

Response to Referee # 1:

Anonymous Referee #1

Received and published: 23 August 2012.

The authors appreciate the referee # 1 for the constructive suggestions to improve this manuscript. In the revised version, we have revised the language carefully. We have also indicated the significance of the color values between different wetland sites using the label letters, and rechecked the conclusions according to the significance test. Please refer to our responses for more details given below.

Overall comments:

This manuscript is an original work and the subject of this manuscript falls within the general scope of this journal. This manuscript presents the difference in DOC concentrations and its spectroscopic/aromatic characteristics of surface runoff among the seven types of wetlands in the northeastern China. Since DOC is an important carbon sink and carbon leaching from land ecosystems to aquatic ecosystems is far from certain, this study could help more accurately quantify regional/global carbon budgets. It is also interesting to know that degraded wetland and paddy land have lower DOC concentrations compared to natural wetlands though the authors did not give any solid explanations. The authors' interpretations and conclusions are relatively sound and justified by the experimental data. The description of materials and methods is sufficiently informative. The results are well organized but not clearly represented due to confusing expressions, which are also the major weakness of this manuscript. In addition, more concise and focused analyses are needed. Overall, I'd like to accept the manuscript but make a major revision.

[Response: Thanks for the positive comments. We are very sorry for the confusing expressions. As suggested by the referee, we found a native English speaker to edit the language for the revised version. Hope it could make the expressions in this manuscript more clear.]

Specific comments/suggestions are provided as below:

Specific comments: 1) There are many confusing sentences making some sections of this manuscript not understandable. Here I only mention several places as shown below. Native English speakers are required to make a thorough revision on the manuscript.

[Response: Thanks. The whole manuscript has been revised by a native English speaker.]

2) P 7920, Line 24-26: This sentence is very confusing, please rewrite it.

[Response: Thanks. The suggestion has been implemented.]

3) P7922, Line 17-19: is it "last two decades" or "past 50yr"? Both have been used in a sentence.

[Response: We all appreciated you very much for your careful review. It should be past

50yr, and we deleted the “last two decades”.]

4) P7924 Line 14: could you add the definition/explanation of degraded wetland here? It is defined according to waterlogging duration and water level or others?

[Response: Thanks. More information is added. The degraded wetland shifted from the natural wetland, accompanied by the changes in soil properties (i.e. decreases in the contents of soil carbon/nitrogen etc.), and also the moisture condition varied compared to that in the natural wetlands.]

5) P7925 Line 10-11: “humic acids have a greater reddish colour than fulvic acids” should be “humic acids are much redder than fulvic acids”. “higher wavelength” should be “longer wavelength”?

[Response: We totally agree with the referee, and revised this sentence according to the suggestion of the referee.]

6) P7926 Line 6: should be “by the one-way analysis of variance (ANOVA)”

[Response: The suggestion is implemented.]

7) P7926, Line 14: delete “48.73_3.26mg/l”

[Response: Thanks. We deleted it according to the suggestion of the referee.]

8) P7926, Line 17-18: this sentence can be incorporated into previous one and delete “7.08: :.”.

[Response: We all agree with the referee. The suggestion is implemented.]

9) P7926, Line 19-24: The highest or lowest values could be only in one month for one site. It's not reasonable to list a range or several values. In addition, have significance tests been used to test if these values are really significantly lower or higher than other values?

[Response: Actually, here we listed the monthly range of DOC concentrations in CAPW, as all the highest monthly value among different sites occurs in the CAPW. In the revised version, we deleted this sentence as suggested by the referee.]

10) P7926 Line 25 to P7927 Line 1-4: these two sentences are overlaid with previous sentences. “monthly maximum” is the same with “the highest monthly”. They need to be deleted or rewritten.

[Response: We all agreed with the Referee. These two sentences have been deleted.]

11) P7927 Line 9: SUVA₂₅₄ has been used as the abbreviation of “the specific UV absorbance”. No need to use the full name again.

[Response: Thanks. We deleted the full name.]

12) P7927 Line 10: “between” should be “among”

[Response: The suggestion is implemented.]

13) P7927 Line 16: “in 2010 than occurred 2009” should be “from 2009 to 2010”.

[Response: We agree with this comment. We have modified this sentence in the revised

manuscript.]

14) P7928 Line 5-10: difficult to understand. Need to reorganize.

[Response: We feel sorry for the confusing sentences. We reorganized this sentence in the revised version.]

15) P7928 Line 7-10: The numbers such as 0.30, 0.27, and 0.32 seem not significantly different. Since no significance tests were shown, you can not draw a conclusion that the C/C ratio of one site is higher than another. Same problems occurred in other paragraphs in comparing the difference among different sites.

[Response: Thank you for the constructive suggestion. Special attention has been paid to this question in the revised version. We added the label letters in the table 3 for the significance of these values. The conclusions about the differences in degree were made only on those showing significance.]

16) P7928 Line 13-16: need to rewrite.

[Response: Thanks. We are sorry for the confusing expressions. The suggestion has been implemented. We rewrote this sentence in the revised version.]

17) P7930 Line 9-12: this implication might not be correct since there are some insignificant relationships between different wavelength DOC absorbance.

[Response: Thanks. We deleted these lines.]

