

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

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SC1 Short comment by Paul Hanson, 08.01.2020

1. Comment

The following 5 papers report on field studies of enriched background ^{14}C isotopic tracers for multiyear controlled litter additions and the transfer of those labels into the soil. You might modify your statement on line 65 to recognize these efforts. The Kramer et al. 2010 paper is probably the most relevant, and you have already cited the related mesocosm study (Fröberg et al. 2009) 1. Tipping E, Chamberlain PM, Fröberg M, Han-

C1

son PJ, Jardine PM (2012) Simulation of carbon cycling, including dissolved organic carbon transport, in forest soil locally enriched with ^{14}C . *Biogeochemistry* 108:91-107, doi 10.1007/s10533-011-9575-1.

2. Parton WJ, Hanson PJ, Swanston C, Torn M, Trumbore SE, Riley W, Kelly R (2010) ForCent model development and testing using the Enriched Background Isotope Study (EBIS) experiment. *JGR-Biogeosciences* 115:G04001, doi:10.1029/2009JG001193

3. Kramer C, Trumbore S, Fröberg M, Cisneros-Dozal LM, Zhang D, Xu X, Santos G, Hanson PJ (2010) Recent (<4 year old) leaf litter is not a major source of microbial carbon in a temperate forest mineral soil. *Soil Biology and Biochemistry* 42:1028-1037.

4. Riley WJ, Gaudinski JB, Torn MS, Joslin JD, Hanson PJ (2009) Fine-root mortality rates in a temperate forest: estimates using radiocarbon data and numerical modeling. *New Phytologist* 184:387-398.

5. Fröberg M, Hanson PJ, Trumbore SE, Swanston CW, Todd DE (2009) Flux of carbon from ^{14}C -enriched leaf litter throughout a forest soil mesocosm. *Geoderma* 149:181-188. [Mesocosm study in support of the larger field EBIS effort.]

Author response

We agree and appreciate the suggested references of Paul Hanson and we will add some of the literature he suggested here. We received additional suggestions from Referee #2 (RC2, comment 4) and decided to include just a selection of Paul Hansons and Referee #2s suggestions, in order to satisfy both comments and to limit to a maximum of three references per citation. We just want to note that our main focus (and also novelty of the study) is in the subsoil aspect. The suggested publications all have their relevance for discovering the fate of litter layer-C and we will include them here, but they mostly cover the topsoil or a soil depth of 0-10 cm only. We modified the sentence in lines 63 to 64 of the original manuscript as follows: “In order to quantify individual C fractions and fluxes, isotope labeling, e.g. using ^{13}C - or ^{14}C -enriched lit-

C2

ter material, has been proven as a very powerful tool (Bird et al., 2008, Moore-Kucera and Dick, 2008, Kramer et al. 2010). Extensive retention of DOC in topsoil horizons has been documented for field-exposed mesocosms (Fröberg et al. 2009) or in field approaches (Kammer et al. 2012).

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