

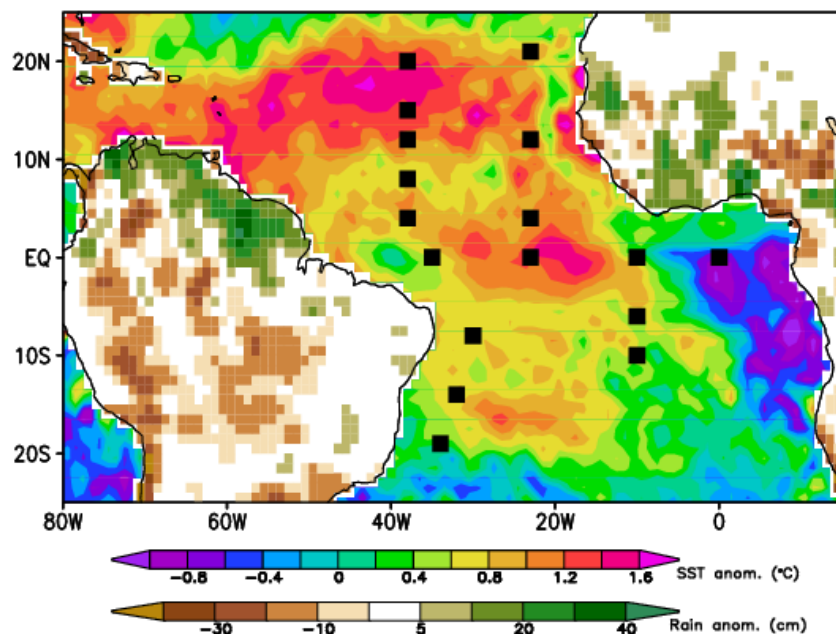
Tropical Atlantic

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The tropical Atlantic Ocean and surrounding continents have experienced several extreme climate events during the past two decades that have resulted in once-in-a-century droughts in the Amazon, extreme drought and flooding in Northeast Brazil, and unprecedented hurricane activity in the Atlantic basin. Almost all of these extreme events have been connected to highly anomalous sea surface temperatures in the tropical Atlantic. However, the mechanisms driving the extreme SST fluctuations are poorly known.

Empirical analyses of SST variability in the tropical Atlantic usually rely heavily on data from satellites, atmospheric reanalyses, and global hydrographic profiles. Direct measurements from the Prediction and Research Moored Array in the Tropical Atlantic (PIRATA) are used much less frequently, despite the generally higher quality of the atmospheric measurements compared to those from satellites and reanalyses, and the enhanced temporal sampling rate of all PIRATA data. Part of the reason is that data from the PIRATA moorings is more difficult to interpret because of the presence of occasional gaps and biases in the time series.

A powerful quantitative tool for assessing the mechanisms responsible for SST variability is mixed layer heat budget analysis. In this project we aim to address gaps and biases in the PIRATA records and avoid inconsistencies in the parameters chosen for heat budget analyses. The resulting product will be a consistent and continuous data set containing the main terms in the mixed layer heat budget of the tropical Atlantic Ocean during 1998-2015. The data set will consist of daily time series of each heat budget component from each of the 17 moorings of PIRATA. The product will be valuable for assessing the causes of extreme climate events in the tropical Atlantic, for validating ocean and climate models, and for diagnosing biases in coupled climate model simulations.



June 2010 SST anomaly (shaded over ocean) and JJAS 2010 rainfall anomaly (shaded over land). Black squares show the positions of the PIRATA moorings.