

Interactive comment on “Investigating microbial transformations of soil organic matter: synthesizing knowledge from disparate fields to guide new experimentation” by S. A. Billings et al.

Anonymous Referee #1

Received and published: 12 January 2015

Overview of manuscript:

The authors provide a nice discussion regarding how information from disparate fields can guide soil organic matter research. The authors use examples from natural, aquatic, and artificial environments and describe how that information can be used to inform specific concepts in SOM research. Secondly, the authors emphasize the importance of establishing intrinsic patterns of decay kinetics for purified substrates. This manuscript provides a nice overview on how SOM research can be advanced through knowledge acquired with more controlled experiments in homogenous or artificial environments. I have no serious criticisms and only offer a few suggestions where text,

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figures, or citations could be refined or added. The manuscript is well written and will be a good contribution to the journal.

Specific comments:

Page 1104, Line 6: Add literature references for “. . .as has been elucidated in the ocean.”

Page 1112, Lines 22-26: This sentence is a bit long winded and should be made more concise or split up into 2 sentences. The way it is now, it is difficult to read.

Page 1114, Lines 2-6: Is there a particular reference for this that would help explain the response you are describing?

Page 1115, Lines 4-5: “In contrast, apparent E_a for the NAGase/NAG reaction appears consistently higher than the corresponding intrinsic E_a .” This statement is only based off of a couple of data points in Figure 1. Actually, only at one pH do you have both intrinsic and apparent values that you can compare. Can you add more data to the graph to support this statement? If not, using ‘consistently’ in this statement is too bold. Additionally, are their error bars associated with this data? Is this the average values? Are these conclusions based on any statistics?

Section 4: You may find this newer publication helpful and worth citing in this section: Tang, J. and W. J. Riley. 2015. Weaker soil carbon-climate feedbacks resulting from microbial and abiotic interactions. *Nature Clim. Change* 5:56-60.

Page 1122, Lines 25-28: Add citations

Figures:

Figure 1: It seems like there would be more apparent NAG E_a values in the literature to add to this graph?

Figure 2: Text is hard to read on this figure. May be helpful for the reader to see arrows included in the figure that indicate changes in E_a and mean residence time with depth.

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Concluding Remark:

Again, I think this manuscript is well written and provides good information for the advancement of SOM decomposition research. The comments provided are only minor.

Interactive comment on SOIL Discuss., 1, 1097, 2014.

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