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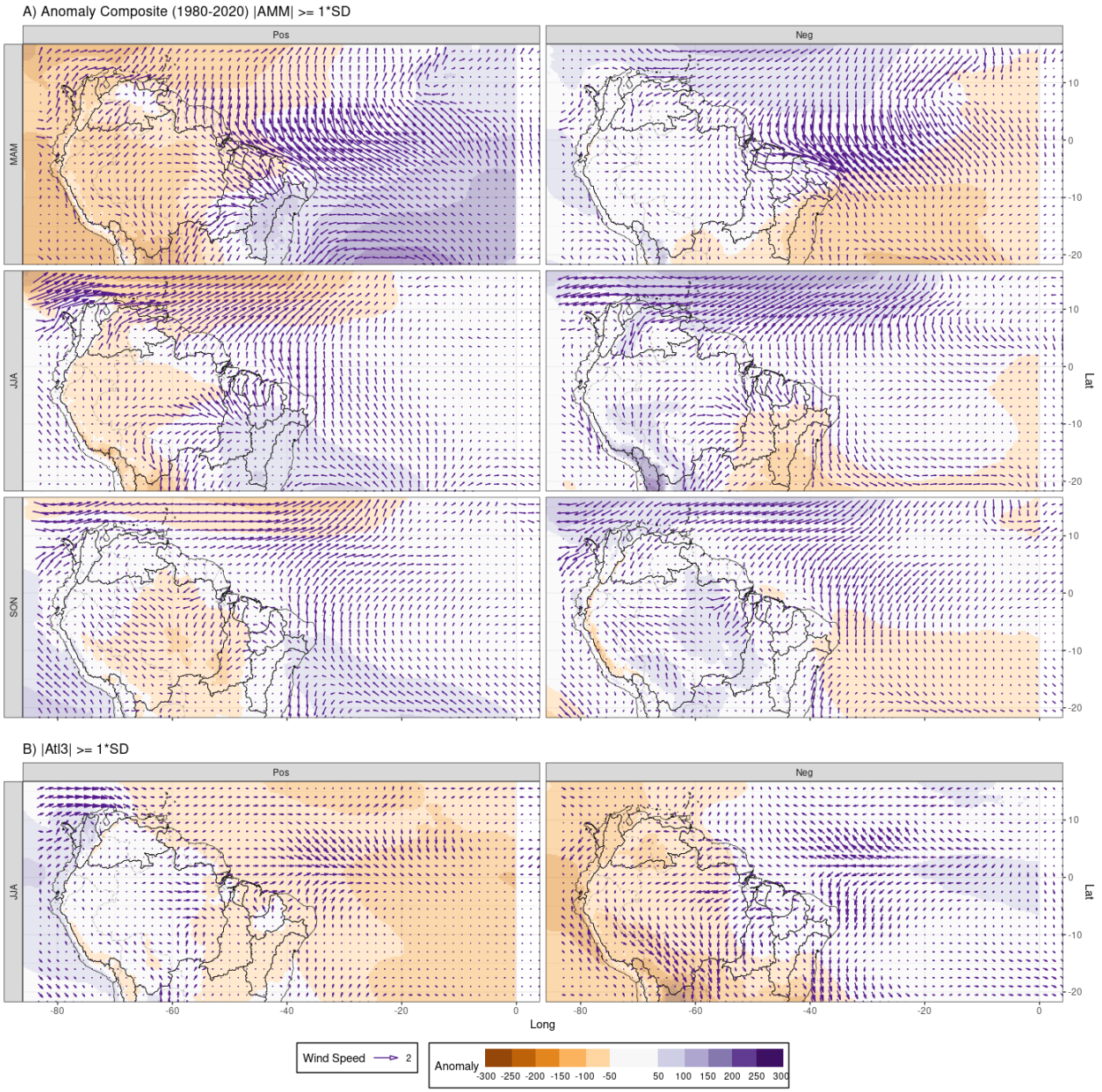

Figure S1. Composites of ERA5 Sea Level Pressure (shading) and 850 hPa wind anomalies (arrows) in the positive and negative phase for the peak season of A) AMM except for austral summer and B) Atl3.

