



Observing climate variability from space at regional scales by use of vegetation index in semi-arid Africa : diagnostic and prospective

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In semi-arid Africa – where annual rainfall ranges between 200 and 600mm, the impact of climate variability can be satisfactorily captured at regional scales based on space observations of vegetation (for instance, NDVI). Indeed, for these regions, the apparent response of vegetation to rainfall has proved to be the strongest, both at the intra-seasonal and inter-annual time steps.

In this study, we first use the long NDVI time series from NOAA-AVHRR (1981-2003) to characterize the rainfall-vegetation relationship for three small semi-arid regions ($\sim 150\,000\text{ km}^2$) located in West, East and South Africa. We propose then to establish to what extent the inter-annual variability of large-scale oceanic fields, which controls rainfall in semi-arid Africa, is related to that of photosynthetic activity in the 3 regions considered. Results emphasize high correlations between the identified large-scale fields (one or two per region) and the NDVI, with a time-lag from 1 to 3 months. Based on this, we established statistical models enabling the prediction of seasonal NDVI from large-scale oceanic fields in small regions of West, East and South Africa.