

SOIL Discuss., referee comment RC3  
<https://doi.org/10.5194/soil-2021-146-RC3>, 2022  
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## Comment on soil-2021-146

Anonymous Referee #3

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Referee comment on "Thermal signature and quantification of charcoal in soil by differential scanning calorimetry and BPCA markers" by Brieuc Hardy et al., SOIL Discuss., <https://doi.org/10.5194/soil-2021-146-RC3>, 2022

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The manuscript from Hardy *et al.* investigates the potential for differential scanning calorimetry to characterise charcoal and quantify BC in soils. The paper uses soils from a croplands and forest soils with pre-industrial charcoal kilns to characterise the thermal signatures and quantify of charcoal C content. The manuscript also compared the accuracy of BC quantification from DSC to the benzene polycarboxylic acid (BPCA) method using a subset of samples. The paper provides an insight in to the continuum of chacoal and BC using DSC as a methodology of determining charcoal C content.

Overall the paper is well written and the authors address the aims of the manuscript clearly. The introduction and methods are concise and well presented. I have some minor comments about the methods and results in the specific comments below. The discussion follows the results well and places the study in the current literature. I believe this is a well conducted and presented manuscript with data that are unique, and findings that fit within the scope of the journal.

### Specific comments

Line 14: Consider rewording sentence, potentially, 'sustainably improve soil fertility'

Line 33-34: Consider rewording to '...interpretable information across the continuum of ...'

Line 101: For the soils collected in Belgium, what was the depth of topsoil sample?

Line 167: Can you explain the selection of charcoal concentrations in more detail?

Line 173 change 'previously' to 'prior'

Figure 4: Caption refers to soils from Wallonia and German, which is confusing because in the methods they are labelled as either German or Belgium soils. Suggest changing Wallonia to Belgium in the caption.

Figure 6: figure has the  $R^2$  value but no line fitted or coefficients listed?

Figure 7: Too many significant figures

Figure 7: caption doesn't explain 7a or 7b explicitly

Line 208: august to "August"

Line 212: any statistical tests to measure these differences

Line 222: keep the naming of  $R^2$  consistent

Line 226: change 'more than twice smaller than' to 'less than half of'

Line 230: "c. five"?

Line 235: consider changing 'mineral background' to 'mineralogy'

Line 242: consider changing "to get rid of" to reduce, remove, minimise.

Lines 267-268 ("A positive ..."): Sentence is confusing, consider rewording

Line 275: Consider rewording sentence.

Line 284: "which may explain the lower ..."

Paragraph 1 of section 4.2 does not discuss any results. Whilst it is relevant information how it relates to the current study is not clear.

Some figures and captions use comma or a decimal point (i.e 96,3 vs 96.3). Figure 4 and 6 uses a decimal point, whereas 5 and 7 use commas