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Cause for an unstable Mediterranean SST teleconnection to the Sahel

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During recent decades, climate variability in the tropical Atlantic region has become a hot topic for the scientific community due to the lack of accurate seasonal to decadal predictions. In particular, rainfall forecasts in the West African Sahel are still far from skillful, being essential for a growing population highly dependent on agriculture and therefore precipitation. Monsoonal rainfall in West Africa triggers in response to the semiannual shift of the Inter-tropical Convergence Zone (ITCZ), reaching its northernmost position over the Sahel during boreal summer. At multidecadal time scales, the Atlantic part of the ITCZ is sensitive to interhemispheric gradients of sea surface temperatures (SST). Furthermore, the atmospheric response to the combination of thermal anomalies in different ocean regions alter the dynamics of the ITCZ at interannual time scales. In this framework, the Mediterranean Sea appears to play an outstanding role in the present period, prevailing over tropical Atlantic and Pacific basins, which historically were the main drivers of rainfall variability in West Africa. Nevertheless, the causes for this change in the leading SST-Sahel teleconnection driving Sahelian rainfall variability have been scarcely proposed so far. Based on observational analysis, our results show evidence on how the ITCZ appears to modulate the Mediterranean SST-driven response of rainfall in the Sahel. These findings are of paramount interest to improve interannual predictability of anomalous rainfall in this region, with the associated socio-economic benefits to Sahelian communities.