



## **Interannual variation of the Sahel rainfall**

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Previous studies observed a correlation between the interannual variation of Sahel summer rainfall and the ENSO cycle. Analyzing both rainfall measured by GHCN stations and compiled on the GPCP grid for the period of 1970-2002, we found that the interannual variation of Sahel rainfall is also linked to the North Atlantic Oscillation (NAO): positively correlated with the Western Europe rainfall, but negatively correlated with the Mediterranean rainfall. Although the ENSO and the NAO modes are not well correlated with each other, the Sahel rainfall is intensified (suppressed) to a greater extent when cold (warm) events and negative (positive) NAO happen simultaneously. A north-south wave train linking the West Africa-tropical Atlantic region to Greenland emerges from the circulation anomalies which are coupled well with the rainfall anomalies. This anomalous circulation is formed by the combination of the ENSO anomalous circulation seesaw between the North Atlantic-Indian Ocean and the North Pacific, and the north-south wave train anomalies of NAO in the mid- and high-latitudes. The Sahel rainfall is modulated by the change in local Hadley circulation caused by both modes. In turn, the convergence/divergence of water vapor flux is modulated by this anomalous local Hadley circulation to maintain the rainfall

variation.