

Responses to the editor

We thank the editor for the comments, which helped us to further improve the manuscript.

1. You used a two-way ANOVA to test for differences between sites and soil depths and their interaction effects, but the revised text does not mention any interaction effects. Was this an oversight? I would like to suggest to briefly mention the interaction effect in the Results section.

We added the following information in line 187 *“yet the interaction effect between site and soil depth was not statistically significant (Table S2)”*, and the following sentence in lines 198-199: *“The $\delta^{13}\text{C}$ of the TOC differed significantly between sites, and also the interaction effect of site and soil depth was statistically significant (Fig. 3a and Table S2).”*

2. ANOVA-type analyses do not require normal distribution of the raw data, but of the residuals of the ANOVA model. This is a common misconception - see <https://pubs.er.usgs.gov/publication/5224239>. While non-normality in response or explanatory variables can indeed make it more likely that model assumptions are not met (e.g., homoscedascity), the patterns in your model residuals should guide you in choosing the type of analysis or data transformation. Please revise accordingly.

We had tested the residuals of the model and not the raw data for normality and homoscedasticity. For a more accurate description of our statistical analyses, we reworded the sentence in the method section in the following way. *“For this purpose, the residuals of the Two-Way ANOVA model were tested for normality using the Shapiro-Wilk test and for variance homogeneity using the Levene’s test.”*

3. Please provide a reasoning/motivation for doing some analyses per soil depth increment (section 2.8): *“Significant differences between radiocarbon data (^{14}C) of the soil total organic carbon (TOC) and respired $\text{CO}_2\text{-C}$ for individual soil depth increments per site were analyzed using the Welch’s t-test (in case of normality) or the Wilcoxon rank sum test (in case of violation of normality).”*

All variables were tested using Two-Way ANOVA. We now added the following sentence in section 2.8 to provide a motivation for the additional analysis. *“In addition, we tested whether TOC and microbial-derived $\text{CO}_2\text{-C}$ from the same soil depth increment differ significantly in their ^{14}C signature in specific soil depth increments since differences might potentially only occur in specific depth ranges.”* The details of the analysis are described in the next sentence in the manuscript.