

Interactive comment on “The influence of hypercapnia and macrofauna on sediment nutrient flux – will ocean acidification affect nutrient exchange?” by H. L. Wood et al.

Anonymous Referee #1

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Herein, I list some specific comments and questions to the authors that might help to improve the MS for its publication.

Materials and methods. The authors should introduce a brief study area description. Depth situation, is an intertidal benthic ecosystem? seasonal variability or some characteristics related to the nitrogen cycling processes?, known nutrients rates of change through the water-sediment interface? typical density of A.F., Microphytobenthos production rates-abundances? May be a map?.

There are many references to other previous works in the experimental set-up this makes a bit unfriendly for the reader to follow. The authors should include some brief

C74

description of how the samples were taken (multicore-boxcore-diving?) and the acidification facility. The authors must specify the light conditions where the cores were kept during the experiments, this is an important issue since the Microphytobenthos is thought to be playing a significant role in the nutrient exchange. **Results.** Section 3.4, the authors should refer only to the significant interaction (pH-A.F. density and flux) results, there are several statements that are more related to a discussion section (P.2395-L.24 towards P.2396-L.5) Figures 1,2,3 should also be edited: include the A.F. density in the bottom of all graphs and remove the gridding lines in the graph area since they interfere with the observation of the fitted lines results of your experiments under different pH.

Discussion. I think that the authors adjust their discussion to classical processes ruling nitrogen cycling. I missed some visiting of other nitrogen processes in this study area, such as dissimilative nitrate reduction to ammonium (DNRA) or anammox?. Could this processes be active?. If denitrification is present in this kind of sediment, therefore it is possible also to expect the presence of other anaerobic processes, If so, it is possible that A.F. density-related acidification interaction (nitrate versus ammonium observed fluxes in 6.8 pH for example) might in fact trigger one type of process over the other?

The authors centered an important role to macrophytobenthos however the discussion is very speculative in this point and lack scientific evidence. The authors should convince that the MPB are actually an important player in the sediments of the study area first and in they experiments. I guess that the authors don't have data on the abundance of MPB in their cores? however, Are there published values of macrophytobenthos abundances or production in the study area? during conditions similar than during the sample collection time? with this information it is possible to calculate using redfield the expected N and P uptake and establish potential influence on net fluxes in the control experiments.

Specific comments in the discussion P.2397, "cryptic phrase" (L.9 - L.12) needs to be

C75

rephrased is difficult to understand, separate in two ammonia oxidising versus interactive factors. P.2397, L.23 introduce microphytobenthos acronym!

Interactive comment on Biogeosciences Discuss., 6, 2387, 2009.