



## **Intraseasonal land-atmosphere coupling in the West African Monsoon**

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Via its impact on surface fluxes, sub-seasonal variability in soil moisture has the potential to feed-back on regional atmospheric circulations and thereby rainfall. An understanding of this feedback mechanism in the climate system has been hindered by lack of observations at an appropriate scale. In this study, passive microwave data from satellite are used to identify soil moisture variability during the West African monsoon, and provide an interpretation of atmospheric variability on time scales of the order of 15 days. During active monsoon periods, the satellite data indicate extensive areas of wet soil in the Sahel. Based on these data, quantitative estimates of the impact of soil moisture variability on surface heating are developed for the wet seasons 1998 to 2006. Comparison with ECMWF analyses indicate that surface heating variations play a key role in the regional heat budget of the planetary boundary layer at the intraseasonal time scale. The idealised atmospheric response to the surface forcing closely resembles the previously documented intraseasonal variations in the monsoon flow, notably a westward propagating vortex at low levels. The vortex can therefore be regarded as an effect of the rainfall (via surface hydrology) as well as a cause.