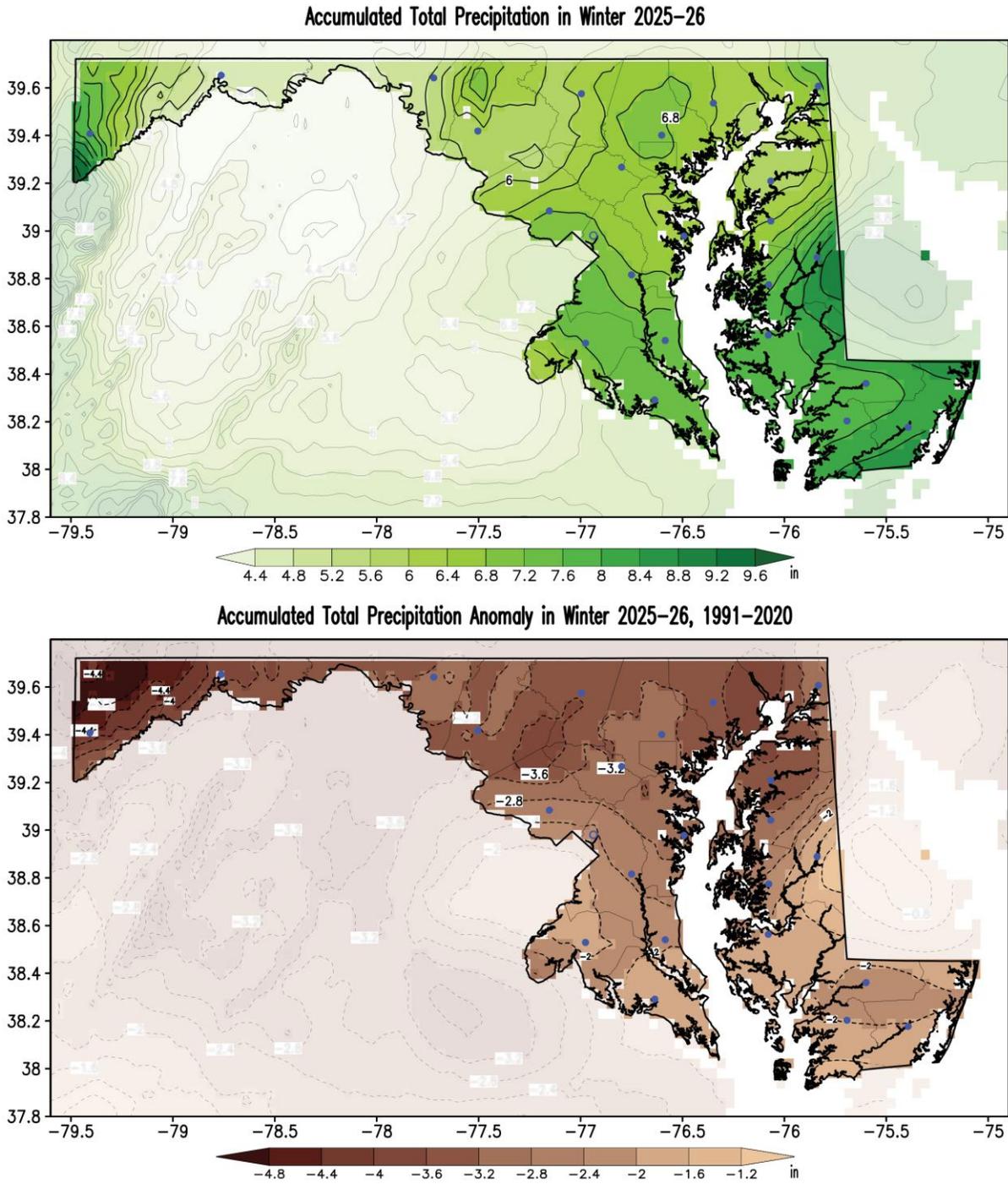

Figure 1. Seasonal mean surface air temperature (top panel) and its anomaly with respect to the 1991-2020 climatology (bottom panel) for winter 2025-26. Temperatures are in °F following the color bar. Blue/red shading in the temperature map shows temperatures below/above 32°F. Blue shading in the anomaly map marks colder-than-normal conditions. Note shading outside the state has been washed out to facilitate focus 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 2025-26. 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 focus 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 2025-26. 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 focus on Maryland. Filled blue circles mark the county seats.
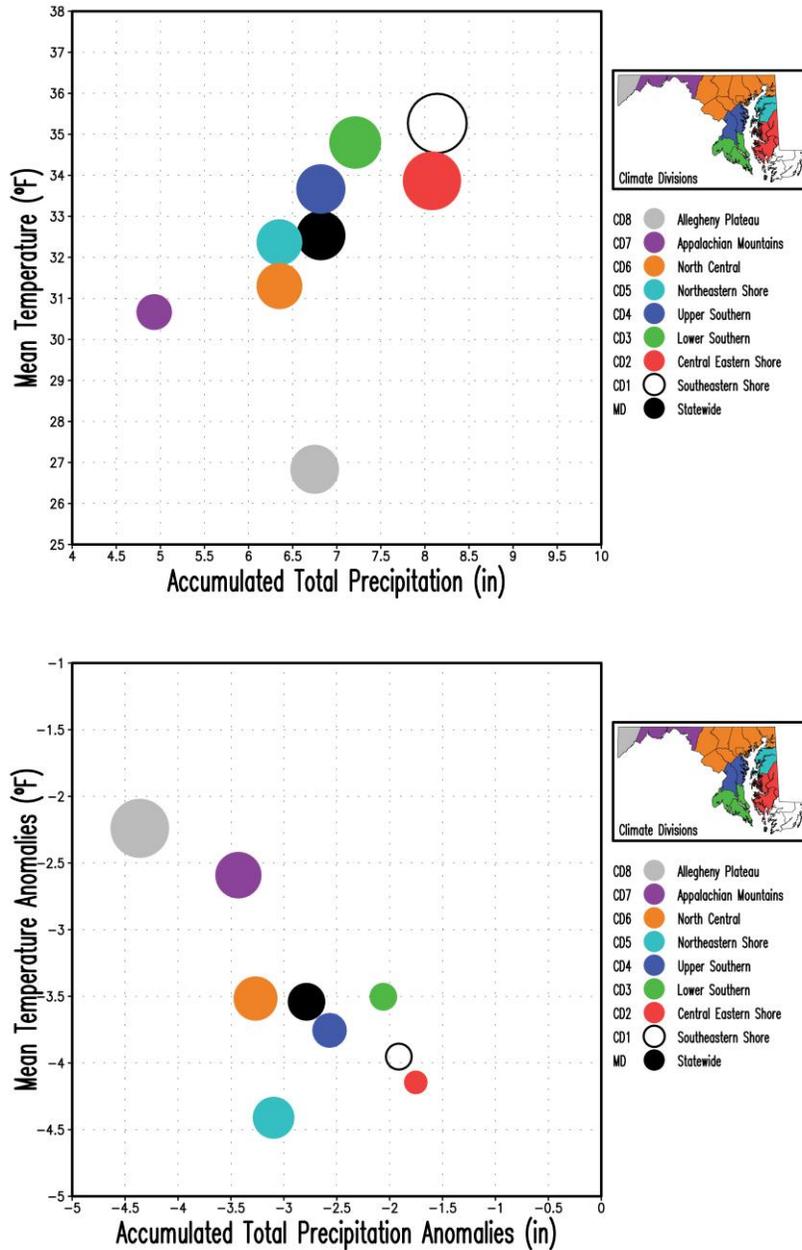
D.   Precipitation

Accumulated Total Precipitation in Winter 2025−26

Accumulated Total Precipitation Anomaly in Winter 2025−26, 1991−2020

Figure 4. Seasonal accumulated total precipitation (top panel) and its anomaly with respect to the 1991-2020 climatology (bottom panel) for winter 2025-26. Precipitation is in inches following the color bar. Brown shading on the anomaly map indicates drier-than-normal conditions. Note shading outside the state has been washed out to facilitate focus on Maryland. Filled blue circles mark the county seats.

