Biogeosciences Discuss., 11, C98–C100, 2014
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Biogeosciences
Discussions
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# *Interactive comment on* "Spatio-temporal variability of soil respiration in a spruce-dominated headwater catchment in western Germany" *by* A. Y. Bossa and B. Diekkrüger

**Anonymous Referee #2**

Received and published: 20 February 2014

General Comments: The manuscript reports a long term study of soil CO2 efflux and associated environmental variables (soil temperature and humidity) in a Norway spruce-dominated forest ecosystem in Germany. The work seems to attempt to address issues inherent in spatial-temporal variability of soil CO2 efflux under different environmental conditions. Even though several studies have been published in this issue at different ecosystems, the information brought up by the authors is significant to improve our knowledge in spatial-temporal variability of soil CO2 efflux. In general the authors have done a lot of work and collected a significant quantity of data; however,



I consider that the manuscript has some shortcomings necessary to deal with before any possible acceptation.

The introduction section presents a poor literature research concern to "the stare of art" in spatial-temporal variability issues and modeling, there are good quantity of studies done in this subject that have not been taken in account is this section.

In M&M section it is necessary to be more precise with methodology and approach, there still some gaps in the information concerning soil CO2 measurements. For example: how many plots/positions where measured at each site, how long and in which intervals the measurements where done, etc.

The Results and Discussion section: The authors have collected a large amount of data to address the problem and applied a multivariate analysis in order to identify clusters and that addressed the aims, but the manuscript focuses on the statistical analyses performed, where the focus should properly be more on the biology and physics of the processes influencing the soil CO2 efflux spatial- temporal variability.

Specific comments: In M&M, the first part of the measurements section (2.2)-(P696, L20-26, P697 L1-9) bellows to introduction not to M&M.

The authors stated that soil temperature at 5 cm depth was measured but it seems to me that was not taken into account during analysis and only soil temperature at 11 cm depth is presented in the results. It is well know that soil temperature at 10 cm depth is not good enough for determination of soil CO2 efflux sensitivity to temperature due to that majority of soil activity is in the upper part of the soil. Moreover, it presents very low daily dynamic in comparison to soil temperature at 5 cm depth, which fix much better the response of soil CO2 efflux to temperature (mainly in Norway spruce forest ecosystems). Have the authors done any analysis about the best fitted soil temperature depth to their soil CO2 efflux?

Table 1. Each investigated site should be presented alone with its variables rather than

as a group.

Fig. 1. More information about individual site characteristics should be added (plant vegetation cover, Soil Temp., Soil moisture, Bulk density, etc).

Figs. 3, 6 and 8. Can be deleted, they are not necessary.

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Interactive comment on Biogeosciences Discuss., 11, 691, 2014.