

Interactive comment on “Impact of mire reclamation on export potential and characteristics of dissolved carbons in the Sanjiang Plain, Northeast China” by Y. D. Guo et al.

Anonymous Referee #1

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This manuscript compares the concentration and composition of dissolved C among natural mires, degraded mires and drainage ditches in northeast China. It addresses an important question of the impact of peatland degradation on dissolved C characteristics. It will be nice if the authors can further elaborate on the combined effect of a lower DOC concentration and a higher DOC lability on the overall C export from the system. I am not sure if “mire reclamation” is an appropriate or common term used – if the reclamation refers to conversion of mire to paddy fields as described in Section 1, then maybe better to specify this. There are numerous typos throughout the

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manuscript – the authors should do a thorough check and correct them in the revision. Some specific comments are as follows:

Running title – For consistency, it might be better to use “dissolved carbon” instead of DOC as the study looked at both DIC and DOC.

P5348, L7 – Was the snowmelt period included in the growing season data? If not, the period with the greatest amount of DOC export might be missed.

P5348, L9 – Suggest to present DIC result as well, as this will be useful to tell whether a higher total dissolved C content is predominantly caused by a higher DOC content. It is better to use TDC as the acronym for total dissolved C since the acronym TC is usually used for total C content, which includes also the particulate fraction.

P5348, L12 – Would discharge be a confounding factor when comparing the DOC concentration among sites?

P5348, L16 – It should be dissolved inorganic carbon rather than inorganic dissolved carbons for the acronym DIC.

P5348, L17 – “Obvious” is not an appropriate word, perhaps use “significant” if it is statistically significant?

P5348, L18 – It should be “excitation” but not “excitation”.

P5349, L2 – Is this number referring to total organic carbon? If so, it should be specified as the flux of particulate C will also have a considerable influence.

P5349, L12-15 – It would be useful to cite the recent papers on the size of soil C pool in northern peatlands (e.g. McGuire et al. 2009, Tarnocai et al. 2009). Also, the contribution of DOC fluxes to the net ecosystem C balance of peatland should be discussed briefly with reference to the recent peatland C budget papers (e.g. Roulet et al. 2007, Dinsmore et al. 2010).

P5350, L10-12 – Rather than describing one specific example, it might be useful to

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describe in general the land use changes in boreal wetlands. Drainage of peatlands is also done for peat harvesting, forestry, etc. in addition to improving the productivity of grazing grass.

P5352, L1 – Mean monthly temperature?

P5352, L6 – Organic carbon or organic matter content?

P5352, L16 – It will be useful to give the seasonal mean water table here. How is seasonally waterlogged mire defined? From your Figure 3, it appeared that both SLM and PLM had standing water above the soil surface throughout the growing season.

P5352, L24 – Was it blocking or digging of ditches? Ditch blockage is a restorative measure and should lead to reduced mire degradation? How many water samples taken for degraded mire and drainage ditches?

P5353, L11 – I think it is a TOC analyzer rather than a DOC analyzer? DIC should have been removed after acidification and is estimated as the difference between TC and DOC. Hence, DOC is measured directly but not determined as the difference between TC and DIC?

P5354, L9 – 20 July of which year?

P5354, L24 – Any post-doc tests done to identify significant difference between specific pair(s) of sites?

P5355, L11-13 – Any correlation analysis done to indicate the strength of relationship? Give the correlation coefficient here. It is a bit vague to say that the DIC-TC relationship is “closer” in the ditches.

P5355, L17-21 – While the decrease in dissolved C could be due to degradation processes as the authors suggested, it might also be partly related to increased dilution by ditch water. From the smaller capillary ditch to the much larger arterial ditch, there is likely an increase in the amount of discharge. To what extent would this effect explain

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your data?

P5356, L7 – Could you show some actual data/result to support the claim that there is no direct relationship between air temp and dissolved C conc?

P5356, L11-13 – Any possible reasons for the different relationships between water level and TC concentrations in 2009 compared to the other two years? Also, why a different relationship (lower TC conc. with lower water level) is observed in SLM and PLM compared to degraded mire and ditches? Please elaborate.

P5357, L22-25 – Any statistical analysis conducted on the difference in concentrations?

P5358, L1-9 – I wonder if it is appropriate to use CV to compare the seasonal variations among sites, since two very different temporal patterns can give the same CV value. Moreover, it would help to further elaborate on the possible reasons for the difference in seasonal variations in DOC components among the three sites.

Figure 1 – I wonder whether the legend for the degraded mire and drainage ditches are mixed up? Based on the site description, the three sites in blue seem to be representing the drainage ditches but not degraded mire? It will be useful to label the sites (e.g. A-DD) on the map as well.

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