Maryland State Climatologist Office – MDSCO

E.   Water Year (October 2025 – February 2026)
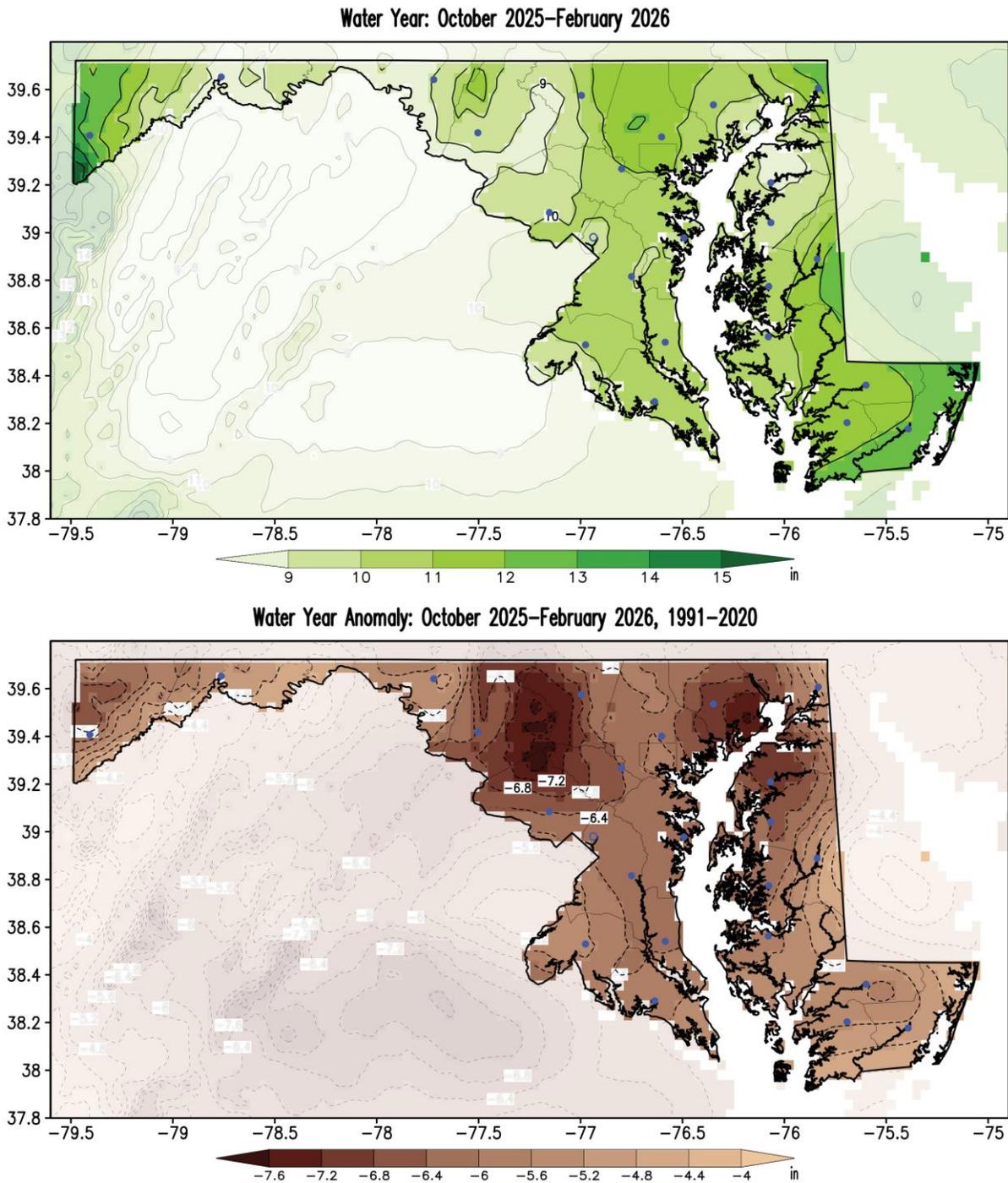
Figure 5. Partial water year until February 2026 (top panel), and its anomaly with respect to the 1991-2020 climatology (bottom panel). Water year is in inches following the color bar. Brown shading in the anomaly map marks drier-than-normal conditions. The current maps display the partial conditions from October 2025 to February 2026. Note shading outside the state has been washed out to facilitate focus on Maryland. Filled blue circles mark the county seats.

4. Winter 2025-26 and Summer 2025 – Winter 2025-26 Climate Divisions Averages

A. Winter 2025-26 Scatter Plots

Figure 6. Scatter plots of Maryland (statewide) and Climate Divisions (CD#) seasonal mean surface air temperature vs. accumulated total precipitation for winter 2025-26. 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 (8.14 inches in CD1, top panel) and by the maximum precipitation anomaly (|−4.36| inches in CD8, bottom panel) among the nine regions. Note that the color of the filled circles corresponds to the color of the Climate Divisions on the inset map.

B.   Summer 2025 to Winter 2025-26 Scatter Plots
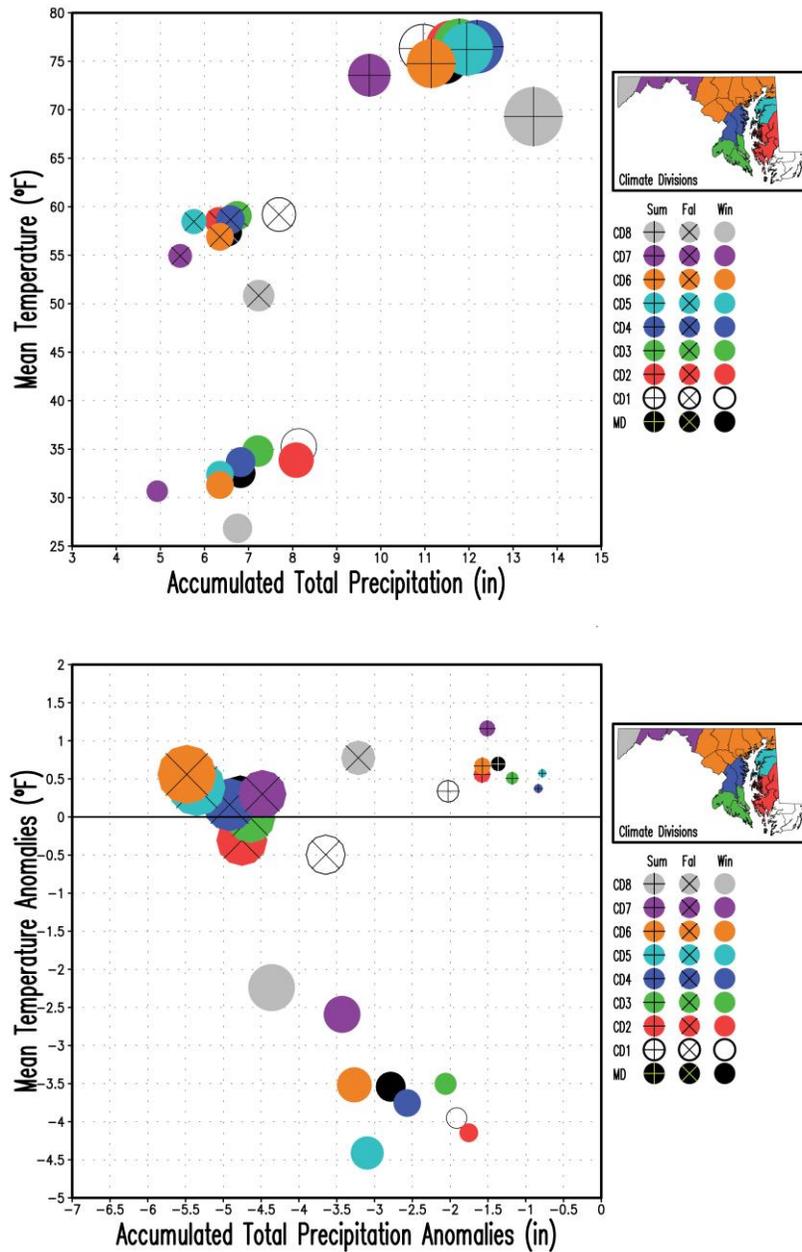
Figure 7. Scatter plots of Maryland (statewide) and Climate Divisions (CD#) seasonal mean surface air temperature vs. accumulated total precipitation for summer, fall 2025, and winter 2025-26. The upper panel shows the mean temperature and total precipitation, and the bottom panel displays their anomalies 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 (13.46 inches in CD8 in summer, top panel) and by the maximum precipitation anomaly (|–5.48| inches in CD6 in fall, bottom panel) among the nine regions and three months. Winter 2025-26 is displayed with filled circles only, while fall and summer 2025 are displayed with superposed multiplication and addition signs, respectively.

