

Interactive comment on “Biogeochemical processes and buffering capacity concurrently affect acidification in a seasonally hypoxic coastal marine basin” by M. Hagens et al.

Anonymous Referee #1

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This study presents a proton budget for a seasonally hypoxic marine basin by measuring a series of key biogeochemical processes. This work is important because it provides a very thorough consideration of the factors that control the pH of coastal waters gives insights into how such waters will respond to increasing CO₂ in the atmosphere. The manuscript was also extremely well written striking the right balance between detail and brevity. The sequence of ideas and the discussion was logical and I was able to follow it well and it all gelled together nicely and made sense conceptually. The experiments undertaken were thorough and well designed, I agree they are likely to cover the key proton generating and consuming reactions, with the possible exception of nitrification which was modelled. Ideally this would have been measured,

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but I accept that not everything is possible. The figures were very clear and presented the key observations nicely.

I also appreciated the appendix on the carbonate system, I think this is extremely useful and has important implications for future work.

I only have two minor suggestions for improvement Perhaps the authors could make a statement as to the sensitivity of the proton budget to changes in the nitrification rate? Given the stoichiometry of 2 H⁺ produced for each mol of NH₃ oxidised, the uncertainty in this reaction could have a significant effect on the proton budget in November, which might be worth commenting on.

Could the fluxes in figure 6 be shown a little more clearly, with the sites marked on the x axis for example? I don't really like colour coding to differentiate between sites, but I accept this might be a very personal taste.

Interactive comment on Biogeosciences Discuss., 11, 15827, 2014.

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