18) P7930 Line 17-20: the numbers for DOC concentrations are not necessary to show here. Suggest deleting them.

[Response: Thanks. The suggestion has been implemented. We deleted them.]

19) Page 7930 Line 21-25: the authors try to owe the difference in DOC concentrations to the geographic difference in the two phialiform wetland types. This means that the water sampling places or timing are the most important factors determining the difference in varied wetlands, which further implies that they are no intrinsic difference in DOC among these sites. Then I will doubt if the sampling methods in this study could really represent the DOC and its spectroscopic characteristics in these varied wetlands. I'd like to see other explanations to the difference between them.

[Response: Thanks for your careful reviews. More detailed sampling information is added in the 2.2 part. We made substantial changes in the discussion part, and added the analysis about SOM, ph-values and redox conditions in the revised version. See the discussion Part in the revised version.]

20) P7930 Line 22-end of this paragraph: One could be the difference in SOM (Table 1). CLPW has much higher SOM content and CAPW, and both phialiform wetlands have higher SOM contents than other wetland types. Since DOC is a product of SOM, SOM content might be the major cause of the difference.

[Response: Thanks. We all agreed with the referee. We added the SOM difference as the

explanation in the Discussion, and cited the related papers.]

21) Page 7931 Paragraph 4.3: This paragraph delivers that degraded wetland and paddy land have lower DOC concentrations compared to natural wetlands though the authors did not give any solid explanations. Does this mean that DOC leaching to water body will be decreased after land use change from natural wetland to rice paddy land? Or will human management practices (e.g., fertilizer use, soil dry-up and irrigation) reduce DOC concentrations in water bodies around the rice paddy land? This is very interesting. I hope the authors can offer detailed explanations on it.

[Response: Thanks for this insightful comment. In fact, worldwide increases in DOC concentrations in streams or rivers have been observed (Hongve et al. 2003; Hejzlar et al., 2004; Evans et al., 2005). Several hypotheses have been put forward to explain these increases, yet none of them are accepted universally (Clark et al., 2010). Meanwhile, DOC concentrations have decreased in some areas where acid deposition has declined (Clair et al., 2008). Worrall and Burt (2007) also indicated that 55 rivers of 315 records showed a significant decrease. Thus, both the DOC trends and the driving forces are uncertain and interesting topics. In the revised version, this Discussion section is re-organized, and more information about this point is added. See the Discussion part.]

22) For figures/Table captions: the full names should be stated for the abbreviations of the 7 types of wetlands. For example, Table 2 and Fig. 3.

[Response: We stated the full names of the 7 types of wetlands for the abbreviations in Table 1, and Fig. 3, and noted that the full names of the abbreviations are the same for the following Table 2, and Figure. 4 & 5.]

23) Fig. 1 is not clear enough.

Please use obvious color to mark the study region in the China's map.

[Response: We totally agree with the referee. Fig. 1 was remade, and used obvious color to mark this study region.]

24) Fig. 2: this figure could not be correctly represented. How could one axis represent both air temperature and precipitation? Need to redraw it.

[Response: The authors all appreciate the Reviewer's careful review very much. Fig. 2 has been remade, and the other axis for precipitation is added in the right side of the figure.]

25) Figure 4, 5, 6: please also indicate if the values between different wetland sites are significant using label letters such as "a, b, c".

[Response: Thank you. We felt sorry that we did not add the label letters in the figures, as the monthly values for the seven sites in the figure 4, 5 and 6 made the figures

confusing by the addition of the label letters. Yet, we rechecked and analyzed the significance of the DOC concentrations, and C/C and E4/E6 in the result part, and added the label letters in the table 3 for the significance of these values in Fig. 5 and 6 by using “a, b, c...”. in the revised version.]

Finally, once again we appreciate you for your good and comprehensive comments. Those revisions according to your comments really make this manuscript improve a lot. Thank you!

References

- Evans, C.D., Monteith, D.T., Cooper, D.M., 2005. Long-term increases in surface waters dissolved organic carbon: observations, possible causes and environmental impacts. *Environ. Pollut.* 137, 55–71.
- Worrall, F. and Burt, T., 2007. Trends in DOC concentration in Great Britain. *Journal of Hydrology*, 346(3-4): 81-92.
- Hejzlar, J., Dubrovsk , M. and Buchtele, J., 2003. The apparent and potential effects of climate change on the inferred concentration of dissolved organic matter in a temperate stream (the Male River, South Bohemia). *The science of the total environment*, 310(1-3): 143-152.
- Hongve, D., Riise, G. and Kristiansen, J., 2004. Increased colour and organic acid concentrations in Norwegian forest lakes and drinking water—a result of increased precipitation? *Aquatic Sciences-Research Across Boundaries*, 66(2): 231-238.
- Clair TA, Dennis IF, Vet R, Laudon H., 2008. Long-term trends in catchment organic carbon and nitrogen exports from three acidified catchments in Nova Scotia, Canada. *Biogeochemistry*; 87(1):83–97.
- Clark, J.M., Bottrell S.H., Evansc, C.D., Monteith D.T., Bartlett R., Rosed R., Newton R.J., Chapman P.J., 2010. The importance of the relationship between scale and process in understanding long-term DOC dynamics. *Science of the total Environment*, 408(13): 2768–2775.