5. Winter 2025-26 Statewide Averages in the Historical Record

A. Box and Whisker Plots
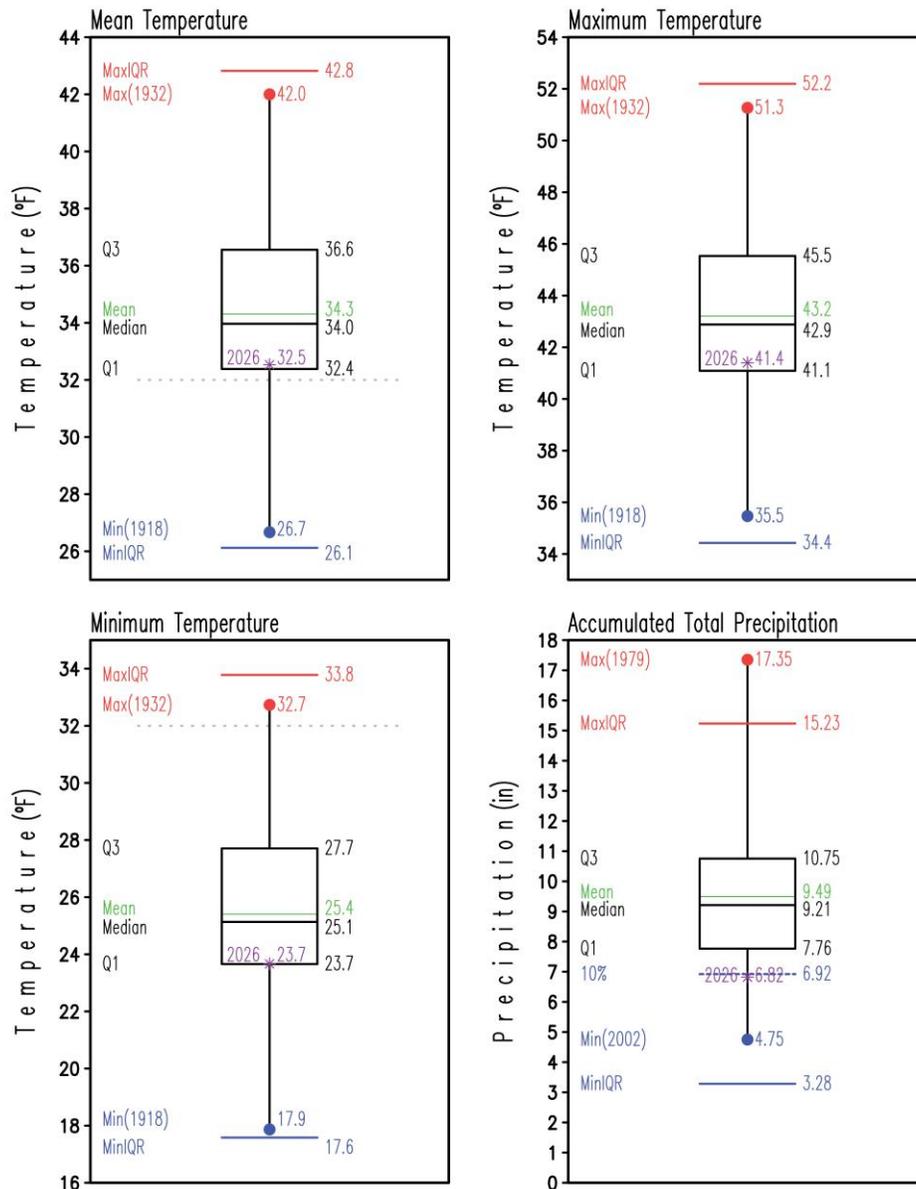
Figure 8. Box and Whisker plots of Maryland (statewide) seasonal mean (upper left), maximum (upper right), minimum (lower left) surface air temperatures, and accumulated total precipitation (lower right) for winter for the period 1896-2025. Conditions for winter 2025-26 are represented by the label and asterisk in purple. Statistics for the period 1896-2025 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. For reference, the 32°F temperature is displayed with a horizontal dotted, gray line, and the 10 percentile for precipitation is displayed with a horizontal dashed, blue 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.
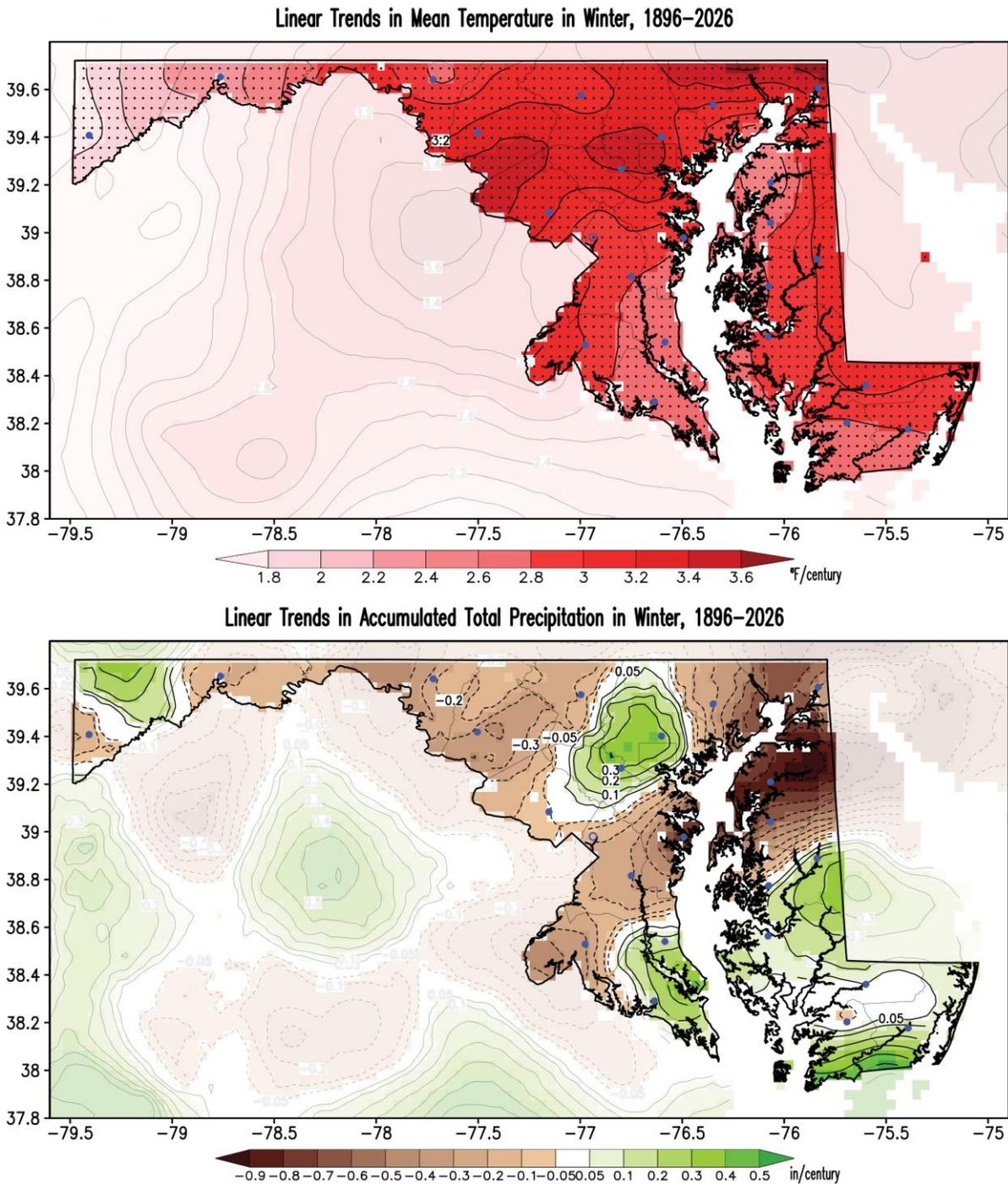
6.   1896-2026 Winter Trends

