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Link between the onset of the Atlantic cold tongue and the West African monsoon

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The interannual variability of the eastern equatorial Atlantic Cold Tongue (ACT) is closely linked to rainfall variability over the western African continent and particularly to the western Africa monsoon (WAM) jump. In this study we try to relate the variability of the ACT to the variability of the WAM. For this, several indexes are defined to characterize the ACT: mean and maximal surface area, dates of onset and dissipation, mean temperature and duration. The analyses are performed with the Reynolds et al. (2007)'s SST analyses at a resolution of 1/4° over the period 1982-2008. Results indicate a succession of warm and cold events, with a large interannual variability, in terms of onset date, extension, duration and intensity. The variability of all these parameters differs considerably. This suggests that different factors have to be taken into account in order to explain this interannual variability.

The ACT onset dates are compared with the WAM onset dates by Fontaine and Louvet (2006) which were compiled from data of the Global Precipitation Climatology Project (GPCP). The correlation between both series is 0.48 and rises up to 0.80 when excluding four years for which, according to Fontaine et al. (2008), the WAM onset was not well defined and the estimated WAM onset date therefore not a relevant index. As the ACT is on average anterior to the WAM onset, this high and significant correlation suggests that the ACT onset date could be a relevant indicator for forecasting the date of the WAM jump. Regression maps of SST and wind anomalies onto the ACT onset and WAM onset are presented in order to characterize the larger scale environment of this variability and to establish links between winds and SSTs over the tropical Atlantic basin during years with earlier or later WAM jump.