

**Response to Anonymous Referee #1 on Manuscript bg-2019-319:
“Increasing soil carbon stocks in eight typical forests in China”**

General comments

Zhu et al. explored an analysis of soil carbon pool in eight permanent plots across China (including primary and secondary forests, and two plantations) in 1990s, and again in 2010s. This resampling enabled them to measure SOC change and change rates, which shows these forest soils were significant carbon sink during the past two decades. The scientific question was quite straightforward, the methods were well established, and the conclusions were reliable and robust. Although the MS is well written, there remain a few minor issues to address (see short list below). but I think these should be straightforward.

Response: Thank you very much for this positive review on our manuscript.

Specific comments

L39. Forests have contributed more than half of these carbon (C) fluxes of terrestrial ecosystems.

Response: This sentence has been modified as you suggested.

L46. the soil C pool typically has a longer turnover time and higher spatial variability compared to vegetation C pool.

Response: Revised as suggested.

L71. SOC density (C stock per unit area) of eight permanent forest sites...

Response: We added the missing definition to the text: “Therefore, in this study we measured SOC density (carbon amount per unit area) of eight permanent forest sites from tropical, subtropical, temperate, and boreal forests in China at two periods of the 1990s and 2010s to quantify their SOC changes.”.

L183-184. Use “Four forest sites, eight forest plots” throughout the text.

Response: We checked this throughout the manuscript.

L236. The SOC accumulation rates were positively and significantly associated with annual litterfall and fallen log production. Delete “the above-ground dead organic C production”, because only dead plant considered here.

Response: We agree that only dead wood and plant litter were analyzed in our manuscript. We changed this sentence as you suggested.

L311-333. It is precisely because the data of SOC change is rare. The authors summarized the carbon budget of all components of the forest ecosystem (biomass, soil, litter and dead wood). I suggest that a figure or table should be provided in SI to summarize these results here.

Response: Thanks for your helpful suggestion, and we will add a new Table into the supplementary information in the new version of the manuscript (Table R1).

Table R1 Summary for C pools and changes in each component of forests in China over the past two decades.

Component	Carbon pool (Pg C)	Carbon density (Mg ha ⁻¹)	National sink (Tg C yr ⁻¹)	Source
Biomass	6.87	41.3	71	Guo et al. 2013 Tang et al., 2018;
Soil	19.98	106.1	57	This study
Litter	0.5	3.2	3	Zhu et al. 2017
Dead wood	0.43	2.8	4	Zhu et al. 2017
Ecosystem	27.35	153.4	135	