A.   Statewide Mean Temperature, Heating Degree-Days, Accumulated Total Precipitation, and Partial Water Year (October−February)
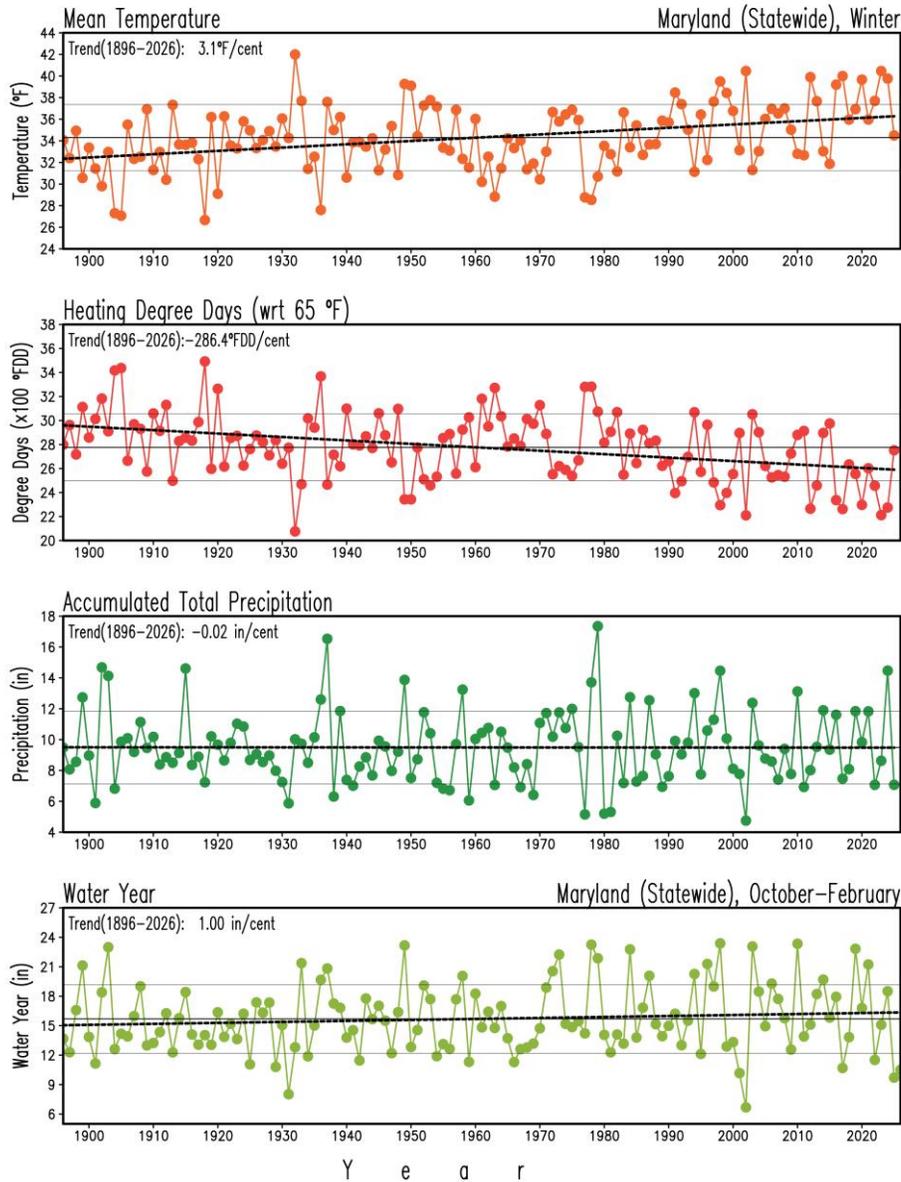
Figure 9. Maryland (statewide) mean surface air temperature, heating degree-days, accumulated total precipitation in winter, and partial water year (October – February) for the period 1896-2026. Temperature is in °F, heating degree-days is in °F degree-days (°FDD), and precipitation and water year are in inches. The thin, continuous black lines in each panel display the long-term means (34.3°F, 2775.3°FDD, 9.49 in, and 15.69 in, 1896-2026), and the double thin, continuous gray lines indicate the standard deviation (3.1°F, 278.2°FDD, 2.36 in, and 3.50 in) above/below the long-term mean. The thick dashed black lines show the long-term linear trends. The warming temperature trend (3.1°F/century), the decreasing heating degree-days trend (−286.4°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 (1.00 in/century) .

B.   Temperature and Precipitation Maps

Figure 10. Linear trends in winter surface air mean temperature and accumulated total precipitation for the period 1896-2026. Temperatures are in °F/century, and precipitation is in inches/century following the color bars. Red shading in the temperature map marks warming trends. Green/brown shading in the precipitation map shows wetting/drying 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 focus on Maryland. Filled blue circles mark the county seats.

7. Chesapeake Bay's Satellite Sea Surface Temperatures

A. Winter 2025-26 Maps
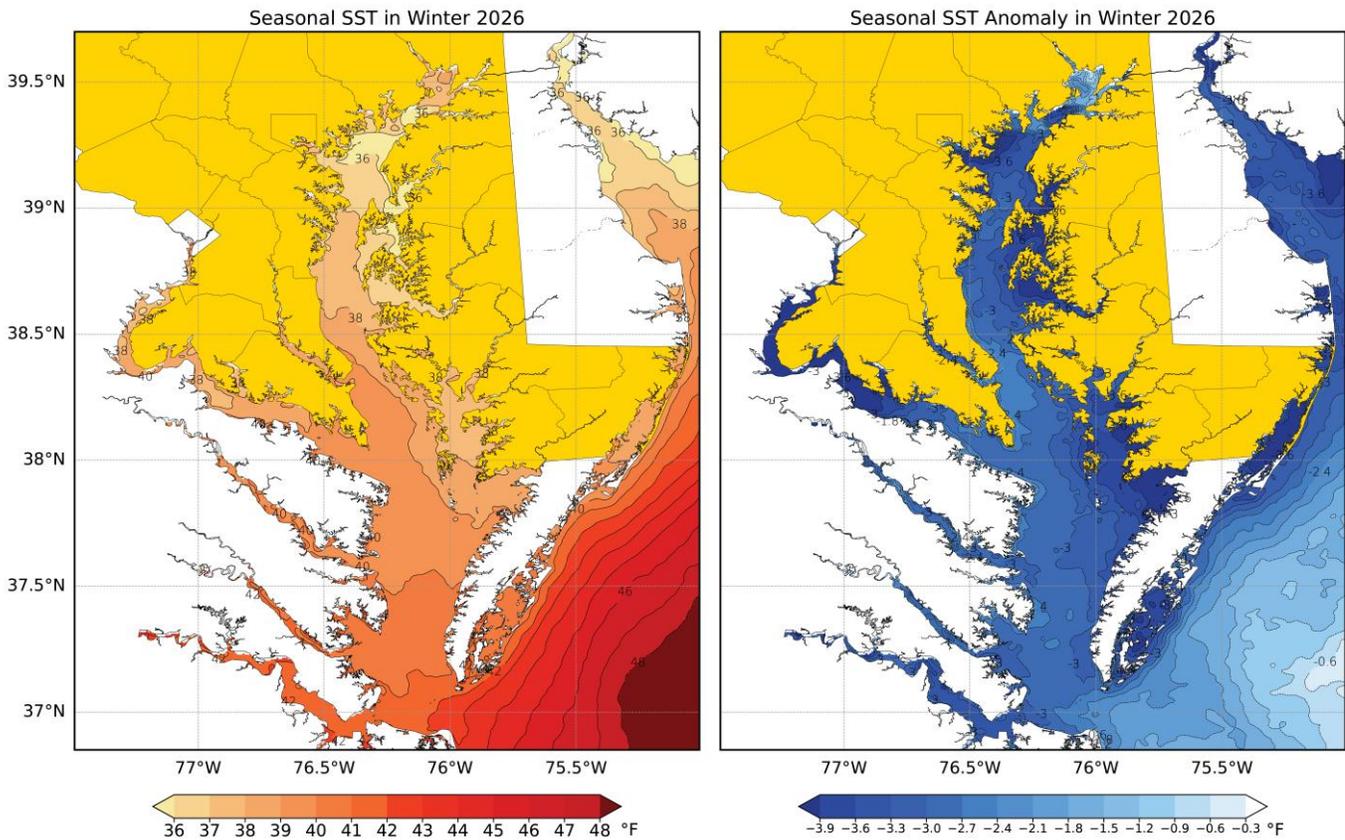
Figure 11. Seasonal sea surface temperature (left panel) and its anomaly (right panel) in the Chesapeake Bay and surrounding coastal areas in winter 2025-26. Temperatures are in °F following the color bar. Blue shading in the anomaly map marks colder temperatures than the 2007-2020 mean. For clarity, the temperatures and their anomalies have been smoothed using a 9-point spatial smoother applied four times. Note that Maryland has been shaded yellow to facilitate focus on the state waters. Please refer to the January and February monthly bulletins to see the distribution of maximum sea ice concentration in the Bay on January 29, February 4, and 9 (from the U. S. National Ice Center). Be aware that the NOAA Chesapeake Bay Office (NCBO) develops seasonal summaries of water quality parameters in the Chesapeake Bay, and that a map of seasonal sea surface temperature anomalies using the same multi-sensor satellite set is also included. Differences with the NCBO's map arise due to differences in the units (°F here vs. °C there), in the mean to be subtracted from the temperatures of the season (2007-2020 here vs. 2007-2024 there), the spatial smoothing here (and none there), and the way the seasonal temperatures are obtained (from monthly temperature here vs. daily temperatures there).

