

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

Anonymous Referee #1

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General Comments

This paper presents an analysis of the time tracers take to get to equilibrium, and the dependence on the boundary conditions. I think this is an interesting and important article, and will make an important contribution. It is generally well written, although see point 1, and is acceptable with relatively minor revisions.

Specific Comments

1. I think it would be in the authors best interest to try to minimize the equations in the main body, especially if you hope to get the attention of the many of those who will have read WH08. I think in most cases the derivations could be moved to an appendix and just the final equations shown in the main body. As it stands I suspect most readers

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will get put off reading all the details, and the ones that do are probably already familiar with the issues and who be happy with just main equations (as long as derivations are in appendix).

2. The focus is placed on flux versus concentration boundary conditions, but isn't some of the difference due to duration of the boundary conditions. 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)?

Relatedly, it might of value to show the time series of surface concentration for the two runs shown in figure 1 (i.e. show the surface concentration from the instantaneous flux). This would I think help explain the difference.

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.

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

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