

## ***Interactive comment on “CHLSOC: The Chilean Soil Organic Carbon database, a multi-institutional collaborative effort” by Marco Pfeiffer et al.***

**Marco Pfeiffer et al.**

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To Referee #4

We appreciate the time taken to identify those points that need more work. Please consider that the English language in this version of the manuscript was proof read by a professional.

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Reviewer comment: There are still areas where the grammar and sentence structure needs work, especially in the first few paragraphs.

Authors' Response: Then entire document was proofread by a professional. -----

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Reviewer comment: \*page 3, I don't think the most of the paragraph that begins at line 65, where the number of data points contributed by various people is mentioned, adds much to the manuscript. I'd suggest shortening this paragraph just to the first two sentences and general information that the data came from a variety of sources, including areas of low representation (i.e METHANOBASE and SEIA data) and by scientists as well as beneficiaries (farmers) of the Agricultural and Livestock Service (SAG by its Spanish acronym) subsidy program.

Authors' Response: The paragraph was shortened and rewritten for clarity.

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Reviewer comment: page 3, line 94: It would be better to introduce this section with a topic sentence saying that there are several caveats users should be aware of with these data and then list these caveats in sentences starting with first, second, and finally, so the reader understands when they authors are transitioning from one idea to another

Authors' Response: We rewrite as suggested and think this will greatly improve clarity of the paragraph. The final paragraph ended as follows: "The assembled data was sampled over several decades and compiled by different authors or institutions. We would like to mention the following warnings to the data users: first, for some data points it was not possible to find or verify the original data source. Second, a potential source of uncertainty may be the analytical method employed for analysis; for most samples (97%), SOC content was analyzed using the wet oxidation method and a small number were analyzed by total combustion (CN elemental analyzer). Discrepancies in SOC results between combustion methods have identified wet combustion as a less reliable assessment method for SOC, as it tends to underestimate organic carbon at higher SOC contents (Kumar et al., 2019), and potentially overestimate in highly reduced soils (Chatterjee et al., 2009). This issue has not been addressed in Chile to

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date. The recommended methods for SOC determination are currently wet oxidation and loss on ignition, however, dry combustion is a more accurate alternative (Sadzawka et al., 2006). Future data collection initiatives should stress consistent analytical procedures as a revision of local standards is urgently required. Finally, a possible source of bias in data from SAG is the fact that samples were taken by farmers following SAG guidelines where a composite sampling is taken for each parcel.”

----- Reviewer comment: page 3, line 97: what level of uncertainty is added by using the wet oxidation method? Why? Is there a reference you could add here where users of the data could learn more about this issue if they wanted to? Oh, some of that information is at line 103. These sentences need to be together. And I'd like more information explicitly given to the reader about the potential errors introduced by wet oxidation (too high, too low?) so they don't need to go to that reference to figure that information out.

Authors' Response: We appreciate this suggestion and addressed the issue by adding more information and a comprehensive review on the methodology as a reference. The phrase changed as follows: “Discrepancies in SOC results between combustion methods have identified wet combustion as a less reliable assessment method for SOC, as it tends to underestimate organic carbon at higher SOC contents (Kumar et al., 2019), and potentially overestimate in highly reduced soils (Chatterjee et al., 2009).”

----- Reviewer comment: page 3, line 102: I don't think you need include "which is not properly addressed in Chile on a national level", especially since the authors bring this up again in page 4, line 1.

Authors' Response: The phrase was eliminated

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Reviewer comment: Table 2: I'm suspicious of the SOC values based on what's listed in Table on as minimum and maximum values. First, the minimum value is listed as

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0.00006 % C. I don't know any method that can accurately measure C levels that low. The maximum value is also listed as over 80 % C. I work in highly organic C soils and I have never seen a % C value higher than about 60 % and that was in a burned area. In addition, based on Table 3, these point are found in areas that are not known for high C soils. Should these data have been excluded during a QC process. Did you do any QCing? Or did you accept all data given to you? Either way, it should be explicitly stated that the data were or were not reviewed (and if they were how they were evaluated should also be included).

Authors' Response: Regarding the values, we reported the values as they are in the original sources. The values mentioned by the reviewer are published values and methods can be checked by the users in the original source. Regarding the methodology used to obtain very low values as the one reported in table 3, it is worth to mention that when using AMS to determine isotopic composition of the SOC it is possible to obtain very low values, which is the case of that particular lowest value in the database measured and reported by Ewing et al., (2006, 2008). We include AMS as a dry combustion method as signaled by reviews of SOC methodology (e.g. Chatterjee et al., 2009). Other very low values exist in the database for the Atacama desert, some of them corresponding to a recent article published by Mörchen et al. (2019) and included in the database; in this study they used a Solu TOC Cube (Elementar Analysensysteme, Hanau, Germany), and extended up to 5000mg of sample weight for very low C contents. Regarding the 83.3% value reported in table 3, this corresponds to a sample obtained from a Sphagnum peat bog by one of our coauthors (J.P. Fuentes), who performed the wet oxidation method. We think this additional information is not necessary to address in the paper as it can be obtained by the users of the database directly from the sources. Anyway, if the reviewer thinks a paragraph as the above mentioned is necessary and the editor concurs, we can add this information to the manuscript.

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Reviewer comment: I notice where the data are online there is no metadata file. I

would suggest you add a meta data file to the online location of the data so that users who come upon the data without finding this reference are able to use it. (This is not something that needs to happen before the paper is published, but a recommendation for future users.)

Authors' Response: A metadata file is being prepared to be added to the database repository.

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Interactive comment on Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2019-161>, 2019.

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