

2025 Weather Outlook Series: North America Summer

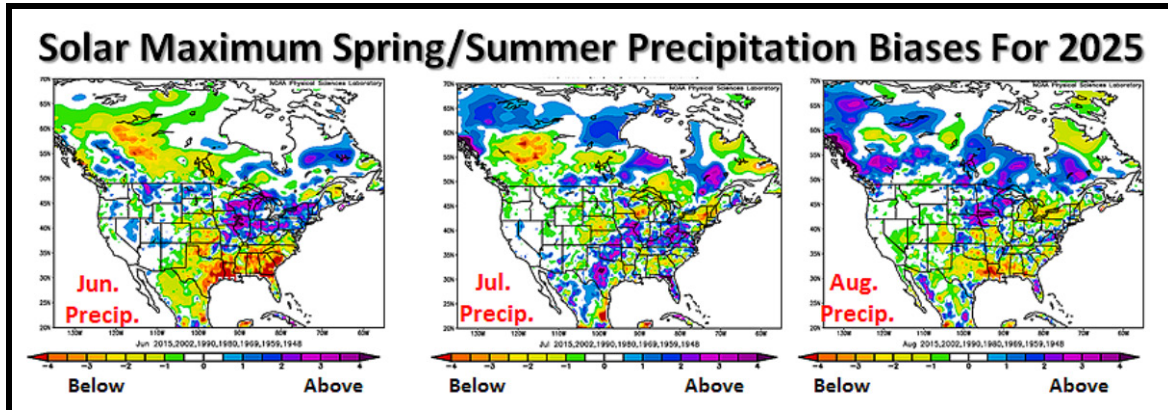
By Drew Lerner

Kansas City, February 7 (World Weather Inc.) – Spring weather, as noted in our second part of this three-part long range weather series for North America, was complicated – to say the least. Either old age is making the art of weather forecasting more complex than it needs to be or we are truly in unique times. *Confidence in the spring outlooks for both Canada and the United States is high despite all of the data presented for the spring outlook. Unfortunately, the summer is not going to be much easier because so much of the summer outlook will be dependent on what happens in the spring.*

Most of the data collected for guidance on the spring and summer of 2025 seems to have some level of dryness advertised for a part of the central U.S. and in a part of the Midwest while Canada, the northern U.S. Plains and the southeastern parts of the United States seem to have a slight wetter bias. The most frustrating part of the spring analysis was the solar maximum factor because the year following the sunspot maximum is often a little wetter biased.

A wetter biased weather pattern makes some sense with the demise of La Nina, expected this spring and neutral ENSO conditions for the summer. However, neutral ENSO years are not always wetter biased. They are wetter than La Nina years, but it is the El Nino bias that brings the moisture into play.

This year's lunar cycle has suggested a drier tendency in the heart of the Midwest and a part of the Plains during the spring and summer, but that must be melded in with the solar cycle, weakening negative PDO and warm ocean water surrounding much of North America.



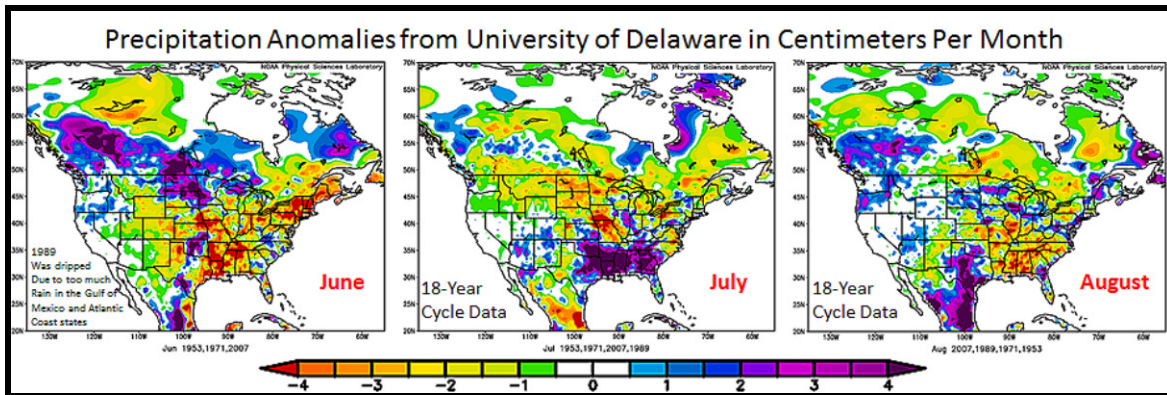
If the solar cycle has anything to say about the summer this year it would suggest a good mix of precipitation and sunshine would dominate the season. No particular area of persistent dryness or wet biased pattern seems to appear except for a few locations in the central Plains and from the heart of Texas into Georgia and South Carolina. All other areas in both Canada and the United States have seen a favorable mix of weather during the summers following a solar maximum which may have occurred in August 2024.