B.   Upper, Middle, Lower, and Entire Basins Averages in Winter
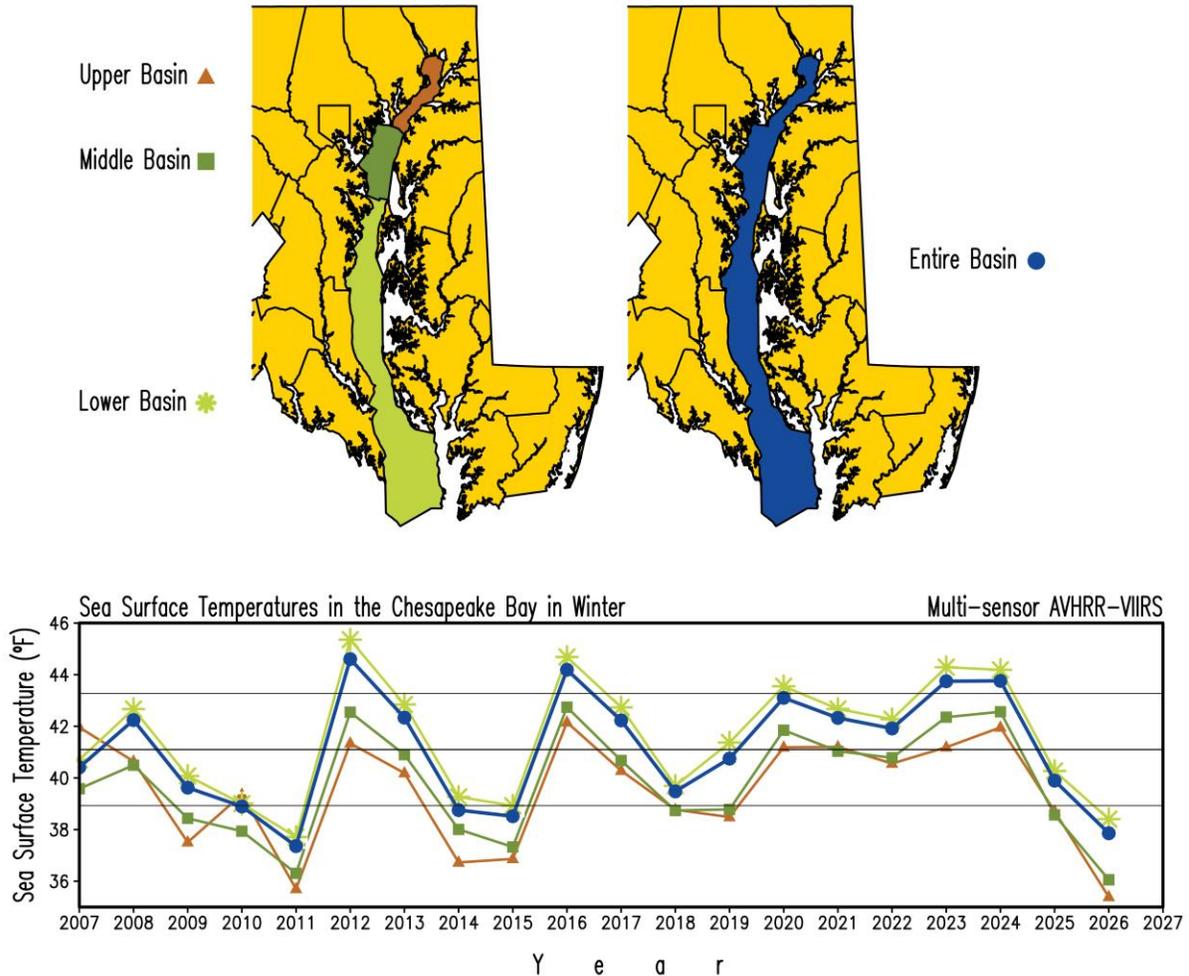
Figure 12. Watersheds in the Chesapeake Bay (top panel) and their area-averaged sea surface temperatures in winter for the period 2007-2026 (bottom panel). Temperatures are in °F. The color of the lines corresponds to the color of the watersheds in the Bay, as indicated on the maps: Brown for the Upper Bay, dark green for the Middle Bay, light green for the Lower Bay, and Navy Blue for the Entire Bay. The mean temperature for the Entire basin in winter 2025-26 was 37.9°F, while for the Upper, Middle, and Lower basins was 35.4, 36.1, and 38.4°F, respectively. The thin, continuous black line in the lower panel displays the 2007-2026 mean for the Entire Basin (41.1°F), and the double thin, continuous gray lines indicate the standard deviation (2.2°F) above/below the long-term mean. The 2007-2026 mean temperatures for the Upper, Middle, and Lower basins in winter were 39.5, 39.8, and 41.5°F, respectively, while their standard deviations were 2.1, 2.1, and 2.2°F, respectively. For consistency with the analysis of the atmospheric variables, the seasonal time series are obtained from the monthly time series.

Appendix A. Winter 2025-26 Tables: Statewide, Climate Divisions, and Counties

A. Mean Temperature and Precipitation

Region	Mean Air Temperature (°F)	Rank (#)	Region	Acc. Total Precipitation (in)	Rank (#)
Statewide	32.5	34	Statewide	6.82	12
Climate Division 1	35.3	30	Climate Division 1	8.14	32
Climate Division 2	33.9	29	Climate Division 2	8.08	36
Climate Division 3	34.8	36	Climate Division 3	7.21	27
Climate Division 4	33.7	30	Climate Division 4	6.82	18
Climate Division 5	32.4	27	Climate Division 5	6.35	13
Climate Division 6	31.3	38	Climate Division 6	6.35	10
Climate Division 7	30.7	53	Climate Division 7	4.93	10
Climate Division 8	26.8	51	Climate Division 8	6.75	9
Allegany	30.5	55	Allegany	4.56	10
Anne Arundel	33.7	29	Anne Arundel	6.51	12
Baltimore	31.1	34	Baltimore	6.71	13
Baltimore City	33.0	33	Baltimore City	6.78	18
Calvert	34.3	32	Calvert	7.38	25
Caroline	33.0	29	Caroline	8.35	42
Carroll	30.2	41	Carroll	6.12	8
Cecil	31.1	32	Cecil	6.58	14
Charles	35.0	38	Charles	7.00	26
Dorchester	34.4	29	Dorchester	7.93	33
Fredrick	31.3	51	Fredrick	5.99	10
Garrett	26.9	51	Garrett	6.74	9
Harford	30.8	29	Harford	6.35	9
Howard	31.7	39	Howard	6.37	12
Kent	32.2	27	Kent	6.00	9
Montgomery	32.7	46	Montgomery	6.37	17
Prince George's	33.6	35	Prince George's	7.02	30
Queen Anne's	32.6	27	Queen Anne's	6.48	13
Saint Mary's	34.7	31	Saint Mary's	7.46	30
Somerset	35.5	32	Somerset	8.04	34
Talbot	33.9	29	Talbot	7.54	24
Washington	30.9	49	Washington	5.28	12
Wicomico	34.6	28	Wicomico	7.97	29
Worcester	35.6	31	Worcester	8.31	34

