

Interactive comment on “On the time to tracer equilibrium in the global ocean” by F. Primeau and E. Deleersnijder

F. Primeau and E. Deleersnijder

Received and published: 14 December 2008

Response to Referee #1

We would like to thank the reviewer for providing helpful comments.

In regards to point 1 " I think it would be in the authors best interest to try to minimize the equations in the main body,...."

The essential points of our paper are made in the introduction together with Figure 1 before we display any equations. Readers who are put off by equations and who are willing to take our results on faith need not be subjected to any equations. However, for those readers who wish to understand what we have done we have provided our derivations. We believe that displaying the equations allows the reader to follow what we have done with the minimum amount of effort. Since these derivations are not

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excessively long we don't want to "hide" them in an appendix.

In regards to point 2 "Would the difference in equilibrium time be as large if the flux and concentration were applied for the same duration (i.e. constant concentration for one year)?"

It is not possible to do what the reviewer suggests. If we have a Dirichlet boundary condition we have to prescribe the concentration for all times unless we switch to a Neumann boundary condition afterwards but then we would not be comparing the equilibration time of a Dirichlet versus a Neumann boundary condition.

In regards to point 3 "I think some discussion of Haine (2006), who argues a mixed (Robin) boundary condition is the appropriate for gases entering the ocean. This may not be needed for a response to WH08. However, some discussion, if not analysis, is needed."

We have added a new section to the paper in which we discuss the equilibration time for a Robin boundary condition.

Interactive comment on Ocean Sci. Discuss., 5, 471, 2008.

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