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West African monsoon variability:

A meaningful illustration of the role of land-atmosphere coupling on interannual variability

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In the land surface modelling community, West Africa is generally considered as a "hot spot" where the land-atmosphere coupling is particularly strong and relevant for the understanding of climate variability at the seasonal to multi-decadal timescale. Interestingly, it is also a region which is highly sensitive to sea surface temperatures, not only in the tropical Atlantic but also in the other ocean basins through atmospheric teleconnections. The present study is aimed at comparing the relative influence of land surface and oceanic boundary conditions on atmospheric variability and predictability at the seasonal timescale. It is based on both ensembles of atmospheric simulations with interactive versus prescribed soil moisture conditions over the late 20th century, and on a statistical analysis of the available instrumental record. The results emphasize the need of an interdisciplinary approach of climate variability, whereby the role of the land surface component is not only evaluated in idealized atmospheric experiments, but also in a more realistic framework where all potential sources of climate variability are considered.