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Interactive comment on "Importance of within-lake processes in affecting the dynamics of dissolved organic carbon and dissolved organic and inorganic nitrogen in an Adirondack forested lake/watershed" *by* P.-G. Kang et al.

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Dear Referee #2,

Thank you for your comments. We have responded to your general and detailed comments (Title: Importance of within-lake processes in affecting the dynamics of dissolved organic carbon and dissolved organic and inorganic nitrogen in an Adirondack forested lake/watershed).

Included are our comments and tables with responses.

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Please, let me know if you require anything else regarding this revision.

Sincerely yours,

Phil-Goo Kang

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1. Responses to general comments.

#A. (Referee's comment) This paper provides valuable information on long-term C and N processes within a lake. Specifically, DOC, DIN and DON data is presented together in a long-term data set which makes possible interesting comparisons across time and seasons. The objectives and the structure of the work are well presented. ==> Thanks for your comments. This comment is consistent with the major goals of our paper.

#B. (Referee's comment) However, the study mostly relies on the description of the dataset and statically analyses are rather scarce (or not well supported). The application of other statistical tools, such as, cross-correlation between inlet and outlet to take into accounted water residence time, will help to provide a more robust discussion based on more explicit objectives. ==> Following your suggestion, we analyzed data using other statistical analyses including step-wise regression, multiple correlation, etc. including hydraulic residence time parameter and using year periods (growing, dormant, and ice-cover). Unfortunately, we did not find any significant results when hydraulic residence time was included as a variable. However, we did find significant and important results when we performed analyses of hydraulic retention (%) in relation to solute retention (%) of DOC, DON and DIN (e.g., Note Table 5 shows Pearson correlation results) using monthly analysis This issue also relates to detailed comment #9 as given below). Although we did not indicate all of these results in our manuscript the relationship between water residence time and hydraulic retention was not significant (p=0.57, r2=0.04), we could add this result if it is considered to be important. Also, with respect to solute's retention (%), the consistent usage of the same equation for hy-

BGD

12, C9520–C9524, 2016

draulic retention compared to solute's retention appears to be reasonable. Hence we used retention (%) not residence time (This issue is also related to detailed comment #1 provided below).

#C. (Referee's comment) Consider to reduce the number of figures/tables according to a more specific predictions. ==> Thanks for your comments. Table 3 will be merged into Table4 and Figure 6 into Figure 5.

2. Responses to detailed comments. #2.1 (Referee's comments) P. 17294 L. 14: Is it possible to consider residence water time for retention estimates? That is compare the "same" water mass at the inlet to the outlet (after 0.6 yr-1) (Revision) (comment) Please see our previous comment regarding the usage of hydraulic retention (%) versus water residence time.

#2.2 (Referee's comments) P. 17294 L. 19-20: which software was use for Seasonal Kendall trend analyses? (Revision) (Accepted) A DOS executable program that runs under Windows operating system was used. Detailed information is provided in the reference (Helsel et al., 2006). Original: A Seasonal Kendall trend analysis was used to determine temporal changes in monthly discharge-weighted DOC and DON concentrations at the inlet and outlet sites (Helsel et al., 2006). Modified: A Seasonal Kendall trend analysis (a DOS executable program) was used to determine temporal changes in monthly discharge-weighted DOC and DON concentrations at the inlet and outlet sites (Helsel et al., 2006).

#2.3 (Referee's comments) P. 17295 L. 6: How precipitation data from 1941 was obtained? (Revision) (comment) Thanks for your comment. The title of Figure 2 will be changed as below: Original: Annual precipitation and temperature at AEC site and yearly discharge at the Arbutus Lake outlet since 1941. Modified: Annual precipitation and temperature at Adirondack Ecological Center site since 1941 (available at: http://www.esf.edu/aec/research/ALTEMP_projects.htm, 2016) and yearly discharge at the Arbutus Lake outlet since 1983.

BGD

12, C9520–C9524, 2016

#2.4 (Referee's comments) P. 17295 L. 6-14: This section shows that there no significant trend in precipitation, temperature or DOC concentration during the temporal period studied. Why you do not related these variables directly? Moreover, temperature and rainfall are not further discussed. (Revision) (comment) Thanks for your comment. As indicated, there were no significant relationships among precipitation, temperature and DOC over the long term. Similarly in the more detailed analyses section for which we had weekly measurements there were no long-term changes, but some interesting patterns become apparent, especially for DON and DIN. However, in response to this question, we will shorten this section if recommended by the editor.

#2.5 (Referee's comments) P. 17298 L. 21: substitute "," to "." (Revision) Accepted. Thanks for your correction. Original: inlet to the outlet, For the calendar... Modified: inlet to the outlet. For the calendar... (Page/line) 17298/21

#2.6 (Referee's comments) P.17306 L.7: remove dot. (Revision) Accepted Original: of Redfield's ratio. calculated from... Modified: of Redfield's ratio: calculated from... (Page/line) 17306/7

#2.7 (Referee's comments) Table 1 Not sure which is the basis to provide correlations within months. Biological periods might make more sense, such as vegetative/growing periods or ice cover. (Revision) Please see our comment of #2.9 below.

#2.8 (Referee's comments) Fig. 2 As far as it is presented now; I do not think this figure is needed. (Revision) (comment) We agree that we can present these results succinctly in the text and hence this figure would be optional. We would leave it up to the editor's recommendation on whether this figure is retained or deleted from the manuscript.

#2.9 (Referee's comments) Fig. 5, 6 and 7 Consider to draw important year periods which are further discussed (vegetative/growing period; snowmelt). (Revision) (comments) Thanks for your comment. We agree that we can show on the figure which months constitute the growing, dormant and snow melt periods. This will help unify

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12, C9520–C9524, 2016

these figures with our discussions on seasonal variation of DOC, DON and DIN.

Interactive comment on Biogeosciences Discuss., 12, 17285, 2015.