

General comments:

This study explored the legacy effect of cover crops, including single and mixtures on soil aggregates in the second main crop rotation following cover crop treatments based on a long-term field experiment. The results of this study have certain meaningful for understanding the legacy effect of soil structure improvement for the subsequent main crops after consecutive cover cropping. However, there are still some issues that need to be addressed including statistical methods of significant difference, accuracy of result descriptions and partially redundant conclusions. Detailed comments are as below.

Main comments:

1. Why was the pairwise t-tests chosen instead of analysis of variance (ANOVA) to compare the significant difference between the seven treatments, e.g., Fig. S5?
2. It is very confusing to understand the results of significant difference between all indexes because the description in main text did not always show the consistency with figures, e.g., Fig. 2, Fig. S4, S5, S6, S7. For example, 'The significantly higher MWD was observed for clover at 0-10 cm (18.8% higher), Mix12 at 20-30 cm (37.6% higher) compared to the fallow in Line 200-201 (Fig. 2)'. However, lowercase letters of significant difference are 'b' for clover and 'a' for Mix12 in Fig. 2a. Please check and keep consistency throughout the manuscript.

Specific comments:

1. It would be better to add 1-2 sentences in Abstract to indicate the OC distribution within macroaggregate fractions.
2. Please add the details of planting date and harvest date for all crops in the section of Materials and Methods. For CC mixture treatment could add the ranges of planting and harvest date for cover crops.
3. 'OC2_1' is not defined in Line 163-164. Please check and add the missing information.
4. Please add the statistical analysis of significant difference and the range of *p* value in the section of Materials and Methods.
5. Please add subheadings for each independent results in the section of Results, e.g., 3.1 SOC concentrations and stocks. 3.2 Soil aggregates distribution....
6. Line 215. Please check the figure caption in Fig. S10. 'MWD' change as 'GMD'?
7. The first paragraph in Discussion section is overlap with the introduction, objectives of the study and materials. Please rewrite.
8. Line 344-350. Please refined and delete the citation. It would be better if the authors could add 1 or 2 statements to expand the future research recommendations.
9. The document of supplementary material S2 is missing. Please check.

Figures.

1. Fig. 2. Please delete 'Lowercase letters denote' before '(a)... and (b)...' in figure caption.
2. There is no citation for Fig. S11 in the main text.