

Interactive comment on “Surface response to rain events throughout the West African monsoon” by F. Lohou et al.

Anonymous Referee #1

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The manuscript by Lahou et al. investigates the e-folding time scale of evaporation decay over the Sahel. I have been struggling to find the main novelties of the paper compared to preceding work on time scales of soil moisture (Teuling et al. 2006, Katul et al. 2007, Seneviratne's work, Koster's work and Dirmeyer's work). I therefore suggest major revisions. In many places the manuscript is not clear or goes into too much detail while missing the main points of the paper. The paper could be substantially improved by systematically highlighting the major (new) points of the paper, in perspective with existing literature on the subject. Some sophisticated analyses of soil moisture time scale (in models) have been developed by Seneviratne, Koster and Dirmeyer. It would be important to discuss these paper, which try to decompose the soil moisture time scale into synoptic and soil dependence and how they relate to your

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work.

Specific comments: - page 18583 paragraph line 10-20: Beside rooting depth (which is really a model abstraction and works very differently in reality), there are lots of other factors that can explain the slower decrease of evapotranspiration in drier climate such as drought resistance (e.g. plant physiological traits, water use efficiencies...). - page 18587: give depths of soil moisture measurements - page 18591: explain that EF is assumed constant and why we can assume that it is constant - page 18592: 5-day long instead of 5 days long - above 4.1.2: you could mention that results could have been expected since EF is never close to 1. - page 18599 line 5: you should point out that this rooting depth is just a model abstraction to represent time scale of evapotranspiration and water use, but plants function very differently in reality. Maybe you should have cited some of the work of Rodriguez-Iturbe.

One last comment: maybe HESS would have been a better fit for this type of subject/study

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