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Biogeosciences Discussions

Interactive comment on "Do we miss the hot spots? – The use of very high resolution aerial photographs to quantify carbon fluxes in peatlands" *by* T. Becker et al.

T. Becker et al.

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First of all, the authors greatly appreciate the constructive review on our manuscript. We have revised our manuscript, basically according to the reviewer's comments in such ways as described below.

Authors should explain why the chose this resampling method (nearest neighbor algorithm).

We used the nearest neighbor resampling because it is copying actual data values of the closest datapoint to the cell in the output dataset and does not alter the original input pixel values. Another reason is, that resampling of multispectral imagery using the nearest neighbor algorithm preserves the relation-

ship between the different bands of the image. See section 3.3, paragraph five.

Expand on the “moving split window” method. The sentence in lines 10 to 11 is unclear.

According to the wish of both referees we extended the explanation for the moving split window analysis and added paragraph eight in the remote sensing section of the methods.

modeling CO2 and CH4 - why were specific variables chosen? Cite appropriate reference.

The questions of both referees to the modelling of the gas fluxes and the used variables are pointing on the preliminary work status of our model and the problem of multicolinearity of the variables. We agree with the referees that the problem of multicolinearity is given. Hence we adapted published models to our situation. In section 3.1 (Gas flux measurements and carbon budget calculation) at paragraph four now the computation and the appropriate references are elaborated as follows:

The seasonal exchange was calculated using models which have been developed for the research site: In case of CH_4, we applied a non-linear function with peat temperature in 20 cm depth and water table as predictor variables (Saarnio et al., 1997) and subsequently tested for their significance. Due to insignificance of the influence of the water table we used the following formula:

$$F_{\mathrm{CH4}} = \exp(a_1 + a_2 * T_{\mathrm{peat}}), \quad (1)$$

where a_1 and a_2 are fitting parameters and T_{peat} is the peat temperature in 20 cm depth.

The CO_2 exchange fluxes were modelled by a nonlinear function of the form:

$$F_{\mathrm{CO2}} = \frac{b_1 * T_{\mathrm{air}} * PAR}{b_2 + PAR} + b3 * \exp(b4 * T_{\mathrm{air}}), \quad (2)$$

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where T_{air} is air temperature, PAR is photosynthetically active radiation and b_1, b_2, b_3 and b_4 are fitting parameters. The first part of the equation including the parameters b_1 and b_2 represents the control of micro-site photosysthesis Kettunen, (2000), the second part with the parameters b_3 and b_4 represents the control of micro-site respiration (Kutzbach et al., 2007a).

Contrasting the results by Saarnio et al. (1997) the model did not explain the hummock emissions significantly (Table 1).

When were pictures taken?

The pictures were taken on August 10 in 2006.

Specify how the "stable" condition for area estimates was defined.

The term "stable" for the condition of area estimates was basically defined by the visual interpretation of the graphs of the total area estimates. At higher resolutions then 25 cm (flarks) or 60 cm (hummocks/lawns) the values varying around 240 m^2 or respectively around 7250 m^2. The sesults of the moving split window analysis are pointing to the same thresholds.

Segment belongs into methods.

The segment is moved into methods.

Technical corrections: **All remarks of the referee have been worked in.**

Interactive comment on Biogeosciences Discuss., 5, 1097, 2008.