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Interactive comment on "Stable soil organic carbon is positively linked to microbial-derived compounds in four plantations of subtropical China" *by* H. Wang et al.

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We thank the reviewer for the constructive comments. We have thoroughly revised the manuscript and addressed all of the comments. We hope that the revised manuscript has adequately addressed the reviewer's comments. In the following, we respond to all general and specific comments from the reviewer. The manuscript is attached with changes marked.

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This paper estimates the C composition of litter and fine roots of 3 broadleaf and 1 coniferous forests by 13C CPMAS NMR and analyzes soil microbial community struc-

ture in the surface soils from those forests using PLFA analysis. The results are discussed including previous results of the surface soil C composition. Experiments are simple. One of the conclusions, "the composition of organic constituents in litter and plant roots does not affect the composition and stability of SOC in the A-horizon soil", is interesting and important. A technical problem is the use of constant CP in NMR analysis that probably underestimates %carbonyl C and/or %aryl C, although alternative method called ramp CP is also not complete. The presence of SSBs is another problem. These faults are more serious in the analysis of SOC. The authors do not exhibit any spectra they obtained and do not explain how treated SSBs during C composition estimation process, which are essential for trusting the data in Table 1 even if the conclusion would not change.

Answer: In NMR analysis the constant CP method is more commonly used than ramp CP in the literature. CP-MAS in NMR analysis is a commonly used technique in many publications, and contribution of SSBs (spinning side bands) to spectral intensity is usually ignored, given their low intensity. The results from this study should be comparable with those earlier publications that used the same technique. We have now provided NMR spectrums as Figure 1 in the revised manuscript to support the information in Table 1. Some of the publications that used the CP-MAS in NMR analysis for soil organic matter research are listed below:

Budge K., Leifeld J., Hiltbrunner E., and Fuhrer J. Alpine grassland soils contain large proportion of labile carbon but indicate long turnover times. Biogeosciences, 2011, 8, 1911-1923. Bonanomi G., Incerti G., Giannino F., Mingo A., Lanzotti V., and Mazzoleni S. Litter quality assessed by solid state 13C NMR spectroscopy predicts decay rate better than C/N and Lignin/N ratios. Soil Biology and Biochemistry, 2013, 56, 40-48. Pronk G. J, Heister K., and Kögel-Knabner I. Is turnover and development of organic matter controlled by mineral composition? Soil Biology and Biochemistry, 2013, 67, 235-244. Ono K., Hiradate S., Morita S., Ohse K. and Hirai K. Humification processes of needle litters on forest floors in Japanese cedar (Cryptomeria japonica) and Hinoki

cypress (Chamaecyparis obtusa) plantations in Japan. Plant and Soil, 2011, 338, 171-181. Dieckow J., Mielniczuk J., Knicker H., Bayer C., Dick D. P. and Kögel-Knabner I. Composition of organic matter in a subtropical Acrisol as influenced by land use, cropping and N fertilization, assessed by CPMAS 13C NMR spectroscopy. European Journal of Soil Science, 2005, 56, 705-715. Kölbl A., Leifeld J., and Kögel-Knabner I. A comparison of two methods for the isolation of free and occluded particulate organic matter. Journal of Plant Nutrition and Soil Science, 2005, 168, 660-667. Fontaine S., Barot S., Barre P., Bdioui N., Mary B. and Rumpel C. Stability of organic carbon in deep soil layers controlled by fresh carbon supply. Nature, 450, 227-281. Shrestha B. M., Certini G., Forte C., and Singh B. R. Soil organic matter quality under different land uses in a mountain watershed of Nepal. Soil Science Society of America Journal, 2008, 72, 1563-1569. Schmidt M. W. I., Knicker H., Hatcher P.G., and Kögel-Knabner I. Improvement of 13C and 15N CPMAS NMR spectra of bulk soils, particle size fractions and organic material by treatment with 10% hydrofluoric acid, European Journal of Soil Science, 1997, 48, 319-328.

Figure 1. Solid-state 13C CPMAS NMR spectra from soil, leaf and fine root in the four plantations in subtropical China subject to Pinus massoniana (A), Castanopsis hystrix (B), Michelia macclurei (C) and Mytilaria laosensis (D).

High alkyl C/O-alkyl C ratio of SOC can be achieved by preferential decomposition of O-alkyl C among plant derived C or by addition of microbial alkyl C after both alkyl C and O-alkyl C derived from plants. Microbial C may contribute to stable SOC pool, but the size of contribution is unknown. This paper does not give any data indicating the considerable contribution from microbial C to alkyl C in the soils analyzed. PLFA suggestion is too weak to your second conclusion.

Answer: We agree with the reviewer that microbial processes are just one of the major factors affecting SOC composition. Thus, we revised the description of results in the revised manuscript. “We thus suggest that the stable SOC composition would be linked to microbial composition” and “soil microbial processes are one of the major factors

affecting stable SOC composition.” Please see the revised manuscript Page 2, line 15-16 and Page 17, line 9-10.

Minor point: The proportion of alkyl C in total C is not ‘alkyl C content’.

Answer: We revised “alkyl C content” to “the proportion of alkyl C in total C” in the revised manuscript.

Interactive comment on Biogeosciences Discuss., 10, 18093, 2013.

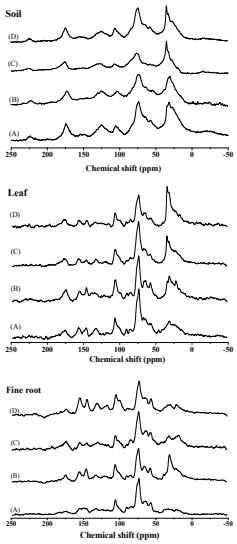

Figure 1. Solid-state ^{13}C CPMAS NMR spectra for soil, leaf and fine root samples from four plantations in subtropical China: (A) *Pinus massoniana*, (B) *Castanopsis hystrix*, (C) *Michelia macclurei* and (D) *Mytilaria laosensis*.

Fig. 1.