

## ***Interactive comment on “Enhanced rates of particulate organic matter remineralization by microzooplankton are diminished by added ballast minerals” by F. A. C. Le Moigne et al.***

**Anonymous Referee #2**

Received and published: 16 April 2013

Previous studies have shown that POC fluxes in the ocean are linked to mineral fluxes. The mechanisms for the close association between mineral and organic matter fluxes, however, are still poorly understood. The purpose of this study is to investigate how minerals influence organic matter (OM) fluxes by “protecting” OM from remineralization as mediated through zooplankton grazing. The authors present incubation experiments with diatom cultures in seawater containing natural bacterial assemblage and three treatments where zooplankton (a rotifer species) and chalk (calcium carbonate) were added in combination or separately to incubation bottles. Experiments include also control incubations with no zooplankton and mineral added. A suite of parameters were measured during the experiments to investigate particle dynamics and remineral-

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isation (inorganic and organic dissolved and particulate elements, bacterial counts and activity). The manuscript is well written, however, because results of each treatment are presented in different panels it is difficult to compare them. Looking at figures 1 to 4 one can hardly see any difference between treatments. Also, in figure 5 (possibly the most important one) one can hardly distinguish the lines corresponding to the different treatments. Overall the only differences in the treatments seem to be the evolution of phosphate and ammonium concentrations, which increase in the presence of grazers. In the case of ammonium the increase is larger in the treatment with grazers alone, while for phosphate the increase is larger in the treatment with grazers and minerals. Hence the argument for the impact of minerals could go both ways. Given the apparent lack of difference in the evolution of particulate matter between treatments one might question the fact that grazing was important at all as compared to treatments without grazers. Further, the decrease in particulate matter without concomitant increase in dissolved matter, in the treatment with phytoplankton only, is left unexplained. Does that mean that the methods used do not allow to follow real evolution of particulate and dissolved elements in the tanks? For the reasons mentioned above I find the evidence for protection of organic matter in the system studied poorly convincing. Results should be analyzed and discussed more thoroughly before publication.

Additional comment: The rotifer species used in this study is referred to as microzooplankton (20 $\mu$ m-200 $\mu$ m; see Sieburth et al. 1978, L&O, 23, 1256-1263) in the text. Aren't they much larger than microzooplankton?

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Interactive comment on Biogeosciences Discuss., 10, 3597, 2013.

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