

Interactive comment on “Current and future CO₂ emissions from drained peatlands in Southeast Asia” by A. Hooijer et al.

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Received and published: 15 September 2009

1. Does the paper address relevant scientific questions within the scope of BG? Yes 2. Does the paper present novel concepts, ideas, tools, or data? Yes 3. Are substantial conclusions reached? Yes 4. Are the scientific methods and assumptions valid and clearly outlined? Not completely 5. Are the results sufficient to support the interpretations and conclusions? Uncertain 6. Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)? No 7. Do the authors give proper credit to related work and clearly indicate their own new/original contribution? Yes 8. Does the title clearly reflect the contents of the paper? Yes 9. Does the abstract provide a concise and complete summary? Yes 10. Is the overall presentation well structured and clear? Yes 11. Is the

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language fluent and precise? Yes 12. Are mathematical formulae, symbols, abbreviations, and units correctly defined and used? Yes 13. Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated? Clarified, extended 14. Are the number and quality of references appropriate? Yes 15. Is the amount and quality of supplementary material appropriate? Yes

Overall quality The paper presents a highly important topic and will provide relevant knowledge generated by combination of different data sources. In general, the methods are clearly described, but an extension of the description of methods should be necessary in order to completely understand the calculation procedure for some of the results.

Specific comments

2.1.4 History and future trends in peatland drainage

Page 7212, line 12-19: The method for projecting, assuming a “business as usual” continuation, should be more precisely explained.

2.1.5 Relationship between groundwater depth and CO₂ emission

Page 7212, line 23-25: The second type of emission study, based on long term monitoring of peat subsidence, is not applied in the present study. The description of this method should therefore be moved to chapter “Uncertainties and research need”.

3.1 Carbon fluxes and climate mitigation It is not clear for the reader how the results in this chapter have been calculated. The estimated deforested area by 2006, 47 % of peatlands in Southeast Asia, or 12.9 Mha, cannot be easily read from any table or figure. This is also the case for the suggestion that 17 % is drained extensively, 67 % is affected moderately and 16 % is unmanaged. It is also unclear how this results in an estimated total drained peatland area for 2006 of 11.1 Mha and the interval 9.5-12.7 Mha (Mh should be corrected to Mha in line 21). The estimation of carbon dioxide emission in 2006, 632 Mt y⁻¹ (355-855Mt y⁻¹) should be referred to Figure 5. However,

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the calculation, as well as for the emission per ha, should be more clearly explained. The method for combination of CO₂ emissions for peat decomposition and peatland fires is not described, neither not mentioned in the method chapter.

Recommendation The methods are clearly presented in chapter 2 and the calculations in page 7214, line 1-7 are transparent. In addition to the description of the projecting procedure, the key figures applied in the calculation of drained areas and CO₂ emissions could be presented, e.g. in table form.

3.1.1 Uncertainties and research need The number of the chapter should be changed to 3.2. The uncertainties of satellite images should be mentioned Subsidence measurement is a feasible method for CO₂ emission estimation. However, a long period (several years) and initial and final surface and bulk density measurements are needed. An alternative rough method based on changes in mineral fraction (ash-content) of the peat material could be assessed. This method requires no initial measurements and is described in the paper: Grønlund, A., Hauge, A., Hovde, A. and Rasse, D. 2008. Carbon loss estimates from cultivated peat soils in Norway: a comparison of three methods. *Nutrient Cycling in Agroecosystems*. 81: 157-167

Interactive comment on Biogeosciences Discuss., 6, 7207, 2009.

BGD

6, C2024–C2026, 2009

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