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The impact of Southern Atlantic moisture source in the precipitation regime of Sahel and Brazilian Nordeste using lagrangian models

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The socio-economical problems related to the severe droughts observed over Brazilian "Nordeste" and Sahel are well known nowadays. Several studies have showed that the precipitation regimes over these regions are influenced by the Inter Tropical Convergence Zone (ITCZ) variability, which can be related with the climatic variations observed in the South and North Tropical Atlantic basins. However, a climatological detailed assessment of the annual cycle of the oceanic moisture contribution to both these regions is still needed in order to get a better understanding of their precipitation regimes and variability. To answer this question, a climatological seasonal analysis of the moisture supply from the South Atlantic to the precipitation in the "Nordeste" and Sahel was performed using a new Lagrangian method of diagnosis which identifies the humidity contributions to the moisture budget over a region. The applied methodology computes budgets of evaporation minus precipitation by calculating changes in the specific humidity along forward-trajectories for the following 10 days. In order to take into account distinct regional contributions we have divided the South Atlantic basin in several latitudinal bands (with a 5º width), and all air-masses residing over each region were tracked forward using the available 5-year dataset (2000-2004). For the Sahel, the preliminary results suggest that the oceanic band northwards 10 degrees south acts as a moisture source for the precipitation along the year and its contribution reaches the maximum during the austral winter, probably related to the ITCZ annual migration over the region. On the other hand, the precipitation over "Nordeste" can be better related to air masses emanating from the oceanic bands between 10 and 20 degrees south. However the response over the region is very heterogeneous spatially and temporally probably due to the high variability of the local climate characteristics. In order to clarify dynamically the origin of the moisture that reaches the semi-arid "Nordeste", a backward-trajectories analysis is being conducted and the results will be presented elsewhere.