

SESSION: (B3) S2D ensemble predictions and forecast information

(B3-02)

How early could the current La Niña have been predicted?

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Historical observations show that one in two La Niña events have lasted for two consecutive years. Despite their outsized impacts on drought and flooding, little is known about the predictability of these 2-year La Niña events. We addressed this question using a hierarchy of simulations performed with the Community Earth System Model Version 1 (CESM1) – a model that simulates realistic 2-year La Niña. First we explored mechanisms and potential predictability under “perfect model” conditions. Then we applied those results to the prediction of the current 2-year La Niña event. We used initialized predictions from the CESM Decadal Prediction Large Ensemble (CESM-DPLE) – a suite of ensemble forecasts initialized on every November since 1954. These CESM hindcasts show similar mechanisms and prediction skill for observed 2-year La Niña as in our “perfect model” forecasts. This allowed us to predict the evolution of the current La Niña using the ensemble initialized in November 2015, at the peak of the most recent El Niño. The CESM-DPLE predicted subsequent La Niña conditions lasting for 2 years. The probability of La Niña for the second year, i.e. the current winter, were 60% according to the initialized forecasts and 80% according to an empirical model combining observed and simulated predictors. Together these results demonstrate that, under specific initial conditions, La Niña events can be predicted two years in advance.