

Response to Referee # 2:

The authors appreciate the valuable suggestions given by Referee # 2 for improving the overall quality of the manuscript. In the revised version, we have made substantial changes by adding the citation of the two previous publications, and totally rewriting the introduction part by focusing on DOC spectroscopic properties. We have also strengthened this paper by enriching the discussion part. Detailed responses to comments are given below:

General comments

The manuscript presents results of DOC concentrations of wetlands with deviating site characteristics in north eastern China. The results are marginally interesting because the paper missis an in deep analysis of the different wetland sites and offers exclusively a descriptive analysis of the measured DOC characteristics. Furthermore not many new results are presented in the manuscript. There are two main concerns I have with this publication. First, data from 2009 of five of the 7 presented sites have already been published by the same authors without making any reference to this publication (Song et al 2011). Furthermore parts of these data have already been publish a second time in 2010 by the same authors (Wang et al 2010), once again without citing that publication in the presented manuscript and the former one of 2011. The general outcome of the two former publications and the presented manuscript are similar describing significant differences in DOC concentrations between natural and degraded wetlands. This finding did not change although an additional year of sampling (2010) has been added in the presented manuscript. A discussion of the formerly presented data and the added value of the new data presented in this manuscript is missing.

[Response: Thank you very much for your review. We did conduct substantial revisions according to your comments.

The latest revision includes:

- 1) We have conducted more detailed description for different sites;
- 2) We rewrote the Introduction part: in the most recent version, we emphasize more about the spectroscopic properties of DOC to be accordance with the main topic of this manuscript;
- 3) Two previous publications were cited, and comparisons between the new manuscript and the two previous publications are emphasized in both the introduction part and the discussion part.

In addition, there is no any data set duplicated between the two previous publications. Our previous publications are designed in different sampling sites. One is about the dynamic of the dissolved carbon (dissolved total carbon, DTC; dissolved organic carbon, DOC; dissolved inorganic carbon, DIC) affected by converting the natural phialiform wetlands to rice paddy. The other is about the dynamic of dissolved carbon resulted from the building of

large drainage ditches and elevated degradation. Maybe the only similar sampling site is the ditch, but the ditch in the Wang et al. (2010) is small ditch within the rice paddy at the field scale. The artificial ditch in the Song et al. (2011) is the large ditch (like a river) at the regional scale. Dissolved carbon dynamic in the artificial ditch in Song et al. (2011) was compared to those in the rivers originating from riparian wetlands and the river sourcing from degraded wetland, while no river is mentioned in the Wang et al. (2010). Song et al. (2011) and Wang et al. (2010) indicated different questions, respectively, so Song et al. (2011) did not cite Wang et al. (2010).

Contrast to these two previous papers, in this paper we tried to investigate the detailed analysis about the differences in DOC and its spectroscopic properties in surface runoff between

- 1) the natural riparian wetland and rice paddy land,
- 2) the DOC differences between phialiform wetlands and degraded wetland,
- 3) the DOC dynamics from rice paddy land and those from degraded wetland to clarify which exerts more influences on DOC dynamics.

Especially, we also want to figure out the differences in DOC color values among these different sites. All these questions are not solved in the two previous papers.

I appreciate the referee very much for the detailed reviews and make me clear about the reorganization of this manuscript. This study region covers numerous natural freshwater wetlands. And almost 80% of natural wetlands have been converted to crop land during the past 50 years. In addition, the degradation of natural wetlands in this region is accelerating year by year primarily due to the intensive drainage of wetlands for agricultural use (Liu et al., 2005) as well as the changing climate (Qian & Ruby Leung, 2007). As for the natural wetland conversion and degradation, the conversion from riparian wetlands to rice paddy land existed, and also the degradation occurring in the phialiform wetlands, which has not been reported in the two previous publications. We hope this manuscript can provide such kinds of information to better understand and accurately estimate the carbon budgets of this region, i.e. for carbon modelers to incorporate the aquatic DOC into the model about regional carbon budgets in the future. We feel very sorry that the expressions might be not clear and misunderstanding for our previous version which missing some kinds of detailed objectives.

In this revised manuscript, we have cited the two previous publications as you suggested. Comparisons between this manuscript and our two previous publications are also described in detail.]