The solar influence is significant, although this meteorologist has seen it take a back seat to the dominating ENSO and Lunar cycle patterns periodically in the past. This year's neutral ENSO should allow other weather patterns, like the solar cycle to have greater influence on the weather. With that said, though, the lunar cycle continues to be persistent in

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suggesting some drier bias will be present in the spring and summer across portions of the Plains and Midwest.

Basic meteorology suggests that the lunar cycle will be promoting an active weather pattern in the Pacific Northwest, improved monsoon moisture coming northward out of Mexico and a periodic, cool, northwesterly flow pattern impacting parts of the Midwest, Delta and southeastern states. This combination usually results in timely rainfall that is sometimes abundant in the northern Plains, parts of Canada's Prairies and across the Midwest from the upper Mississippi River Basin into the southern and middle Atlantic Coast States. The only way this pattern will promote dryness is by a strong ridge of high pressure building up in the central parts of North America and that is where the lingering negative PDO and spring dryness come into play complicating the outlook.



As you may recall from part two of this weather outlook series, the lunar cycle wanted to induce some notable dryness in a part of the west-central and southwestern Corn Belt, portions of the central Plains and in a part of the lower Midwest during the spring. As noted in our spring outlook there is potential for ridge building to evolve in the Great Plains and/or Rocky Mountain region during the spring resulting from the drier biased pattern that dominated autumn and winter in the central United States. Drought conditions that are already in place today in the northern Plains and upper Midwest coupled with the limited precipitation pattern of late in the central and southwestern Plains cannot be ignored especially with La Nina and negative PDO still playing out even though both are showing signs of diminishing this spring.

The negative PDO and La Nina can produce or enhance a high pressure ridge in the middle of the United States when conditions are just right. The potential for ridge building in the Rocky Mountains and/or High Plains region this spring is relatively good because of the combined impact of drier than usual soil, poor early spring rainfall and warmer than usual April weather. That combination along with the negative PDO and weak La Nina does point to a higher potential for ridge building of significance until the solar cycle is brought into the equation.

Returning cool air in May should push the ridge of high pressure back to the west into the Rocky Mountains, but that will not promote much rain in the central U.S. until that cooler period abates. That cooler period will end with a strong return flow of moist and warm air coming northward into the central United States from the Gulf of Mexico during late spring and early summer and that could help bring rain into the central U.S. easing the long term drying trend. The lunar cycle data suggests frontal boundaries in late spring may

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be more likely in the northern Plains and Canada's Prairies rather than in the heart of the Midwest suggesting some of the dryness will only be partially eased.

If summer begins and there has not been significant rain in central United States from the central Plains into the central Midwest then all bets are off for a favorable mix

of rain and sunshine to evolve in to the key Corn and Soybean production areas of the Midwest.

World Weather, Inc. does not believe that this is the correct scenario for the spring and summer, but until we get to mid-spring it has to be a consideration for summer weather.

The preferred solution to the summer outlook is that some dryness will remain over the Great Plains and western Corn Belt from the spring and a northwesterly flow pattern aloft will bring frontal systems down from Canada periodically into the heart of the Midwest. These frontal systems will become stationary during mid-to late-summer and will act as triggers for rain and thunderstorm activity. As a result, World Weather, Inc. believes some partial relief will come to the drier areas in the western Midwest and Great

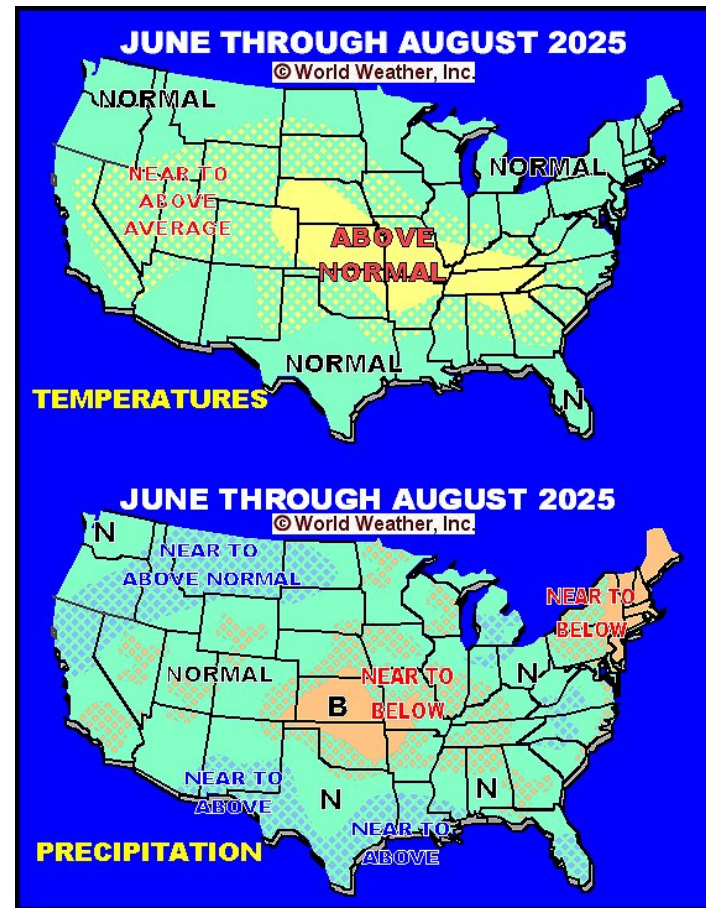
Plains while a more routine occurrence of rain and thunderstorms occurs in the northern and eastern Midwest.

