

Referee #1

We thank the referee for their evaluation of our work. Our responses to their comments are provided in blue below.

In this manuscript, Duvert et al investigate the age of dissolved organic carbon (DOC) mobilised by streams in rainforest and agricultural dominated catchments during wet and dry seasons. Understanding how, and if, old OC is mobilised from landscapes with different land use/land cover is relevant for projections on global C budgets. The current changes in rainfall regimes, specially in the tropics, have also strong implications for C mobilisation and export. Yet, the number of studies addressing both spatial and temporal variations are limited. Considering this, the work of Duvert et al is timing. I found the manuscript well-organised and scientifically sound.

Key strengths of the manuscript: a) the hypothesis and how the authors address each one throughout the manuscript; b) the experimental design (study area and parameters measured); c) the number of samples for radiocarbon analysis as it is above the average found in for similar studies; d) the use of H and O stable isotopes in water to link the hydrological and C cycle, and e) data analysis, presentation and interpretation.

Thanks for this very positive assessment.

The main limitation of this work is the calculation of the fraction of mineralised DOC that contributes to DIC. The results indicate that that between 13-65% of the DIC originates from in-stream mineralisation of DOC (line 262). Given the low number of samples analysed for DIC (only three samples per season), the uncertainty around those estimates is rather high. Moreover, the mixed-model approach to calculate the fraction of DOC being mineralised appears not robust enough. The authors partially acknowledge this limitation (lines 190-195). Although estimating these contributions is interesting, it appears that it's beyond the scope of the manuscript. Hypothesis #3 refers to a comparison between the age of DOC and DIC (line 87). I would suggest to provide an interpretation of the ^{14}C -DIC values without calculating the contribution of mineralised DOC to DIC.

We agree that the low number of DIC age estimates makes interpretations of our mass balance calculations difficult. In line with this comment, we will remove the calculations of the fraction of mineralised DOC contributing to DIC in the revised manuscript.

There are some areas in which the manuscript can be improved:

1. The language can be slightly improved: *went on to show* (line 48), *were always lower* (line 221), *water stable isotopes* (line 210; water does not have isotopes but H and O do), *relatively stable between seasons* (line 221), *here* (lines 82, 84 and 87), *coarse estimates* (line 192), *in depletion of modern carbon* (line 83).

We will modify the text as suggested.

2. Please include information about the type of splines used in the generalised additive model. This is important for reproducibility. Alternatively, the authors can make the code publicly available which I strongly recommend.

We will add this information.

3. Include all available data in Figure 5.

We will add the one set of values for site P1 on the figure.