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Hydrology and Earth System Sciences
Discussions
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# *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 #1**

Received and published: 19 May 2016

General comments:

This manuscript uses a series of different methods to construct input and output streamflow and TSS, TN and TP loads/budgets for two reservoirs situated in subtropical southeast Queensland. The results are used to provide an estimate of uncertainty in the loads and are then used to calculate the retention of the constituents. The key finding is that the major flood in 2010/11 dominated the sediment and nutrient budgets for the entire 14 year study period and highlights the importance of long-term monitoring with a primary focus on obtaining high resolution data from large flood periods. The data also show that while the high uncertainty in the load data in the flood period prevents reliable calculations of mass retained in the reservoirs during this time (the uncertainty was higher than the mass retained), the trapping efficiency as a percentage could still be estimated for some parameters as well as the retention over the



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whole study period. Overall the findings provide important insights for research on catchment budgets and reservoir retention and the paper is suitable for publication. I initially found the construction of the manuscript to be a little unconventional where it appeared study results (i.e. modelled and monitored load data and uncertainties, comparisons between the data etc) were reported in the 'materials and methods' section with this section being quite long relative to results/discussion. However, on reflection given the main findings/theme of the manuscript I don't think a restructure would greatly improve the manuscript. Hence I recommend publication pending some minor revisions that relate to methods that require additional information and some minor textual edits.

Specific comments:

Section 2.2: I'm wondering if some more information (or a reference) could be provided for the Source Catchments/WaterCAST modelling from the SEQ region? For example the model captures land uses soil type EMCs, however, later in the manuscript it is stated that river channel erosion is the main source of sediment inputs to the reservoirs – can the model account for this process?

Page 4 Lines 27-28: Some more information of the methods of analysis for TSS and in particular TN and TP would be helpful. Can a reference be provided on the analysis? E.g. What digestion was used; what instrument were the data measured etc. Also might be worth pointing out that there is uncertainty in the laboratory analysis as well!

Page 6 Lines 7-11: I was a bit confused on this paragraph on what data the authors are referring to – on a second read I'm guessing that it was monthly turbidity data (measured on a probe?) that was collected? Then this data was compared with the nephelometer data (the two datasets?). This just needs to be better clarified.

Page 6 Lines 25-27: Not sure if this is needed (what is expected)?

Page 8 Line 21: I may have missed it in the manuscript but I was not clear on what the





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difference is in the definition between ‘mean load’ and ‘total load’?

Figure 8: Not sure if this figure adds too much to the manuscript?

Technical comments:

Abstract: Suggest adding brackets for (TN) and (TP) where first defined.

Page 2 Line 13: Please spell out ‘nitrogen’ so reads ‘...and sometimes nitrogen (N)...’

Page 2 Line 29: ‘This study’ = new paragraph so needs tab space. Also note a few instances in the manuscript where the tab for new paragraph is needed – Page 3 Line 19, Page 3 Line 25, Page 4 Line 14, Page 4 Line 24 (starting with Uncertainty), Page 5 Line 8.

Page 3 Line 10: Please add ‘(SEQ)’ after ‘southeast Queensland’ (then okay to use SEQ later on – e.g. Page 4 Line 11)

General comment – please check spaces throughout the manuscript (e.g. Page 3 Line 15; Page 4 Line 4)

Page 3 Line 26: Suggest adding ‘catchment area’ so will read ‘...within the Wivenhoe and Somerset catchment area..’

General comment – ‘data are plural’ so e.g. Page 5 Line 27 ‘Monthly monitoring data were’ (also check Page 6 Line 7; Page 7 Line 25; Page 9 Line 27; Page 10 Line 5).

Page 5 Line 28: Replace ‘was completed by’ with ‘from’?

Page 6 Line 27: (If keeping this section) delete ‘be’.

Page 9 Lines 15-16: Suggest replacing ‘loads’ in these two lines with ‘water volume’ (I was initially confused thinking that these were TSS and nutrient loads and the next sentences were repetitive).

General comment: From $\sim$ Page 9 Line 17, TSS, TN and TP are reported as [TSS], [TN] and [TP] – suggest being consistent throughout paper (unless there is a distinction

between the two ways that I have missed?).

Page 10 Line 11: Suggest deleting ‘retention’

Page 10 Line 13: ‘TSS was retained in both reservoirs..... in all non-flood years’ – already said two sentences before – so maybe delete?

Page 10 Lines 23-24: The way I read this is that 60% of catchment inflows in 2010 water year was from the upper Brisbane arm meaning that 40% is from Somerset discharge – but during the flood period would all the 40% be ‘controlled release’?

Page 11 Line 9: Not sure on this one should it be ‘TSS inputs... were estimated’ or ‘TSS input.... was estimated’?

Page 12 Line 23: replace ‘than’ with ‘that’ so reads ‘..clear that uncertainty...’

Page 13 Line 1: do you mean Wivenhoe instead of Somerset here (for TP retention over study period)?

Page 13 Line 7: Suggest to reference Table 2 in here again.

Page 13 Line 15: Suggest to check through the references – seem how they are listed are a little inconsistent throughout (e.g. should it be Avnimelech et al. (2001)?)

Page 13 Line 20: suggest removing ‘however’ at end of sentence and add ‘for’ so will read ‘Direct measurement of reservoir volume is required for more accurate estimates of change in storage volume’.

Page 14 Line 14: add ‘d’ so ‘dissolved inorganic N’.

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