Response to the Comments of Reviewers

The authors in this paper reported the effects of nitrogen addition on soil particulate (POC) and mineral-associated organic carbon (MAOC) content after a short time in one subtropical forest. The results showed that POC content increased by N addition, but there was no change of MAOC content. Furthermore, the authors stated the increases of aboveground litter production and lowered soil enzymatic activities mainly explained the POC content, and the trade-off of exchangeable cations resulted in no changes of MAOC content. This study can provide us some information on the influences of N deposition on SOC. However, there are many previous studies that have been reported the effects of N addition on soil C pools and the chemical exchangeable cations. Thus it seemed that novelty of this study is slightly weak, especially considering that only one Castanopsis fabri forest stand and it is not the most typical vegetation in the studied sub-tropic region. More detail minor comments were as follows.

Response: Thank you very much for your kind work and constructive comments, which greatly improved the quality of the manuscript. Based on the comments of other reviewers, we have made revisions to the entire text. In this new response letter, we have revised the line numbers.

Line 42-43, this sentence is not clear and not robust conclusion. Based on the data of this study, you can not conclude N addition reduced the persistence of SOC and the less vulnerable MAOC because of the less change of MAOC content. It is also not very clear and difficult to understand "the nutrient density of SOC".

Response: We have revised the sentence as "the accumulation of SOC under short-term N addition is primarily driven by POC, and the response of different SOC functional fractions to N addition is inconsistent". Please see Lines 39–41.

Study site Section, you need to give more detail description of forest stand, such as natural forest or plantation forest, stand age, tree density, and so on.

Response: This is *Castanopsis fabri* natural forest. Since the establishment of the national nature reserve, this forest has not been disturbed by human activities. At the beginning of the experiment, the tree height was 15-20 meters, the diameter at breast height was 20-40 centimeters, and the closure was about 75%. We have added those detail description of forest in the "Study site" section. Please see Lines 110–118.

Experimental design, it is not robust experiment considering just one time of N addition after 1.5 year when you collected soil sample in

December 2021. Moreover, the author determined BG and CBH enzymatic activities just related to cellulose decomposition.

Response: We agree with your opinion. We will focus on the effects of longer periods of N addition in later experiments. BG and CBH are both cellulase enzymes that act on the ends of reductive and non-reductive cellulose polysaccharide chains to release glucose or cellobiose. BG hydrolyzes cellobiose to produce two molecules of glucose. We originally considered enzymes such as polyphenol oxidase and peroxidase for degrading polyphenolic compounds, but short-term N addition had no significant effect on these two enzymes. This may be because short-term N addition did not significantly promote the accumulation of recalcitrant organic carbon in the soil, so it was not included in this study.

Result section, SOC content and soil pH values should be necessary and important data and it is better to give these data in text.

Response: Done. The data is presented in Table 1. Compared with the control, both low-N addition and high-N addition significantly reduced soil pH and significantly increased SOC content. Please see Lines 215–216.

Line 285-286, it is too speculated that the less root biomass explained the lack of MAOC content.

Response: Thank you for your kind suggestion. We have changed the sentence to “fine root biomass was not influenced by short-term N addition in this study, and there was no significant relationship between fine root biomass and MAOC. The regulatory role of fine root biomass on MAOC needs further exploration”. Please see Lines 316–319.

Line 318-320, it is not reasonable to conclude N addition reduced the persistence of SOC based on the lower MAOC:POC ratio.

Response: We agree with your opinion and have deleted it.

Change “aboveground litter biomass” to “aboveground litter product”.

Response: Done. We have changed “aboveground litter biomass” to “aboveground litter product”.