Biogeosciences Discuss.,
doi:10.5194/bg-2016-14-AC2, 2016

Biogeosciences Discussions
Open Access
EGU

Interactive comment on "Patterns of carbon processing at the seafloor: the role of faunal and microbial communities in moderating carbon flows" *by* C. Woulds et al.

C. Woulds et al.

c.woulds@leeds.ac.uk

Received and published: 5 April 2016

Reviewer 2:

Once again we would like to thank the reviewer for their overall positive opinion, and for their attention to detail which will allow us to improve the manuscript. Major comments:

The main comment from this reviewer is that the discussion is overly long. We agree, especially concerning the section about bacterial growth efficiency, and will undertake to significantly reduce the length of the discussion. Specific comments:

Reveiwer: Line 73: It might be worth pointing out what does biological C processing not cover. Is there non-biological C processing in these systems? It might be worth

Printer-friendly version

Discussion paper

pointing out the differences.

Answer: The term is used to distinguish between short term uptake and cycling and longer tern C burial. This will be clarified.

Reveiwer: Line 76: A quibble: Stable isotope tracer experiments are an excellent tool, but not ideal. For instance, radiotracer 14C incubations are far more sensitive and do not depend on sorting out mass of naturally occurring background tracer distribution.

Answer: Acknowledged, but working with stable isotopes has practical benefits which can allow increased numbers of experimental treatments/durations/replicates. A note will be added.

Reveiwer: Line 117 and following: Independent of the food-web tracer studies, it would be nice to have some information on the relative benthic biomasses for these two sediment types, e.g. muddy and sandy bottoms. I would be surprised if muddy bottoms actually supported more faunal biomass.

Answer: Detail will be added.

Reveiwer: With the exception of the respiration measurements, these are single endpoint experiments. Dynamics between the pools are not necessarily accessible.

Answer: Agreed, wording will be amended.

Reveiwer: Line 124: “Recent findings” is relative; dynamic biogeochemical cycling in low OC permeable sediments has been extensively documented over the last two decades.

Answer: Agreed, wording will be amended.

Reveiwer: Line 171: Please describe more carefully the labeled phytodetritus in more detail. Was it composed of a single species and what? Was it prepared in the same fashion for both sites? What was it composed of? How fresh was it? Was it added as fresh or freeze-dried material.

Answer: Detail will be added.

Reveiwer: Does the difference between the labeling percentages (ca. 25% and 34%) for the two sites reflect different batch preparations, or differing compositions of pytodetritus?

Answer: Detail will be added as above.

Reveiwer: Methods: It's not entirely clear to me that total bulk 13C of the sediment was determined (i.e. total Corg 13C). This must have been done in order to calculate the recoveries of tracers shown in Figure 2.

Answer: The totals shown in figure 2 are total biologically processed C, and therefore do not contain C remaining in the sediment.

Reveiwer: Is there a time zero sample, i.e. samples taken from one core immediately after the addition of the 13C-labeled phytodetritus?

Answer: This is only available for Loch Etive, and not on the Ythan sand flat, therefore data has not been included.

Reveiwer: Line 244 and following: It is not really clear to me why the authors work with the del (_) notation for these type of experiments. There is also no obvious connection from how they go from Equation 2 to Equation 3, the latter of which is the more relevant for this manuscript.

Answer: Data are reported using the del notation in the results section because many workers in the field use this notation, and ïĄĎïĄď is a clear way of displaying isotopic enrichments. However, our calculations for uptake used At% instead. There is not supposed to be a connection between equation 2 and equation 3.

Reveiwer: Calculations with exceedingly large enrichments, for instance as seen in the macrofaunal biomass (lines 290 and following), become inaccurate.

Answer: The reviewer's meaning is not quite clear, however if this is given as a reason

for not using the del notation, then note that uptake calculations were made using At% instead.

Reveiwer: Line 280: . . ..or as dissolved organic carbon.

Answer: This will be added.

Reveiwer: Section 3.1: It might be helpful for the reader to plot the remineralization data over the time course of the experiment.

Answer: We will prepare these plots and assess whether they are a good use of space.

Interactive comment on Biogeosciences Discuss., doi:10.5194/bg-2016-14, 2016.

Printer-friendly version

Discussion paper