

Interactive comment on “Major flood dominates 14 year sediment and nutrient budgets for two subtropical reservoirs” by K. R. O’Brien et al.

Anonymous Referee #2

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General comments

This paper deals with some important issues about the challenges that are faced in some catchments and reservoirs where peak flows, despite very rare, have a huge influence on the load budget. On the same time these peak flows are the most difficult to monitor and represent very short time periods which complicates data interpretation.

The paper is generally well written with a fluent and precise language and very few grammatical errors. The paper is well structured and both data and methods are described in sufficient detail and it is an interesting data set with a long time series of both flow and nutrient and sediment concentrations. In that sense I find that the paper does have a sufficient quality and some relevance for the general readership of HESS. However, I find that the weak part of the paper is the fact that I do not see that this

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paper makes a substantial contribution to our current knowledge about nutrient budget estimations or nutrient and sediment transport processes. It is fairly well known that peak flows can contribute substantially to transport of nutrients and sediment and that monitoring of these peak flows are difficult because any time averaging (which is mostly done during normal flow periods) introduces a huge uncertainty on the peak flow load estimates. Therefore I suggest that it could be considered if this paper might be more suitable for a targeted engineering journal, for instance with special interest in reservoir and dam dynamics and their impacts on freshwater ecosystems.

There is an excessive use of references to supplementary material. I find it somewhat problematic that such a large part of the paper relies on supplementary material. In my opinion supplementary material should function as a supplement, not as an essential extension of the paper. I therefore suggest that the supplementary material is critically reviewed and condensed.

Generally I think that the Conclusion section is more a Perspectives section. I suggest that the conclusion should be rewritten to sum up the findings rather than discussing perspectives and implications.

Specific comments

P. 7 line 5: You write that you do not expect a good relationship between TN and turbidity. However in the plot (Fig. S2) the relationship looks just as good as for TP and TSS? Could you comment on this?

P 8 line 15: For output loads the uncertainty is estimated as deviation of Method 3 from method 4, but why is method 4 used? and not one of the others?

P 8 line 6: In method 3 why are loads not calculated based on the two monthly measurements, rather than just one? Would two measurements not give a better estimate, simply due to less interpolation and more real data?

P. 11 line 19: Do you mean flow-TSS correlations as conducted by Grinham et a.

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(2012). Slightly confused with what is your method and what is done by others.

P. 13 line 3-4: You repeat what you just said above about the size of the relative uncertainty compared to input and output uncertainty.

P 13 line 7: That uncertainty is high in unmeasured elements is quite trivial I think. You could either leave this out or state it differently.

P. 12-13: There is a really large focus on this other study, but I do not see clearly how this study advances our knowledge compared to the Parson (2011) paper?

P. 13 line 13-15: Do you mean comparison between methods 1-4 or comparison between the two different reservoirs? Please clarify.

P. 13 line 20-24. Are you more confident using trapping efficiency during peak flows or in general? I do not find it completely clear why you come to the conclusion about more confidence in trapping efficiency than in retention, since both are a function of inflow?
P. 13. Line 24. Do you have any suggestions to how this could be achieved?

P. 13 line 27 – P 14 line 1-4: I suggest that this should be moved to the results section? I miss a comment of the importance/implications. Do you believe in these numbers, given the uncertainty in loads, and what is then concluded? I suppose that loss of storage volume seems not to be an issue in these two reservoirs, despite and overall net retention of sediment and nutrients?

P 14 line 15-17: Is this your conclusion (this is the impression I get) or one by Lewis et al. (2013)? Either rephrase so that this is clear or delete reference.

P. 14 Line 22: I do not understand this sentence. Less is released and this leads to net export? And where is Brisbane water supply located? Are water pumped from lake Wivenhoe to the water supply? Could you rephrase this sentence?

P 1 line 30 p. 15 line 1-2: I suggest that this section is rewritten to be more specific about this particular study. It is a rather general statement but as I understand it is

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based on the findings in this study?

P. 15 line 9-10: This should be moved to the discussion session.

Technical corrections

P. 2 Line 16: please correct typing mistake in “reservpors”.

Please be consistent in the use of spelling out “concentration” or writing in in brackets (example p. 10 line 2 and 16).

P. 13 line 6: please replace “than” with “that”.

P. 14, line 27: You already defined DIN, no need to repeat it.

P 14, line 29: Please replace “dissolve” with “dissolved” and write “N and P” rather than N:P.

Fig. 6. Please include units on y axis rather than in the figure text.

Figure S3. The figure would be easier to read if the plots were bigger relative to the text.

Figure S4. The figure would be easier to read if the plots were bigger relative to the text.

Table 1. I find this table very difficult to read and I suggest that it is restructured or left out as there is a quite comprehensive description of data in the main text.

Table S4: What does “Method 3: Method 1”, is it the deviation between the two?

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