Table A1. Seasonal mean surface air temperature (left) and accumulated total precipitation (right) in Maryland (statewide), climate division, and county levels for winter 2025-26. Temperatures are in °F, and precipitation is in inches. The rank is the position the variable for winter 2025-26 occupies among the 131 winters since the 1895-96 winter, after the 131 values have been arranged from lowest to highest using the *standard competition ranking method*. The closer to 131 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.
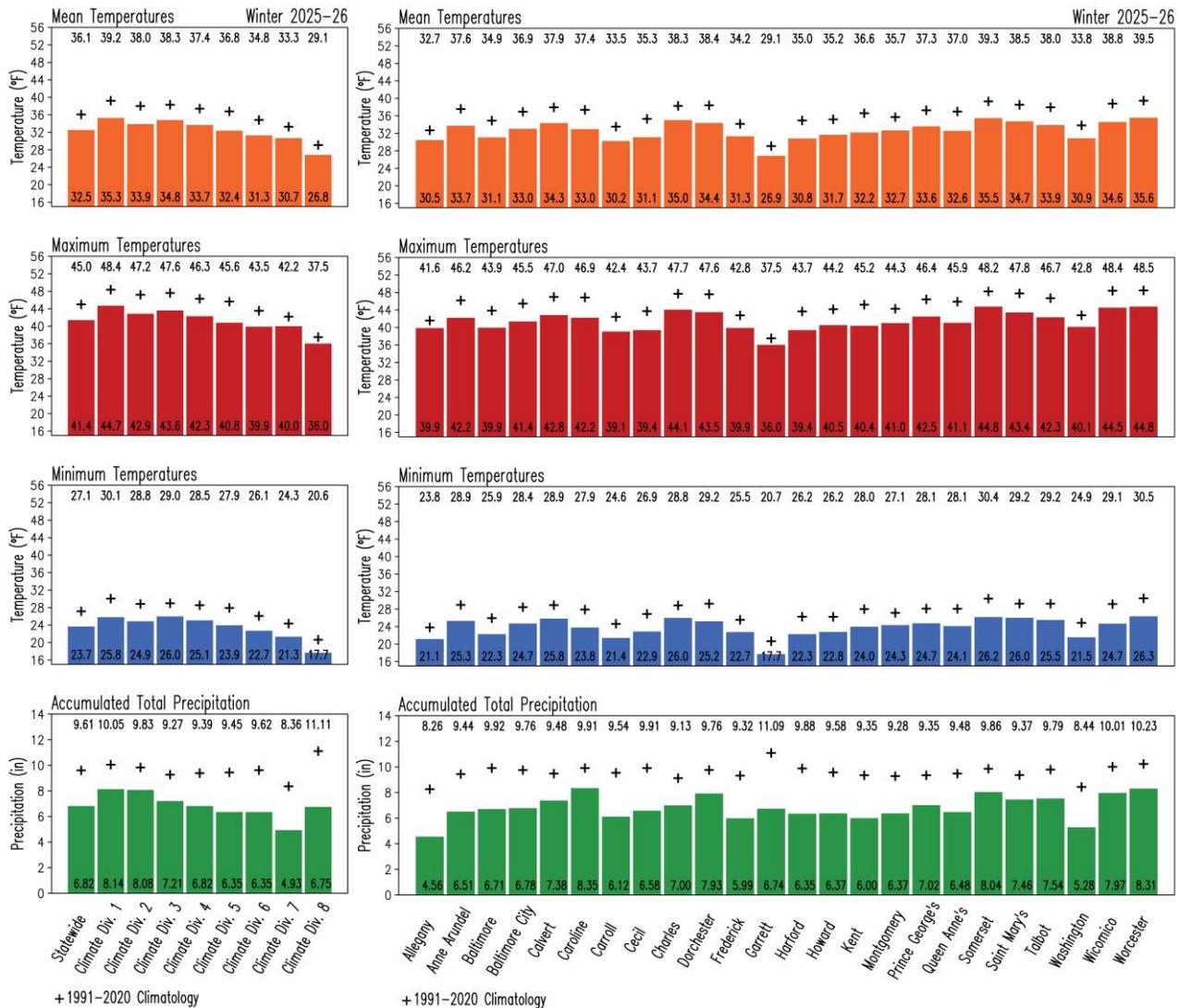
Appendix B. Winter 2025-26 Bar Graphs: Statewide, Climate Divisions, and Counties
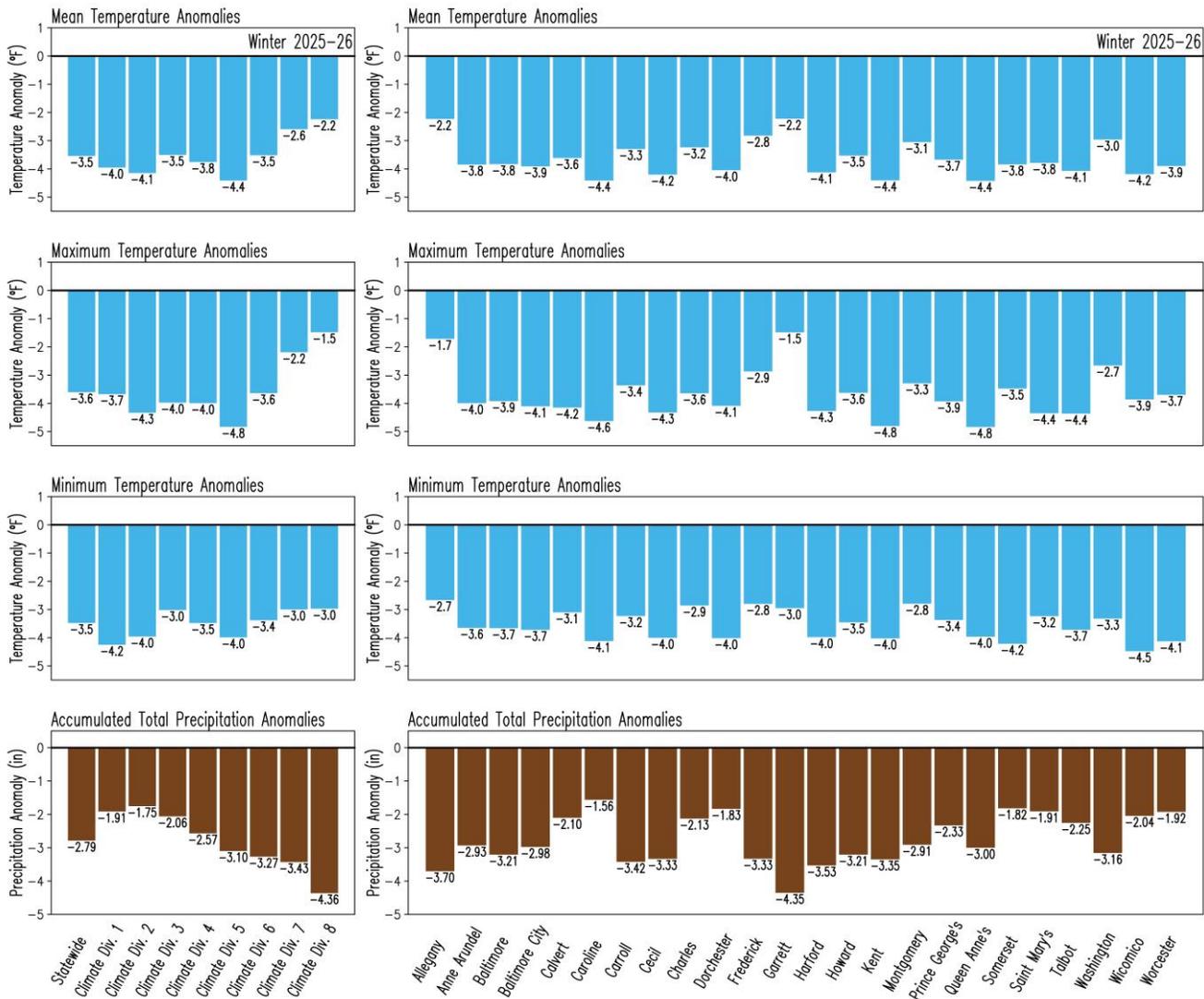
A. Temperatures and Precipitation

