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Biogeosciences Discussions

Interactive comment on "Subsidence and carbon loss in drained tropical peatlands: reducing uncertainty and implications for CO_2 emission reduction options" *by* A. Hooijer et al.

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Well done on a very dense, informative paper. The results will likely have far-reaching implications for projects and Governments seeking to Reduce Emissions from Deforestation and Degradation (REDD) in peat swamp forests. Drainage of peat swamp forests is known to be the predominant, and a globally significant, source of greenhouse gas emissions in a number of developing countries such as Indonesia. In particular:

1) The results represent a significant advance in the current state of knowledge of peat-water depth emission relationships. At the time of writing, the emission relationship

presented in the 'Peat CO2' (2006) report by the same lead author is widely recognised as a 'best guess' approximation of the relationship between peat emissions and water table drawdown. It is frequently used as a default relationship for estimation of baseline emissions in avoided peat conversion projects in the burgeoning voluntary carbon market. The emissions relationships presented in this paper represent a significant improvement on the 2006 equation, whilst supporting the results of the previous equation where drainage commenced more than 5 years ago. This study increases the confidence in our ability to reliably forecast emissions from drained peat, and therefore adds value to carbon sold from REDD projects in peatlands. This might increase the likelihood that REDD can out-compete such emissions-intensive land use transitions.

2) The study was able to quantify the 'spike' in greenhouse gas emissions occurring during the first five years after peat drainage - at around 2 - 3 times the rate in the years that follow. Capturing this early spike in emissions is of particular interest to REDD project developers, as this could double or triple the carbon benefits yielded by projects seeking to avoid conversion of peatlands – potentially delivering much needed additional revenues during these early, highly cost-sensitive years of the project.

3) The results were derived from a (relatively) simple network of peat subsidence poles coupled with a water table monitoring program. These results were corroborated by findings in a matching study (also to be published in this journal), which used the more complex and commonly applied gas flux chamber method. This provides evidence that simple, low-cost devices such as PVC subsidence poles are just as (or even more?) effective in monitoring peat emissions, than the gas flux chamber methods which are expensive and can generate misleading results if not properly applied. Local people could easily be trained to monitor the peat subsidence poles and water tables, suggesting that this technique has a local capacity building element as well as reducing costs.

It is recognised there is still a need to replicate the study to further increase the precision of the revised emission relationship. Hopefully this is something the rapidly in-

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creasing number REDD projects in peat swamp forests might feasibly contribute to. As a final comment, would it be possible to add a Standard Error term to the Carbon-Water Depth emission relationships, to allow for their use under the Verified Carbon Standard (VCS)?

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