

Interactive comment on “Vertical partitioning of CO₂ production in a Dystric Cambisol” by Patrick Wordell-Dietrich et al.

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1. Referee comment:

The present study investigated the contribution of fresh litter-derived C to CO₂ production in the three soil profiles, the design and the methodology adopted was adequate, and the MS. is well written. However, the contribution of new C to CO₂ emissions can't be fully assessed by the ¹³C labelling experiment. And the conclusion of the importance of roots and the rhizosphere for CO₂ production, should be evidenced by input of labelled root or root exudate analog in additional treatments.

Authors response: We thank the reviewer for the interesting comment, unfortunately there is no analog experiment which could show the importance of roots and roots

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exudates to CO₂ production in the soil profile. Therefore, we can only rely on other studies which investigated the contribution of root respiration to total soil respiration such as Högberg et al. (2001). Still this is an interesting question and should be investigated in future studies.

We will add the following to discussion section (4.3, p.12 I12) “Even if we are unable with our study to distinguish between autotrophic and heterotrophic respiration, the importance of autotrophic respiration to total soil respiration was investigated in a large scale girdling experiment by Högberg et al. (2001). In their study they reported that autotrophic respiration accounted for up to 54 % of total soil respiration. In consequence root-derived respiration should be higher in the topsoil than in the subsoil, due to the decreasing root bio- and necromass with increasing soil depth.

2. Referee comment:

This study is a two-year experiment. How to reduce the cross-feeding effect? Especially, the young beech litter can be assimilated into microbial biomass C. Did the formulas already take into account the cross-feeding effects between different C decomposition stages?

Authors response:

We are not sure if we understand the comment correctly, but we didn't account for cross-feeding effects in the calculations, since we assume this was not the aim of the study.

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