

Interactive comment on “Warming mobilises young and old soil carbon equally” by F. Conen et al.

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General comments

This is an interesting and important addition to the ongoing debate on the sensitivity of soil carbon to temperature changes. The authors have used a new and powerful technique to assess potential contributions of young and old soil carbon to carbon release under temperature increases. The paper is generally well, and clearly written and generally of a high quality. I have some reservations about some of the conclusions and links made from the results (see below), which should be dealt with or clarified. I agree with the first referee’s comment that the authors should make comment on the influence that sample treatment could have had on results and lability of carbon.

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Specific comments

p1359 line 25 to p1360 line 10 (and even 20). In my opinion the authors seem to make links between their results and speculate on possible mechanisms for them without evidence specific to their study. This part of the discussion should be amended to clarify a) where links made are purely speculative and based on other, non-related studies, or b) where there is evidence directly relating to their study.

p1361 lines 20-23. How do the authors know that their results were not influenced by changes in microbial community or composition if they didn't directly measure these changes?

p1361 lines 27-31. The authors should be careful in drawing parallels between their work and work on peatland soils. Perhaps instead of the current wording, write something along the lines of 'Similarly, for northern peat lands, Dioumaeva et al (2002) found.....'. I would leave the part 'The same can be expected' out, instead add perhaps 'which may suggest and equal sensitivity....'

Technical corrections

p1356 line 22 - replace 'would' with 'are' p1357 line 1 - replace 'stronger' with 'more strongly' p1357 line 11 - replace 'are decreasing' with 'were observed to decrease' p1357 line 13 - replace 'period are' with 'period were' p1359 line 9 - replace 'were' with 'was' p1360 line 2 - replace 'more likely' with 'it is more likely that' p1360 line 19 - replace 'which is the opposite we found here' with 'in contrast to our findings' p1360 line 25 - replace 'is' with 'was' p1360 line 26 - replace 'This indicates that carbon older, respectively younger, than 45 years at this site has the same temperature sensitivity' with 'This indicates that at this site, carbon older or younger than 45 years respectively has the same temperature sensitivity' p1360 line 28 - replace 'got' with 'were' p1361 line 3 - replace 'would cause an about 7.7% greater stimulation of the decomposition of younger soil carbon as compared to soil carbon older than 26 years' with 'would cause a 7.7% increase in stimulation of decomposition of soil carbon younger than

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26y, compared with older soil carbon.' p1361 line 4 - replace 'Statistically, this might be significant, a fact that underlines the precision of our approach' with 'The statistical significance of this result underlies the precision of our approach'. p1361 line 6 - replace 'larger quantities of it' with 'larger litter quantities' p1361 line 11 - replace 'that site' with 'the RM site' p1361 line 14 - replace 'annual carbon inputs into soil therefore more similar and so were Q10 values.' with 'and therefore annual carbon inputs to soil and Q10 values were more similar' p1361 line 18 - replace 'Result and robustness of our findings reduce the uncertainty' with 'This result and therobustness of our findings may help to reduce the uncertainty' p1361 line 20 - replace 'making use of a' with 'based on a' p1361 line 23 - replace 'They show for mineral soils that carbon' with 'Our results suggest that the carbon' p1361 line 25 - insert a comma after 'equilibrium'

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