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The Climate Prediction Center's 2010-11 Seasonal Forecasts and a Look Ahead to 2011-12

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The fall, winter and spring of late 2010 and 2011 witnessed a moderate to strong La Niña across the tropical Pacific Ocean, which shaped CPC's seasonal outlooks for those seasons. La Niña often results in drier-than-average conditions across much of the southern part of the continuous United States and wetter-than-average across parts of the North, particularly in the Pacific Northwest and in the Ohio Valley. Temperatures are often above average across the South and below average across the North, mainly from the northern Great Lakes region westward. These effects normally result in probabilistic seasonal forecasts which favor these impacts in these regions and the forecasts for the winter 2010-11 and spring 2011 were no exception (Figs 1 and 3).

Precipitation forecasts for September – November 2010 through April – June 2011 all scored at least 30% better than a climatological forecast, the longest streak (eight) of very successful forecasts since CPC began issuing forecasts in this style in 1995 (*i.e.* Fig. 1, right). The success of these forecasts was directly tied to the La Niña, as these forecasts heavily leveraged the expected impacts from the episode.

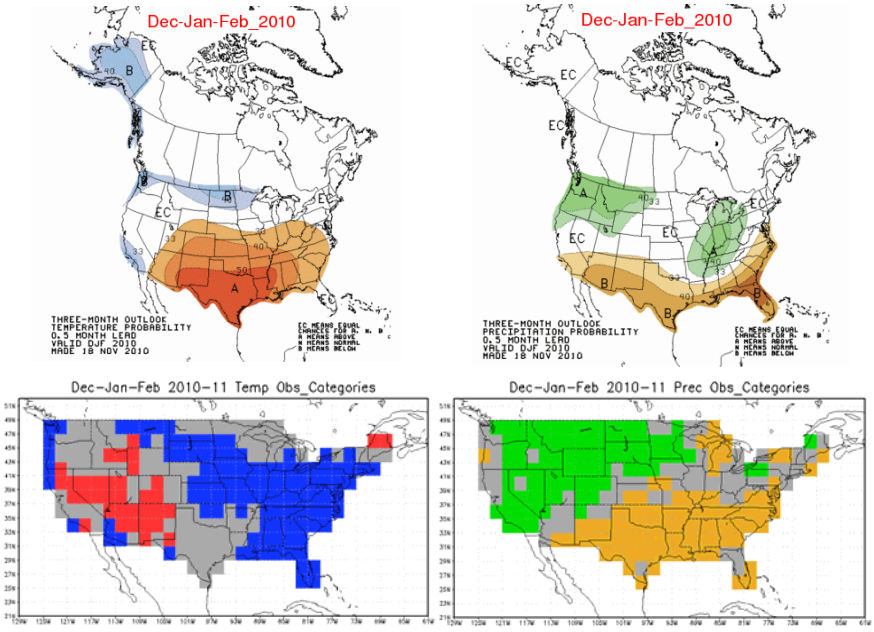

Fig. 1 December 2010 – February 2011 forecasts (top) and categorical verification (bottom).

In contrast, the temperature forecasts during the heart of the winter (November – January, December – February, and January – March) were not as successful (*i.e.* Fig. 1, left), with Heidke skill scores near or below zero for all 3 forecasts. The obvious question to ask is what caused the disparity in skill between the temperature and precipitation forecasts and the answer highlights some of the unpredictable factors that often influence the climate during a particular season. While the La Niña dominated the precipitation signal, a strong negative phase Arctic Oscillation (AO) teleconnection pattern developed in mid-November (Fig. 2) and persisted largely unabated through the middle of January, at which point another teleconnection pattern, the Pacific-North American (PNA) pattern became strongly positive for 2-3 weeks (not shown). The influence of these two teleconnection patterns during the winter, which included the second lowest December AO value (Fig. 2a) in the historical record dating back to 1950 (exceeded only by December 2009), resulted in temperatures during the winter that were either normal or below normal across much of the eastern two-thirds of the country. This result was at odds with CPC's seasonal forecasts, which favored above average temperatures across much of the southern and central parts of the nation.

