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Biogeosciences Discussions

Interactive comment on "Enhanced ocean carbon storage from anaerobic alkalinity generation in coastal sediments" *by* H. Thomas et al.

H. Thomas et al.

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Response to referee A. Hofmann

Expression of alkalinity:

We perfectly agree with the referee that H+ should be seen as the species responsible in governing total alkalinity according to the Dickson’s definition. We have made a corresponding statement in the methods section.

Re: Ammonium release and H2S reoxidation:

We very much appreciate this comment. We have inserted a section where we discuss these issues. We have discussed re-oxidation of H2S, but have to note here that the Jorgensen 1982 reference does not seem to relate to water with temporary contact to the atmosphere, which permits escape of H2S as we discuss.

Re: denitrification and riverine inputs.

We refer to a study (Beusekom and deJonge, 2002), which has been carried out in the same area and moreover has been published at the time our data were obtained. We thus feel it is appropriate to refer to this study, which appears to be in line with a recent global assessment by Seitzinger et al. (2006). This does not mean that we consider the study by Hofmann et al. (2008) as irrelevant. Rather, we do not have any tool at hand to judge whether the Beusekom/deJonge estimate is more or less appropriate than the Hofmann et al. (2008) estimate (besides that they appear to converge at the lower range of the Beusekom/deJonge estimate). We therefore prefer to refer to the study which has been carried out in the same area as ours.

Re: change in CaCO3 inventory of the Wadden Sea:

To the best of our knowledge there is not study reporting such a change, although clearly such a change had the potential to influence any AT budget at annual time scales.

Re: benthic denitrification: It is difficult to directly compare our results with the simulations by Paetsch and Kuehn 2008: First they focused on a different period, and temporal variability might substantially. Second, to the best of our knowledge Paetsch and Kuehn (2008) did not explicitly include the Wadden Sea in their simulations. We only used their results of given an impression of the order of magnitude, which these processes might have on larger scales, this in similarity to our referring to the Seitzinger et al. (2006) study.

Interactive comment on Biogeosciences Discuss., 5, 3575, 2008.