Reaction to interactive comment, received and published 1 July 2019, on
"Global database and model on dissolved carbon in soil solution", by
Langeveld, J., Bouwman, A. F., van Hoek, W. J., Vilmin, L., Beusen, A. H. W., Mogollón, J. M., and Middelburg, J. J.

We thank Zeli Tan for his reaction and constructive feedback. Below, we repeat the text of the referee in italics, followed by our response (in normal font).

It is a very interesting study and fits well to the scope of BG. I am not an expert on soil data and thus waiting for the comments from reviewers on the validity and robustness of the method. I have one suggestion from the modelling perspective. To date, many Earth system and land surface models are using SOC as a proxy to calculate the DOC concentration in the soil and then using it with water flow to calculate DOC fluxes to inland waters. Could the authors calculate the correlation between the modeled global DOC in this study and global SOC data (such as HWSD SOC) to see how the previous proxy-based method might bias DOC flux estimates?

Thank you for your nice suggestion and your interest in our study. Indeed, SOC is used in studies as a proxy for DOC. In addition to the sampled data from studies in the database, we also extracted ISRIC soil data from the HWSD (Batjes, 2015, 2016) for the corresponding grid cell of every database site. We included these 30 second-resolution data, as well as the dominant and mean for aggregated data to 30 minutes, in the topsoil analysis. However, the correlations for a (simple) single regression of every extracted soil parameter vs DOC where poor. For example for SOC, the Pearson correlation coefficient was not higher than 0.07 for the three datasets. In general, the mean for 30 minute grid cells yielded best results. Furthermore, in the multi-regression analysis none of the extracted soil properties had a clear added predictive value (page 6, line 28/29). Therefore, the extracted soil parameters were not used as a parameter in the model.

In response to your question, we conducted an analysis of the mentioned HWSD data for SOC topsoil (D1 in the WISE30 dataset) vs the modelled DOC concentrations (Figure 1). Correlation however is poor.

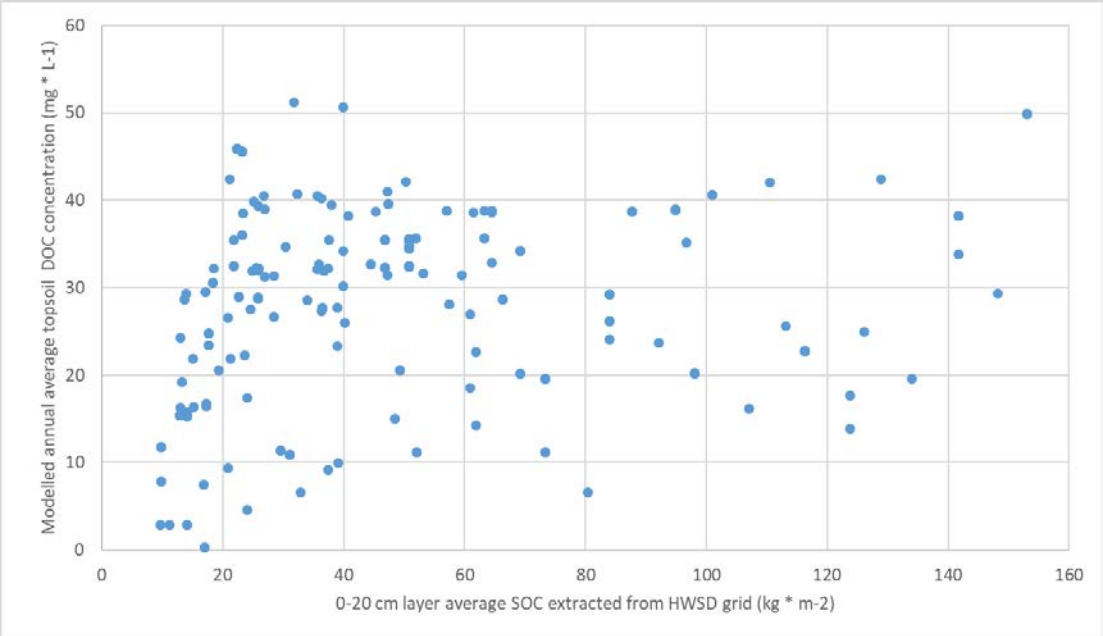

*Figure 1: Soil organic carbon (SOC) data (kg*m^{-2}, for 0-20 cm) extracted from HWSD-WISE30sec (Batjes, 2016) plot vs. modelled DOC concentrations (mg*C L^{-1}) for topsoil. SOC data are mean-value aggregated to 30 minutes. DOC*

concentrations are the same data as in figure 7 in the article. Three extreme values with a high leverage point (SOC>200,DOC<25) were excluded. Simple linear regression coefficient of determination, R^2 = 0.03.

References

Batjes, N. H. (2015) *World soil property estimates for broad-scale modelling (WISE30sec)*. ISRIC-World Soil Information.

Batjes, N. H. (2016) 'Harmonized soil property values for broad-scale modelling (WISE30sec) with estimates of global soil carbon stocks', *Geoderma*. Elsevier, 269, pp. 61–68.