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## Modes of variability in the Tropical Atlantic and its influences on the precipitation regime in Brazil

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Tropical Atlantic variability modes can influence atmospheric circulation impacting the precipitation regimes over South American and the intensity of the meteorological systems associated. The objective of this work was to analyse the centennial variability and trends of the zonal and meridional modes in the Tropical Atlantic Ocean and their influences in the precipitation, focusing on the North and Northeast of Brazil. The zonal mode was estimated using the ATL3 index, calculated by the monthly sea surface temperature anomaly (SSTa) within 3°S-3° N and 20°W-0. The AMM index represents the meridional mode and was obtained by the difference of the monthly SSTa between the North (5-20°N and 60°W-10°E) and South (20°S-5°N and 60°W-10°E) Atlantic. The indices were calculated for three reanalyses, NOAA ERSST v4, ERA20C and ERA-Interim, and compared to the observational dataset OISSTV2 using correlation for the 1982-2010 period. The results showed a positive trend in both indices considering the period of 1900-2010 for the two centennial reanalyses (NOAA ERSST v4 and ERA20C). However, the trend is higher for the ATL3 index and lower for the AMM considering the NOAA reanalysis. The monthly precipitation was also used to analyse the relationship between the indices and precipitation pattern. The correlation between ATL3 and AMM and the precipitation field using the NOAA reanalysis showed that ATL3 positively influences rain over northeastern Brazil, throughout the Tropical South Atlantic, and northwestern Africa between 1900 and 2010. The opposite is observed relative to AMM, once anomalies of negative (positive) precipitation in the Southern (Northern) Hemisphere are related to a positive SSTa in the region. These results may be related to the most intense SSTa in the northern tropical Atlantic, which shifts the ITCZ, promoting more precipitation further north, and favors the hurricane season. All reanalyses represented the indices in agreement with observations, however, the statistical parameters were better for with the ERA-Interim. A possible reason is that ERA-Interim is a newer reanalysis, with more observed assimilated data. Moreover, it has a finer resolution when compared to the other datasets, which contributes to a better representation of the precipitation patterns. In conclusion, ATL3 positively influences precipitation in the North and Northeast Brazilian regions, as the warmer SST drives the position of the ITCZ. Therefore, the observed increasing trend in the precipitation over this region over the past years was associated with the increase in SSTa over the Tropical Atlantic, which may favor precipitation in the north and northeast of Brazil.

