Biogeosciences Discuss., 5, S978–S981, 2008
www.biogeosciences-discuss.net/5/S978/2008/

Biogeosciences Discussions

BGD

5, S978–S981, 2008

Interactive Comment

Interactive comment on "Meeting the challenge of mapping peatlands with remotely sensed data" *by* O. N. Krankina et al.

G. Schaepman-Strub (Referee)

gabriela.schaepman@wur.nl

Received and published: 1 July 2008

GENERAL COMMENTS

This paper gives an important insight into the status of peatland representation in remote sensing inferred land cover maps. It demonstrates the urgent need for improvements given the important role of peatlands in the global carbon cycle and the modeling thereof. This paper is analyzing existing maps and sources of their differences, without addressing what is needed (they might all be right for the purpose they address, but irrelevant to carbon cycling studies). I would suggest, also based on the well-chosen title, to start with a clear definition of peatlands (see suggestion below), explain why mapping of peatlands based on this definition is a challenge with optical remote sensing data (this might be clear to RS specialist in the current version, but not to the broad community addressed by the special issue), show the current status (as already included), point out what would be needed, and finally discuss ways forward. Given the fact that peatlands refer to a certain thickness of peat in the soil which is hidden to optical remote sensing techniques, I guess that this last part has to include a discussion on potential proxies (e.g. vegetation types, moisture conditions, seasonality, etc.) and combination of data sources. Connolly et al., 2007, might be a good inspiration for a user-driven combined approach.

Connolly, J., Holden, N. M., and Ward, S. M.: Mapping peatlands in Ireland using a rule-based methodology and digital data, Soil Sci Soc Am J, 71, 492-499, 10.2136/sssaj2006.0033, 2007.

SPECIFIC COMMENTS

Definition of peatlands in relation to what peatland maps should represent

This paper needs a well-thought definition of what should be mapped and how this might deviate from the classical definition (Rydin, 2006) of peatlands.

It remains unclear whether this paper addresses wetlands or peatlands, and if the map should also show peatlands which are covered by grasses, trees, etc., which can be very relevant for greenhouse gas emissions (for example in the Netherlands major peatland areas are under agricultural use, see also Schrier et al., this special issue).

Thus, what kind of maps are needed for e.g. carbon modeling (carbon stocks and carbon fluxes), peatland ecology (e.g. wetlands versus peatlands, vegetation composition, drained peatlands), etc.? Maybe include reference of Beilman et al., 2008, on mapping of peat carbon stocks.

David W. Beilman, D. H. V. J. S. B. S. F.: Peat carbon stocks in the southern Mackenzie river basin: Uncertainties revealed in a high-resolution case study, Global Change Biology, 14, 1221-1232, 2008.

Rydin, H., and Jeglum, J.: The biology of peatlands, Oxford University Press Inc., New

York, US, 343 pp., 2006: Peat is the remains of plant and animal constituents accumulating under more or less water-saturated conditions owing to incomplete decomposition. It is the result of anoxic conditions, low decomposability of the plant material, and other complex causes. Peatland is a term used to encompass peat-covered terrain, and usually a minimum depth of peat is required for a site to be classified as peatland. In Canada the limit is 40cm (National Wetlands Working Group 1997), but in many countries and in the peatland area statistics of the international Mire Conservation Group it is 30cm (Joosten and Clarke, 2002).

Significance of comparison between maps

It remains difficult to judge the significance of the comparison between the maps as long as their purpose is not clearly set – the maps are based on different data sets (time span, spatial resolution), definitions and classes (e.g., wetlands versus bogs), methodologies, differences are expected.

If understood correctly, the Russian reference map is a bog map, does this mean that the 25% meso- and eutrophic peatlands mentioned in the description of the area are omitted by the reference map?

It remains unclear, how much the material (inventory, Landsat scenes) of Oetter et al., 2001 and Pflugmacher et al., 2007 really differs. Obviously training datasets have a major influence on classification, even if in one case TM is used while in the other MODIS. Looks like good intercomparison results are biased by common basic material.

TECHNICAL COMMENTS

It took me too much time to identify the different maps/databases and their names (description versus names in Table 1). Suggestion: Describe LARSE land cover in same chapter as rest of remote sensing-based maps, introduce the database names as they appear in chapter where maps are explained, consistent with names in Table 1. Keep formatting style throughout the whole description (i.e. list style is abandoned for BALANS and LARSE peatland cover map).

p. 2076, line 25: projecting their future change

p. 2077: Most people are used to get categorical maps from remote sensing – it would be helpful to include some more sentences or give an example for categorical versus continuous maps.

p. 2078: NBAR - explain abbreviation

p. 2079: High spatial resolution data classification is successful - it should be mentioned why this kind of data was not used in the current study (e.g. aim of global mapping?).

p. 2080, line 11: What about disturbance by fire?

p. 2088-9 and Fig. 3 and 4: It remains unclear if Fig. 3 only shows peatland classified pixels or all pixels of the area. If the wet classes correspond to the peatland pixels, this has to be mentioned in the text and figure title. Same applies to Fig. 4. For more details on spectral reflectance of vascular plants versus sphagnum you might look into Schaepman et al., special issue. Spectral signatures over the wet open areas might significantly be influenced by the seasonal changes of the solar angle (BRDF effects)!

p. 2091: Explain why radar might be an option.

Interactive comment on Biogeosciences Discuss., 5, 2075, 2008.