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Impact of Tropical Atlantic variability on Tropical Pacific predictability

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Previous studies indicate the influence of Atlantic variability on ENSO frequency and variability (Wu and Kirtman, 2004; Dommenget et al. 2006; Jansen et al., 2009). Rodriguez-Fonseca et al (2009) shows that summer equatorial Atlantic anomalous SSTs are highly anticorrelated with the equatorial Pacific in the next winter months. The mechanism of the Atlantic/Pacific teleconnection involves an anomalous Walker circulation triggered by the anomalous SST over the eastern Tropical Atlantic, which results in anomalous easterly winds over western Pacific and thermocline perturbations that propagate eastward thus favoring the development of ENSO conditions (Losada et al., 2010; Polo et al., 2015).

Here, we use the NMME and EUROSIP multi-model seasonal prediction systems for the period 1981-2014. In order to investigate the impact of the summer Atlantic variability on the predictability of ENSO, we compare retrospective forecasts initialized in February to forecasts initialized in June. We find that the June initialized forecasts have consistently higher skill in predicting ENSO than the February initialized at longer lead times, indicating a source of ENSO predictability in the initialization of June. We further find that models with high prediction skill over the summer Tropical Atlantic tend to both better reproduce the connection between the summer Tropical Atlantic SST and the winter Tropical Pacific SST, and also have higher skill in predicting the winter Tropical Pacific SST. Given that the Tropical Atlantic is an area of large and systematic biases and poor prediction skill (i.e. Richter et al., 2017) this study emphasizes the importance of correctly representing the Tropical Atlantic mean state and variability in order to improve Tropical Pacific predictability.

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