Sea level variability on interannual, decadal and longer time scales along the tropical Atlantic

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Regional sea levels often behave significantly differently from the global average, making it difficult to establish future sea-level projections. In the Atlantic Ocean, the regional average steric (thermosteric, halosteric) sea level plays an important role in the variability of the overall trend, associated with heat and freshwater, redistribution due to circulation, and freshwater input from melting land ice and river runoff over the past two decades. This contribution varies in space and time. Based on sea level measurements obtained by satellite altimetry from CMEMS products and salinity and temperature data from Argo floats for the period 2005-2015, we found that the Gulf of Guinea and the Atlantic Niño boxes experienced a large thermosteric relative to the Amazon box, which experienced a larger halosteric contribution to sea-level change. This remarkably large halosteric contribution is associated with a cooling in the upper 700 m range. Currently, local atmospheric forcing, such as wind variability, may not explain this warming while the Tropical Northern Atlantic (TNA) index tends to explain the freshening.