



## **Comparison between soil moisture estimations by GRACE satellite mission and by land surface models over West Africa**

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Soil moisture is a key variable for land surface modelling particularly in regions, such as the Sahel, where the coupling between land surfaces and the atmosphere is potentially important. Water availability in the root zone is also fundamental for monitoring and modelling vegetation development but measurements of this variable are scarcely available at regional -global scale.

The GRACE mission allows monitoring the vertically integrated soil water content. However retrieving this parameter from the gravity field variations measured by GRACE is not straightforward and different water height products are available.

In this paper we compare different GRACE water content products with the soil moisture calculated by various land surface models employed in the AMMA Land Model Intercomparison Project (ALMIP) over the period 2004-2006. Both seasonal and inter-annual variability of the GRACE products are consistent with the precipitation fields, with 2004 being very dry in the Sahel. The differences between the satellite products and the modelled soil moisture are significant and they are larger than the intra-variability within the GRACE products or within the outputs of the different land

surface models. Interpretation and discussion of these observations is carried out by also taking into account in-situ soil moisture measurements and a simple parametric model based on precipitation.