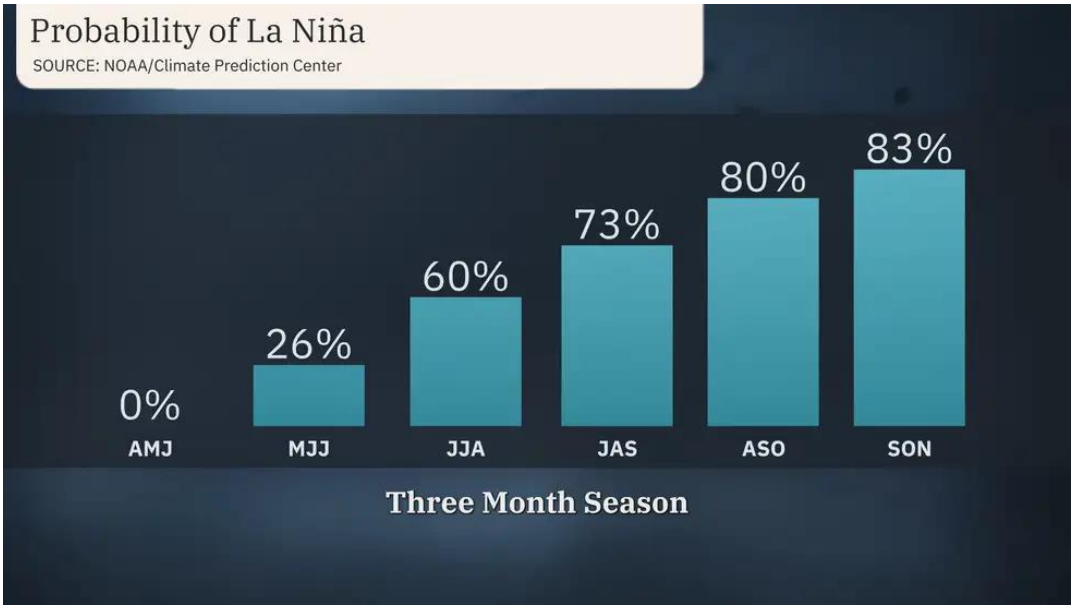
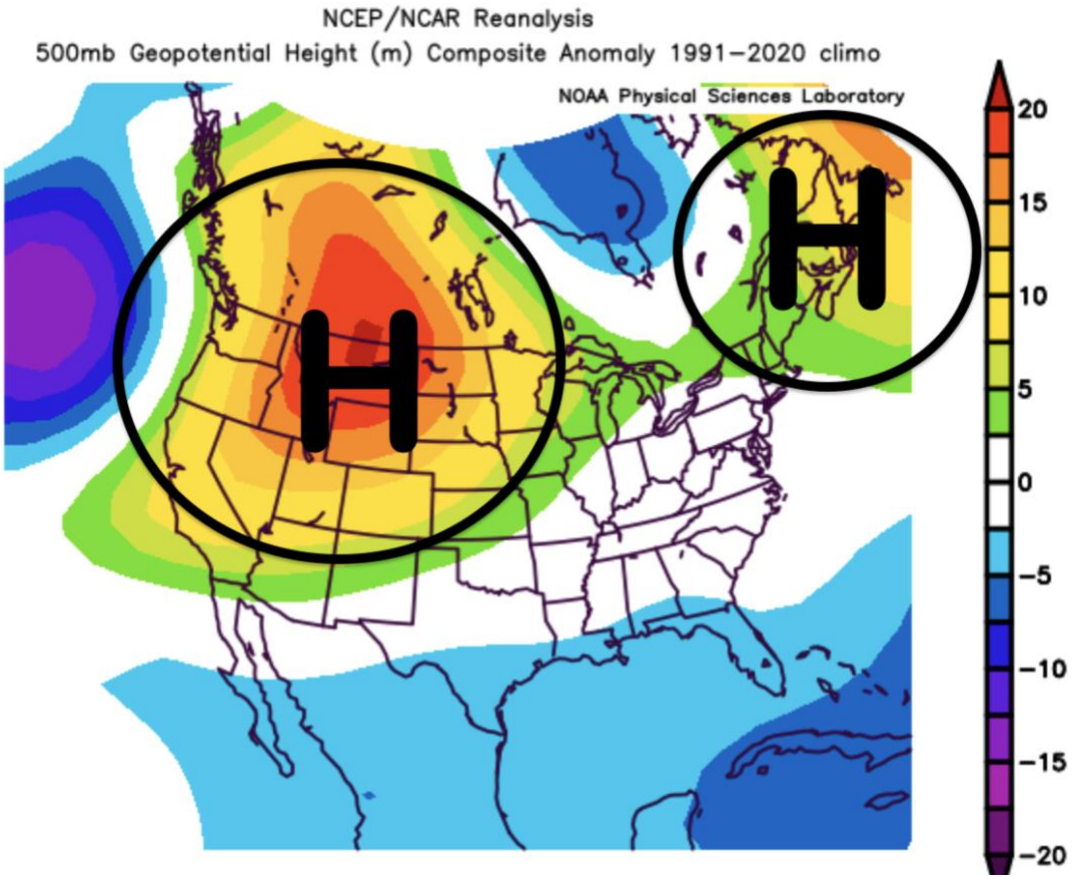
Summer Outlook 2024



