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Comment

## ***Interactive comment on “Global-scale pattern of peatland *Sphagnum* growth driven by photosynthetically active radiation and growing season length” by J. Loisel et al.***

### **Anonymous Referee #2**

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#### General comments

This very well written discussion paper analyses how *Sphagnum* growth relates to bioclimatic variation at the global scale. This is a very important topic as these peat mosses are responsible for long-term carbon sequestration in peatlands, as described in an excellent introduction. The choices the authors made regarding data collection and analysis are well argued. I agree with the focus on two well-studied species and two integrated bioclimatic variables. However, interpretation of the results is not easy and poorly discussed, see specific comments below. PAR<sub>0</sub>, the variable that most explains *Sphagnum* growth at the global scale, represents a mixture of latitude, growing

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season length (defined by temperature) and cloudiness, which does not necessarily increase with global warming, as assumed in the abstract. The analysis described in this paper is interesting and deserves publication after more careful interpretation of the results.

### Specific comments

p.2170, l.13 temperature is not included in PAR0, except for delineating the length of the growing season, so I suggest to remove temperature in this sentence.

p.2175, l.4 I would prefer height growth over length growth as the cranked wire method measures height increment. Length growth (of individual shoots) can be larger as the moss not always grows straight upward.

p.2178-2179 Not necessary to repeat the F, R2 and p values, they are in the tables.

p.2179, l.14 Table 3 does not include the explained variance for the full multiple model.

p.2180, l.10-16 Could the relationship with PAR0 be partly a species effect? At least in Europe the faster growing *S. magellanicum* has a more southern distribution than *S. fuscum*. Are the relationships still there if you test for the species separately? Or is the species effect perhaps a PAR0 effect? You could test this in an analysis of covariance.

p.2181, l.21 Is the higher PAR0 at continental sites related to the lower latitude or less cloudiness? Here it would be good to include F and p values, as it is not somewhere else.

p.2181, l.26 ... the short duration of ... Why would the maritime regions have a thinner snow cover, assuming they have more precipitation?

p.2195 y-axis label: cm instead of mm yr-1

p.2196 Very interesting figure

Appendix Is it possible to sort the studies from high to low PAR0, so that it is possible

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to see which are the high PAR0 sites with the high growth rates? Gerold should be Gerdol. Which are the high-elevation sites?

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Interactive comment on Biogeosciences Discuss., 9, 2169, 2012.

**BGD**

9, C699–C701, 2012

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