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Interactive comment on “Anthropogenic and natural CO₂ exchange through the Strait of Gibraltar” by I. E. Huertas et al.

Anonymous Referee #1

Received and published: 4 March 2009

Review of the paper Anthropogenic and natural CO₂ exchange through the Strait of Gibraltar by I. Huertas, A. Ríos, J. García-Lafuente, A. Makaoui, S. Rodriguez-Galvez, A. Sanchez-Román, A. Orbi, J. Ruiz, and F. Perez, submitted to Biogeosciences for possible publication.

The paper Anthropogenic and natural CO₂ exchange through the Strait of Gibraltar by Huertas and coworkers reports on a detailed study of the carbon cycle in the Strait of Gibraltar, which constitutes the link between the Mediterranean Sea and the North Atlantic Ocean. The study is based on an very extensive field data set and yields in assessments of carbon exchange between the two basins. The study moreover gives a detailed discussion of the results in the view of recent results from other researchers, which contributes to the comprehensive nature of the work by Huertas et al. I have

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some detailed comments, given below, and think that the work is well suited for publication in Biogeosciences.

Detailed comments:

In general I very much appreciated the comprehensive discussion of work found in literature. However sometimes I have had the feeling that it was difficult to recognize the original work by Huertas et al.. I recommend to introduce a brief recollection of the original findings (without discussion), for example right before the conclusions. In any way the own results need to be better discriminated against literature results.

Page 1024, line 11: A rather theoretical, conceptual application of the TTD method has been introduced by Thomas et al., GRL 2001.

Page 1025, line 27: The statement "due to carbonate sedimentation" appears to be cryptic and unclear here. Please clarify.

Page 1041, lines 18-26: The section on Ca is entirely unclear to me. Also, I cannot identify the information, which should be shown in the plot. If Ca is a conservative water mass property, it should not be a surprise to see variations in Ca, when water masses mix. In my view an argument for biological changes in the Ca concentrations can only be made from deviations / anomalies relative to the conservative behavior. The authors should make some efforts to show this, if they think there were biological changes.

Page 1050, line 9-10:

The term pump has to be clarified here. If the Mediterranean "only" pumps CO₂ from the surface of the Atlantic into its deeper layer, this would be one aspect. But it would also be possible that the Med. absorbs anthro. CO₂ on its own, which would constitute a different, complementary way of pumping CO₂ into the deep Atlantic.

Interactive comment on Biogeosciences Discuss., 6, 1021, 2009.

BGD

6, S322–S323, 2009

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