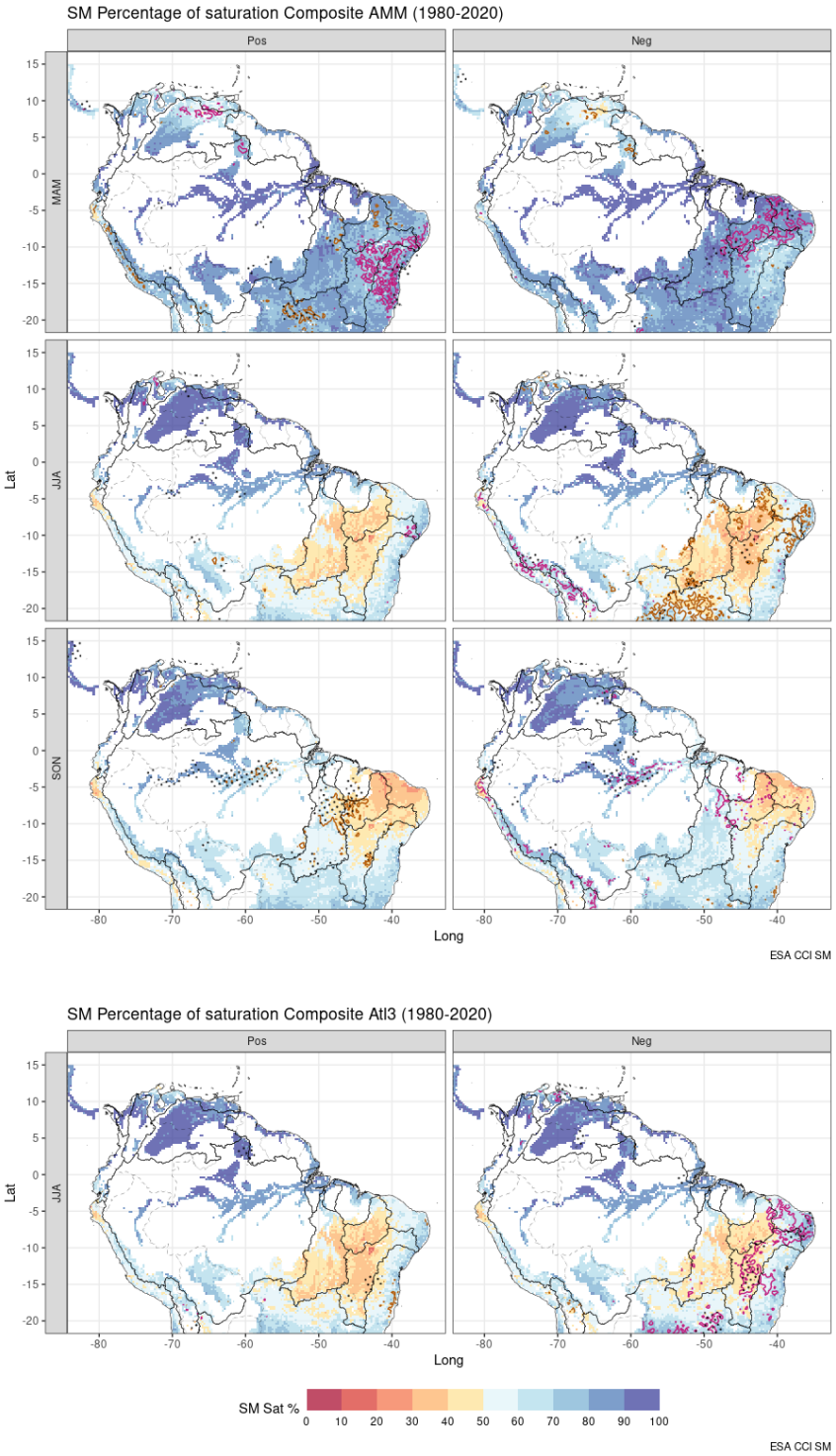

Figure S2. ESA CCI SM saturation composites. Anomalies are drawn with contours at every 5% with positive in purple and negative in gold. Black dots hatching shows the regions where the difference between the anomalies of each phase with respect to the neutral phase are statistically significant at 95% confidence level.

