

Interactive comment on “Modelling and monitoring nutrient pollution at the large catchment scale: the implications of sampling regimes on model performance” by R. Adams et al.

Anonymous Referee #2

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General Comments

What sampling frequency is necessary to comprehensively capture specific hydrologic and hydrochemical processes with certain models? This is an important question that can either complicate or facilitate hydrologic research considerably. Therefore I appreciate the fact that the authors of this paper intend to shed some light on this issue. Unfortunately, it seems as if the main focus of this manuscript is another one.

Since ‘Implications of sampling regimes on model performance’ is part of the title of

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this paper the reader expects the paper to give new insights into sampling strategies and especially the advantage and disadvantages of sampling nutrients more or less frequently. However, large parts of the manuscript deal with the actual problems and challenges of modeling nutrients and the specific difficulties that the authors encountered in their catchments. This becomes especially obvious in the conclusion section where only 4 of 13 bullet point conclusions actually talk about results of the sampling frequency analysis while the others deal with model components, model parameters, modeling results. Readers that pick up this paper to learn more about sampling strategies will inevitably be disappointed.

I fully agree that we need to know more about sampling strategies and cost-benefit ratios of data collection frequencies. Therefore I would recommend a careful refocusing of this manuscript. That means shifting the emphasis from the modeling to the sampling, removing parts of the nutrient modeling description and conducting a clearer comparison of which sampling frequency is the best for which scenario (for which nutrient). This way the paper will be much stronger and more valuable to the reader.

Specific Comments

Abstract: The abstract is not informative regarding the results and conclusions. It reads more like an abstract for a conference that you write in advance and where you do not really know what you will actually present when the time comes. Some hard facts from the results section are missing.

p. 10169, l. 27: What algorithm is used and why do you use ‘to estimate daily PET’ twice in a sentence?

p. 10170, l. 11: How is variability in true rainfall patterns on higher frequency data sets accounted for?

p. 10178, l. 12: How are the results somewhat surprising? And are these time periods generally comparable if one of them was relatively short and coincided with a dry spell?

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Probably not. So what can we actually learn from this exercise?

p. 10180, l. 2: ‘..not shown for brevity...’ But this is the interesting part of the paper!

p. 10180, l. 7: What are the ‘important implications for optimal sampling intervals’? Some more details please.

p. 10180, l. 13: Through calibration of what?

p. 10181, l. 1-4: This sentence is unclear.

Figures: Most of the figure captions need more detail (e.g. Fig. 4 – which data set which catchment?).

Figure 6 and 7: Axis labels are in a different format. It would be easier to compare if all time series would start and end at the exact same point in time.

Technical Corrections

p. 10166, l. 9: ‘...and allowed estimates of error associated with traditional monthly or weekly water quality records to be estimated...’

p. 10167, l. 23-25: This sentence is awkward. I do not understand what you want to say.

p. 10168, l. 2: A catchment does not ‘flow’.

p. 10173, l. 6: Nback is not in Figure 2.

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