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Hydrology and Earth System Sciences
Discussions

Interactive comment on "The Normalized Difference Infrared Index (NDII) as a proxy for soil moisture storage in hydrological modelling" *by* N. Sriwongsitanon et al.

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Anonymous Referee #1 This is an interesting article assessing the link between the Normalized Difference Infrared Index (NDII) and soil moisture storage for hydrological applications. It is of interest for HESS Readers, however as it is I am confused with the objectives of the manuscript. It seems to me (but Authors might want to correct me) that sometimes concept of root zone soil moisture and soil moisture storage are unclear. I believe that e.g. Numerical Weather Prediction and Hydrological communities are not exactly after the same information, the root-zone water storage or its variability, i.e. the day-to-day variability or the medium/long terms variations (?) That is why I believe

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major revisions are required, my main concern are listed below:

Reply: We appreciate your constructive comments. And we will fully consider all your comments to revise the manuscript.

*Clarify the objectives; NDII as a proxy root zone soil moisture variability / storage. For example References used slide 8433 (Albergel et al., 2008, Ford et al., 2014, Reichle, 2008...) are not for the same applications that the one you are targeting, then the comparison is not easy. [The use of surface observations in Land Data Assimilation System (that propagates the surface observations into deeper parts of Land Surface Model) is omitted also.]

Reply: We will clarify the objectives of this study in the introduction. Root zone storage is the term we intend to use throughout. We will use this term consistently in the entire manuscript. We implicitly mentioned the method of "propagating surface observations into deeper parts" as "model" in Page 8433. We will do more clarification here.

*Choice of the evaluation metrics. I am not certain that the coefficient of correlation is the best metric to assess this work. It is known to be artificially increased in case of a strong annual cycle [as illustrated by figures 7 and 8]. The use of 8-days data is also in favour of this increase. Maybe that other metrics like the Nash-Sutcliffe efficiency would be more adequate.

Reply: Maybe the coefficient of correlation is not the best metric to assess the results, but it serves a similar purpose as the Nash-Sutcliffe efficiency (NSE). Our concern is that NDII is a non-dimensional variable, while Su is in the unit of mm. NSE may not be suitable to justify the relationship between a non-dimensional variable and a dimensional variable. However, as suggested by the referee, we will deseasonalize the time series to obtain more robust conclusions. And then, we will put the deseasonalized two time series data together which will clearly show their relationship.

*Discussion of the results; Readers are too often referred to Tables and figures, results

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are not enough discussed in the text

Reply: We will improve our discussion in the text.

- Better justify the use of the FLEX soil moisture as a reference - Carefully list all the acronyms - indicate last access to websites

Reply: We will do more interpretation to clarify the reason to choose FLEX soil moisture as a reference for root zone storage. In fact, the root zone storage in FLEX is the dynamic part of the moisture storage in the unsaturated zone. Of course the unsaturated zone contains more moisture than contained in the root zone storage (mostly in the region below the root zone until the saturated groundwater, but also partly in the form of moisture within the root zone layer that is not accessible or accessed by roots). The root zone storage capacity that is obtained by calibrating FLEX, defines the part of the unsaturated zone that determines the dynamics of the runoff regime. This storage capacity is created by the vegetation through transpiration from the root zone. We shall explain this better in the paper. In addition, we shll list all the acronyms. And we will update the link of the website.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 12, 8419, 2015.