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Biogeosciences Discussions

Interactive comment on "Nitrification and growth of autotrophic nitrifying bacteria and Thaumarchaeota in the coastal North Sea" *by* B. Veuger et al.

Anonymous Referee #1

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The authors present the results of a very interesting study on nitrification and DIC fixation by nitrifying bacteria and Thaumarchaeota in the North Sea during winter. They present a very nice dataset of activity rates, which questions the role of Thaumarchaeota as nitrifers in coastal waters, in contradiction with previous findings based on the detection of amoA gene copies in the same area. Overall the paper is well written and will undoubtedly contribute to our understanding on the nitrification in coastal waters. Nevertheless, I have some comments which may help to improve the manuscript. My major concern is related to the use of chlorate as nitrite oxidation inhibitor.

Abstract -The authors could indicate in the abstract that the study was conducted dur-

ing a period characterized by both high nitrification and high Thaumarchaeota abundance. -Lines 16-18. Please, clarify here the implications of 13C-fixation into different PLFAs or delete the sentence from the abstract. -Line 18. The authors did not measure cell abundances therefore these are not cell-specific rates. -Line 26. The authors did not report DIC fixation by nitrifiers, they only provide data for bacterial nitrifiers.

Introduction -Page16879, Line 18. Please provide references for heterotrophy among nitrifiers.

Materials and methods -Please, indicate the periodicity of sampling for each measurement.

Results and discussion -Page 16885, lines 25-28. Please clarify this sentence. -Page 16887, lines 22-27. The authors should discuss why the inhibition of 13C-fixation is similar with both inhibitors (Figure 3). This can only occur if chlorate is also inhibiting ammonium oxidation. This fact has been demonstrated by Hynes & Knowles (1983, AEM 45:1178-1182). Chlorate may indirectly inhibit ammonium oxidation in mixed communities, through the reduction of chlorate to chlorite mediated by nitrite oxidizers. Therefore, the inhibition of 13C-fixation by chlorate must be taken with caution, and I suggest removing these data from the manuscript as they do not provide any useful information. -Page 16889, lines 14-21. I would delete this speculation about the potential role of Thaumarchaeota as nitrite oxidizers, as chlorate appears to be inhibiting also ammonium oxidation. -Page 16892, lines 11-13. Please clarify this sentence. It is not clear why this calculation was possible for 13C-fixation into PLFAs but not for 13C-fixation into bulk SPM.

Interactive comment on Biogeosciences Discuss., 9, 16877, 2012.