Biogeosciences Discuss., 6, C1071–C1073, 2009
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Biogeosciences Discussions

Interactive comment on "Perturbation experiments to investigate the impact of ocean acidification: approaches and software tools" *by* J.-P. Gattuso and H. Lavigne

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Received and published: 7 July 2009

We thank referees 1 and 2 for their comments and suggestions. Our replies are below.

Reply to referee 1

1. The referee wonders whether this manuscript should be published as a technical note rather than as a scientific article. We agree that the manuscript is of technical nature and are happy, as suggested on the journal web site, to revise the title to: "*Technical note: approaches and software tools to investigate the impact of ocean acidification*".

2. Referee 1 feels that the functions described are "*black boxes*". We cannot disagree more with this statement as *seacarb* is free software, the source code of which is available to anyone (one just needs to download the package). Further, *seacarb* can be redistributed and/or modified under the terms of the GNU General Public License as published by the Free Software Foundation.

3. It is puzzling that the manuscript is described as a software manual on page C716. Of course it is not as mentioned by the referee on the previous page: "*The manuscript presents a review of the perturbation techniques applied when studying the impacts of ocean acidification...*". We agree, however, with the suggestion of referee 2 to provide the commands in an appendix.

4. Referee 1 mentions that "*The respective equations and solutions have been published many times in the past...*" and provides two references. If the reviewer refers to the underlying thermodynamic equations and calculations of thermodynamic constants, we agree with his/her views. That is the reason why none of this information is provided in the manuscript. If the reviewer refers to the 5 functions described, we could find no information on perturbation experiments in the two references that were provided (and with which we are familiar).

5. We disagree with the suggestion to add sub-heading in *3.1 Gas bubbling*. The reason is that *3.1.1 pH-stat* would be confusing as a pH-stat can be accomplished both by gas bubbling and by acid addition. Furthermore, the text is not very long and the usefulness of additional headings questionable.

6. We agree with all the minor changes which are suggested.

Reply to referee 2

1. The suggestion of referee 2 to provide the *seacarb* syntax as an appendix is excellent.

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2. The figures, especially the font size, will be made larger but we plan to keep figure 5 and the initial and final values unless the handling editor suggests otherwise.

3. Table 2 will be revised as suggested.

4. Describing the reason or advantage of using the total scale versus the seawater scale is beyond the scope of the manuscript and can be found in Zeebe and Wolf-Gladrow (2001) and Dickson et al. (2007).

5. It is not clear what the referee suggests by referring to the paper by Caldeira et al. (of which one of us is a co-author).

6. We agree with all the minor changes which are suggested, except with adding a reference to the changes in pH which is correctly referenced to Table 2.

References cited

Dickson, A. G., Sabine, C. L., and Christian, J. R.: Guide to best practices for ocean CO_2 measurements, PICES Special Publication, 3, 1–191, 2007.

Zeebe, R. E. and Wolf-Gladrow, D. A.: CO_2 in seawater: equilibrium, kinetics, isotopes, Elsevier, Amsterdam, 2001.

Interactive comment on Biogeosciences Discuss., 6, 4413, 2009.