Biogeosciences Discuss., 4, S1546–S1548, 2007
www.biogeosciences-discuss.net/4/S1546/2007/

Biogeosciences Discussions

Interactive comment on "Dissolved iron distribution in the tropical and sub tropical South Eastern Pacific" *by* S. Blain et al.

Anonymous Referee #1

Received and published: 1 October 2007

The manuscript presents interesting data on dissolved Fe distribution in the South Pacific Ocean, a region with an urgent need of high quality Fe data for understanding global ocean biogeochemical cycling and the influence of Fe on oceanic biological productivity and carbon cycle. If the data are of high quality, the manuscript would certainly deserve to be published at BG. The Fe data reported in this manuscript appears limited by the analytical methods used. Some data appear questionable and require additional explanation. In addition, there is a need for further discussion of the Fe results. My detailed comments are listed below:

1. One of the "new" finding in the manuscript is the low level of Fe ($\sim$0.10 nM) observed in the South Pacific subtropical gyre. But how much can we trust the Fe data at such low level? The comparison of various analytical methods (including the one used for

dissolved Fe analysis in this manuscript) during SAFe cruise has shown that for low-Fe surface water samples there is an uncertainty of ~0.10 nM between results obtained by different methods and that it is not clear which method provides more accurate results at this level. In the present manuscript, Fe blanks due to acid used for acidification, NH4OH used for neutralization, buffers and column, the effect of Fe speciation (organic complexation at pH 5), and the results of the analysis for SAFe surface samples are not reported and discussed. These are required for assessing reliability of the results. The inconsistency of data between stations and depths (see below) indicate that there are some problems in the Fe date reported in the manuscript.

2. The surface water DFe concentrations in the gyre station (~0.10 nM) are lower than those at HNLC stations (~0.15 nM). Is it real? If Fe availability limits algal growth at HNLC region, will Fe availability limits the algal growth at gyre stations? An explanation of why Fe concentrations are different between the two regions may be useful.

3. The surface water DFe concentrations in the gyre station (~0.10 nM) appears similar or slightly higher than that (~0.08 nM) at SAFe station where eolian Fe flux is much higher. Is it real? Is there a reason why dissolved Fe at the South Pacific gyre is so high for a region of extremely low eolian flux?

4. There is a large fluctuation of surface water DFe between stations at the gyre region. For example, surface water DFe at STA 12 is 50% higher than surrounding stations such as GYR2, GYR3, STA14 and EGY4. Surface water DFe at STA 18 is also 50% higher than surrounding stations such as STA20 and EGY4. Are these differences real? Is there any reason for these variations?

5. The vertical distribution of DFe for STA 14, 12 and GYR3 seems confounded by contamination of artifact. For example, at STA12, DFe at 375 (0.5 nM) is much higher than that at 400 m (0.24 nM); at STA 14, DFe at 375 (0.22 nM) is much higher than that at 400 m (0.14 nM); at GYR3, DFe at 375 (0.24 nM) is much higher than that at 400 m (0.13 nM). Are these real or due to contamination? Is there any reason for these

BGD
4, S1546–S1548, 2007

EGU

variations?

6. There are more than three digits reported for DFe in Table 1. Would the analytical method for DFe allow for such high precision?

7. At upwelling stations near station UPX DFe/P ratio at 400 m depth is generally higher than that at the surface. There are high levels of DFe, N and P in these waters. What limit algal growth here? Why would the biological activity deplete one of these nutrients?

8. At HNLC stations near station MAR3 to HNL2, both DFe and N, P are relatively high at the surface. What limit algal growth (or the biological depletion of one of these nutrients) here?

Interactive comment on Biogeosciences Discuss., 4, 2845, 2007.