

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

Anonymous Referee #2

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This is an interesting analysis estimating the contribution of leaf litter on soil organic matter formation of each soil layers. Generally, this is a well performed field study on a relevant subject. The manuscript is quite interesting and decently written, although some descriptions and conclusions are inaccurate. I suggest revisions to address some of the issues I raise below.

Lines 23-26: This description is inaccurate. 0-10-cm soil sequestered 0.99 g C m⁻² yr⁻¹ from labeled litter, 0.37 g C m⁻² yr⁻¹ in the 10-50-cm soil layers. It is not surprising, compared to the considerably large contribution of 0-10 cm soil C pools. 48% of the SOC stocks (0-180 cm) were sequestered in the top 10 cm soil layer (Table 2).

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Lines 34-36: Most studies focused on SOC dynamics only in 0-10 cm soil layers? The concepts of “topsoil” and “subsoil” are confusing throughout the text. According to my understanding, the authors described the soils in the 10-to-180-cm layers as “subsoil” involving their own results. But the topsoil described here is obviously not 0-10 cm only.

Lines 38-41: This statement is not correct. Below-ground inputs may more important contribution than the litter for SOC accumulation (Nadelhoffer and Raich, 1992; Majdi, 2001; Pausch and Kuzyakov, 2018). Nadelhoffer, K. J., and Raich, J. W.: Fine root production estimates and belowground carbon allocation in forest ecosystems. *Ecology*, 73, 1139–1147, 1992. Majdi, H.: Changes in fine root production and longevity in relation to water and nutrient availability in a Norway spruce stand in northern Sweden. *Tree Physiol.*, 21, 1057–1061, 2001. Pausch, J., and Kuzyakov, Y.: Carbon input by roots into the soil: quantification of rhizodeposition from root to ecosystem scale. *Glob. Change Biol.*, 24, 1–12, 2018.

Lines 64-66: I noticed and agreed with the comments from Paul Hanson. And: Guelland K, Esperschütz J, Bornhauser D, et al. Mineralisation and leaching of C from ^{13}C labelled plant litter along an initial soil chronosequence of a glacier forefield. *Soil Biology and Biochemistry*, 2013, 57: 237-247. Kammer A, Schmidt M W I, Hagedorn F. Decomposition pathways of ^{13}C -depleted leaf litter in forest soils of the Swiss Jura. *Biogeochemistry*, 2012, 108: 395-411.

Line 116: It's important to measure the mass of litter (both for initial and after 22-months) for estimating the relative contribution of the sequestered C from litter? This is my primary concern.

Line 217: SOC content in 0-10 cm soil (8.2% here) is largely different (> 5 times) from that given in Table 1 (1.5%, the same forest plot or stand, their previous study). Is there any special on the location of the soil sampling in this study?

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