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Weakening Satellite Era and Future Tropical Atlantic Sea Surface Temperature Variability

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Since 2000, a substantial weakening in the equatorial and southeastern tropical Atlantic sea surface temperature (SST) variability is observed. Observations and reanalysis products reveal, for example, that relative to 1982–1999, the March–April–May SST variability in the Angola–Benguela area (ABA) has decreased by more than 30%. Both equatorial remote forcing and local forcing are known to play an important role in driving SST variability in the ABA. Here we show that compared to 1982–1999, since 2000, equatorial remote forcing had less influence on ABA SSTs, whereas local forcing has become more important. In particular, the robust correlation between the equatorial zonal wind stress and the ABA SSTs has substantially weakened, suggesting less influence of Kelvin waves on ABA SSTs. Moreover, the strong correlation linking the South Atlantic Anticyclone and the ABA SSTs has reduced. Multidecadal surface warming of the ABA could also have played a role in weakening the interannual SST variability.

To investigate future changes in tropical Atlantic SST variability, an ensemble of nested high-resolution coupled model simulations under the global warming scenario RCP8.5 is analyzed. SST variability in both the ABA and equatorial cold tongue is found to decrease along with reduced western equatorial Atlantic zonal wind variability.