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Interactive comment on "Response of CH_4 emission to moss removal and N addition in boreal peatland of Northeast China" *by* H. N. Meng et al.

H. N. Meng et al.

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Responses to the reviewer's comments (bgd-11-3365-2014)

Dear editor,

We have received the comments on our manuscript entitled "Moss removal and N addition interact to affect CH4 emission in boreal peatland of Northeast China" (bgd-11-3365-2014). We are very grateful to give us the opportunity to revise our paper. We thank the two referees for their thorough reading and their constructive comments and suggestions, which have helped us to improve the quality of our manuscript. According to the comments of the referees and the editor, we try our best to address the issues raised and to revise the manuscript. The detailed responses to the comments are

attached. We hope you would be satisfied with the revised version.

If you have any questions about this paper, please contact us without hesitate.

Best wishes!

Sincerely,

Changchun Song

Responses to the comments from Reviewer

Comment 1: What real environmental changes do these two disturbances represent?

Response: We thank the reviewer's comment. Recently, boreal peatlands have been experiencing climate warming, N deposition and enhanced drought, which would increase N availability and decline moss growth. Therefore, this study was to simulate the effect of moss loss and increased nitrogen availability on CH4 emission in the context of global change.

Comment 2: Urea could be mineralized to ammonium, what environmental change leads to high ammonium loading alone?

Response: We thank the reviewer's comment. In the boreal peatland, climate warming is predicted to increase N mineralization in soils. Meanwhile, ammonium is the dominant form of N in bulk N deposition in China (Liu et al., 2013, Nature, 2013, 494:459-462). These would lead to high ammonium loading to boreal peatland in Northeast China.

Comment 3: The authors state that removing mosses eliminated C substrates for methanogens, but it isn't clear that the mosses are near enough to the water table to play this role. And the authors' interpretation that moss removal from dry hummocks would lead to increase methane oxidation is not clear in this context.

Response: We thank the reviewer's comment. Although the water table in the study

site was below the moss layer, moss removal decreased belowground biomass (Table 3) that may reduce C substrates for methanogens. Meanwhile, moss removal would decline soil moisture status through evaporation and formed aerobic conditions. Therefore, moss removal would increase CH4 oxidation in soil. In the revised manuscript, we have given more explanation on page 8, line 233-241.

Interactive comment on Biogeosciences Discuss., 11, 3365, 2014.