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Biogeosciences Discussions



# *Interactive comment on* "Temperature sensitivity of soil respiration is dependent on readily decomposable C substrate concentration" *by* A. A. Larionova et al.

**Anonymous Referee #1**

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The authors present an interesting study on the variability of the temperature sensitivity of soil respiration. As they say at the end of their discussion: "This study is the starting point to assess biologically and ecologically meaningful parameters [...] which are necessary to determine respiration response to changing temperature." Seen as a starting point, it is a valuable contribution. By definition, a starting point will open more questions than it answers. Hereby, it should clearly state (a) its objectives, (b) its achievements and, most importantly, (c) open questions and possible ways to address them. Points (a) and (b) are well presented by the authors. Point (c) should be extended. In this context, there is one major issue, which I would like the authors to address:



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As I understand, the parameter Vmax, as determined in this study, reflects the maximum respiration rate of a soil sample when glucose is not limiting. As such, Vmax is the product of microbial biomass and respiration rate per unit biomass. The response of respiration rate to glucose addition was determined within 30 minutes after substrate addition. Thus, the effect of substrate addition on microbial growth is not reflected in the reported values of Vmax. However, when glucose is not limiting, microbial biomass easily doubles within 24 hours (Figure 2). Would Vmax then not increase equally fast under such conditions? If so, would the cancelling of Vmax and Ks not be short-lived and of limited ecological importance? Or, the other way round, could there be situations when glucose is not limiting in soil (or remains well above Ks) while microbial growth is inhibited?

Considering this issue may lead to a clearer differentiation between parameters which are important in the short-term and those more relevant in the long-term. A distinction between processes and parameters most relevant on either time scale would be helpful. It might also help to improve the structure of the discussion.

Linguistic improvements would further help to make the valuable thoughts presented in this paper more easily accessible to readers.

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Interactive comment on Biogeosciences Discuss., 4, 2007, 2007.