Understanding the SST anomaly patterns in equatorial and southern Atlantic Ocean

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Several patterns of equatorial and South Atlantic Ocean (SAO) interannual sea surface temperature (SST) anomalies have been described: the equatorial Atlantic Niño and SAO dipole (SAOD) peak in boreal summer while the South Atlantic subtropical dipole (SASD) supposedly peaks in winter. Here we present the analysis observations showing that the Atlantic Niño, SASD and SAOD may largely represent one mode of ocean-atmosphere interactions reminiscent of the SAOD pattern most pronounced during summer. Indeed, summer is the only season in which the inverse correlations between the northern and southern poles of both the SAOD and SAOD are statistically significant. Heat budget calculations suggest that the interannual SST anomalies are primarily driven by heat flux anomalies and that the southern extratropics plays important roles. On the decadal time scale, a 12.5 yr marginal peak of the Atlantic Niño index appears mainly explained by the South Atlantic variability in context of the SAOD. Our results suggest that the SAOD may provide a framework for understanding large-scale and long-term SST variability in equatorial and southern Atlantic Ocean.

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