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Investigating the volcanic impacts on Tropical South Atlantic modes of variability for the Historical period using the IPSL-CM6-LR Large Ensemble and INPE-BESM

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In this study we investigate the the South Atlantic Ocean response to large tropical volcanic eruptions for the historical periods. In particular, we analyse the changes in the coupling of the ocean and the atmosphere over that ocean basin triggered by changes in the amount of incoming shortwave radiation.

The analysis consists of averaging the response of the five biggest eruptions in the last 200 years, namely, Krakatoa (1883), Santa Maria (1902), Agung (1963), El Chichón (1982) and Pinatubo (1991), represented by the IPSL-CMP6-LR Large Ensemble, from the Institut Pierre Simon Laplace, and the BESM-CMIP6, from INPE-CPTEC. We perform the same analysis on reanalysis products as well, such as the HadISST and NOAA's ERSSTv5.

In order to capture the interannual change in the climate variability, we use two climate indices that assess the coupling of ocean and atmosphere over this timescale, namely, the Atlantic Meridional Mode (AMM) and the South Atlantic Subtropical Dipole (SASD). We compute their time series from the model output and calculate their regression to the SST and precipitation fields.

Such analysis should yield more insights on how the interaction between the ocean and the atmosphere responds to external forcings, providing a better understanding of the processes that control the climate variability over the South Atlantic Ocean basin.