The second concern I have are deficits in the description of the methodology. Soil and water sampling methodology is not very clear what makes it difficult to assess the results of the study. No information is given on the specific sampling locations within each sampling site. It is not clear what kind of surface water has been sampled (pond, stream, artificial drainage). Additional information on e.g. ph-values or redox conditions of soils are missing which may give more information for interpreting the results.

[Response: Thanks. We feel very sorry for the not detailed description. Detailed information about the sampling locations is added. In this paper, the surface ponding (not streams or artificial drainage) was sampled. Unfortunately, we did not monitor the ph-values or redox conditions of soils in this study. But we added some references about ph-values or redox conditions of soils in the discussion part to explain the possible reasons for the results and we will check the redox conditions and ph-value in our future experiments. Thank you very much for your fruitful advices.]

Because DOC in wetland soils have already been investigated earlier a more detailed discussion on the relationship of soil organic carbon and the concentrations in surface runoff is needed.

[Responses: Thank you for your detailed review. Due to the difficulty in soil sampling from wetlands, we sampled the soil only at the end of the growing season. Thus, we did not go into detailed analysis about the relationship between soil organic carbon and DOC concentrations in the previous manuscript. But we indeed agree with the referee that the relationship between them should exist. By citing more relevant papers, we introduced the relationship in the discussion part to strengthen the analysis the results for the revised version of this manuscript.]

Specific comments

Page 7920, line 25: The findings are very similar compared to results from a former publication of the same authors in 2010 and 2011 (Wang et al 2010, Song et al. 2011). There was not given any reference to this publication

[Response: We have cited the two publications. Please see our response above.]

Page 7923, line 2: Within the introduction reference to the more specific DOC characteristics are missing which should give reasoning for the second and third objective of the paper

[Response: [We rewrote the Introduction part. More information is added about specific DOC characteristics]

Page 7924, line 20: Were the samples taken from real surface runoff or were they taken from wetland streams?

[Response: In this study, all samples were taken from the surface runoff from wetland, not the wetland streams or rivers. Song et al. (2011) covers the rivers. We are sorry for the not clear description. We have emphasized it in part 2.2 for the revised version.]

Page 7924, line 15: It is not clear whether the measured concentrations are representative for the wetland sites or whether the presented differences between sites may also can be related to small scale characteristics of the specific sampling site. It is well known that wetlands are very heterogeneous and specific site characteristics may have a large impact on DOC characteristics.

[Response: We totally agree with the referee that wetlands are very heterogeneous and specific site characteristic. We tried our best to avoid the uncertainty during the sampling due to the consideration of the heterogeneous environment in wetlands. During the experimental procedure, we did three sampling repeats with intervals at about 20m for each site. For every sampling bottle, the sampled water consisted of water from four directions. More detailed sampling information is added in the 2.2 part. Meanwhile, we added the analysis about the uncertainty analysis in the discussion part.]

Figure 3: The DOC results for five of the seven wetlands for 2009 have already been published in 2011 without any reference to the publication

[Response: Reference to the publication is added as suggested.]

Figure 4: The SUVA 254 results for five of the seven wetlands for 2009 have already been published in 2011 without any reference to the publication

[Response: Reference is added. In addition, to highlight the originality of this study, we deleted SUVA 254 results and focused on the C/C and E4/E6 in the revised version.]

Missing literature:

Song, C. C.; Wang, L. L.; Guo, Y. D.; et al. 2011. Impacts of natural wetland degradation on dissolved carbon dynamics in the Sanjiang Plain, Northeastern China. JOURNAL OF HYDROLOGY, 398, 1-2, 26-32

Wang, Lili; Song, Changchun; Song, Yanyu; et al. 2010. Effects of reclamation of natural wetlands to a rice paddy on dissolved carbon dynamics in the Sanjiang Plain, Northeastern China. ECOLOGICAL ENGINEERING, 36, 10, 1417-1423.

[Response: Two previous papers have been cited.]

References:

Qian Y, Ruby Leung L (2007) A long-term simulation and observations of the hydroclimate in China. Journal of Geophysical Research, 112, D14104, doi: 10.1029/2006JD0081347.

Liu J, Liu M, Tian H et al. (2005) Spatial and temporal patterns of China's cropland during

1990–2000: an analysis based on Landsat TM data. Remote Sensing of Environment, 98, 442–256.

Once again, we appreciate you very much for your constructive comments to improve our manuscript. Thank you!