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# *Interactive comment on* "Substrate quality alters microbial mineralization of added substrate and soil organic carbon" *by* S. Jagadamma et al.

**Anonymous Referee #2**

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General comments The paper of Jagadamma and co-authors is focusing on the effects of addition of four 14C-labeled, chemically different organic substrates on the decomposition of native SOC and microbial decomposer community (bacteria and fungi) of four contrasting soils from tropical, moderate, sub-arctic and arctic ecosystems. Authors applied relevant isotope-based methods and molecular analysis to partition soil CO2 respiration and to quantify microbial gene copy numbers. Additionally, cumulative CO2 production was mathematically approximated to reveal best-fitted model for range of substrates and soils. Despite the up-to-date approach, quality of writing and the topic of the direct scope of Biogeochemistry there are, however, several issues which prevent this paper to be accepted in its current state. Below authors will find general comments while specific recommendations for the paper improvement and technical corrections are directly in the draft file attached.



First of all, the weakest point of the study, to my point of view, is a rather simplistic interpretation of obtained information: although long-term experiment with amendment of uniformly labeled substrates was conducted to estimate mineralization of added and native OM (e.g. priming effect, PE), very few discussion is devoted to the phenomena of PE as such. What kind of PE was observed? Which mechanisms were involved? How PE differed between such contrasting soils? What is the ecological relevance? These questions left almost unanswered. Secondly, the reasoning of the hypothesis 1 ("cumulative respiration of substrate C and native C would be higher when soils are amended with easily metabolized substrates compared to relatively more complex substrates") is not clear, since it was not resulted from introduction. Thirdly, modelling part, especially biophysical meaning of each model applied, should be much better explained and justified (see specific comments). Lastly, there is a lack of statistical information on some figures and tables either in main text of the manuscript or in Supplementary.

Please also note the supplement to this comment:
http://www.biogeosciences-discuss.net/11/C1324/2014/bgd-11-C1324-2014-supplement.pdf

Interactive comment on Biogeosciences Discuss., 11, 4451, 2014.