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Biogeosciences Discussions

Interactive comment on "Changes in the spectrum and rates of extracellular enzyme activities in seawater following aggregate formation" *by* K. Ziervogel et al.

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Many of Reviewer #3's comments relate to the methods, including specific points that we have addressed above. The method for measuring enzymatic hydrolysis rates using fluorescently-labeled polysaccharides has been described in numerous publications by Arnosti and colleagues; these references include those cited in the Methods section. As described above in the response to reviewer 2, our incubations run over a time course extending from days to weeks. As described in the Methods section (p. 5, l. 146-151), in Fig. 1 and Tab. 1, we publish the highest rate measured for each substrate, during the time course of the incubations. We took this approach because

hydrolysis of different substrates was complete (hydrolyzed entirely to monomers) at different time points, and choosing to report rates at a single time point would have artificially depressed the calculated hydrolysis rates for substrates that were most quickly hydrolyzed (i.e., once a substrate is completely hydrolyzed to monomers, dividing by a longer incubation time simply results in a lower calculated hydrolysis rate, since hydrolysis was already complete). Comment [2]: As stated in our response to reviewer 2, we do not have any numbers for fall 2008, and did not collect samples for community analysis. Comment [3]: the reviewer may have mis-read Table 1, since the reviewer's comment about the enrichment of laminarin and xylan hydrolysis in roller bottles relative to whole seawater is not accurate: as shown in Tab. 1, the enhancement of laminarin and xylan hydrolysis on aggregates relative to the whole seawater were in the same range at both times. It is true that xylan rates in fall 2008 were higher than in spring 2006, but this enhancement was seen for whole seawater as well as for aggregates. Comment [4]: the rates of aggregate-associated enzyme activity are included in the roller bottle activities, as shown in Fig. 2 and explained in the text on p. 7, l. 189-191. Comment [5]: We agree with the reviewer that activities of proteases in natural seawater also will likely limit the active lifetime of free enzymes; we have carefully rephrased the sentence on p. 12, l. 357 to note that our experiments conducted under 'clean' laboratory conditions represent a first step in assessing factors other than protease activities that control enzyme lifetime.

Interactive comment on Biogeosciences Discuss., 6, 11293, 2009.