It's known we're on our way toward a La Nina this season, which is nicely illustrated by this graphic developed by the TWC. This is relevant as the increasing probability of a switch to a La Nina from our current El Nino will play a large influential role in this summer's heat potential.

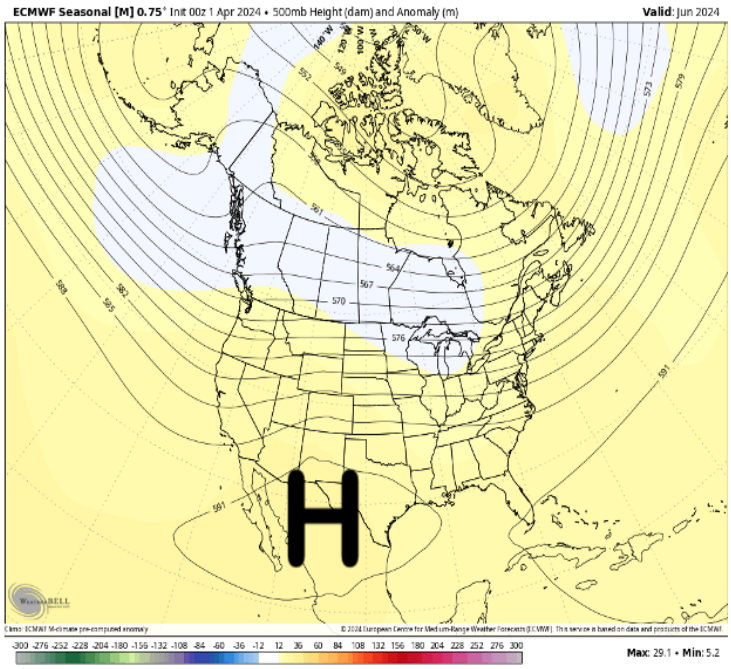
One of the main reasons why we see warmer-than-average temperatures during the summer months of June, July, and August is because of a common feature coined as a "semi-permanent heat ridge", which is a "heat dome". Persistent heat and dry conditions occur with these features.

