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Interactive comment on “Sourcing the iron in the naturally-fertilised bloom around the Kerguelen Plateau: particulate trace metal dynamics” by P. van der Merwe et al.

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I found this to be an excellent paper which is certainly publishable, given that minor changes and some cuts are made. The study compares the particulate chemistry at a series of sites on the well-fertilised Kerguelen plateau with more remote sites that are poorly fertilised. The particulate chemistry is able to show that the Fe used for fertilisation originates from the re-suspension of shelf sediments and from fluvial and glacial sources derived from the Kerguelen Archipelago. This is an important finding some aspects of which need to be emerge more clearly. My main criticism is that the calculation in section 3.7 rests on the assumption that all particulate P is biogenic and

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this needs to be supported. What are the compositions of the rocks of Heard and Kerguelen Island- basalts can be high in P and may be an important source to the sediments? There may also be other non-biogenic sources. This calculation would require chemical and mineralogical data for the island rocks and the sediments for publication. In the absence of this data I would omit this section. The paper also tends to lose focus towards the end and removal of section 3.7, and also 3.9, would help to retain focus.

Additional Comments below keyed to page and line numbers.

13392 line 14. What sedimentary records?

13393 line 7. Needs dFe inside the bracket. Also important here to point out that deFe includes colloidal and nanoparticulate Fe (which may be only partially bioavailable) as well as aqueous Fe (which is probably all bioavailable).

Line 16. Better to write inside the bracket as follows (e.g. weathering products delivered by fluvial and glacial processes, resuspension of sediments and porewaters, . . .). It is likely that the porewaters contain reduced Fe which is oxidised to nanoparticulate Fe (oxyhydr)oxides on entering seawater. This is the main source of potentially bioavailable Fe from re-suspension.

13394 line 5. Unclear, re-write this sentence.

13395 line 11. I am not familiar with this methodology but would not expect that you could combust nylon and polyester. Is this correct as written?

13399 line 5. Fig. 2 seems to show that the southern waters are colder but less salty. Check this.

line 25. Write 'contain recycled Fe'. Delete a form of.

13400 line 7. Clarify that these are molar ratios here and in the Tables.

13401 lines 8-14. Start with R2 and move these lines to the end of the paragraph – a

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more logical order to fit the following discussion.

13404 line 22. Briefly explain how Al was lost preferentially and why you think processes involved occurred here.

13406 line 5. The Scroth paper found that 2-3% of the total Fe (not of all the rock flour) could be leached by distilled water. This is a dFe measurement and may not all be bioavailable (see above).

Line 7. Not quite correct. Write as follows- ‘. . . .this dFe is leached from nanoparticulate Fe (oxyhydr)oxides in glacial rock flour (Raiswell et al., 2010, Raiswell 2011)’ The 2011 reference is DSR v.58, p.1364.

Line 20. See above. The assumption that all P is biogenic needs to be thoroughly justified or else this section should be left out. Even if you can justify this assumption the paper is starting to lose focus here and would be improved by leaving out this section.

13408 line 19. Delete et al. This is the DSR 2011 reference.

Section 3.9. I cannot see that you need this section and the paper would keep its focus better without this section. The relevant sentences from this section could be put elsewhere.

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