

THE ATMOSPHERIC RESERVOIR

Examining the Atmosphere and Atmospheric Resource Management

AN OSCILLATING WINTER?

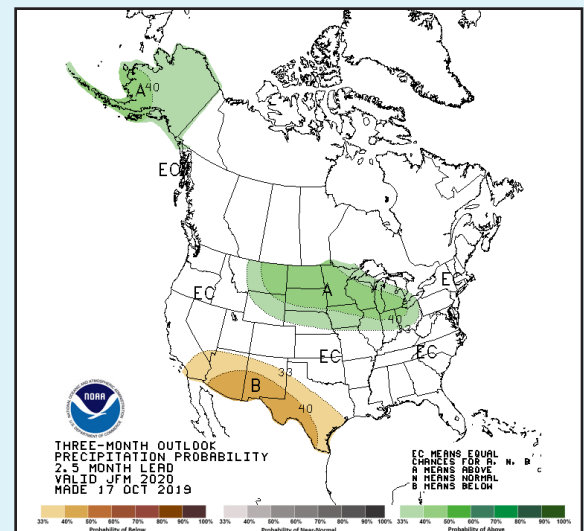
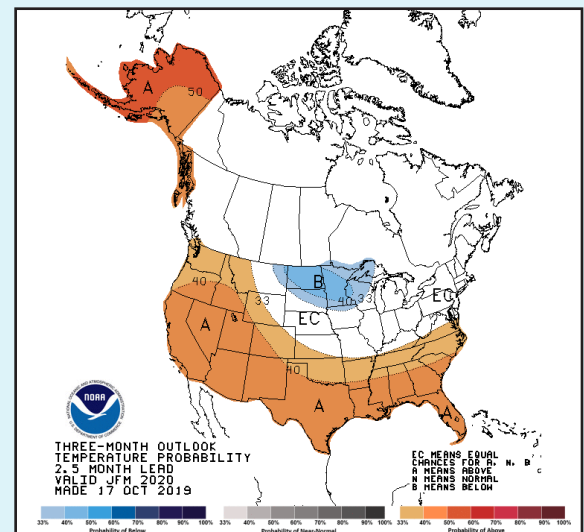
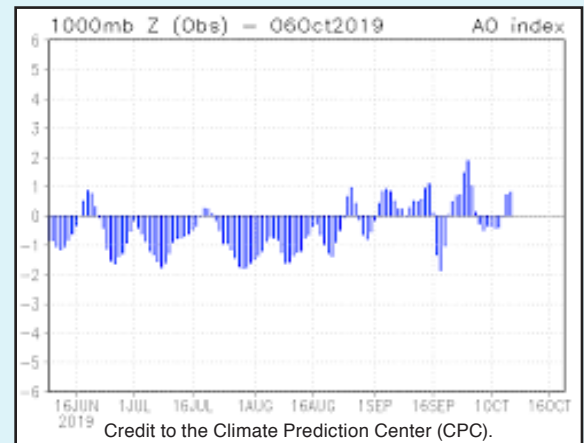
By Mark D. Schneider

A strong El Niño or La Niña can help predict the long-term winter weather pattern for North Dakota. This winter the El Niño - Southern Oscillation (ENSO) is forecast to remain neutral, meaning that meteorologists will be looking elsewhere for tools to help them make long-term predictions. Fortunately, there are other oscillations that occur in our atmosphere such as the Arctic Oscillation (AO) that can provide reasonably accurate forecast trends of a few weeks to a month. Think of the AO in terms of high and low pressure over the Arctic region. When there's higher relative pressure over the Arctic and lower pressure over North America then colder air is favored to move southward and this is known as the negative AO phase. The opposite is true with a positive AO phase when lower air pressure exists over the Arctic and higher pressure over North America.

Next we have something called the Polar Vortex (PV) that has been highly publicized in recent years. Other common names for the PV are polar cyclone or polar low and there are normally two centers, one located over Baffin Island (northeastern Canada) and one over northeastern Siberia. When these two PV centers remain in place over their high latitude locations, we don't hear much about them. When PV centers move south over places such as the continental U.S., however, there is usually a large amount of attention focused on them. The PV is present year-round, although it strengthens during the winter because there is a greater temperature gradient between the equator and the poles.

There is a relationship between the AO and PV and it involves the movement of the polar jet stream either north or south according to what phase the AO is in. When the AO is in a positive phase, the polar jet stream remains farther north and keeps more colder air and storm systems in Canada. However, when the AO is in a negative phase, the polar jet stream shifts further south and oftentimes North Dakota is the recipient of colder, snowier conditions. You can see from the AO graphic that changes in phase from positive to negative occur often, on the order of just a few weeks to a month, so this shorter forecasting timeframe is used instead of the seasonal timescale that El Niño or La Niña might receive.

In early November when this article was written, North Dakota had already experienced a cooler, wetter start to Autumn. For the month of October, temperatures across our state were between three and seven degrees Fahrenheit below average and this trend was continuing into November. The Climate Prediction Center's winter forecasts show greater chances for below normal temperatures and above normal precipitation for North Dakota. With the AO being the favored indicator to watch, don't be surprised if our actual weather conditions "oscillate" this winter.



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