Dear Reviewer,

thank you very much for your comments to improve our manuscript.

Please see below for a detailed reply to your comments:

- Line 84-112: it's good to see the brief summary of methods used for analyzing time series of soil water. However, in terms of wavelet method, I think it worths mentioning the extension of wavelet coherence from two variables to multiple variables, including multiple wavelet coherence (doi:10.5194/hess-20-3183-2016) and partial wavelet coherency (https://doi.org/10.5194/hess-25-321-2021) .
    - Thank you for this suggestion and making us aware of these publications. We will include a paragraph about the multiple wavelet coherence and partial wavelet coherency in the introduction and discussion of our revised manuscript. For the present study, it was sufficient to detect the basic differences in temporal patterns. For future studies, we will definitely consider this approach in our analyses. Especially, partial wavelet coherence is a promising tool to analyze factors (precipitation, Eta) that might explain the variations in SWS.
- Line 113: capitalize "w" in "wavelet" please.
    - We will correct the typo.
- Line 170: I might have missed how did you treat the three replicates when you analyzed the data using wavelet? Did you do wavelet coherency for each lysimeter or for the mean values of the three lysimeters.
    - We used the mean values between the three lysimeters for our further analysis. We will add the following paragraph in the revised version of the manuscript:

      „For the further analysis (wavelet and wavelet coherence analysis) the mean of three replicate lysimeters was calculated for each hour and parameter.

- Line 204-205: I would detail the exact depth of each horizon for each lysimeter. How did the variations in the thickness of various horizons below the Ap horizon affect the SWS and associated correlations with climate (e.g., P, and Eta)?
    - We will include a table with the exact depths of each horizon in the appendix. As you can see in Fig. 2 the variation between the different lysimeters is very small as well as the variation in horizon depth between the lysimeters. Therefore, we decided to include only the plots of the mean values between the different lysimeters for each site in the manuscript.

Horizon DD-01	**Depth [cm] DD-01**	**Horizon DD-01**	**Depth [cm] DD-03**	**Horizon DD-05**	**Depth [cm] DD-05**	**Horizon SE-41**	**Depth [cm] SE-41**	**Horizon SE-45**	**Depth [cm] SE-45**	**Horizon SE-46**	**Depth [cm] SE-46**
Ap	0-30	Ap	0-35	Ap	0-30	Ap	0-30	Ap	0-37	Ap	0-35
Al+Bt	30-42	Bt	35-75	Bt	30-65-	Bt	30-55	Bt	37-75	Bt	35-75
Bt	42-80	elCcv1	75-115	elCcv1	65-115	elCcv	55-100	elCcv	75-150	Bvt	75-84
elCcv	80-150	elCcv2	115-150	elCcv2	115-150	elCv	100-150			elCcv	84-105
										elCv	105-150

- Line 208: why not keep exact the same. How can you exclude that the different crops in 2014 would not affect the associated relationships?
    - You absolutely right that it would have been more reasonable to plant the same crops at both sites in 2014. Unfortunately, the effect cannot be excluded that the different crops might have on the SWS. However, we decided to keep the year 2014 in our analysis to extend the observation period at the beginning in order to be better informed on initial differences. The different crops were planted in the beginning and not in the middle of the time period, effects were assumed to be minimal.
    - We just received note that in 2015/16 winter wheat instead of winter barley was planted in Dedelow. However, since both crops are winter cereals we expect only minor deviances.
- Line 245: if you are interested in the real correlation between two variables, partial wavelet coherency mentioned above may be a better option. This at least can be discussed in the conclusion.
    - Thanks for the suggestion. As you mentioned, partial wavelet coherency (PWC) might be a better tool to analyse the correlations between soil water storage, precipitation and actual evapotranspiration. According to the publication you mentioned PWC is especially useful when dealing with variables that might be dependent on other variables. By applying PWC this effect of other variables can be excluded. We will include a paragraph of this advanced methodology in our discussion and conclusion.
    - Note that PWC is currently implemented in the commercial software Matlab, but not implemented in free software R.
- Line 296: I don't think that band is green, more like bright sky blue
    - We will change the colour description.
- Line 301, 304, 305: please specify which smaller scales
    - With smaller scales we meant the scales from semi-annual to monthly scales. We will specify that in the revised version of the manuscript.
- Line 340: can't see the small peak in Fig 4b. Do you mean Fig 4d?
    - We meant Figure 4d. Sorry for the confusion. We will correct the mistake.
- Line 350: I did not see the description of rainfall pattern. It shows no annual cycle but big peak at a few hours' time scales, and this is more obvious at the drier site. Can you please add this result in?
    - Thank you for the remark. We mentioned the rainfall pattern in line 340 but as you suggested, we could enhance the description more. We will include the results in the edited manuscript.
- Line 396: Twelve
    - We will exchange „12" for „twelve".
- Line 451-454: can you please explain how ETa responds to the SWS changes after more than 100 days? ETa should not respond to SWS change in a very short time? I know this is related to different time scale, but it seems really hard to understand from the hydrological process point of view. You may need to clarify here.
    - Why is there such a temporal scale in the relation between SWS and ETa? From a hydrological perspective, SWS and ETa are of course always related from shorter to longer times. The time delay in the relation between ETa and changes in SWS at shorter times (hourly, daily, etc) are, however, stronger affected by other water balance components. However, the time scale we are looking at is the annual scale so the variations we are observing here are more related to seasonal fluctuations than small-scale daily fluctuations. So at a seasonal scale the SWS is decreasing around 90 days earlier than the ETa,

which could mean that the decrease in ETa could be buffered by taking up water from deeper layers of the soil. So the SWS will decrease but not the ETa. This shows the importance of SWS as a variable for crop productivity.
    - We will explain this fact more detailed in the revised manuscript.

- Line 467: 136 h or day?
    - We meant „days“ and will correct the mistake in the manuscript.