Biogeosciences Discuss., 5, S2359–S2361, 2008
www.biogeosciences-discuss.net/5/S2359/2008/

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.

Received and published: 5 December 2008

Response to anonymous referee #2:

We very much appreciated the detailed and constructive review. We are glad to state that we have adapted the manuscript according to the referee’s comments as obvious from our below point to point response. We have chosen to acknowledge this accordingly.

Methods:

We have changed the typing of alkalinity accordingly. It is lower case now, except for first words of a sentence and in titles of references.

We have given the sources for the data (water column NO3-, riverine and atmospheric NO3-) now in the methods section as well.

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

We have rewritten our methods section in order to provide a clearer picture of our work. We have inserted a new figure 1, which depicts the area and the approach of the box model.

We very much appreciate the request to clarify further sections of our methods chapter. We have now given additional information regarding the computation in the methods section.

We appreciate the advice to avoid potentially unclear statements and now have replaced the expression ventilation time by a plain language description.

The additional “box” has been identified in the methods section at lines 17-18 on page 3578 of the print version of the BGD manuscript. We did not show this additional box in Figs 1 and 3 in order to keep the figure clear and focused on the actual topic of the manuscript.

Results and discussion:

Figure 1: We appreciate the comment on the reference level of the anomalies. We now show the annual mean AT, as well as the annual mean pH in Figs. 1 and 3 with a corresponding statement in the caption.

We have now rephrased the section on Fig.1, stating that: Total alkalinity shows relatively homogenous distributions during each of the seasons in most parts of the North Sea (Fig. 1). Furthermore in general the seasonal variability of AT is relatively low compared to the seasonal variability of DIC as reported by Thomas et al. (2005b) or Bozec et al. (2006). This signal is perturbed….

We also have adapted the wording regarding the Baltic Sea rivers. We intended to point to the rivers discharging into the Baltic Sea.

We have referred to the hydrographical analysis by Lenhart et al. (1995). We assume that their simulation reproduce the main circulation features relevant for our purposes.

BGD

5, S2359–S2361, 2008

Page 3579, line13 We have replaced the term “unravel” as proposed.

Line 19, table 1: We now give the term AT(mix) in the table.

Line 22, table1: Thank you very much for point us to the unbalanced water column nitrate. This has been corrected now. Observed nitrate condition in the Southern Bight and the adjacent North Sea were similar.

We have replaced the term new nitrogen as suggested by assimilation of new nitrate.

Lines 26 and 28 on page 3580 have been rewritten.

With regard to the low pCO2 conditions in spring, we now have referred to Thomas et al., 2004, discussing in detail the seasonal evolution of the surface pCO2.

Page 3581, line 24: This sentence has been changed. Pages 3582, lines 7, 11: Both sentences have been rewritten accordingly. Line 20: Cheng and Wang (1999) give the stoichiometry of the relevant reactions. We have referred to this publication earlier.

Page 3583, line 6: The Revelle factor is needed to convert any change in alkalinity to changes in the pCO2, which drives the CO2 air-sea flux.

Line8: We have inserted “reactive”.

Line 10: We have adapted the statement accordingly.

Line 15: We appreciate this comment and have added a corresponding statement.

Figure 1: We now have included the reference point, i.e., the annual mean AT distribution. The sampling grid has been shown repeatedly elsewhere, as stated in the method section.

Figure 3: We now have included the reference point, i.e., the annual mean pH distribution.

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