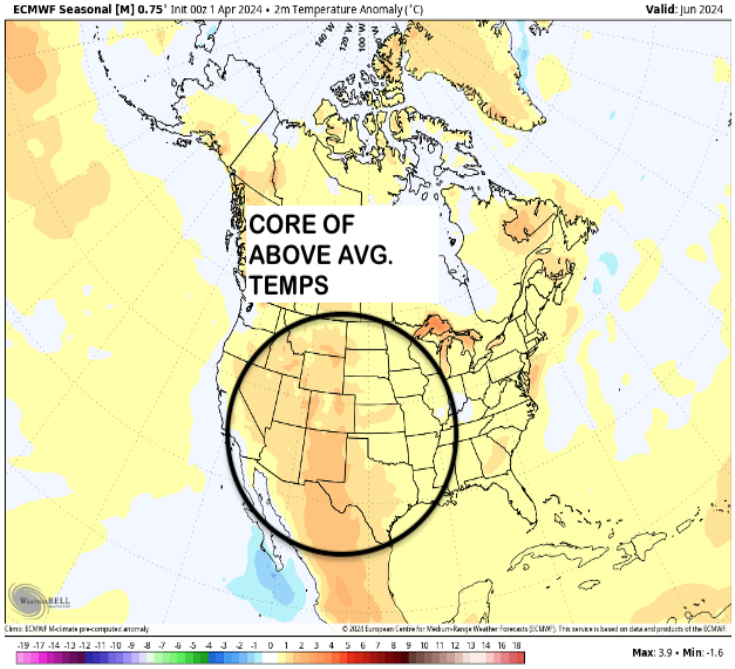
This ridge begins to develop June and will be most prevalent across the central part of the U.S. This will tend to oscillate toward the Pacific NW then progress eastward. Furthermore, we'll also see influences from the Bermuda Ridge from the Atlantic side. Below is a mid-level height (500mb, or 18,000 feet) composite of La Nina years during June-August, and we see that the U.S. tends to deal with positive geopotential heights during the summer months (e.g. associated with warmer-than-average temperatures).



The Summer Months

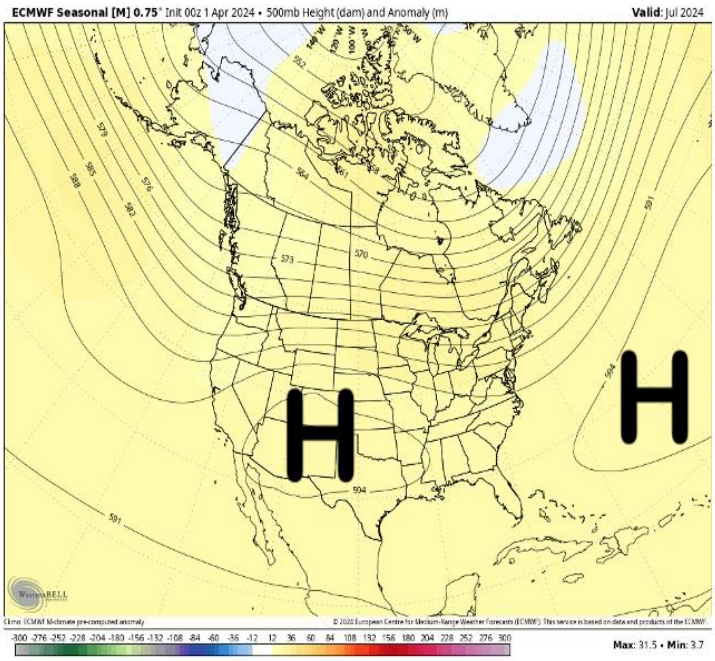
As we flip the calendar to June, we'll begin to see the Sonoran "heat dome" billow from the Mexican plateau and expand northward. This will render the "bulk" of above average temperatures across the Great Plains, portions of the Southwest, and across the Intermountain West. Where the center of heat occurs will coincide with where we'll see the below average departure in precipitation, since these summer ridges are associated with dryness. Elsewhere, we'll still see above average temperatures.

