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Response of the Guinean coastal water cycle to changes in Atlantic Equatorial SST intraseasonal variability.

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A strong ocean-atmosphere coupling exists in the equatorial region (northern front) of the Tropical Atlantic cold tongue where cold intraseasonal (respectively warm) sea surface temperature (SST) anomalies strengthen (weaken) southerlies between the Equator and the Guinean coast. Such interactions have a significant contribution in the functioning and partitioning of the water cycle in spring over the ocean as well as later in the season over West Africa.

Using the regional Weather Research and Forecasting Model (WRF), this study aims to describe and quantify such interactions. First we perform an ensemble of simulations for the period April-Jul 2006 that involves testing atmospheric convection, cloud microphysics, boundary layer and radiation schemes. Results are compared to satellite-based products (TRMM, QUICKSCAT, TMI, SRB) and recent reanalysis including CFSR, MERRA, ERA-Interim and the ECMWF special reanalysis (ERA-AMMA) produced within the AMMA project.

WRF simulations in which Atlantic SST intraseasonal variability is changed are then presented to quantify the impact on the water cycle of such fluctuations and to describe the dominant underlying mecanisms.