

Interactive comment on “Global database and model on dissolved carbon in soil solution” by Joep Langeveld et al.

Anonymous Referee #1

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The authors have done a lot of work to assemble the data. The database will be a valuable resource. It is disappointing that the flux data are not analysed, since these are arguably more important than concentrations in the context of the carbon cycle. It would be of great interest to know the distribution and statistics of the flux data. I do not think the justification for analysing [DOC] only (page 4, line 22) is convincing. The authors say that fluxes can be obtained as the products of concentration and water flux. What happens if you do this, how do the results compare with the direct flux data? Looking at Figure 5, average fluxes might be $> 20 \text{ gC/m}^2/\text{a}$, which is about twice the value that Buckingham et al reported for non-peat UK soils. Buckingham et al compared straight average and flux-weighted concentrations, and found not much difference, but this was the UK only. Is it possible for the authors to make such a

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comparison for their collated data? A discussion of the possible dangers of reporting straight-average annual [DOC], which I assume is what has been done, would be helpful. The model is unimpressive – the predictions do not vary much and so there is strong bias, predictions being too high at low [DOC] and too low at high [DOC]. A problem might arise if high soil moisture promotes DOC production (positive effect) while associated high water throughput causes dilution (negative effect). Again, it would be of interest to know the implications of the modelled data for flux estimation. Can the different averages in Figure 4 be compared for statistical significance? Page 4, line 20. I do not understand this argument – surely there is more decomposition of organic matter near to the soil surface, not with increasing depth? Is it more to do with escape of CO₂ as gas, and the dissolved DIC flux, becoming less efficient with depth? The paper is not that well written, it could do with a careful edit for language and grammar. The word “equatorial” is mis-spelled as “equitorial” throughout. Reference S. Buckingham, E. Tipping, J. Hamilton-Taylor Concentrations and fluxes of dissolved organic carbon in UK topsoils. *Sci Tot Environ* 407 (2008) 460 – 470

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