

Interactive comment on “Constraints on Enhanced Weathering and related carbon sequestration – a cropland mesocosm approach” by Thorben Amann et al.

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Dear Oliver, Thank you for your comments. In the following we document our replies and changes that we made according to your suggestions.

Reviewers comment

Our reply

1. Include the soil material characteristics used in the mesocosm in the main MS. important would be soil C content, soil pH value (in CaCl₂) and texture. The origin (horizon of which WRB soil type) would also be of interest. It can be

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assumed that an acid soil respond differently than an alkaline soil.

We included all available data on the soil in the supplement section S1.

2. Please specify the amount of olivine for suitability under field conditions. The 22 kg m⁻² corresponds to 220 t ha which seems very high, or?

Yes, the amount is high, yet leaves no visual impact on the soils. It is hard to estimate a suitable amount, since it strongly depends on the grain size distribution of soil type and rock powder. We added a small remark on the value of the application rate to avoid confusion.

3. Can you also add a direct evidence of C accumulation during the period, formation of C org and C inorg?

In Fig. 3 of the MS, we show the development of DIC in the soil water. Beyond this, we don't have information on carbonate precipitation or Corg formation.

4. How was the productivity of the plants affected by the olivine application?

Like stated in the MS, the effect of the olivine application on plant growth and productivity is the topic of the original study for which the experimental setup was designed. Results are processed in another MS that is currently being finalized. We can therefore not include them in the present MS. Moreover, the present MS focusses on the weathering rates and potential for carbon sequestration and adding information about the plants would distract from the main focus. It will also elaborate the paper considerably (more material and methods, more figures, more discussion points, etc.) which is not desirable and is the main reason for us to divide the results in 2 publications.

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