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Poster
The tropical Atlantic Warm Pool is one of the main drivers of the marine intertropical convergence zone and the associated coastal North-east Brazilian and West-African monsoons. Its meridional displacement is driven by the solar cycle, modulated by the atmosphere and ocean interactions, which nature and respective proportions are still poorly understood. This paper diagnoses the physical processes underlying the seasonal meridional migration of the Atlantic warm pool in an Ocean General Circulation Model (OGCM). We primarily provide simple evidence of how the large amplitude of the migration in the west, compared to the east, is mainly due to the strong east-west contrast of the meridional SST gradient intensities, which are maintained by equatorial and eastern tropical upwellings. Our main results consist first in identifying a diagnostic equation for the migration speed of the two meridional boundary isotherms of the Warm Pool, expressed in terms of the various mixed-layer heat fluxes. We then evidence and quantify how, in general, the migration is forced by air-sea fluxes, and damped by the ocean circulation. However, remarkable controls by the ocean are identified in some specific regions. In particular, in the northwestern part of the Warm Pool, characterized by a large temperature inversion area, the boreal spring northward movement speed depends on the restitution of the solar heating by the thermocline. Also, over the southern part of the Warm Pool, our study quantifies the key role of the equatorial upwelling, which, depending on the longitude, significantly accelerates or slows down the summer poleward migration.
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