



Tropical Atmospheric Response to Decadal Changes in the Atlantic Equatorial Mode

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It has been shown that the atmospheric response to the Atlantic Equatorial Mode is non-stationary. After the 1970s, Sea Surface Temperature (SST) anomalies in the tropical Atlantic are able to alter the atmosphere in the tropical Pacific via modifications of the Walker circulation. Such changes could be related to the differences in the background state of the global SSTs before and after the 1970s, but also to changes in the interannual Equatorial Mode itself. In this work we first describe the differences in the interannual Equatorial Mode before and after the 1970s. Then we use two AGCMs to perform different sensitivity experiments changing the spatial structure of the Equatorial Mode, and we explore the differences in the atmospheric response over the tropical Pacific region to each of the SST patterns considered. It is shown that the changes in the Walker Atlantic–Pacific cell produced by the EM are stronger after the 1970s, and are reinforced by the change in the impact of the EM over the Indian Ocean and the Maritime Continent. It is also shown that, although the Atlantic–Pacific connection is established by the aforementioned changes in the Walker circulation between the two basins, the modulation of the Indian sector is crucial for a realistic simulation of such connection by climate models.