Interactive comment on “Occurrence of benthic microbial nitrogen fixation coupled to sulfate reduction in the seasonally hypoxic Eckernförde Bay, Baltic Sea” by V. J. Bertics et al.

Anonymous Referee #2

Received and published: 12 November 2012

The Bertics et al. manuscript addresses the potential simultaneous occurrence of sulfate reduction and N fixation in anaerobic core horizons from the Baltic Sea. This work adds new data to the observations that sulfate-reducing bacteria fix nitrogen. Overall, the technical approach is sound, the conclusions regarding N fixation sound, and the paper is well written. I believe the work to be timely and important and deserved publication in Biogeosciences.

I have some strong reservations about the “denitrification” data used in this paper. The authors correctly identify the measurements as potential rates in the methods, but then treat them as environmentally-relevant rates in the results and discussion. My questions about this measurement are not only semantic, but also about the entire relevance of the measurement. The acetylene block approach might be used where NOx- concentrations are known, but in this application they only tell about the potential for enzyme activity. In highly reducing sediment, sources of oxidized NOx are minimal because of lack of oxygen for nitrifying bacteria and the potential for sulfide-induced inhibition/death of nitrifiers. The very interesting profile of denitrification shows strong vertical structure, with the highest potential rates >2-3 cm below the sediment-water interface. For these rates to have relevance, the NOx would need to either be formed at depth (unlikely) or diffuse/bioadvect from surface sediment layers. Moreover, there is a high potential that DNRA would strongly compete for NOx. The authors should either identify an environmental relevance of these data, or delete them. The paper does not require these data to be a useful and valuable contribution.

Some minor issues with associated page numbers:

6495 Would be nice to mention Br analysis technique and the fact that the coefficient is pore water derived.


6507 Convert the integral of SR to equivalent oxygen units and predict O2 penetration (Cai, W.-J., Sayles, F.L., 1996. Oxygen penetration depths and fluxes in marine sediments. Marine Chemistry 52, 123-131). This whole argument seems poorly set up. High oxygen will not result in deep oxygen penetration in these sulfidic sediments.


Interactive comment on Biogeosciences Discuss., 9, 6489, 2012.

C5595