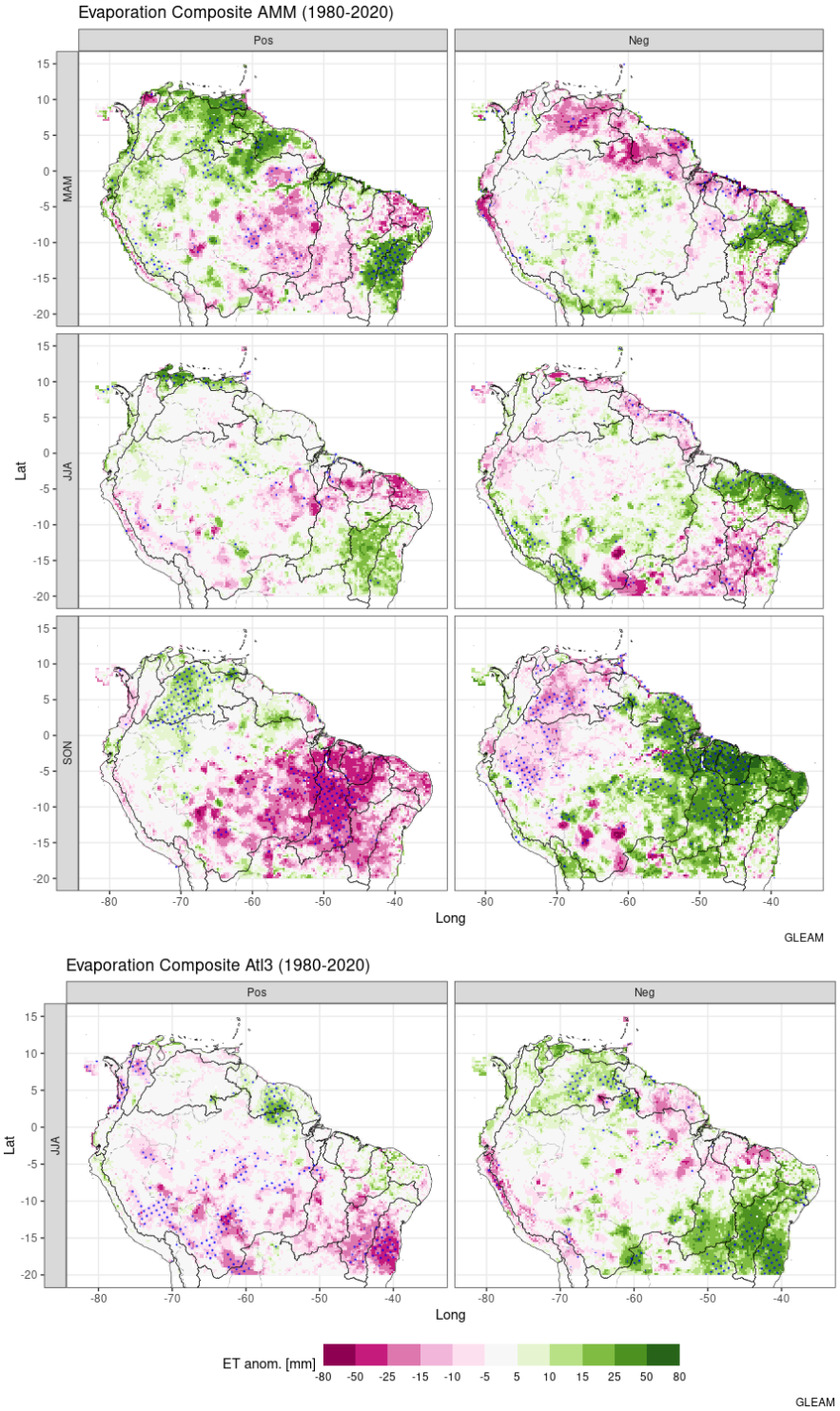

Figure S3. GLEAM anomaly composites. Blue dots hatching shows the regions where the difference between the anomalies of each phase with respect to the neutral phase are statistically significant at 95% confidence level.