In the meantime, a periodic moisture flux into the northwestern U.S. will bring some moisture into the northern Plains and Canada's Prairies. Some of that moisture will be joined by moisture flowing northward from the southwest monsoon. The northwesterly flow pattern aloft in Canada's Prairies though will limit precipitation in the northeastern one-third to one half of the Prairies making those areas a little drier than usual while southern Alberta, southwestern Saskatchewan and the northwestern U.S. Plains are a little wetter biased.

The tropics will also help to provide moisture feeds into the Gulf of Mexico coastal areas and the southern Atlantic Coastal States during summer. The northwesterly wind flow aloft coming out of Canada may leave the northeastern U.S. drier biased while the cool fronts bring timely rainfall to the northern and eastern Midwest and the middle Atlantic Coast States.

The southwest monsoon this year will not be back to normal, but it should perform much better than it did last year and in 2023. In the meantime, the central parts of the U.S. will have some drier biased conditions.

West and South Texas precipitation in the summer this year will be near to above normal with August possibly being wettest. Florida will be impacted by a favorable

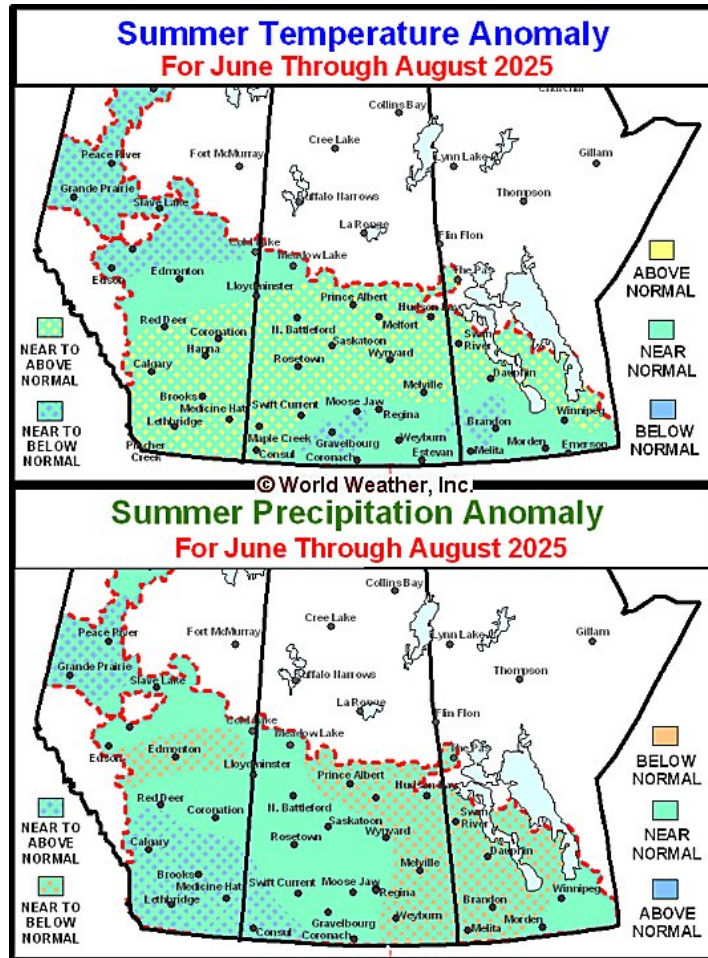


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southeasterly wind flow that will bring frequent showers and thunderstorms into the region during the summer.

Temperatures this summer will be warmer than usual in portions of Canada and in the central United States.

