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Title: Climate change and subseasonal predictability
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Abstract:
Climate forecasts at subseasonal timescales are believed to derive skill from various sources, such as slowly varying modes of the atmosphere-ocean system (e.g., Madden-Julian Oscillation) and persistence. Bridging the gap in knowledge of predictability between timescales of two weeks and seasons will require use of information from multiple climate phenomena operating at all timescales of variability. While decadal changes are a known source of predictability in seasonal forecasts, climate change has generally not been examined as a potential source of predictability for subseasonal timescales. Recently, there has been an increased interest in the impact of climate change on weather events, especially extremes, defined as the tails of the distribution of potential weather and climate events. There is evidence in observations that climate change impacts the frequency of extreme events and the potential maximum intensity of such events by shifting the distribution, creating a new normal, and with it a new potential for extremes. Identifying the changing frequency of extremes may allow attribution of these events, in a probabilistic sense, to climate change as a cause. In addition to altering the probabilities of extreme events, climate change may also be affecting the fundamental predictability of these events by changing background conditions that can impact the chaotic dynamics of the climate system. Quantifying changes in the predictability of events at sub-seasonal timescales may be important for several reasons, including: 1) Identifying the impact of climate change and decadal variability on changes in forecast skill, especially associated with the prediction of extremes; 2) Determining appropriate adjustments for non-stationarity in the calibration of forecast systems; and 3) Advancing our fundamental knowledge of how predictability may change in a changing background state. By determining shifts in the statistics of such events, this analysis will use ensemble forecasts with a multi-decade set of hindcasts (CFSRR, and the ESRL GEFS reforecast) to examine the predictability of subseasonal variability and how this predictability has changed over time. The potential for attribution of extreme events to climate change and improvement of subseasonal prediction systems will be discussed.
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