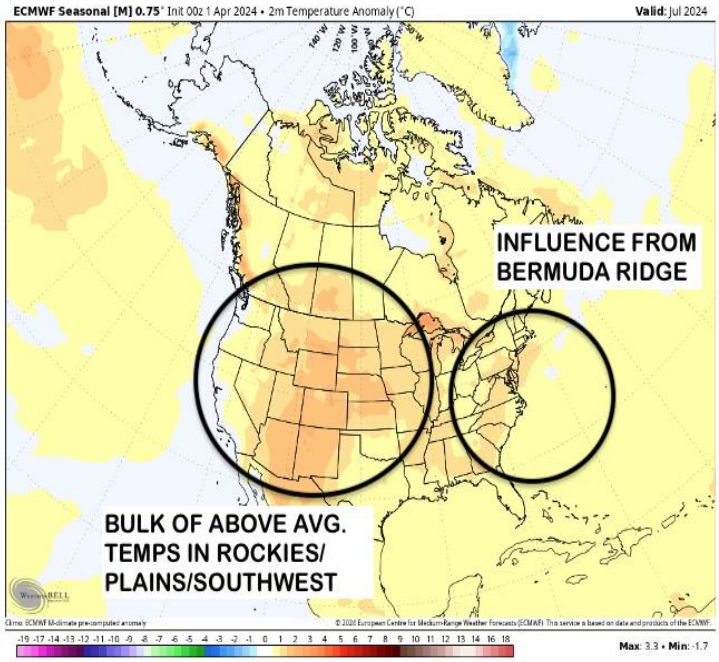


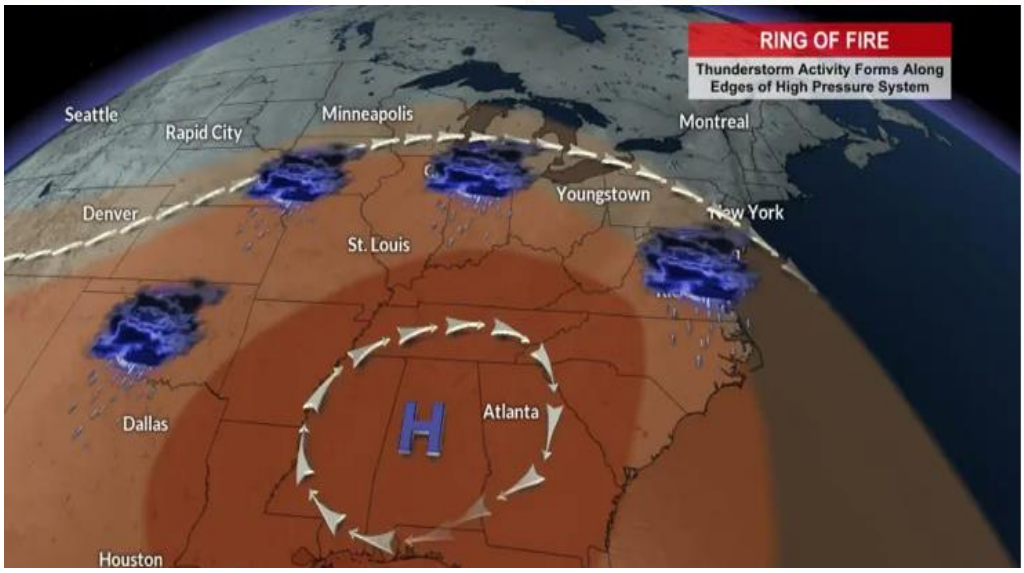


Transitioning into July, the semi-permanent ridge will continue to straddle the central U.S. as it strengthens. By mid-summer, we'll begin to see influence from the Bermuda ridge as it interjects humid air from the Atlantic and Gulf up the East Coast. The combination of both will focus the main area of above to well above average temperatures into the northern Plains, Ohio Valley, and toward the Northeast. As a result of this type of pattern, we tend to see something called the "Ring of Fire" develop (shown below).

This type of pattern is associated with active severe weather and storms that fire along a boundary along the outer periphery of the subtropical ridge. As the jet stream flows along it, we see energy and moisture travel along forming thunderstorms bringing periods of unsettled conditions from the Plains to the Northeast.

