Biogeosciences Discuss., 12, C29–C31, 2015
www.biogeosciences-discuss.net/12/C29/2015/

Biogeosciences Discussions
Open Access

Interactive comment on "Effects of global climate change and organic pollution on nutrient cycling in marine sediments" *by* C. Sanz-Lázaro et al.

Anonymous Referee #2

Received and published: 27 January 2015

This is a study that investigates the combined effects of a predicted seawater temperature combined with an organic nutrient input on the biogeochemistry on shallow-water sediment systems. I like these type of studies for a number of reasons: 1) the authors investigates multiple stressors (since single stressor is very uncommon in the real world), 2) intact, natural sediment communities are used, 3) the experiment is designed to take time into consideration and 4) more than 2 temperature treatments were used. However, I do have major issues with the fact that the experiment was conducted in darkness, especially considering: "The aim of this work is to examine the effects of temperature rise and organic enrichment on sediment nutrient release". See specific comments in this matter below.

Specific comments:

Full Screen / Esc
Printer-friendly Version
Interactive Discussion
Discussion Paper

#1 The last paragraph in the introduction. You are only looking at heterotrophic processes, i.e. not the entire sediment community and how it is affected by organic input and warming. Please specify the aim better and also try to incorporate this in the rest of your introduction.

#2 Although you refer to the paper by Valdemarsen et al., 2009 for specific details regarding the methods, I still would like to know at what depth the sediment was collected without looking at this paper. This is important considering your data and the scope of this paper. Since this sediment was collected in July at 1 m depth (at least it was in Valdermarsen et al. 2009), I wonder why the autotrophic community, i.e. benthic microalgae is not even mentioned? How much benthic microalgae was present at the sediment surface?

#3 With the approach of only incubating the sediment in darkness you only target heterotrophic processes. However, during light, these shallow sediments often functions as sinks for inorganic nutrient via uptake by benthic microalgae. This is especially true during summer, with far less dark hours than light hours, meaning that the net flow of nutrients (at least nitrogen) during 24 hours might be the complete opposite to your results. Any thoughts on this?

#4 The surface oxygen (in the top layer of sediment???) was maintained due to bioturbation, even though the sediment was in complete darkness during the entire experimental period. Was any oxygen profile in the sediment performed? If the oxygenized layer was reduced (which I suspect it would since no photosynthesis could be performed by the benthic microalgae) this would have contributed to your results with time even though the top surface was oxygenized?

#5 I would suggest starting the discussion with a brief reminder of the aims and also highlighting the most important results for your study. As it is right now, the discussion come across as a bit boring and to technical and immediately starts discussing the phosphorus fluxes.

BGD
12, C29–C31, 2015

#6 I would like to see a discussion if you believe your results would look the same if you allowed the temperature to vary, i.e. taking daily and weekly temperature variations into consideration. Because during summer it can be several degrees difference between day and night, between days and weeks which might affect your results.

#7 Page 36, line 24, sure, could be true, on the other hand with your experimental design you cant really say since NH4 (especially during summer with many light hours in contrast to dark hours) is taken up by the sediment during the day.

#8 Please include in your discussion how your fluxes probably would behave if your they were measured both during light and dark and how this probably changes your conclusions.

#9 Multiple stressor model. What model is used for investigating the multiple stressor effect? Where you find significant interactions are these results synergistic?

Interactive comment on Biogeosciences Discuss., 12, 21, 2015.