Biogeosciences

Discussions

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Interactive comment on "Filtering artefacts in bacterial community composition can affect the outcome of dissolved organic matter biolability assays" *by* Joshua F. Dean et al.

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We thank the referee for the positive comments. Below we give a first response to each of the points raised initially. To facilitate discussion, we also give a more detailed response to the two most important issues in order to expand on the points the referee raises (denoted with *). We will post a final response and modified manuscript after the Open Discussion is closed.

- We used "DOM carbon concentrations" so we didn't confuse readers by switching between the acronyms "DOM" and "DOC", but we acknowledge this is not the norm so we will revert to using both acronyms.

* - The reviewer is correct that it is more common to fit a negative exponential model to data of this type. However, this function is constrained to be strictly decreasing and therefore cannot be sensibly fit to data that show increasing values with time, or even lag-phase dynamics. Rather than impose a functional form on the data we therefore decided to use a smoothing approach (GAMs), combined with model selection methods to guard against overfitting. This approach has been successfully applied elsewhere (Catalan et al. 2017, JRG:Biogeosciences, DOI:10.1002/2016JG003512). We have also fit negative exponential models to the same data (resulting in much poorer fits, AIC = -13, see attached Fig. 1), and can include this and supply the details and results as Supplementary Material if required.

* - We initially excluded these results because there was very little change in the d13C values during the experiment. However, after exploring the literature further, and after the encouragement of the reviewer, we found that reporting d13C-values during these incubations is rare. We now include these results in the attached Fig. 2, and below we discuss the results briefly. This figure can be included in the manuscript and the discussion expanded to cover this data if the referee(s) and editor agree that it adds value:

The d13C-DOC values remain stable during incubation, within $\pm$ 2.0 ‰ (Fig. 2), although this variability is slightly more pronounced than in other dark bacterial decomposition experiments of aquatic DOC ($\pm$ 0.0-0.5 ‰) (Lalonde et al. 2014, Biogeosciences, DOI:10.5194/bg-11-3707-2014; Vahatalo and Wetzel 2008, Limnol. Oceanogr., DOI:10.4319/lo.2008.53.4.1387). The shifts in d13C-DOC could be due to the preferential mineralisation of certain DOC molecules with distinct d13C signatures - a more positive d13C signature for all samples at day 5, and a more negative d13C signature in only the P7 samples at day 14. The former shift reflects the initial increase in DOC concentrations seen in the P2 and P7 treatments, and the latter shift reflects the change in DOC degradation dynamics seen only in the P7 treatment. However, these shifts in d13C-DOC do not provide any clear line of reasoning for these differing

DOC dynamics (for example a shift towards less negative d13C-DOC values due to chemoautotrophic fixation of ambient CO2 at day 5). As the experiment progressed, the d13C across all samples converged, although over a range of 1 ‰ (-28.0 to -29.0 ‰).

- We will add a short discussion on the expected influence of filter pore size on DOC concentration and characteristics starting with the references as suggested.

- We will ensure consistency throughout the ms with reference to "filtration"

- We will correct the missing labels in Figure 1.

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Interactive comment on Biogeosciences Discuss., https://doi.org/10.5194/bg-2018-282, 2018.

Fig. 1.

Fig. 2.