First of all, we would like to thank the reviewer for reading our manuscript and making insightful comments and constructive suggestions, which helped to improve the manuscript. We have responded to all comments individually.

Congratulations to the authors for their efforts in conducting this research and preparing the manuscript. The manuscript addresses an important topic in soil science by investigating the interactions between soil organic carbon (SOC) and mineral phases, particularly Fe- and Al-bearing phases. However, several aspects of the methodology and data interpretation would benefit from further clarification to strengthen the robustness of the findings. My comments and suggestions are provided below.

Lines 13-14: The manuscript's aim explicitly concerns Fe, Al, Mn and Si, and the hypothesis proposes roles for all four. But the principal OC conclusions are essentially about Fe and Al. What does the study actually establish about Mn- or Si-associated OC? If their contribution cannot be resolved using these extractants, should Mn and Si be presented as supporting geochemical observations rather than as equivalent components of the central research question?

Response: We appreciate the observation of the reviewer. All four elements have been implicated in the preservation of SOC and thus we included these in the scope of our study. However, the concentrations of Mn and Si were small and there was no significant relationship between extractable Mn and Si associated with OC, so we did not include these elements in the conclusion. We appreciate the reviewer's comment and have added a sentence in the conclusion: "Extractable Mn and Si did not show any relationship with extractable OC in both top and sub-soils".

Line 15: The abstract explicitly frames the study as examining Fe-rich and P-deficient soils, but phosphorus is not reported among the measured soil properties. The Methods report pH, EC, texture, CEC, TC/TN and total Fe, Al, Mn and Si—but no P measurement. Please provide the relevant P measurements and threshold/reference, or remove the P-deficient framing from the objective and abstract.

Response: We agree with your observation and have revised text excluding P in Line 15.

Lines 21-22: The Methods indicate that pyrophosphate, ammonium oxalate, and DCB extractions were performed separately on different soil aliquots rather than sequentially on the same soil sample. Therefore, the statement in the Abstract that "SOC was extracted in the sequence: CPP > C-DCB > C-OX" is potentially misleading and should be revised. Please clarify that these represent three independent extraction procedures.

Response: We have made the statement clear to read as "The sequence of the soil organic carbon (SOC) content removed by the three extractants was: C_{PP}>C_{DCB}>C_{OX}, with a mean of 62±0.16 %, 41±0.19 % and 28±0.21 %, respectively, of the total C in the soils".

Lines 33-34: the abstract stated that "The significant amount of OC associated with OX extraction also indicated that a substantial portion of the SOC was associated with SRO and poorly crystalline Fe oxides", but in the conclusion it's mentioned that "Poorly crystalline and SRO alumino-silicate minerals were absent in the soils." Please clarify this statement.

Response: Thank you. Poorly crystalline and SRO aluminosilicates minerals (such as allophane and imogolite) were absent in the soils. However, the contribution to OC associated with SRO and poorly crystalline Fe oxides was indicated by the substantial amount of OC extracted by OX in the soils.

Lines 222-223: The DCB extraction was repeated for some samples when brown or red coloration persisted in the soil residue. Since the objective of DCB extraction is to remove pedogenic Fe oxides as completely as practicable, please clarify how repeated extraction was accounted for when interpreting the relationships between DCB-extractable Fe and soil organic carbon, particularly if residual SOC was measured after extraction?

Response: Thank you. To obtain a complete DCB extraction especially with some of our soils containing high Fe, repeated DCB extraction is necessary (Mehra and Jackson, 1960). The extracts from the repeated DCB extraction were added to the initial extracts from the initial DCB extractions and extracts were then analysed. All soils used for the study underwent a complete DCB extraction with evidence of grey colour residual soils and the OC was measured in the residues after a complete DCB extraction.

Lines 264-265: Some samples reach pH 7.6, but the manuscript simply states that TC represents OC because "most" soils are acidic, and carbonate was tested qualitatively with HCl in soils near neutral pH. Because TC serves as the denominator for the reported percentages and C:(Fe+Al) ratios, even modest inorganic C could affect the quantitative interpretation. Please provide evidence that inorganic C was negligible across the dataset.

Response: There was only one sub-soil sample with a slightly alkaline pH and the total C in this sample was measured before and after acid treatment that showed undetectable inorganic C.

Line 341-342: Al extracted by PP, OX, and DCB ranged only between 2-4% of the total Al in samples. What are the possible Al forms in soils?

Response: Thank you for this question. The possible (and targeted) Al forms extracted by PP is organically complexed Al, while Al forms extracted by OX are; poorly crystalline and SRO Al, and some organically complexed Al may also be extracted. DCB does not extract crystalline forms of Al, however, Al substituted in the structure of Fe oxides will be released during the reductive dissolution of Fe oxides such as goethite and hematite.

Line 393. Was the procedure conducted in sequence (i.e. PP first, and followed by DCB, and OX), or is it the sequence with higher to lower organic C C-PP > C-DCB > C-OX? Perhaps the authors can clarify the sentence.

Response: Thank you. The authors have revised the sentence to clarify the sentence in Line 403.

Lines 408-409: The interpretation appears to assume that the OC released by OX represents a subset of the OC released by DCB, such that CDCB - COX can be interpreted as OC associated exclusively with crystalline Fe/Al oxides. However, it is also mentioned somewhere that OX and DCB are independent extractions with different reaction chemistries and partially overlapping. How do the authors address this issue? Or perhaps, I suggest interpreting these values as operationally defined extractable-C fractions rather than assigning the 13% difference quantitatively to crystalline Fe/Al-associated OC.

Response: Yes, despite the different underlying chemical mechanisms and partially overlapping extractions in the DCB and OX procedures we assumed that OX extracted OC represented a subset of the DCB extracted OC because DCB extracts all forms of free Fe oxides including poorly crystalline, short-range ordered and well-crystalline Fe oxides, where as OX almost exclusively removes poorly crystalline and short-range ordered Fe oxides. Thus, the difference between the OC removed by the two extractants should provide a reasonable indication of the association of OC with poorly crystalline and short-range ordered Fe oxides.

Lines 630-632: This result highlights that the amount of carbon extracted by a reagent and the amount of mineral elements extracted by that same reagent do not necessarily follow the same pattern. Pyrophosphate can disperse organic matter and disrupt associations between organic molecules and soil particles. It can also extract organic matter associated with metal ions, particularly through complexation with Fe and Al. Other factors, such as the nature of the organic matter and its associations with soil minerals, may also be important. Consequently, the amount of OC extracted does not have to be proportional to the amount of Fe or Al extracted.

Response: Yes, the amount of OC extracted by a reagent and the amount of an element extracted by the same reagent may not follow the same sequence because of the contribution of both Fe and Al in the association with OC, particularly in the PP and OX extractions.

Lines 754-755: The authors stated that "Crystalline Fe oxides (i.e., goethite and hematite) were dominant…" and that SRO aluminosilicate minerals were absent." But elsewhere the authors acknowledge that DCB and OX are non-specific: DCB does not quantitatively extract all crystalline Fe phases, while OX may dissolve some crystalline Fe minerals." Can goethite and hematite dominance, and the absence of SRO aluminosilicates, be concluded from selective dissolution alone? Unless supported by independent mineralogical measurements, these statements may need to be reformulated as inferences based on operational extraction ratios rather than direct mineral identification.

Response: We agree with the reviewer and acknowledge that extraction procedures alone can't establish the presence of particular crystalline phases in soils. We have done the mineralogical analysis of the soils using X-ray diffraction to confirm Fe oxides (though data not presented here) that confirmed the presence of goethite and hematite in the studied samples.