

Interactive comment on “Modelling short-term variability in carbon and water exchange in a temperate Scots pine forest” by M. H. Vermeulen et al.

Anonymous Referee #1

Received and published: 13 March 2015

The authors investigate in this very interesting paper the interannual and seasonal differences of carbon and water exchange between vegetation and atmosphere in a temperate forest ecosystem dominated by Scots Pine. By combining Eddy-Covariance-Data and a local process-based vegetation model (LPJ-GUESS) the authors show that environmental factor do not explain annual exchange rates, but can successfully for monthly and daily ones – except for winter seasons and droughts. By analyzing other temperature responses and different mechanisms of water uptake the authors emphasize the need for testing and developing modelling approaches in vegetation modelling. To my opinion this paper is well written and comprehensible, except for a couple of minor comments. I recommend publication of this paper.

C99

Minor comments:

- Page 270, line 17-21: These sentences are written a bit complicated (line 17) or too general (line 18-21). Please try to rewrite in order to better understand what you mean with “more direct” (line 17) and whether you used “factorial experiments” instead of one could do that.
- Page 271, line 12: Please use another word for “model error”.
- Page 273, line 4: Please be clear what you mean with “for all years”. Do you mean 1997, 1998 and 2009 or more years?
- Page 273, line 6: please explain “litter” in terms of “a depth” as it is written in this sentence! Is it the “aboveground litter layer” or the “soil surface”?
- Page 273, line 9-10: Are exact dates known for these additional measurements? Please provide the years in brackets.
- Page 273, line 16: Please provide some references for forest gap models.
- Page 273, line 18: Please explain what you mean with “main tree species”. Is it the dominant species or a mean species? Moreover, authors write that the study is based on main tree species rather than PFTs. However, on the next pages authors refer to PFT-specific parameters (e.g. page 275, line 12). Please try to avoid this inconsistency.
- Page 273, line 20: Please explain in more detail, what “neighboring individuals” means on a patch.
- Page 273, line 21: I would recommend switching “cohort” to the brackets and “age class” to the sentence for a better understanding.
- Page 277, line 7: Did you check whether there is a significant trend in the climate data from 1997 to 2009?
- Page 278, line 10-11: Please also provide for this reference a location of that study.

C100

Technical comments:

- Page 275, line 3: Please write “with” using lower case letter.
- Please use consistent labels in the figure and table captions concerning the change of the temperature response function (Fig. 3, 5, 6, Tab. 3).
- Fig. 7: In the figure captions, it should be stated (consistent to the figure) that solid lines are modelled values and the dotted line is the observation.
- Page 284, line 11: A section number is missing.
- Please use “g” instead of “gram” consistently in all figures and tables.

Interactive comment on Earth Syst. Dynam. Discuss., 6, 267, 2015.