Figure B1. Seasonal surface variables in Maryland for winter 2025-26. 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 2025-26. 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.
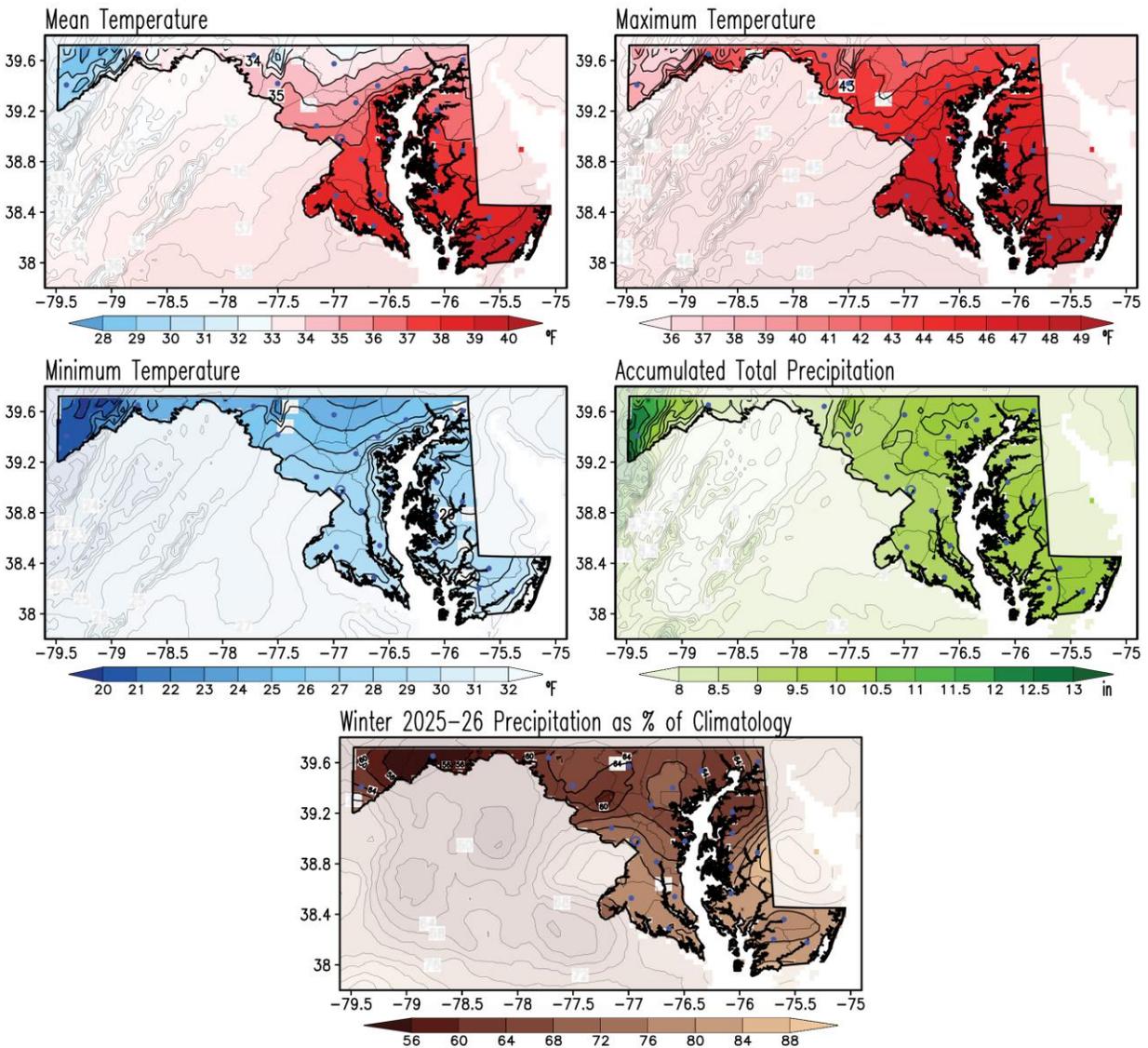
B.   Temperature and Precipitation Anomalies

Figure B2. Anomalies of the seasonal surface variables in Maryland for winter 2025-26. 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 2025-26.

Appendix C. Winter Climatology and Winter 2025-26 Precipitation as Percentage of Climatology Maps
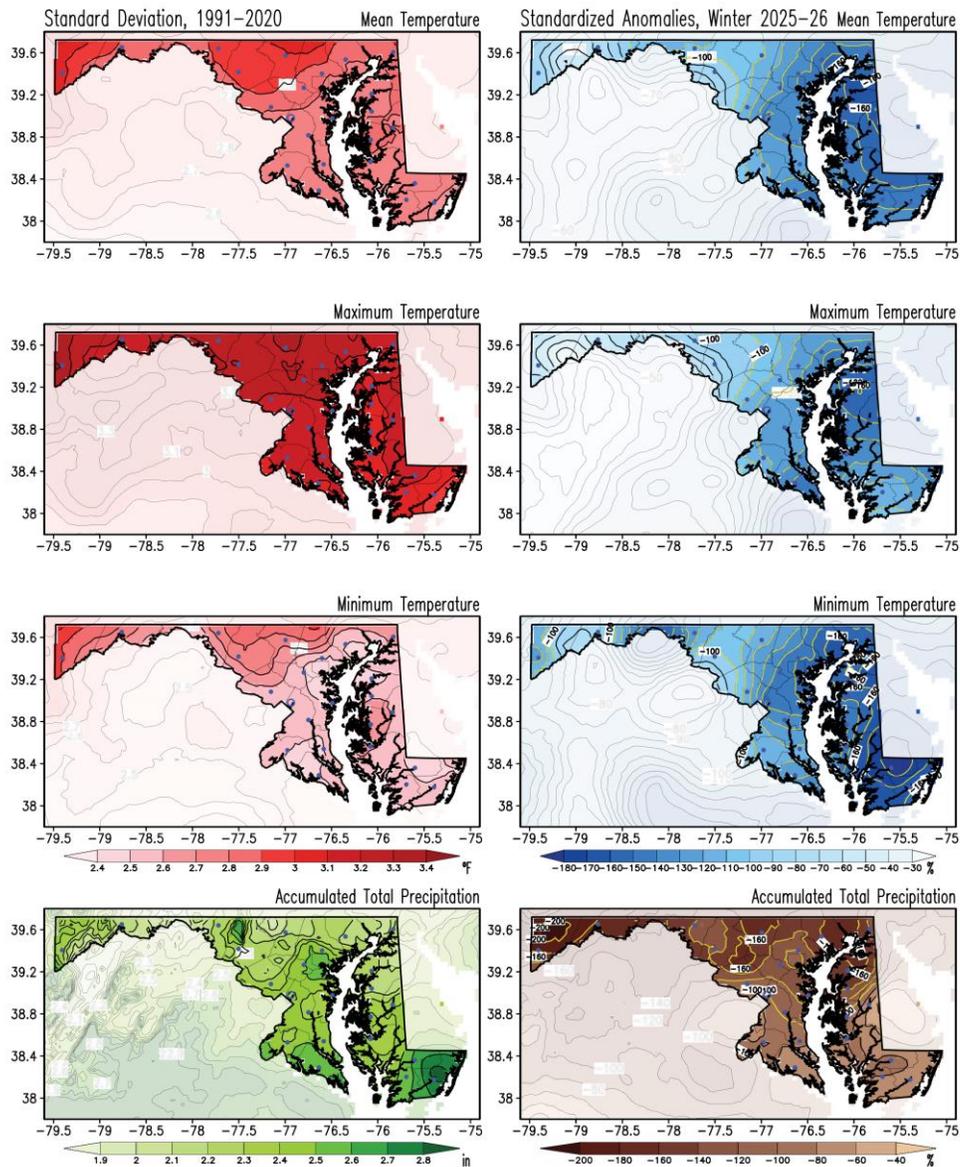

Figure C1. Winter climatology of the seasonal mean, maximum, and minimum surface air temperatures, and accumulated total precipitation for the period 1991-2020 (upper and middle rows), and precipitation in winter 2025-26 as a percentage of climatology (bottom row). Temperatures are in °F and precipitation in inches, as indicated by the color bars. This is the current climate normal against which the winter 2025-26 conditions are compared to obtain the winter 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 shading in this map shows drier-than-normal conditions. Note that shading outside the state has been washed out to facilitate focus on Maryland. Filled blue circles mark the county seats.