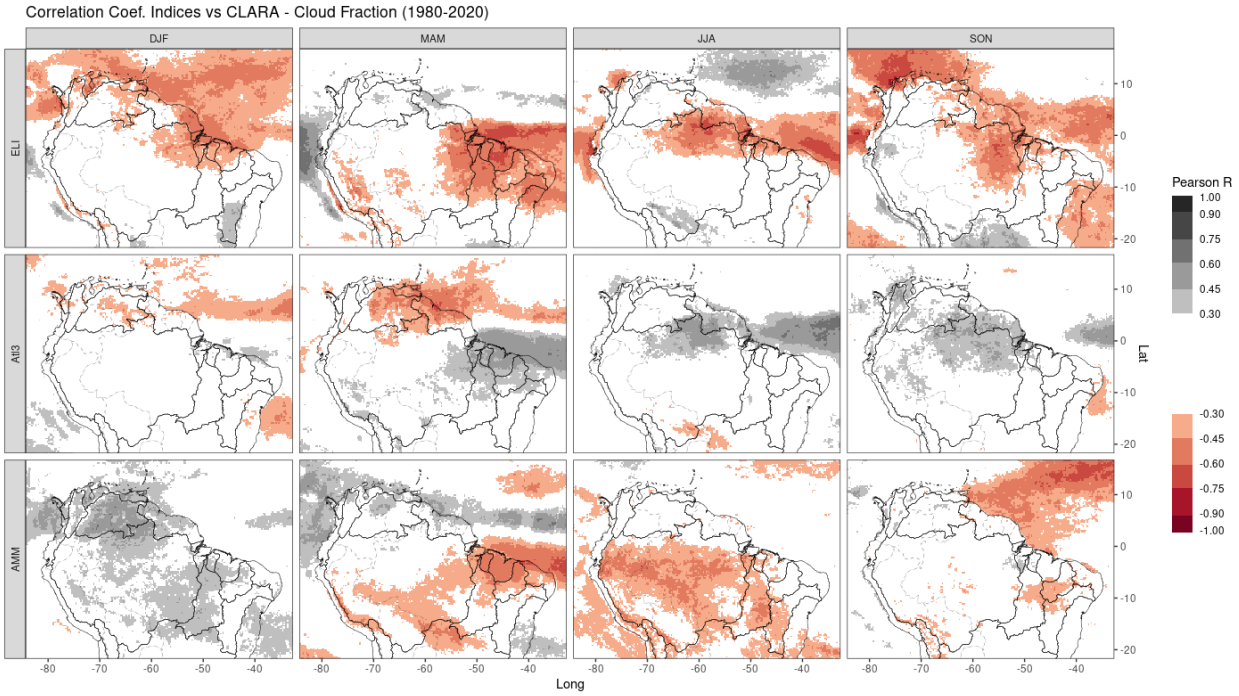

Figure S4. Correlation of Ocean modes with CLARA satellite Cloud Cover. In order to include ENSO's influence, the El Niño Longitude Index (Williams & Patricola, 2018) was included in the analysis in conjunction with the AMM and the Atl3 indices. 95% confidence level significant values are shown in colours.

