

### **Authors' response to the topic editor's comments**

**Title:** Differences in organic carbon fractions and stability explain limited accumulation in loam and sandy loam under greenhouse conditions

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**Dear Prof. Luisella Celi Celi**

Thank you very much for your careful evaluation of our revised manuscript and for your positive assessment. We appreciate the opportunity to make these final minor revisions. We have carefully addressed all three comments and revised the manuscript accordingly. Our point-by-point responses are provided below.

#### **Comment 1:**

Lines 57–58: “A global meta-analysis by Gross and Glaser (2021) showed that manure application, on average, enhanced SOC stocks by about 35.4%.” Could you please specify the time period (i.e., over how many years) over which this increase was observed?

#### **Response:**

Thank you for this helpful comment. The 35.4% increase reported by Gross and Glaser (2021) represents the overall average effect across the included field experiments rather than an increase over a single fixed duration. In their meta-analysis, manure application durations were grouped into 3–5, 6–10, 11–20, and >20 years. We have therefore revised the sentence to clarify the time periods covered (Lines 57–59).

#### **Comment 2:**

Line 69: What hydrothermal conditions are being referred to here? Please provide some clarification.

#### **Response:**

Thank you for this helpful comment. We agree that the term “hydrothermal

conditions " was too general. We have therefore clarified that, in the context of greenhouse systems, it specifically refers to the warm and humid environmental conditions that can enhance organic matter decomposition and accelerate SOC turnover. To support this clarification more directly, we added Zhang et al. (2022), which specifically addresses the effects of warm and humid greenhouse conditions on SOC dynamics, while retaining Gross and Glaser (2021) to support the general influence of climatic conditions on manure-induced SOC storage. The corresponding text has been revised in Lines 68–72.

**Comment 3:**

Table 2: I suggest changing "amide-C" to "acyl-C," as the area integrated between 160 and 190 ppm includes amide, carboxyl, and ester acyl-C.

**Response:**

Thank you for this important clarification. We agree that "acyl-C" is more appropriate because the 160–190 ppm region includes amide, carboxyl, and ester carbon. Accordingly, we have replaced "amide-C" with "acyl-C" in Table 2.