

Interactive comment on “Drivers of seasonal and event scale DOC dynamics at the outlet of mountainous peatlands revealed by high frequency monitoring” by Thomas Rosset et al.

Anonymous Referee #1

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General comments:

Rosset et al. reported high-resolution sensor data to investigate the mechanisms driving DOC concentration at the outlet of a bog and a fen in the French Pyrenees. The data and results are interesting. However, the paper can be improved further by explaining how complete are the sensor data, and providing discussion on how water temperature is related with the input and output of organic carbon in the bog and the fen. Specific comments are below, which the authors may consider when revising the manuscript.

Specific comments:

C1

p. 4, line 10-24: What is the percent of data for which gap-filling models were used? Also, has there been any period of power outage? The merit of this paper is on the high-resolution ‘sensor’ data. Thus, the information is needed on the number (or the percentage) of data points that has been actually collected.

p. 5, line 8-: How accurate was the analysis? What was the recovery of the reference material?

p. 5, line 12-: If the data with >20 FNU were ignored, what is the percentage of those “ignored” data points compared to the total? Also, considering that [DOC] can be high with high flow, those data points are potentially important in interpreting the results. If included, could they change the conclusions? I think the graphs showing the relationship between the [DOC] and fDOM would be helpful. Can you add the graph as a supporting information?

p. 5, line 16: number of observations 174 vs. 27. Why are these so different?

p. 5, line 27: what is the K in the equation 1? Please explain the terms in the equation.

p. 6, line 11: Have you used “DOC_max” for the analysis? If not, why didn’t you include it for the analysis?

p. 7, line 3-: So, did log- or square root-transformation satisfy the assumption? Was non-parametric analysis unnecessary?

Fig. 1: Is the boundary of the watershed for the ‘outlets’ correct? Watershed boundary can be delineated for any point of a stream using DEM data. The watershed area for the red circles should be larger than the boundary of the fen or the bog (orange lines in Fig. 1). I wonder the DOC dynamics at the outlets could be significantly influenced by non-wetland areas considering that the stream lines are extended beyond the orange lines.

Fig. 3: Is the purpose of this research on comparison between the fen and the bog? If so, which period should be used? The same overlapped period (May, 2017 to Jan.,

C2

2019)? Or any period with available data? If you have chosen the second option (any period with available data) to maximize analysis power, why did you omit the period of Jan. 2015 to Sep. 2015 (Rosset et al., 2019, JGR-Biogeosciences)?

Fig. 4: Interesting graphs. (a) When $\log(\text{DOC initial})$ is ~ 2.0 , the DOC initial should be $\sim 100 \text{ mg/L}$. But, the maximum [DOC] in the Fig. 3d is $\sim 30 \text{ mg/L}$. Why are these this so different? (b) What are the meanings of the y-intercept? When water table increase is 0, the $\log(\text{DOC increase})$ is about -1 (fen) and +1 (bog). Then, DOC increase should be 0.1 mg/L (fen) and 10 mg/L (bog) even without the water table increase. What kind of mechanism is working?

Concentration of DOC shows the dynamic balance between the input and output of organic carbon. How water temperature is related with the input and output of organic carbon in the bog and the fen?

Fig. 5: The graphs include many information and are hard to digest. I recommend to leave essential information only and provide the rest as a supporting material. Or figure caption can include in-detail explanation on the symbols.

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C3