

Interactive comment on “Kinetic bottlenecks to chemical exchange rates for deep-sea animals II: Carbon dioxide” by A. F. Hofmann et al.

Anonymous Referee #2

Received and published: 5 February 2013

In the manuscript by Hofmann et al. the authors aim to combine physico-chemical characteristics of seawater into mechanistic equations that define, describe and predict how climate change will impact the boundary layer environment of marine animals. This manuscript specifically aims to evaluate the impact of increasing CO₂ concentrations in the world's oceans on marine organisms ability to export CO₂. In general, I believe that this manuscript is well written, the language is fluent and precise and the overall presentation well constructed and clear. The topic is within the scope of BG. The manuscript basically addresses a relatively understudied topic concerning the importance of the factors controlling CO₂ within the diffusive boundary layer around marine animals in an ocean changing in temperature and CO₂.

My field of expertise is not in biology, but I believe the inclusion of some organism spe-

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cific properties would be useful. The use of one example for a species with well-known kinetic mechanisms would be useful and help to bring the subject to life. Additionally, a more in depth discussion on ocean acidification would be helpful as well.

The concept of “enhancement factor” is interesting but a broader discussion would be useful.

The results for the Mediterranean Sea seem to be the most surprising. The authors should explain these results more in depth. Are these results appropriate and what one would expect for the region in question?

The treatment of diffusion and CO₂ reactivity as two separate steps does not seem to be useful. Since CO₂ is highly reactive in seawater, considering only the purely diffusive CO₂ export flux sheds no light on the question that the authors propose to answer. It would be appropriate to discuss the limitations of this approach.

Interactive comment on Biogeosciences Discuss., 9, 15787, 2012.

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