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Influences of the tropical Indian and Atlantic Oceans on the predictability of ENSO

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The El Niño Southern Oscillation (ENSO) is the leading mode of climate variability and predictable on inter-annual time scales. Recent studies suggest that the tropical Indian and Atlantic Oceans influence the dynamics and predictability of ENSO. Here we investigate these effects in a hybrid coupled model consisting of a full complexity atmospheric general circulation model coupled to a strongly simplified linear 2-dimensional ENSO recharge oscillator ocean model.
By analyzing different sets of sensitivity experiments it was shown that the main aspects of the tropical Indian and Atlantic Oceans influence on ENSO can be understood relatively well in the framework of the simple linear ocean dynamics of the model. We find that the tropical Indian and Atlantic Oceans have distinct effects on the dynamics and predictability. The decoupling of the tropical Indian Ocean has a strong impact onto ENSO dynamics, but the initial conditions of it have only a small impact on the ENSO predictability. In contrast, initial conditions of the tropical Atlantic have a stronger impact on the predictability of ENSO, but the decoupling of the tropical Atlantic has almost no effect on the ENSO dynamics.