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Interactive comment on "Human land uses enhance sediment denitrification and N_2O production in Yangtze lakes primarily by influencing lake water quality" *by* W. Liu et al.

Anonymous Referee #1

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General comment:

This paper evaluated the effects of human land uses on sediment denitrification and N2O production in Yangtze lakes. A broad-wide monitoring and spatial analysis in 20 lake's watersheds around Yangtze river are invaluable. The evaluation of the indirect effects of human-dominated land uses (HDL) in watersheds on sediment denitrification and N2O production in the lakes by structural equation modeling is a new approach and can be also appreciated in this study area. However, it is bit difficult to understand for me whether this MS provides new insight relative to current knowledge. The discussion on the results of the study was insufficient and did not support conclusions adequately.

1) There is little discussion on the results of SEM analysis (Table 4 and Figure 4) that are the main results of this study. More discussion on the results of SEM analysis is needed to support conclusion of this study.

2) In regard to SEM analysis, I think the authors should not delete NH4+ from the analysis (P. 7824 line 2 -4) because NO3- and NH4+ concentration in water column is regulated by different mechanisms and NH4+ can be influenced on sediment denitrification directly and indirectly.

3) I did not understand the causal relation between DO and NO3- (DO -> NO3-; standardised path coefficients -0.34) in Figure 4. How do the authors explain the causal relation (also the causal relation between ORP and NO3-). The authors should explain the results in Figure 4 and Table 4 more carefully.

4) The authors should also discuss on the result in Figure 2 that showed the relationship between Ln-Background denitrification rate and Sqrt-N2O production rate. What does it mean?

Specific comments:

P. 7819 line 25-P. 7820 line 2: The authors should state the summary of 20 lakes based on Table S1.

P. 7824 line 2 -4: The authors should not delete NH4+ from the SEM analysis because NO3- and NH4+ concentration in water column is regulated by different mechanisms and the correlation between the two variables was not so strong.

P. 7824 line 6 -9: Please explain how to estimate the values of indirect effects in Table 4 with an example using standardised path coefficients in Figure 4.

P. 7825 line 8 -10: Please show r, and P values.

P. 7825 line 22 -23: Please show r, and P values.

P. 7828 line 1 -: The authors should pay attention to the significant digits of the values

used in this paragraph.

P. 7828 line 1 -8: Is it possible to compare the annual values calculated from the one-time monitoring data to the literature annual values? The authors should mention potential limitations of the data.

P. 7828 line 13-22: I did not understand the significance of this paragraph. The authors only entered the residence time in the equation of Seitzinger et al. (2006), not in discussion the validity of the results in this study.

P. 7828 line 16: Please show the unit of WRT.

P. 7829 line 4-5: I understood the incubation in this study was conducted under anoxic condition (P. 7821, line 11-12).

P. 7829 line 18-P.7830 line18: This paragraph did not discuss on the results of SEM analysis (Figure 4 and Table 4).

Table 1: The authors should pay attention to the significant digits of the values.

Figure 3: Please explain the figs (A) and (B) in the caption.

Figure 4: Please explain the figs (A) - (D) in the caption.

Interactive comment on Biogeosciences Discuss., 12, 7815, 2015.