**Biogeosciences
Discussions**

Interactive comment on "Carbon isotope discrimination during litter decomposition can be explained by selective use of substrate with differing δ^{13}C" *by* J. Ngao and M. F. Cotrufo

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Dear referee,

Please find in the attached pdf file (supplement) the complete responses to the referee's comments, for which we are grateful. We replied to each comment, which are identified by a number for better clearity. Below are summarized the most relevant points (which are detailled in the pdf file): (1) Both referees actually pointed out the observed isotopic discrimination of alpha-cellulose as an important but still unclear

issue of our manuscript. We gave evidences that our extraction method did not discriminate. An entire paragraph has been prepared for being included in the discussion part. (2) In several comments, the referee #1 considered a part of our work as just "model adjustment". But it emerges that our study approach has somewhat been misunderstood. We are sorry about that. As we reported in the introduction (P15 L17) we used model simulation to test our hypothesis. The isotopic model was build from a three-C-pool model which gives temporal dynamics of fractionnal contribution of each pool. This model was fitted on CO2-C data. To this model was added an isotopic linear mixing model in order to represent the isotopic composition of each C pool. These isotopic composition values and therfore the isotopic fractionation factors were not fitted, but either measured (for cellulose) of taken from published studies. In fact we run three different simulations: i) assuming no kinetic fractionation, ii) assuming kinetic fractionation only for cellulose (i.e. the intermediate pool), iii) assuming that both the fast and the slow pool were composite and formed by group of substances of differing isotopic composition. The important novel conclusion from our work is that the latter assumption appeared to be the most realistic (i.e. results from this simulation were the closest to the measured values). Indeed, to run the model simulations we had to introduce the parameters and, for our scenarios, we used realistic fractionation factors consistent with published data, as stated in the ms. We hope to have now clarified this misconception, i.e. that we did not made "just adjustment" to the model but run model simulations on the bases of stated assumptions. (3) For most of the numerous comments of the referee #1, beside the responses we also proposed several changes and adds to the submitted manuscript, this work being already done. (4) We also proposed a new manuscript title following the referee #2's comment ("Temporal changes in stable carbon isotope discrimination during leaf litter respiration: Effects of preferential use of different carbon substrates and kinetic fractionation") (5) We also proposed below a modified version of the figure 5 as you suggested.
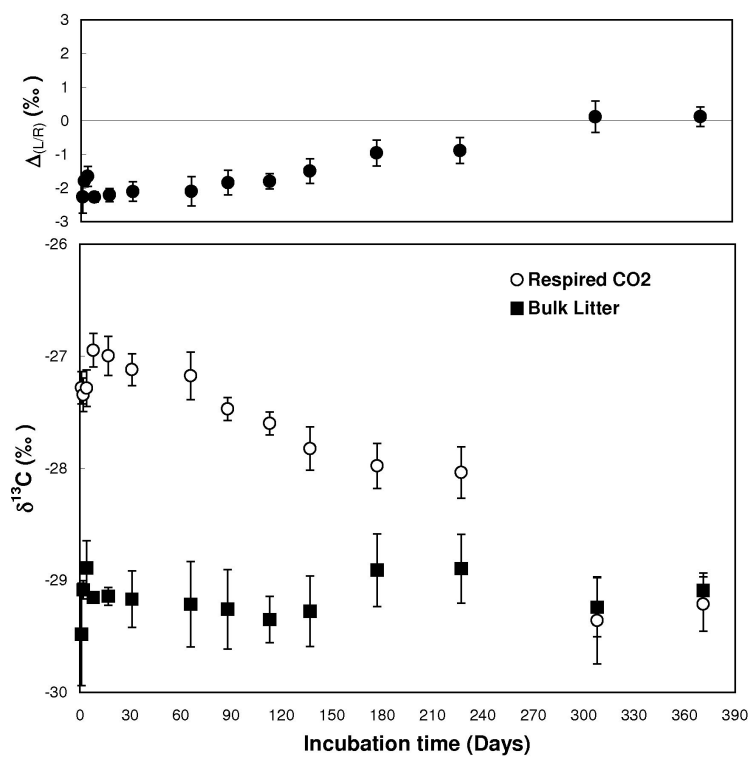
Please also note the supplement to this comment:

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Fig. 1.