

Interactive comment on “Estimating Sahelian and East African soil moisture using the Normalized Difference Vegetation Index” by A. McNally et al.

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1. A statistical approach is empirically based so that the coefficients derived from the measurement at one site may not be applicable to other sites or to a large area. This is the main problem with this paper. The developed NSM index works well on average at the Niger sites (Figure 3). However, it could not adequately describe the soil moisture in a wet or dry year at the Niger sites. It could not fully explain soil moisture in terms of magnitude and seasonality at other sites (see below). The authors may revise their paper with in-depth analysis and discussion in this perspective

RESPONSE: We will be clearer in our analysis and discussion regarding the utility of the in situ soil moisture observations in calibrating the pixel based NDVI data. As

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mentioned in our responses to the other reviewers, the inter-annual variability at a point is going to be controlled by local rainfall, slope, aspect and vegetation. These are characteristics that are not resolved at the 10km scale which we conduct our analysis. However, the point information does provide information on the timing and units of soil moisture that are needed to transform the NDVI signal into a soil moisture signal. After we have transformed the NDVI into an estimate of soil moisture and aggregate it to the country-crop zone scale (Figure 8) we show that we do capture differences between wet and dry years: the NSM accurately detected the agricultural drought condition in Niger for 2004 and 2009.

2. A map of NSM would help. The authors can compare NSM, NDVI, and API. Some in-depth analysis and discussion in their similarities and differences would help.

RESPONSE: we will include more discussion on the similarities and differences of the different estimate of soil moisture and the NDVI.

3. Should "dekad" be "week", and "dekadal" be "weekly"?

RESPONSE: Dekad is the time unit often used with agricultural drought monitoring which is two 10 day periods for the first 20 day in a month, and an 8-11 day period for the third dekad of a month. We can make the explanation that appears on 7970 clearer. "The dekad is a standard time step for agricultural monitoring and NDVI that aligns with calendar months: the first and second dekads being 10 days each and the third being the remainder of the month (8–11 days).

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