If the solar cycle has greater influence on North America weather than accounted for here it could be a wetter year in both Canada and the United States, but World Weather, Inc. is a little nervous about an association between strongly negative October through December PDO index values and less than usual central U.S. rainfall in the June through August period. There is also a greater presence of drought in the central states during summers following the strongly negative autumn PDO. Data for PDO does not date back much farther than 1900 and there have only been a few instances of strongly negative autumn PDO index values making confidence in this correlation a little low. However, with the potential for dryness still possible in the central United States this spring and a possible stronger than expected ridge of high pressure



evolving that correlation cannot be ignored, despite the wetter bias associated with years that follow the solar maximum.

THE BOTTOM LINE

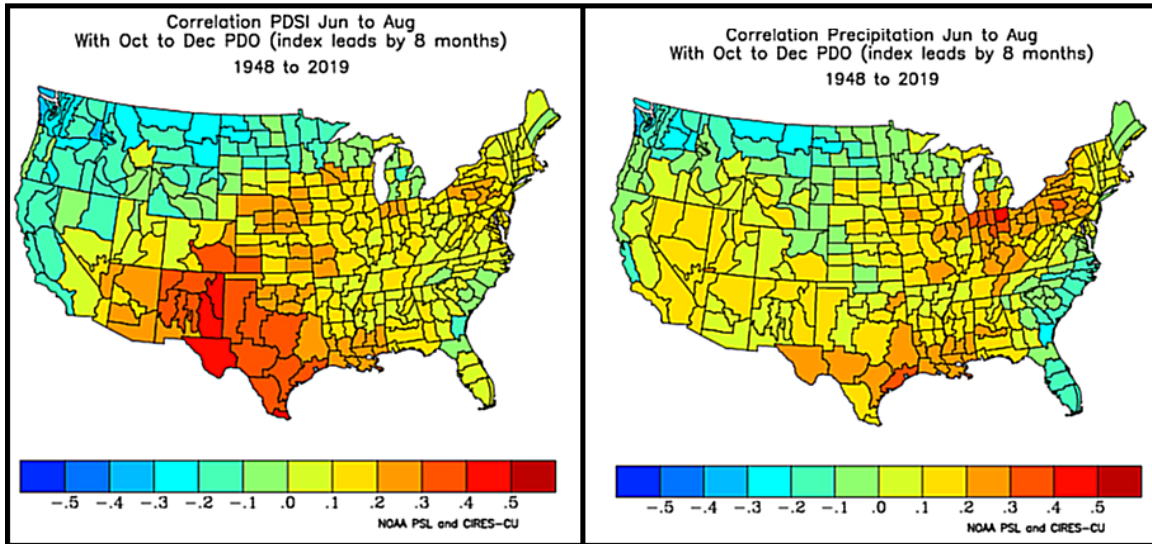
Much about the forecast for summer 2025 in the United States will be determined by spring weather and an update on all of these parameters influencing the summer will made in April and May to improve the potential outlook for June through August. **For, now World Weather, Inc. has left in "some" dryness in the central United States, including parts of the central Plains and western and central Midwest just in case the dryness feared for parts of the central U.S. verifies in the spring. If that happens, the revised summer outlook will most likely enhance the heat and dryness in the middle of the nation and the favorable summer production outlook will turn more threatening.**

The most recent verification of this association between strongly negative autumn PDO index values and dryness in the following summer occurred in 2021-22. In the autumn of 2021, the negative PDO was near a record low and the following summer precipitation

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anomalies were well below normal in the Great Plains and western Corn Belt. That trend induced greater drought which reinforces the correlation with the strongly negative Oct-Dec. negative PDO.

CORRELATIONS WITH OCTOBER THROUGH DECEMBER PDO



A FINAL THOUGHT ABOUT JULY WEATHER IN NORTH-CENTRAL U.S. AND CANADA'S PRAIRIES

Another study coming from the very dry September/October period last year suggests an association with a lighter-than- usual precipitation bias during July in the northern Rocky Mountain region, northern Great Plains, upper Midwest and neighboring areas in southern Canada's Prairies. This was not a droughty pattern, but one of less frequent and less significant rain compared to normal. The significance of this anomaly comes from the fact that the study came from a parallel with the autumn of 1952 and was independent of all other data and studies for the long range outlook and yet the suggestion of below normal precipitation in these areas matches very well the bias for below normal July precipitation coming from the lunar cycle. That raises the potential for a drier biased in July in these areas, but not much else can be said about the remainder of North America, based on this study. Also, it should be noted that June and August were not nearly as anomalously light on precipitation and July was.

The most complicating factor of all is still the solar cycle bias for greater rainfall coming in years that follow the solar maximum.

An update to the spring and summer outlook will be coming in late April and May after the early to middle part of spring weather has been completely assessed. For now, the outlook maps presented herein represent our best forecast given all of the variables this year.

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