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Atmospheric response to SST tendancy in the Eastern topical Atlantic in July-August

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The objective of this work is to understand how the seasonal tendances of the tropical Atlantic SST influence the migration of the Intertropical Convergence Zone (ITCZ) and the West African precipitation associated with it. For this we carried out different sensitivity tests to the SST, climatological, with the regional atmospheric model WRF-ARW. Our results, based on the July-August period, show a strong influence of SST anomalies in the Dakar Nino (DN) and Atlantic cold tongue (ACT) regions on the marine ITCZ and West African precipitation. Above the ocean, the cooling of the tropical northeast Atlantic induces a strong reduction in precipitation north of 10°N, associated with the southward displacement of the ITCZ which is located between 5°-10°N with a slight increase in rains. On the other hand, the warming of the SST of the tropical south-eastern Atlantic induces an increase in marine precipitations, with a maximum centered on 5°N, explained by the location of the ITCZ further south than that associated with the cooling in the region of DN. On the continent, the influence of these SST tendances is characterized by the presence of a zonal dipole of rainfall anomalies over the Sahelian regions. The SST cooling effect in the DN region is more marked in the western Sahel, particularly in Senegal, with a sharp drop in rainfall in this region. While that of warming in the LEF region is more marked in the Sahel, which also induces a strong reduction in the intensity of the rains in this region. However, the combined experience of these two type anomalies shows a dipole of rainfall anomalies over the ocean and over the continent. This dipole is characterized by a decrease (increase) in Sahelian (Guinean) rainfall. Our results also show that, for all simulations, the increase (reduction) in precipitation is more explained by the convective (non-convective) part of the rain. The influence of the SST of DN contributes 40% to 100% on the decrease in rainfall in the West Sahel, while the SST of the ACT reduces rainfall in the eastern Sahel by 40% to 100%. Thus, this work underlines the importance of taking into account the effect of the seasonal anomaly of the SST of DN on Sahelian precipitations in forecasting models.