



## **Influence of decadal sea surface temperature variability on northern Brazil rainfall in CMIP5 simulations.**

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The Amazon and Northeastern (NE) regions of northern Brazil are characterized by very different rainfall regimes but have certain similarities in terms of its variability. The precipitation variability in both regions is strongly linked to the tropical Atlantic gradient of sea surface temperature (SST) and the tropical Pacific SST anomalies, which at decadal timescales are modulated by the Atlantic Multidecadal Oscillation (AMO) and the Interdecadal Pacific Oscillation (IPO) SST modes, respectively. On the other hand, it has been found that state of the art models from the fifth phase of the Coupled Model Intercomparison Project (CMIP5) are able to reproduce some of the characteristics of the low frequency SST variability modes. Following this, in this work we analyze how CMIP5 models simulate the observed response of precipitation in Amazon and NE regions to the AMO and the IPO and the atmospheric mechanisms involved. Results show that, in both CMIP5 simulations and observations, Amazon and NE rainfall response to the AMO is the opposite, owing to the modulation of the intertropical convergence zone (ITCZ) position. Conversely, the IPO affects equally the two regions as a consequence of anomalous subsidence over the entire northern Brazil triggered by warm SST anomalies in the tropical Pacific. Such results suggest that an improvement of the predictability of decadal SST modes will directly revert into a better prediction of changes in Amazon and NE rainfall at long timescales.