

Interactive comment on “Priming and substrate quality interactions in soil organic matter models” by T. Wutzler and M. Reichstein

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The paper by Wutzler and Reichstein is an interesting study comparing different modeling approaches to represent priming. These approaches have been incorporated in an already well-known model and tested for different scenarios. The subject is timely and the paper is well written. It was really a pleasure to read this paper and I suggest accepting this paper after some minor improvements.

1. The different approaches are perhaps not sufficiently related to observed mechanisms. I am used to read papers about priming and it was clear to me but perhaps not for a non-priming addict. I suggest citing more papers (and give more details for the already cited papers) describing mechanisms of priming to justify the choice of the different approaches (Fontaine et al., 2003, Blagodatskaya and Kuzyakov, 2008, Guenet C7054

et al., 2010, Blagodatskaya et al., 2011).

2. There is no comparison with data and therefore it is not easy to know how much this work is relevant. I am sure it is and I understand that it is a theoretical study but at least some citations of experimental studies would be useful to be sure that the respiration or the microbial biomass calculated are at least in the same order of magnitude than the respiration and the microbial biomass observed. (see I225-228, I366-368, etc.)

3. You may also better justify why you chose these scenarios. My opinion is that the scenarios are well design and clear for a specialist but BG readers are not all soil scientists.

4. The data of the microbial biomass are not represented but they are discussed, please could you add a graph presenting the microbial biomass dynamic.

5. The equations are not described sufficiently and the reader does not know where they come from. Please add more details.

References Blagodatskaya, E., and Y. Kuzyakov. 2008. Mechanisms of real and apparent priming effects and their dependence on soil microbial biomass and community structure: critical review. *Biology and Fertility of Soils* 45:115-131. Blagodatskaya, E., Yuyukina, T., Blagodatsky, S., Kuzyakov, Y., 2011. Three-source-partitioning of microbial biomass and of CO₂ efflux from soil to evaluate mechanisms of priming effects. *Soil Biology and Biochemistry* 43, 778–786. Fontaine, S., A. Mariotti, and L. Abbadie. 2003. The priming effect of organic matter: a question of microbial competition? *Soil Biology and Biochemistry* 35:837-843. Guenet, B., M. Danger, L. Abbadie, and G. Lacroix. 2010a. Priming effect: bridging the gap between terrestrial and aquatic ecology. *Ecology* 91: 2850-2861.

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