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Interactive comment on "Sink or link? The bacterial role in benthic carbon cycling in the Arabian sea oxygen minimum zone" *by* L. Pozzato et al.

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This is an interesting study focused largely on the fate of organic matter and role of bacteria in the carbon cycle and food web in the Arabian Sea. The study employed isotopically labeled POC and DOC. Overall it is suitable for publication, but could be strengthened by attention to the following issues.

(1) The work might be more interesting if posed as a series of questions or hypotheses. Did you expect the POC and DOC might have different fates, or thhat bacteria might play different roles in determining these fates?

(2) The POM and DOM tracers were introduced at different locations in the sediment

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column (the surface and 4 cm down) How could this have affected the results? Are the animals responsible for feeding on POC (and competing with bacteria) largely surface feeders? What would have happened if you introduced the POC at depth and the DOC on the surface?

(3) Methods – Please give the sampling dates - was the experiment done during monsoon or intermonsoon periods? What was the incubation time? I could not find this information in the methods or on the figures although I may have missed it. Water was changed every 3.5 days so it must be longer than this. Is this the same experiment as Pozzato et al. 2013 (7 days?).

(4) Clarify what is different from Pozzato et al. 2013. The information in Fig. 2 and 3 of this ms looks like the same as that in parts of Fig. 2 and 3 off Pozzato et al. 2013 J. of Sea Research. Are these the same or different experiments? I recognize there are multiple treatments in the published paper – is this ms about one of those treatments? Is the information in Table 4 of Pozzato et al. different from that in Figure 4 of this ms?

(5) Results text in Section 3.2 needs error terms in the text and some statistical text to provide comparisons among taxa and stations.

(6) Note that megafauna were not included in this experiment. And I believe the experiments occur over a very short time period (unclear about this). Some discussion is merited on the potential that animal ingestion of bacteria might involve deposit feeding megafauna (like holothurians and echiurans). Also allow that macrofaunal ingestion might occur more slowly than the time period of the experiment.

(7) Conclusions focus on bacteria as a sink but don't say much about the role of the OMZ... it appears in the title so that it seems like there should be mention of whether it plays a role in any aspect of the cycling studied. STOMZ and SToutOMZ are very different in DO, grain size and OM as well as T... do any of these factors control aspects of C processing studied here? If there is no influence of these factors that is an important result.

BGD
10, C3724–C3726, 2013

Some specific items to consider or correct.

Line 28. What about the earliest studies? Blair et al. 1996; Levin et al. 1997 and others Line 79 . . . showed that limited faunal activity. . . Line 84-86. Awkward – please rephrase Line 186 The sediment cores were then frozen Line 305 new paragraph

Table 2 Polychaetes is spell incorrectly. Here and throughout the text Polychaetes and should be listed as Other Polychaetes since Linopherus sp. is a polychaete.

Fig. 2 and 3 what is Eukaryia on the charts?

Line 312 – Could symbiotic bacteria in the foraminifera be taking up the DOM? Line 329 DOM tracers were not processed

Line 359-61. Please note there are deep-sea environment where bacteria are a primary food source. Vents and seeps are prime examples.

Line 386 inducing should be induced Line 431. It is interesting that in may natural abundance isotope studies foraminifera have d13C values similar to those of sediment Org. C (and slightly lighter than phytoplankton/suspended POC). Could this reflect their reliance on sedimentary bacteria?

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