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Interactive comment on “Dissolved Fe across the Weddell Sea and Drake Passage: impact of DFe on nutrients uptake in the Weddell Sea” by M. B. Klunder et al.

Anonymous Referee #2

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Review of manuscript doi:10.5194/bgd-10-7433-2013 submitted to Biogeosciences
Dissolved Fe across the Weddell Sea and Drake Passage: impact of DFe on nutrients uptake in the Weddell Sea M.B Klunder, P. Laan, H.J.W De Baar, I.A Neven, R. Middag, and J. van Ooijen

General comments

The manuscript by Klunder et al. presents the full water column sections of dissolved iron (dFe) along two transects of the Southern Ocean (Weddell Sea and Drake Passage) during the International Polar Year – GEOTRACES program (cruise ANT XXIV/3). The data is of high quality and novel in that this is the first time that full pro-

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files have been reported in this region. The dFe data is described in terms of water masses, hydrography and sources, with a particular focus of dFe control of nutrient uptake. This is an important contribution to the scientific literature due to Fe limitation of phytoplankton communities in Southern Ocean waters and its consequential effect on the marine carbon cycle in the region.

In summary, the scientific significance is good, the scientific quality and presentation quality are both good-to-fair. The Fe data is of very high quality (which is the norm for the Royal NIOZ laboratory) and backed up by excellent analytical figures of merit, and the discussion of the distributions is by far the strongest part of this manuscript. However, I believe the manuscript needs to be improved before being suitable for publication in Biogeosciences. In particular the abstract and discussion section are too long, and in the latter the sentences are sometimes speculative and repetitive. The paper would benefit from more paragraph breaks. The text concerning the nutrient ratio control by Fe limitation needs improving (there are several typographic errors) and it would benefit from another close read. Also, I am not convinced that the size of the diatoms is a good proxy for Fe limitation or nutrient uptake as other factors such as diatom species composition would likely play a more important role (and this manuscript contains no information on the phytoplankton community).

The Figures are generally good, although they could be easily improved with a bit more care. For example, different figures should be largely consistent with each other to aid the reader compare data easily. The sections (Figures 2, 3 and 4) run west-to-east, but Figure 7 runs east-to-west. The isolines on the ODV plots are very small, and figures with several different panels do not contain panel lettering, even though they are cited in the text. The figures could be better cited in the main body of text. The reference list is comprehensive and up-to-date.

I recommend the paper may be suitable for publication in Biogeosciences after revision. I provide some other specific and technical comments below, which I hope will help the authors improve this manuscript. It is frustrating that a reviewer has to pick up many

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typographic errors. This is the role of the author before submission and reduces the quality of the manuscript.

Specific comments

Title. No need for “in the Weddell Sea” at the end as you have already stated this.

Please be consistent with your tense throughout the manuscript. You switch between present and past tenses.

“Nutrient” should often be singular where you have used the plural.

There are often commas inserted in the text where they are not needed. And in other cases, commas are missing This makes the sentences hard to follow. Please scrutinise.

You use of brackets (especially for references) needs a careful check.

Lines 37-41. You have been selective with which references you have chosen to cite here in iron limitation in the Southern Ocean. There are many other good papers by other labs.

Line 174-5. Is this a weblink to the Bruland database? This could do with updating as more data has been received since November 2011.

Line 257. I have not heard of the LLoD concept. Surely a limit of detection is a precise value?

Lines 380-384. Many other factors are involved between the relationship between dFe, fluorescence and POC export. This text needs improving as you have oversimplified the connections.

Line 516. Information on the species composition as well as the size of the diatoms would be very useful here. Can you provide details please?

Line 545-554. This section is largely speculative and hand-waving. Please re-write.

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Technical comments

Line 16. What is the difference in drawdown related to?

Line 20. Insert “and” before “the N:P”

Line 30. Add “the” before “Drake Passage” and no comma afterwards

Line 33. Has AABW been defined before? Care with defining acronyms on first use.

Line 44. “Lin et al., 2011”

Line 52: “Peninsula”

Line 71: “estimates”

Line 84. New paragraph

Line 116. “us” after “allows”

Line 121: “vegetative”? A better word could be “growing”

Line 132. Brackets need sorting

Lines 153-158. I like this approach to oceanographic consistency

Line 163. Baseline (singular)

Lines 179 and 215. Brackets!

Lines 188-190. Re-word this sentence

Line 290. Nutrient removal (singular)

Line 308. Brackets

Line 314-315. Use a space between a value and its unit and no “.” Needed after “m”

Line 337. Brackets

Line 372. “m” not “meter”

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Line 393: “was”

Line 491. “ratio was”

Line 493 “seawater was”

Line 503. Add “.” at end of sentence

Line 534. Add “.” at end of sentence

Line 564. No comma

Line 573. “Ridge”twice

Line 583-588. Use of brackets and other typos. Also, do not cite an abstract in the main body of the paper.

Line 673. Typos.

Line 644. Use English

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