Public justification (visible to the public if the article is accepted and published):
Dear Authors,

both reviewers have studied your revised manuscript and are happy with the changes you made. However, there are still some corrections to be made according to Review #2. Furthermore, Reviewer #2 also comments on errors in terms of language. As I also found several mistakes and your phrasing sometimes too vague or awkward and thus not clear for the reader, please again take the time to go over your writing. I have added some more comments and suggestions in the attached pdf (inserted into your response, but of course to be applied to the manuscript).
I am recommending minor revisions and as the required changes are indeed not major, I am not planning to send the manuscript back out to the reviewers.

Looking forward to receiving your revised manuscript and concluding the publication process!
All the best,
Theresa Blume

Thank you for the comments and suggestions! Please find our corrections below.

- Black text denotes the review comments.
- Green color denotes original text from our previous document.
- Red is our responses and corrections.

The revised version addresses all my previous comments. But the modified text contains several langues mistakes, to be corrected.
I have some minor suggestions:
- do not use groundwater level and groundwater head interchangeably, use precise wording
- line 189: with fluxes integrated over the lake surface area "and in time".

Corrected

- line 200: "With this assumption, the impact of the unsaturated zone is considered within the hydraulic response time": I do not understand what this means; do you not simply mean that storage changes in the unsaturated area are neglected?
- line 200: " In the model, this time represents the time water need spends travelling through the unsaturated zone, and it is estimated from the observed data"; please avoid giving the impression that hydraulic memory is related to actual water travelling through the system; you rather refer to the time that the impulse is travelling through the system; this difference is important (if needed, refer to the transit time estimation work by James Kirchner for details)

Corrected as:

“With this assumption, storage changes in the unsaturated zone are neglected. In the model, this time represents the time water spends travelling through the unsaturated zone, and then the pressure impulse traveling through the system. The hydraulic memory of the system is estimated from the observed data.”

-bandstop filter: can you give the implementation also as for the other filter?

Both implementations are included in the supplementary figure.

- fig. 3b: linear models - what is modeled and what enters the linear model (should be clear already here)

We rephrased the caption as:

“fit quality of linear models of the weather forcing-lake level relations (eq. 6) using different system memory timeframes.”

Editor comments

L211

please always state precisely if you are referring to lake or catchment storage. This needs to be clarified. Please also explain why you assume that. What is the basis of this assumption? Right now the phrasing makes it sound a bit random.

"We based this assumption on the fact that lake level changes are relatively small compared to the scale of the catchment, and the catchment geometries are simple in a lowland, sedimentary geological setting. The catchment storage change - lake level change relation reads as:"

Fig. 3

is memory size the correct term here for memory extent in days? It sounds awkward. Maybe system memory?

For more clarity, we removed the title from the top of the plots, and rewrote the caption as:

"Lake response time analysis: a) autocorrelation of lake levels, b) fit quality of linear models using different system memory timeframes."

L400

Our presented approach tried to show that to understand the lake level dynamics such complex understanding is not required. The here presented simple process describes the behavior of the simplified model we used. The results show that the majority of the dynamics can be explained with this simplified setup, as shown by the good model fits. The discrepancies between the model and the observation that provided the basis of our discussions shows that the catchment is indeed not as simple as it may seem by the model.

this seems a bit circular but also contradictory,

We would revise the last sentence as: The analysis of the remaining discrepancies between the model and the observation that provided the basis of our discussions shows that the catchment is not as simple as it may seem by the model.

L437

An event will affect the water table until the water seeps through the unsaturated soil.

I don't understand this

Corrected as:

"A rainfall event will affect the water table until the water seeps through the unsaturated soil."

Reviewer 2

“Lakes are directly exposed to climate variations, as their recharge processes are driven by precipitation and evapotranspiration, but they are also affected indirectly via groundwater trends, changing ecosystems and changing water use.”

I find this separation of directly and indirectly a bit hard to follow. If the lake is groundwater fed and groundwater recharge is affected by climate change - that is still a direct impact to me. You also also seem to consider impacts on the recharge processes as direct impacts. Clarify why groundwater trends caused by climate change are not a direct impact. If you are here referring to groundwater trends caused by other processes then this should be clarified.

We rephrased this, to avoid confusion:

“Lakes are directly exposed to climate variations, as their recharge processes are driven by precipitation and evapotranspiration, and they are also affected by groundwater trends, changing ecosystems and changing water use.”

Comment to L162:

It would be good to mention this also in the manuscript, I already suggested this in the previous round.

Included as:

“Second, this approach explicitly takes into account meso-scale heterogeneity of weather systems, which is of particular importance for precipitation and actual evapotranspiration with high variability at spatial scales of a few kilometers or less. When we tested our lake models using weather station data, we were unable to obtain the same model fit qualities as with the CER v2 dataset. The largest differences happened after extreme rainfall events, where due to the spatial variation the recorded amount of rainfall could differ a lot from the rainfall at other locations. Because summer storms have a strong impact on the lake levels, we could not close the water balance models using weather station data.”

L201

This suggests that the linear model in equation 4 is a valid assumption, however note that eq. 4 links catchment volume to lake levels, so the hypsographic curve cannot be used directly.”

You need to explain why this is a valid assumption when you are using catchment storage and not lake storage. Why is it possible to assume that if your lake shows a linear relationship, the catchment will also do that? When is this the case and when isn't it?

The lake level – catchment storage relation is mainly a question of geological complexity. The lakebed morphology could be an indicator of a complex, or simpler geological setting, hence linearity in the hypsographic curve could be an indicator as well. But, as many other factors would affect this relation as well, after some consideration we decided to remove this argument from the revised manuscript.

Instead, for our choice of linearity we would use the argument of the assumed simple geology directly, and the argument of scale differences raised by the second reviewer: as the range of lake level changes are much smaller then the catchment scale. Please see our first correction above.

We rewrote this section as:

"The hypsographic curve based on the bathymetric model of the lake shows a linear relation between the lake volumes and lake levels (Jahn and Witt, 2002), but note that this relation cannot be used to link the lake levels to the catchment storage."

L212 – we have removed this sentence.

L246 - in what way does this help with visualization? Needs to be clarified.

"For the plots of the linear regression analysis (Figure 6,7,8 and 9), a lowpass filter was used over the lake level data, with a cutoff frequency at 20 days. This was necessary for the visualization in Fig. 7, where the higher frequency components would appear as noise over the coefficients."

L324

"larger lags"

L544 – We show now the MODIS data in supplementary figure 2.