

Interactive comment on “Upland streamwater nitrate dynamics across decadal to sub-daily timescales: a case study of Plynlimon, Wales” by S. J. Halliday et al.

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General Comments: The manuscript by Halliday et al. (Upland streamwater nitrate dynamics across decadal to sub-daily timescales: a case study of Plynlimon, Wales) describes a long-term time series of nitrate concentrations at two locations with different land cover in Wales. The study demonstrates long-term trends in nitrate concentrations relative to potential drivers including atmospheric deposition and temperature, and explores possible explanations for seasonal and diurnal variability. The dataset is important and the paper is significant, both for the interpretation of broad scale patterns but also as a way to move forward time series analysis of water quality data in

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freshwater systems.

Specific Comments: The data quality and analysis seems technically sound. I only have a few comments: 1) I appreciate that you were clear about the implications of 7 hr sampling intervals on interpreting diurnal patterns. I'm fine with your approach to model the hourly values, but think the broader community would benefit from a more detailed description of the DHR approach that you used. 2) The time series analysis of the dataset is a very important contribution given the lack of this kind of analysis in river and stream work (seems like most is in oceanography and climate fields). Any additional detail that you see as relevant to moving the water quality studies in this direction (and challenges, particularly related to sample density and auto-correlation) would be appreciated. 3) Given that you have a figure on DON (Fig.3), it seems like you should at least include more info in the methods on lab analysis. 4) Your section on the "significance of diurnal cycling" is important - while an interesting process that will yield insights into ecosystem dynamics, I applaud you for putting it in a broader context of watershed N cycling and retention.

Technical Comments: The paper is very well written and only a few technical details need to be addressed -

P. 13144: Please clarify what "1983/1990" means? Section 5.4 title: needs space

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