

Interactive comment on “Relevance of aboveground litter for soil organic matter formation – a soil profile perspective” by Patrick Liebmann et al.

Anonymous Referee #3

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This study investigated the impact of aboveground litter for soil organic carbon (C) sequestration and the subsequent partitioning of litter-derived C in different soil layers and OM fractions. In general, I think the data are solid and the results are valuable for understanding fates of litter C input. I have some minor comments/suggestions that could improve the manuscript.

Lines 37 and 38: This statement may be correct only for natural ecosystems. For example, OM disturbance due to tillage may be a pathway for cropping systems.

Line 99: Did you also observe the amount and chemical properties of the litter? These factors could impact litter decomposition and are important for interpreting the results.

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Line 271: "...both, inputs...". Line 301: For "DOM", did you mean DOM leached from surface soil layers? Is it possible that rhizodeposition still made a considerable contribution in subsoil MAOM although root density and exudation were low, given that subsoil MAOM contents were also very low? In addition, it looks that microbial decomposition of root derived C may also increases $\delta^{13}\text{C}$ values and decrease C/N ratios of MAOM; so I am wondering if the observations can fully support the conclusion that DOM leached from the surface soil layers was a dominant source. Lines 360 to 364: Could you explain where the majority of litter-derived C goes; emitted as CO_2 ? If so, why the older mobilizable OC did not emit as CO_2 ? Line 366: Did you measure the amount of litter residues after 22 months? Line 395: This statement (and may be statements in other places) is also related to the comment on root-derived C contribution to subsoil OM. Figure 1: What about the differences of bulk OC between these two sampling times; increasing, decreasing, or no detectable change? Figure 3: I would suggest deleting the grey points if they were not reliable.

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