**Biogeosciences
Discussions**

Interactive comment on "Fire-derived organic carbon turnover in soils on a centennial scale" *by* N. Singh et al.

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Author's Comment

1) The "meta-analysis" terminology has been used in broad sense to connote the model fit of the available data. For example Glass (1976) defines meta-analysis as: "The statistical analysis of a large collection of analysis results for the purpose of integrating the findings" (Glass, 1976). While the search for effect sizes in aggregated datasets is often used under this nomenclature, this is not the exclusive sense of the word. Other authors have used it without estimating the effect size (Angers and Eriksen-Hamel, 2008).

2) We agree with the comment regarding the value of using a model with more than

one pool. However, considering the existing dataset, it was not possible to calculate (i.e., constrain) turnover time of PyC with two or more pools or test different existing models and consider the best-fit model to calculate TT. They are different reasons for that. First, all the long-term existing studies consist of one single point data after the input. We applied the simplest mathematical expression of decomposition to these data, since we could not evaluate fit of alternative models. This is the most commonly used model for SOM. Second, most short-term studies included in this manuscript show a rapid decomposition rate of PyC that lasted a few weeks at the maximum. When a time series was present, we used only the last sampling point so that the effect size between the studies is comparable The small amount of PyC lost within the first days suggests that the fast cycling pool of PyC in most studies represented only a minor part of the whole and hence the single pool model may be adequate to capture the bulk dynamics (Derrien and Amelung, 2011).

The simple first order kinetics model was adequate to take advantage of available data to compute turnover times of PyC and the parameters that could affect it. The model was intended to show a trend rather than to give a single true rate of decomposition. We agree with context of the comment and do state in the manuscript that the results of the first order kinetics model assuming a homogeneous pool is subject to uncertainty. It is possible that the introduction of a fast and a slow component, for example for the short term studies for which a two-pool model could be constrained, could change the computed overall turnover time of PyC.

Reference

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