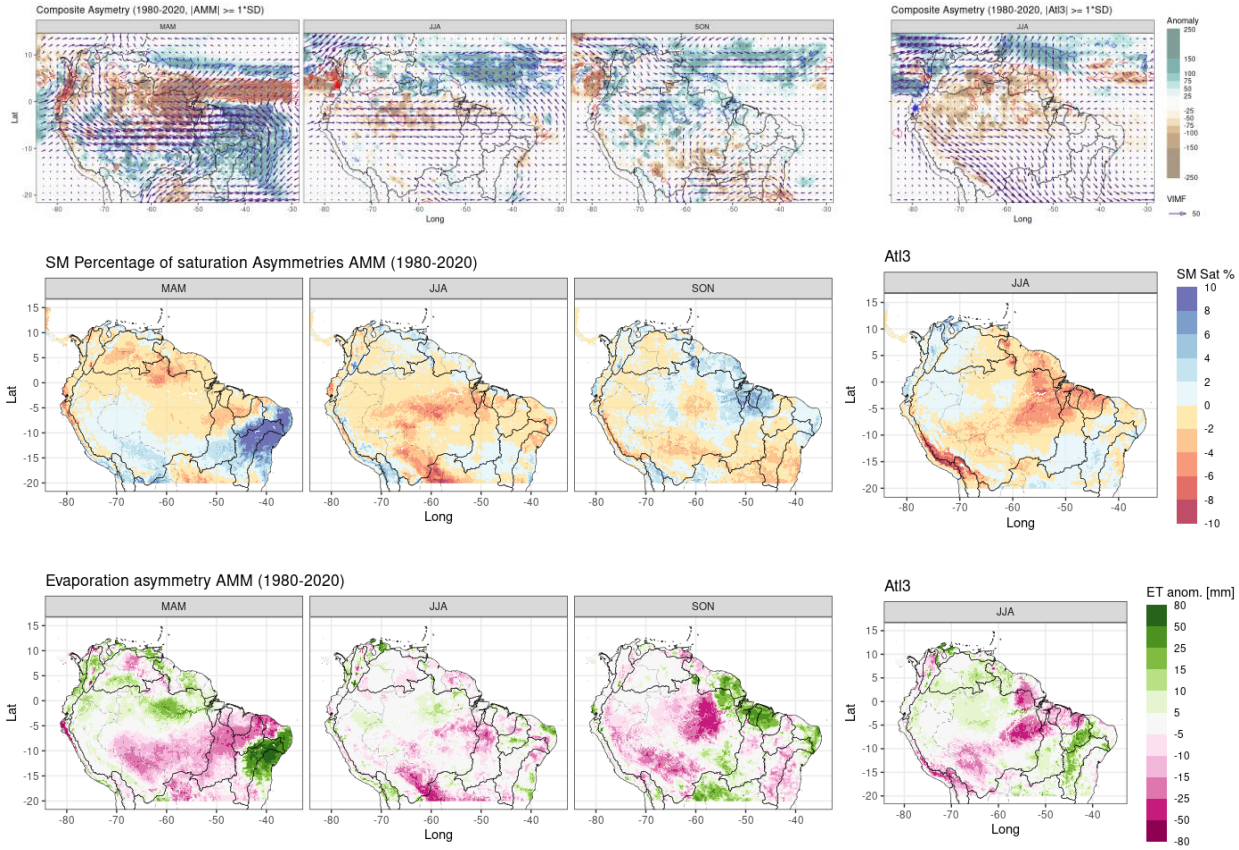

Figure S5. ERA5 and ERA5-Land Composites, positive plus negative phase (asymmetry) of – top panels – VIMF, MDiv and Ppt for the peak season of A) AMM except for austral summer and B) Atl3. Asymmetry of SM anomalies – middle panels – for A) AMM except for austral summer and B) Atl3. Asymmetry of evaporation anomalies – lower panels – for A) AMM except for austral summer and B) Atl3.

