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Biogeosciences Discussions

Interactive comment on "Diel patterns in nitrate concentration suggest importance of microbial pathways for in-stream processing" *by* Jan Greiwe et al.

Anonymous Referee #3

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This novel approach of analyzing and visualizing diel nutrient data is an important contribution to stream ecosystem science. It fits the scope of this journal well. Overall, I found this manuscript to be interesting and advancing the use of diel cycles of nutrients to interpret ecological functions in streams. However, the lack of simultaneously measured process rates (such as metabolism, nitrification or denitrification) makes parts of the discussion and conclusions very speculative and I strongly recommend to shorten and nuance that section.

Specific comments: 1. In figure 1 I wonder why the evaluated stream reach is mapped outside of the land use map? In particular, information on urban areas including pasture

between the measuring points are of interest to the interpretation of this data set.

2. Line 220. "Downstream transport of solute signals therefore fails to explain most of our data. We therefore interpret our data to indicate primarily in-stream origin of diel nitrate cycles." What about signals from land, i.e. soil water signals. Especially during low flow. I realize this comes later in the manuscript but I would move some of that discussion here and clarify it also in the methods.

3. Line 368-60 "In the remaining clusters temporal shifts were evident that could be explained by temporal shifts in microbial nitrate processing but not by photosynthesis-driven uptake." This line makes it sound like you measured microbial processing or photosynthesis, please re-phrase.

4. Line 250-256. My experience of dissolved oxygen signals is that they can often match cluster C, with maximum %O2 in the afternoon. I would not be so quick to discard cluster C from being driven by photoautotrophs without evidence. Especially since there was a negative correlation between solar radiation and cluster C (line 183), which is what you use to argue for photoautotrophic dominance in driving cluster A and B.

5. Could spring photoautotrophs be light inhibited during mid-day and therefore cluster C peaks in the afternoon? Cluster C was most prominent in spring when harmful UV is the highest. Which were the light levels in this study? Was light ever measured under water?

6. No statistics are presented in the results section on page 8, please include that.

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