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Biogeosciences Discussions

Interactive comment on "Labile Fe(II) concentrations in the Atlantic sector of the Southern Ocean along a transect from the subtropical domain to the Weddell Sea Gyre" *by* G. Sarthou et al.

Anonymous Referee #2

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General comments: The authors have presented a detailed and well written manuscript on the study of Fe(II) concentrations in the Southern Ocean. There is so little data on Fe(II) that this will be a welcome contribution to the Oceanographic community. The data is of good quality and well presented with interesting comparisons made to other data sets (e.g. Th/U). I have just a few comments which I have detailed below:

Specific comments:

P. 4169, Line 10. Section 2.2 Sample processing and analytical methods In this section

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the authors discuss the time between sub-sampling and analysis was 3 min. How exactly did this happen. Was each Go-Flo sampled individually prior to the next Go-Flo being recovered from the Kevlar line? Also, how long would it take to recover the Go-Flo bottles before they were sampled, this is mentioned later on in the manuscript but it would also be useful to mention it here for clarification of the actual time between collection and analyses.

P. 4169, Line 27. With regards to the method used for the determination of Fe(II), I believe this was originally used by King et al. (1995) and adapted by Croot and Laan, I therefore think this should be included as a reference along with Croot and Laan (2002).

P. 4173, Line 16 and Figure 5. I think the depth of the intermediate depth shown in Fig 5c needs to be confirmed, in the legend it states 300-2000m but the manuscript text and figure caption, the depth is stated as 500-2000m. In addition, I don't think the authors have made reference in the text to the oxidation rates calculated for below 2000m as shown in Fig 5c.

P. 4176, Lines 14-30. The authors present very good reasons for the high Fe(II) values observed at the stations sampled between 12:00 and 16:00. They discuss biological production and indicate some superoxide and Fe(II) production rates which I think are realistic. Whilst I understand the half life for superoxide is also low, as the samples analysed were unfiltered, could there have been some positive interference from superoxide generation which could also account for the high Fe(II) values observed.

P. 4177, Line 1. I think it might be useful to include the dates of the ANT XXIV/3 cruise to clarify that the time periods referred to coincide (Feb-Apr 2008).

P. 4177, Line 17. Could the authors please clarify what the labile Fe(II) ranged quoted (0.023-0.87 nM) refers to, is this the sub-surface maxima observed in the STZ or in the ACC, if it is the STZ what was the range for the ACC.

BGD

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Figure 3. The x-axis on Fig 3a is labelled DFe (nM), should this not be titled ‘labile Fe(II)’.

Figure 6. Title of the y-axis, this refers to a % so I do not think the ‘(nM)’ is necessary.

Interactive comment on Biogeosciences Discuss., 8, 4163, 2011.