

Interactive comment on “Effects of environmental factors and soil properties on topographic variations of soil respiration” by K. Tamai

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I appreciate the anonymous referee #3 for his valuable comments and suggestions. The following is the list of the author's reply to the interactive comments on “Effects of environmental factors and soil properties on topographic variations of soil respiration” by K. Tamai. I am very sorry that this reply has not proofread by native English speaker. I shall submit the revised manuscript after proofread by native speaker.

[General comments] The paper by K. Tamai represents a good endeavor to estimate the comparative significance of climatic and soil quality factors on soil respiration in mountain forest ecosystems. In this context, this work is definitely in the scope of the journal and worth publishing in BG. However, the manuscript needs very deep revision and re-writing before being accepted for publication. The paper was designed inaccurately,
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rately, e.g. without taking into account whether the abbreviation is properly explained in the text beforehand etc. Practically all the parts of the article are to be re-written to be more understandable and consistent with general standards accepted for scientific publications. No scientific hypothesis was suggested either in ‘Introduction’, as a starting point for stating specific goals of the research, or in ‘Discussion’, as a quintessence of the data obtained by the authors. The ‘Discussion’ section should be completely re-written, so that to give a reader an idea on how the new information obtained by Tamai et al. could be explained in a broader scientific context and correspond to the to date level of our knowledge on the topic. The level of English is such unsatisfactory that it sometimes makes difficult to follow the outline, results and discussion. Deep linguistic revision by native English speaker is absolutely urgent!!!

[Reply] This manuscript was proofread by native English speaker belonging to the Canadian Company before the submission. I shall revise the inadequate abbreviation commented by Anonymous Referee #2. “I define the solid hypothesis is “Soil moisture is supposed to vary in slope. Soil property is also supposed to vary in slope. Because, soil is developed under the different moisture environment.” The definition of critical scientific questions is which has more large effect on the soil respiration variations in a slope.” I shall add these definitions more clear in “Introduction”.

Specific comments [Comment] Abstract Page 10936 L2. Terms ‘mature soil’ and ‘immature soil’ seem not strictly scientific. Can they be replaced e.g. by the depth of soil profile? [Reply] The mention of “immature soil” in Yamashiro site is from the identification by Araki et al. (1997). The mention of “mature soil” means that the soil in Kahoku site is more mature than that in Yamashiro site. Because the soil in Kahoku site is identified to be brown forest soil by Kobayashi and Shimizu (2007). The Yamashiro area is completely bare land without any vegetation caused by exploitative carbon taken out (from 6th century) and erosion until 1875 (Goto et al., 2004). We can confirm that the land had already covered with no vegetation before 17th century according to the old picture painted in 1684 (Editorial board of Yamashiro town history, 1986). Thus, the Ya-

mashiro site had been completely bare land without any vegetation for more than 300 (-1200) years. The difference of immature and mature soil is years from the disturbance and their intensity. I shall add these information in "Site description".

[Comment] L3. Strictly, speaking, soil temperature and moisture are also 'soil properties'. I suggest the use of 'chemical composition' and 'climatic conditions' would be more preferable to the case. [Reply] I used the word "soil properties" as the properties of soil that are stable in hours scale. Among them, biological features such as root biomass, and physical features such as porosity are also included. Thus, "chemical composition" is supposed to be poorer suitable than "soil properties". The explanation that "soil properties are defined to be table in hours scale such as root biomass and Porosity" would be added just as page10936line26 into "Abstract"..

[Comment] L9. "Plot L" was not specified beforehand; therefore, this term should be replaced by less specific description/name (plot under mature/immature soil or something like that). [Reply] The mention "Plot L" is revised to be "Lower part of slope".

[Comment] Introduction Page10937 L10 – 20. It is necessary to separate "our data", with Tamai et al as authors, from the "literature data" or "data obtained by others". Otherwise, this chapter seems to look weird. [Reply] Following this comment, I shall delete the mention from Page10937Line 18-20.

[Comment] Results Page 10944 L1-2. What does 'soil repellency' mean? Water repellency? I would recommend describing the phenomenon in more detail. [Reply] Kobayashi and Shimizu (2007) reported that "Soil water repellency occurred at below a threshold water content of approximately 0.29 m³ m⁻³." This mention is added into the adequate part of this manuscript.

[Comment] Discussion As a matter of fact, the major part of the 'Discussion' section is just an explanation of/a number of speculations on why the authors argue that temperature and wetness factors are critical in Yamashiro forest on 'immature' soil, while in Kahoku forest they do not. I believe this should be assigned to 'Results' section rather

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than to 'Discussion'. I am sure the 'ideology' of the Discussion should be based on the following order: the novelty of authors' principle results – what was done before by other authors – how the data by Tamai et al. correspond to the literature data – why they correspond (or DO NOT correspond?) to the other data – hypothesis explaining the data – prospective of further research on the topic, taking into account the lack of information on this or that. Otherwise, the manuscript is lacking basic structure in the description of the experimental data and authors' explanation of the data obtained. [Reply] There are many ideas for writing the "Results" and "Discussion" for example, as the comments by Anonymous Referee #3 and Anonymous Referee #2 that "The details of results of analysis were listed in the Result Section." I wrote the "Results" with the idea that "The details of results of analysis should be listed and the proof to verify their correct should be shown in the Results". I think my idea is closer to the comment by Anonymous Referee #2 than that by Anonymous Referee #3

Reference Goto, Y., Tamai, K., Miyama, T., and Kominami, Y.: Stand structure and dynamics during a 5-year period in a broad-leaved secondary forest in southern Kyoto Prefecture, central Japan, *Japanese Journal of Ecology*, 54, 71-84, 2004 (in Japanese with English summary). Kobayashi, M. and Shimizu, T.: Soil water repellency in a Japanese cypress plantation restricts increases in soil water storage during rainfall events, *Hydrological Processes*, 21, 2356-2364, 2007. Palmroth, S., Maier, C. A., McCarthy, H. R., Oishi, A. C., Kim, H. -S., Johnsen, K. H. Katul, G. G. and Oren, R.: Contrasting responses to drought of forest floor CO₂ efflux in a Loblolly pine plantation and a nearby Oak-Hickory forest, *Global Change Biology*, 11, 1-14, 2005. Yamashiro town history editorial board : Yamashiro town history -text part-, pp.999, Yamashiro town hall 1986 (in Japanese).

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