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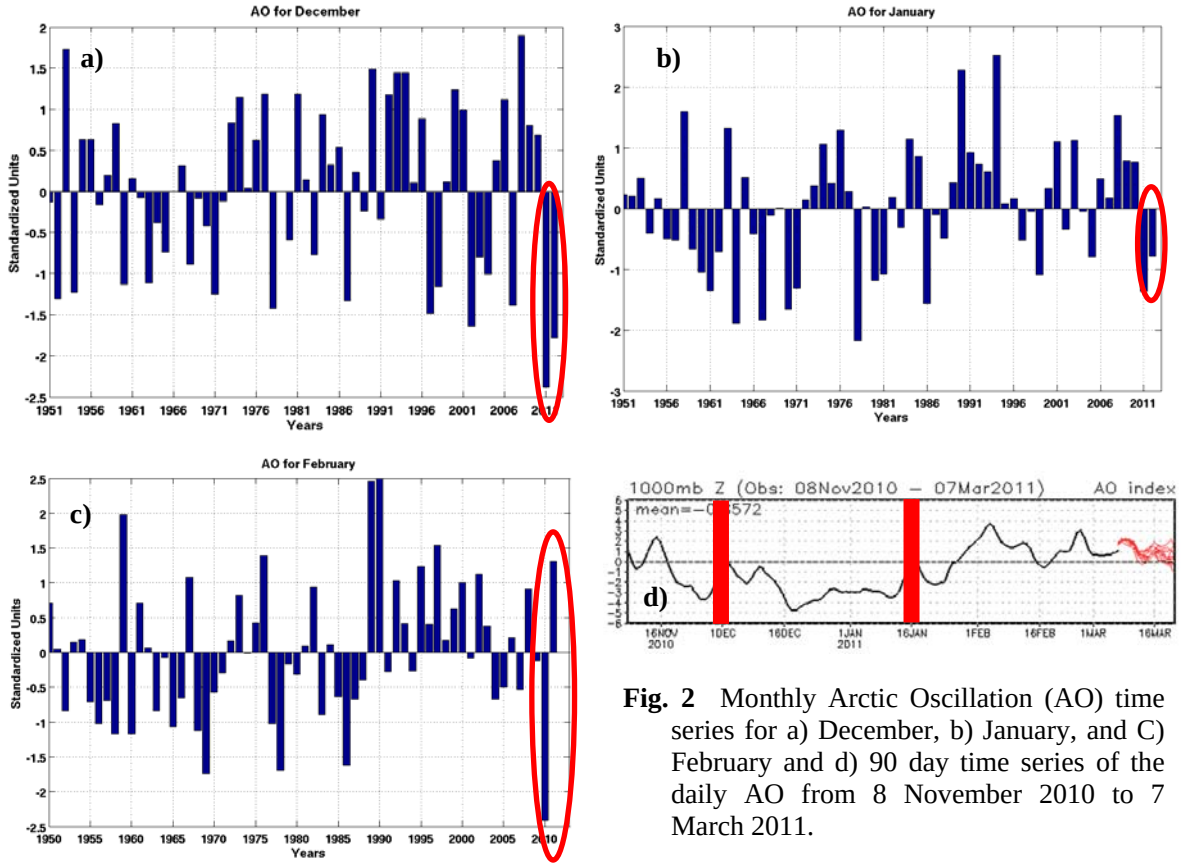

Fig. 2 Monthly Arctic Oscillation (AO) time series for a) December, b) January, and C) February and d) 90 day time series of the daily AO from 8 November 2010 to 7 March 2011.

By early February, the AO became positive and remained neutral or positive during the remainder of the winter (Fig. 2d) and throughout the spring. This transition, along with the continuation of La Niña conditions, resulted in a string of successful temperature forecasts beginning with February – April 2010 continuing into early summer. The verification for these forecasts was quite consistent with previous La Niña episodes, with colder-than-average temperatures observed across much of the northern Plains, the northern Rockies, the Pacific Northwest and warmer-than-average temperatures across much of the southern part of the nation during spring (Fig. 3).

As we head into the winter of 2011-12, La Niña conditions have again developed throughout the Tropical Pacific, as sea surface temperature departures more than 0.5°C below average spanned the central and eastern tropical Pacific. This has helped to shape the outlooks for the winter, with CPC's seasonal outlooks again generally favoring wetter and colder than average conditions across much of the northern part of the country and drier and warmer than average conditions across much of the South.

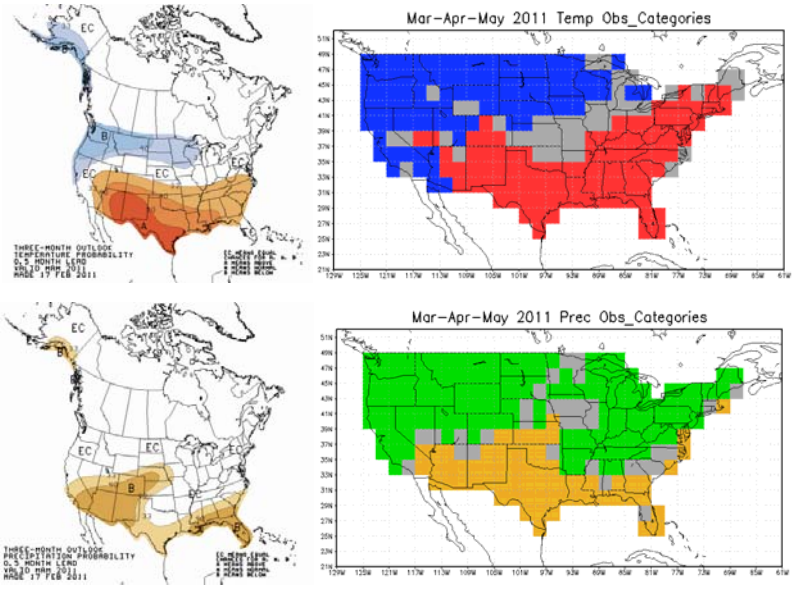

Fig. 3 March – May 2011 forecasts (left) and categorical verification (right) of temperature (top) and precipitation (bottom).