Biogeosciences Discuss., 5, S1953–S1954, 2008
www.biogeosciences-discuss.net/5/S1953/2008/

Biogeosciences Discussions

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

R. Jahnke (Referee)

rick.jahnke@skio.usg.edu

Received and published: 15 October 2008

This manuscript reports an all-to-often overlooked aspect of ocean chemistry - the role of the ocean boundaries on basin-wide and global exchanges. As correctly pointed out in the other comment on this paper, there is ample evidence that exchanges between the margin and open ocean are of a magnitude to be important. The authors here provide convincing evidence that the alkalinity produced by denitrification in shelf sediments and the burial of reduced metabolites (primarily reduced S species but iron and manganese as well) is of sufficient magnitude to help neutralize a significant fraction of the CO2 invading the oceans in margins. This ultimately enhances uptake and facilitates lateral transport of CO2 taken up at margins, enhancing export to the open ocean. Combined with other processes that are unique to coastal systems, such as

Full Screen / Esc
Printer-friendly Version
Interactive Discussion
Discussion Paper

the removal of CO2 from the atmosphere by mangroves and salt marshes and its direct transfer to coastal waters, this study adds to the growing evidence that margin systems play a major role in the marine carbon cycle.

This manuscript provides a very clear description and discussion of the evidence and I have no comments about the overall presentation. The presentation is objective, pointing out the potential uncertainties in such estimates as the burial of reduced sulfur but nevertheless arrives at estimates of rates that are significant in the context of global fluxes. I hope that this manuscript stimulates additional research on carbon exchanges, and specifically alkalinity exchanges, at margins and perhaps to more objective interpretations of previous observations of mid-depth alkalinity maxima in the open ocean water column.

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