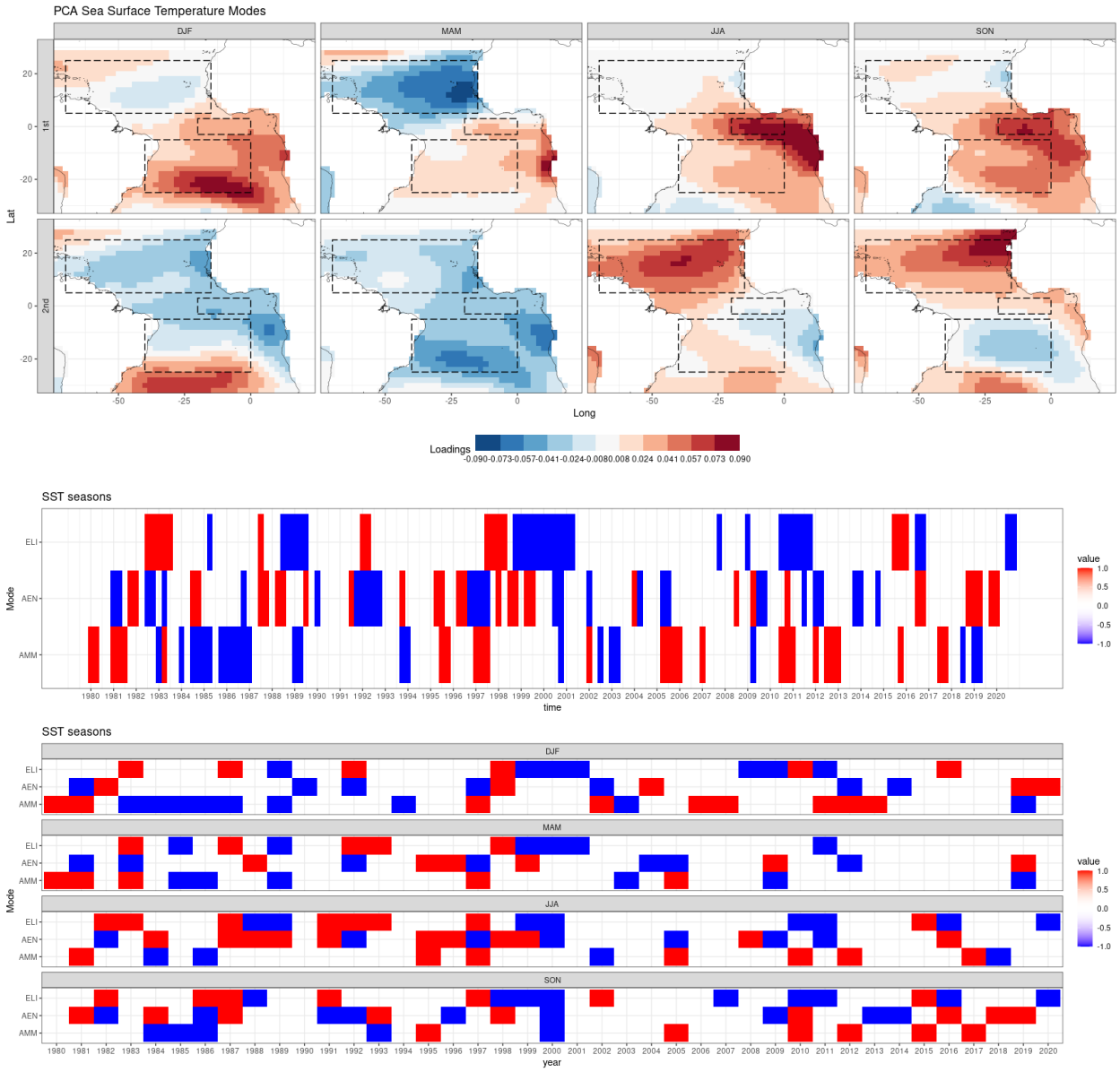

Figure S6. (Top panels) Loadings of the 1st and 2nd Principal components of the Tropical Atlantic SSTs in ERSSTv5. (Middle panel) Seasonal time series of the three SST indices described in the methods section. The Atlantic El Niño (AEN)(Atl3), the Atlantic Meridional Mode (AMM) and the El Niño Longitude Index (ELI) in ERSSTv5. (Lower panels) Sesonal SST indices time series but stratified by season