# Appendix D: The Water Year Climatology, and October 2025-February 2026 as Percentage of Climatology Maps
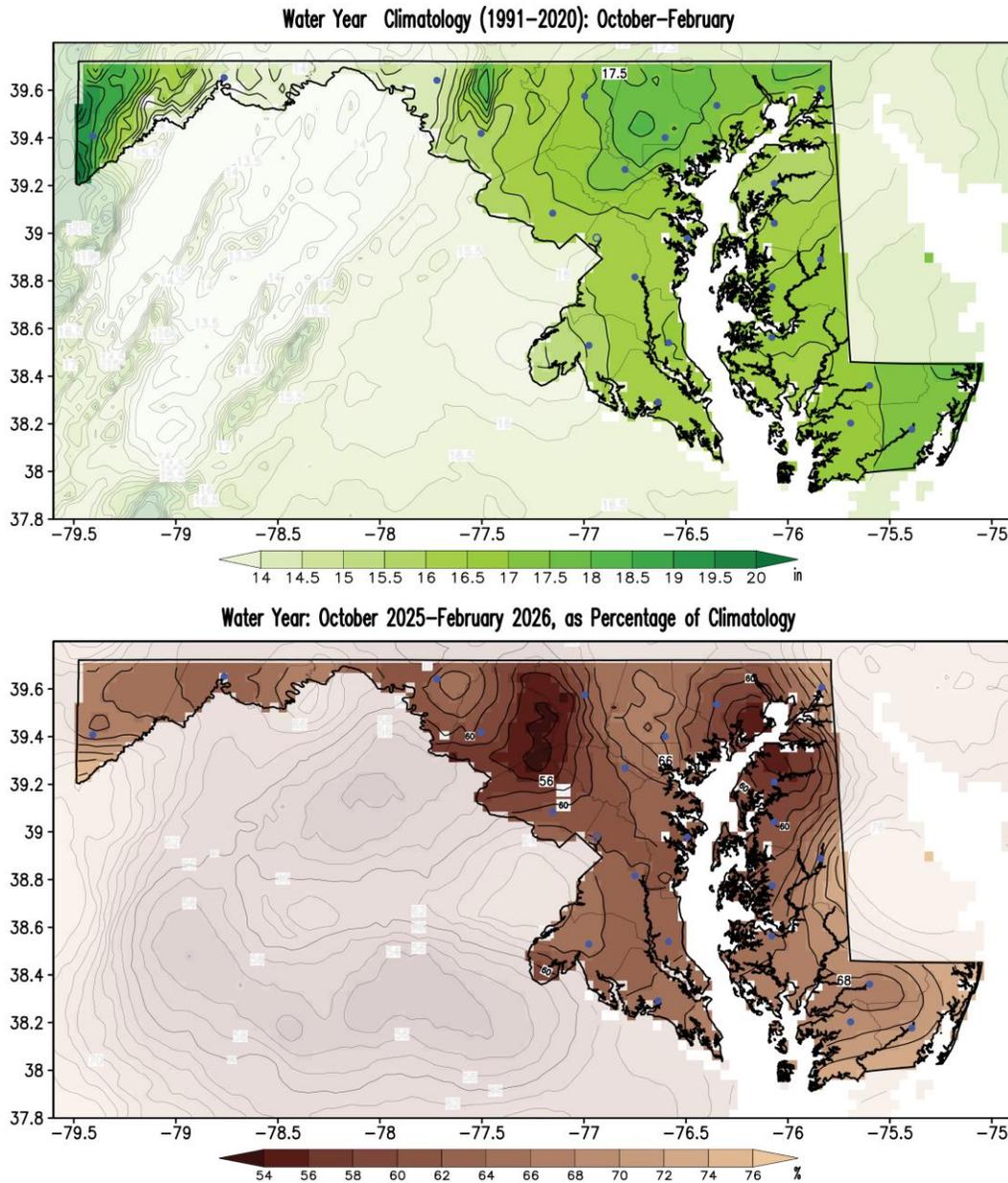
Figure D1. Climatology of the partial water year (October – February, top panel), and the partial water year (October 2025 – February 2026) as a percentage of the climatology (bottom panel). Climatology is for the period 1991-2020. The climatology for the water year is in inches, following the color bar. The partial 2026 water year as a percentage of climatology is obtained by dividing the 2026 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 partial 2026 water year is drier than normal. Note that shading outside the state has been washed out to facilitate focus on Maryland. Filled blue circles mark the county seats.

Appendix E. Winter Standard Deviation and Winter 2025-26 Standardized Anomalies Maps

Figure E1. Standard deviation for winter and standardized anomalies of temperatures and precipitation for winter 2025-26. 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 2025-26 (right column) are obtained as a percentage of the standard deviations. The standard deviations for temperature are in °F, and those for precipitation are in inches, according to the color bars. Blue shading in the anomaly temperature maps marks colder-than-normal conditions; brown shading in the anomaly precipitation map marks drier-than-normal conditions. The yellow isolines on the anomaly maps mark anomalies equal to or greater than 100% or 1 standard deviation. The standardized anomalies are obtained by dividing the raw anomalies (from Figures 1 to 4) by the standard deviation (from the left column panels) and multiplying the result by 100; hence, the units are in percent (%). Note that shading outside the state has been washed out to facilitate focus on Maryland. Filled blue circles mark the county seats.

Appendix F. Winter Mean and Standard Deviation of Sea Surface Temperatures Maps
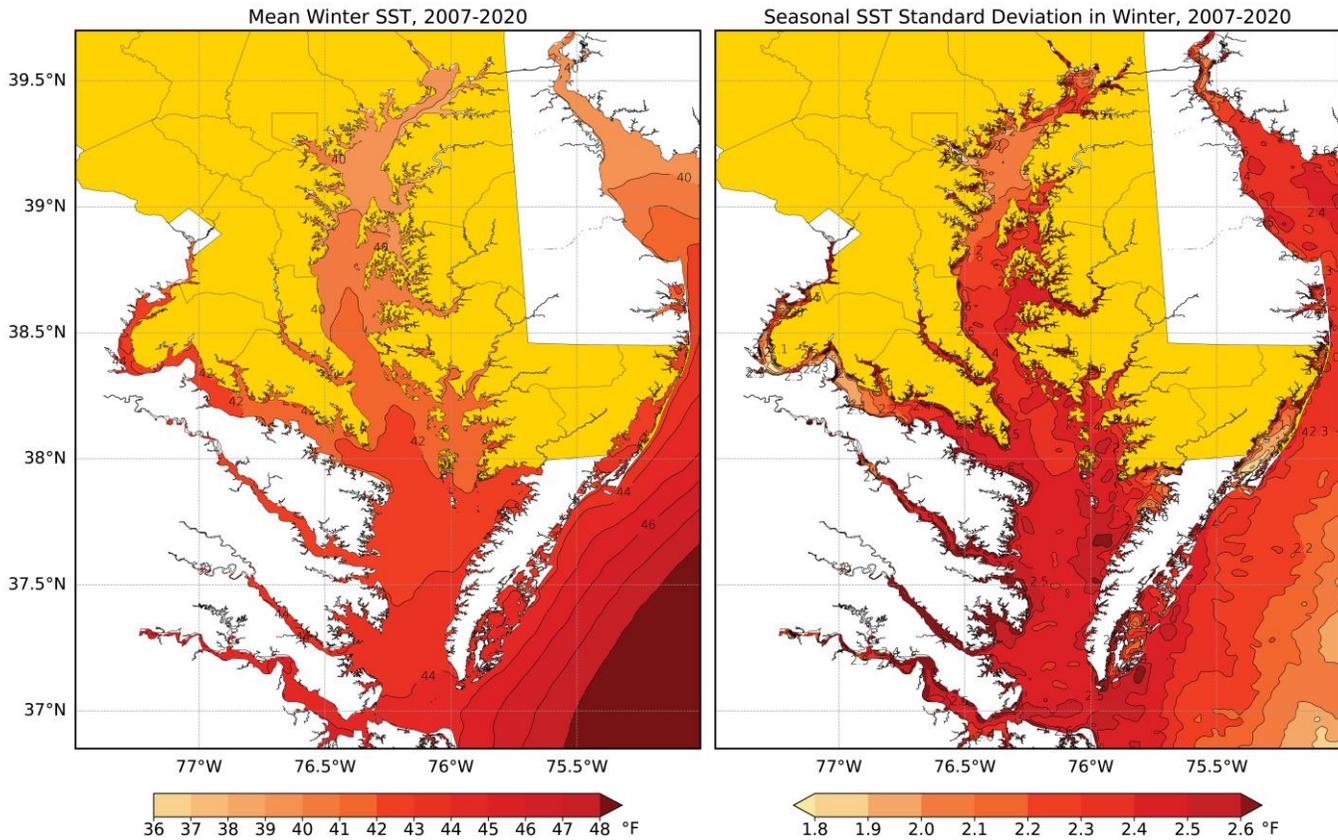
Figure F1. Mean (left panel) and standard deviation (right panel) of seasonal sea surface temperatures in the Chesapeake Bay and surrounding coastal areas in winter for the period 2007-2020. The mean and standard deviation of the temperatures are in °F as indicated by the color bars. The mean temperature map is the current mean against which the winter 2025-26 conditions are compared to obtain the winter 2025-26 anomalies (from Figure 11). For clarity, the mean and standard deviation of the temperature have been smoothed using a 9-point spatial smoother, applied four times. To facilitate comparison between the mean winter map (left panel) and the winter 2025-26 map (Figure 11, left panel), the shading schemes are the same. Note that Maryland has been shaded yellow to facilitate focus on the state waters.

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://journals.ametsoc.org/view/journals/bams/93/11/bams-d-11-00197.1.xml

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

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.

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/records/item/55797-wmo-guidelines-on-the-calculation-of-climate-normals