

**Response to editor's comments on "The role of snow cover and soil freeze/thaw cycles affecting boreal-arctic soil carbon dynamics"- Manuscript BG-2015-279**

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*Dear Editor,*

*We appreciate your detailed comments. We have revised the manuscript accordingly, and thank you for considering our manuscript.*

1) In the text and several Figure legends you repeatedly use the term 'Rh ratio' to denote the proportional contribution of different soil layers / carbon sources to total Rh. To my knowledge the term 'Rh ratio' is not commonly used and might be misleading, as you actually refer to a fraction rather than a ratio. Also the wording 'soil heterotrophic respiration (Rh) composition from soil organic carbon (SOC) pools distributed at different soil depths' needs improvement, as a flux (Rh) cannot be 'composed' of different pools. You might want to refer to 'Rh%' or 'Rh fraction' and define it e.g. as 'the relative contribution of Rh derived from different soil layers (Fig. 8+9)/ C pools (Fig. 10) to total Rh'.

**Response:**

Thanks for this suggestion. We have used the term of "Rh fraction" instead of "Rh ratio" in both figures (Fig. 7, 9, 10), and the text.

2) In Fig. 1 you depict average summer and winter fluxes by a single line / colour, which is misleading given that winter fluxes were available only for two of the three sites. Please use distinctly different colours for the respective dataset for each site or the respective average for each season.

**Response:**

We now use different lines for the NEE observations during winter and summer in Fig. 1b.

3) As much as possible, please keep colour blindness in mind and avoid the parallel usage of green and red in the Figures (see [http://www.biogeosciences.net/for\\_authors/manuscript\\_preparation.html](http://www.biogeosciences.net/for_authors/manuscript_preparation.html)).

**Response:**

We have updated Figs 1-3, and now do not use the two colors at the same time.

4) In all Figures (incl. Figs. 5-10) composed of multiple panels grouped to letters a), b), c) etc. these should be listed and explained in the respective Figure legends. Thus you can also avoid using titles for the different panels.

**Response:**

We have added explanation for each panel in figures 5-10. We also removed the titles for most of the figures to be more concise.

5) Following common convention, please replace in the units ,day' by the symbol ,d' and ,yr' by ,y' throughout the manuscript.

**Response:**

We have corrected the day<sup>-1</sup> as d<sup>-1</sup>. However, it seems that most Biogeosciences manuscripts use yr<sup>-1</sup> instead of y<sup>-1</sup>. So we haven't changed this. But please let us know if this is improper.