

Interactive comment on “Metabolic tradeoffs and heterogeneity in microbial responses to temperature determine the fate of litter carbon in a warmer world” by Grace Pold et al.

Grace Pold et al.

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Received and published: 29 August 2019

Thank you for your thoughtful and helpful review. Here we will highlight the changes we made (no quotes) to the manuscript in response to your comments (in quotes):

"First, it would be better to provide an explicit equation showing how CUE is calculated in DEMENT: $CUE = C_i + (T-15)*C_t$, where C_i is the intrinsic CUE, which is calculated as a function of baseline CUE and numbers of enzyme and transporter. This equation, though simple, would first make the writing much easier to organize and follow with regard to what specific changes have been modified in this study. This equation could be listed around line 80 on page 4."

C1

The suggested modification has been made.

"In addition, the first sentence in section 2.3 about Running DEMENT could be moved above to the very beginning of section 2.2 to introduce the modifications. "

Good idea. The sentence has been moved up.

"Also, it might be better to include the DEMENT GitHub repository URL. "

Thank you – the link has been fixed.

"The results of Pold et al. clearly indicate the role of CUE variability in regulating the fate of litter C in response to temperature (and likely moisture). Although I overall agree with all of the results and discussions, there is one spot in the very beginning of the results section was particularly not clear to me: in the paragraph around line 130, first, to my understanding references to Figure. 1A and Fig.1B should be reversed. "

Thank you – the references have been swapped and figure 1 has been modified.

"As regards the homogeneous scenario, the authors stated “all taxa had an identical temperature sensitivity that was equivalent to the cross-taxon mean ($0oC-1$). . .”. I am not sure what exactly the constant C_r value is across taxon, 0, some value positive or negative, as illustrated in Fig.1 A, A_i , A_{ii} ? "

The cross-mean average in this scenario is zero in this instance. We have clarified this in the text and also moved Fig 1. A_i and A_{ii} to a separate figure to reduce confusion.

"Also, throughout the discussion and results, the terms used to describe heterogeneity in the specific parameter C_r and homogeneous community are not easy to follow, and are sometimes confused with descriptions of other microbial models that are not microbial explicit. I recommend being explicit and consistent throughout the ms when using heterogeneity and homogeneity to describe the variation in C_r and across-taxon variability, as well as different models."

Thank you. We have settled on using the phrasing of "fixed" CUE temperature re-

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sponse for those where it is a set value, "dynamic" for where CUE can change as a function of community composition changing with temperature without Ct being temperature sensitive in and of itself, and have restricted the terms "homogeneous" and "heterogeneous" specifically to describe differences in Ct across taxa.

The version of the manuscript with these revisions is now in the supplement here.

Please also note the supplement to this comment:

<https://www.biogeosciences-discuss.net/bg-2019-269/bg-2019-269-AC2-supplement.zip>

Interactive comment on Biogeosciences Discuss., <https://doi.org/10.5194/bg-2019-269>, 2019.