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Discussions

Interactive comment on "Towards accounting for dissolved iron speciation in global ocean models" *by* A. Tagliabue and C. Völker

Anonymous Referee #2

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Page 3, line 14-15 and Page 10 line 8. Wu and Luther (1995) should be cited here together with Rue and Bruland (1995) and van den Berg (1995).

2. Page 3, line 11. Wu et al (2001) should be cited.

3. Colloidal Fe is a significant portion of total dFe but has not been represented in the model. How would the colloidal Fe affect the model result?

4. The rates of reactions involving various Fe species (kphW, kphS, klS, kbS, kpcp and kr) are not accurately understood. What is the sensitivity of the model to range of uncertainties for these rate constants?

5. The bioavailability of various Fe species, especially colloidal Fe and FeLw and FeLs, is not well understood and will influence the model result.

6. Page 10, line 24, equation 19 may have a problem. Vertical profiles of Fe-binding ligands show that the ligand concentration increases with depth similar to dFe. However, the equation 19 shows that the ligand decreases with depth like DOC. DOC is very low in the deep ocean where Fe- binding ligand concentration is very high.

7. In general, I am not convinced that including Fe speciation in the climate model will be useful. This is because in Fe limited region, the biovailable Fe flux to the euphotic zone is strongly influenced by upwelling from the subsurface ocean where Fe speciation is relatively constant. Essentially all the Fe supplied to the surface ocean in the Fe-limited region is used up biologically. Thus, it is the subsurface ocean Fe flux rather than Fe speciation that controls the climate.

References:

1. Wu, J., E.A. Boyle, W. Sunda, and L.S. Wen, 2001. Soluble and colloidal iron in oligotrophic North Atlantic and North Pacific oceans. Science. 293:847-849.

2. Wu, J., and G.W. Luther III, 1995. Complexation of Fe(III) by organic ligands in the northwest Atlantic Ocean by a competitive ligand equilibration method and a kinetic approach. Mar. Chem. 50:159-177.

Interactive comment on Biogeosciences Discuss., 8, 2775, 2011.