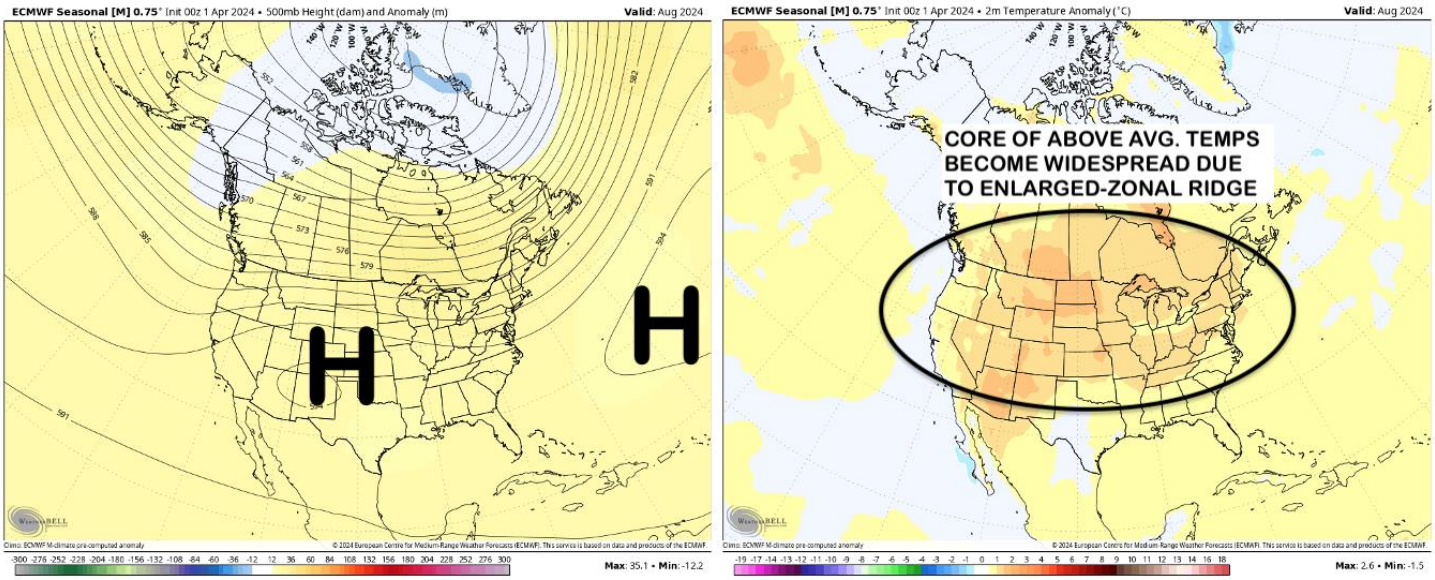






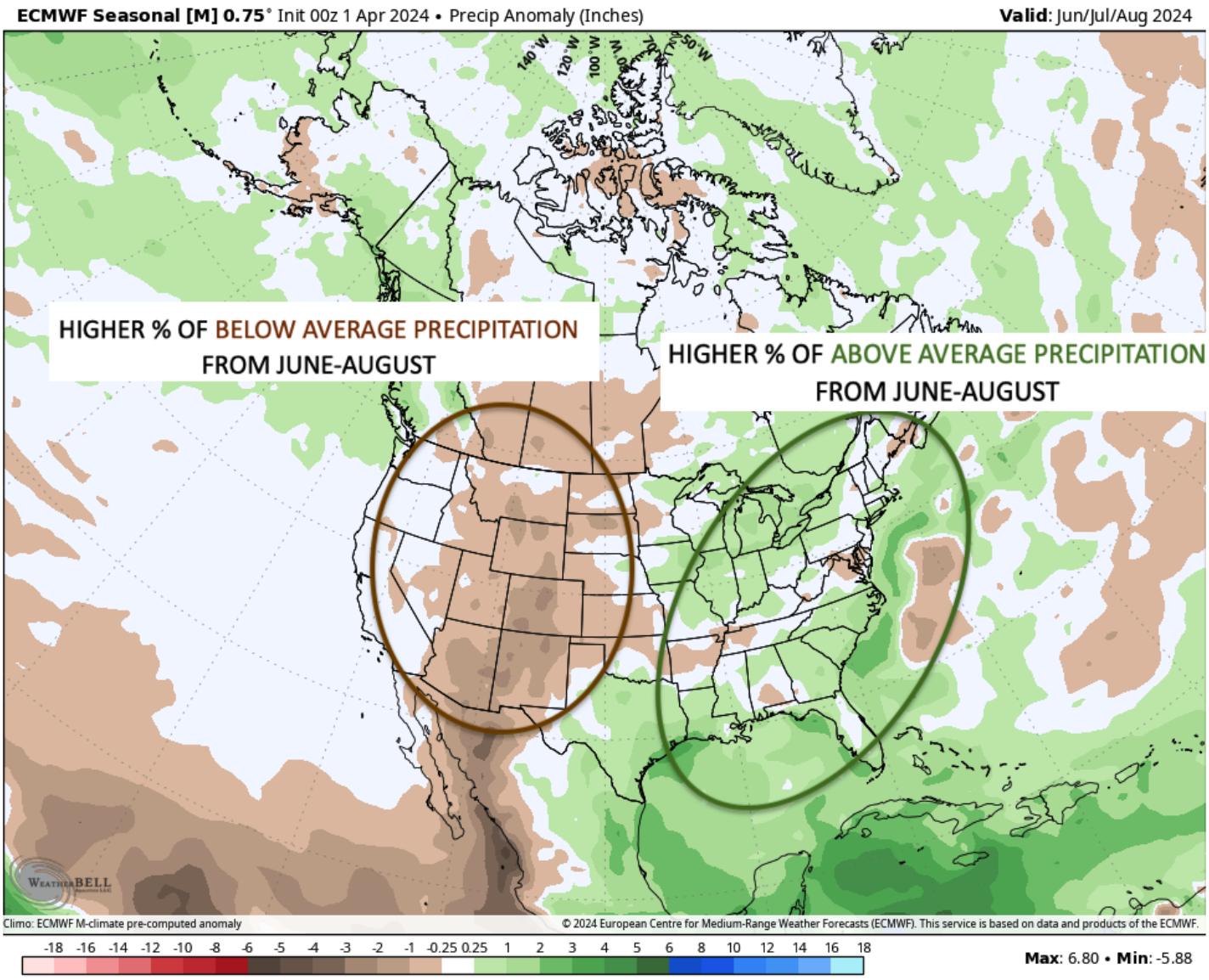
By August, this is where we'll see mostly widespread well above average temperatures encompass the U.S. As the central U.S. ridge expands and becomes more zonal along with influence still from the Bermuda high, not only will heat increase but humidity levels will become more widespread. The latter will tend to focus along the deep South and across the Southeast up into the Mid-Atlantic. The core of the heat, however, will focus across the northern Plains, Great Lakes, and into the interior Northeast. This is also where we'll be

watching diligently tropical cyclone tracks and precipitation swaths from the positioning of the Bermuda ridge, as it'll play a large role in storm tracks.



Lastly, hot summers uncoincidentally fall in line with droughts, since higher temperatures cause evaporation reducing water content in the soil. According to a seasonal model that incorporates multiple factors of the atmosphere to produce certain forecasts, we see that the core of below average precipitation will prevail across the Rockies, Southwest, and a majority of the Intermountain West. That's consistent on where the majority of residence time the subtropical ridge will have. With exacerbated dryness will come increased wildfire risks for portions of the Plains, Northwest, and Rockies, though since we did come out of a relatively wet winter this all together may be mitigated.

On the contrary, east of the Mississippi River we'll see an increased likelihood of above average precipitation as shown below. Regarding the latter, this increase chance of above average precipitation may also lead of instances of flooding as active severe weather and increased moisture from the subtropics can compound causing several events.



In conclusion, we're on pace for a very warm summer collectively given the transition out of a El Nino and into a La Nina. We'll see several heat waves and episodes that'll shift around across the U.S. along with active stretches of severe weather and rainfall. Furthermore, hurricane season is forecasted to be active so we'll be dealing with quite a bit as we enter into the summer months.