

Interactive comment on “Sources of Fe-binding organic ligands in surface waters of the western Antarctic Peninsula” by Indah Ardiningsih et al.

Anonymous Referee #2

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The study reports an investigation on the organic speciation of Fe along a natural gradient of the western Antarctic Peninsula. Although there were few stations investigated, the overall data can provide valuable information on the role of Fe and its ligands in a crucial area of the planet. The manuscript is generally well written and clear to follow.

I have some major remarks (mainly related to the presence and the quality of the data), along with some minor comments.

Major comments

1) I do not completely agree with the use of the reference Seyitmuhammedov 2020, being a PhD thesis not available. If it had been used just for a minor aspect, it would have been ok, but it is often cited, particularly for data that are present there but not

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presented in this manuscript. First of all, I think some additional detail for the DFe analysis (section 2.2) could be useful and I suggest to add them. However, the main problem is related to the values of labile particulate Fe and Mn (section 4.1), $\delta^{18}\text{O}$ and dissolved and total-dissolvable Fe (section 4.2). In order to help readers, I think that they could be presented at least with ranges. Maybe it could have been smoother to publish those values before submitting this manuscript, to have a proper reference to cite.

2) I looked at the dataset presented in the reported link (<https://doi.org/10.25850/nioz/7b.b.5>) and I have some questions or remarks with the presented data and their use in the Results or Discussion sections.

2a. Fluorescence. What do negative values for fluorescence mean? Are they just a consequence of improper calibration or do they have another meaning? In addition, there are some fluorescence data missing (two depths for Station 70 and all the depths for Station 72), hence I wonder how the plots were drawn for Figure 5b. Please clarify.

2b. DFe. Are data for St 90 40 e 100 m below the LOD? I ask that because that there is no standard deviation for those parameters, and also because the standard deviation of the blanks is reported as 0.02 nM (line 134), hence the LOD should be around 0.06 nM by using the 3σ method, which is higher than the values reported for those two samples (0.05 nM). If so, I think it should be clearly expressed, but in that case I wonder how the values could be plotted in Figure 3b (maybe as half the LOD?) and how the CLE-AdSV analyses were performed for those two samples, since they would need a value of DFe for the voltammetric titration. Please clarify this aspect and make the corrections if needed.

2c. Silicate. Why data for Silicate are not reported in the table? Also, in line 314, to express the purpose of the Si^* values, the authors comment that “a negative Si^* indicates Fe limiting conditions”, but in their dataset there are no negative values for Si^* . Please explain better this point.

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Minor comments

- Line 38: correct CO₂ ("2" in subscript).
- Section 2.1: please define the material of the 0.2 μm filters used for filtration and the volume of the GO-FLO bottle. Although the conservation procedures are correct, I wonder why the samples for Fe-binding ligands and DFe were collected separately, instead of freezing just one bottle and take the aliquots for the two analyses from the same "container" in the lab (of course acidifying before DFe analysis).
- Figure 1: I suggest using a darker yellow to indicate the Coastal Current.
- Section 2.2: please report the certified or informative values of S_{AF}e D1 and GSP samples. In addition, report also the LOD of the procedure.
- Line 153: in "CLE-CSV" there is an "Ad" missing before "CSV".
- Line 156: the full stop at the end of the sentence is missing.
- Line 158: please close the parenthesis which was opened before "αFe^{III}L".
- Line 160: the authors refer to αFe_L, but I guess they meant αFe^{III}L instead?
- Figure 2: please uniform the indication of "c." for the third figure, using the two parentheses consistently with (a) and (b). Also, in the caption, the "θ" in "σ_θ" should be in subscript. Finally, Absolute Salinity is reported with "A" in subscript or as plain SA in the text and in the Figures, please uniform in the whole manuscript.
- Line 189: I think there is some problem with the "<" and ">" for Absolute Salinity. Did the authors mean "33.0 < SA < 33.7"?
- Figure 3: there is a reference missing (and an unclosed parenthesis) in "D_{Fe}, data from ;". Also, what do the author mean when they say "with colors denoting depth the values of [L_t]?" I guess there's a "depth" in excess?
- Line 233: please remove the comma after [L].

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- Figure 5: why in some images the profiles are "smooth" (e.g. b) and in others are "rounded" (e.g. a and c)? Also, in Figure 5a there are only the profiles for the 5 stations, well separated, while for example in Figure 5c there are more. Why?
- Line 264: I think the "that" is in excess?
- Line 284: since it is one value, it should be "maximum", while "maxima" is used for plurals (accordingly, correct also line 298 from "maximum" to "maxima" if it is referred to more than one).
- Line 298: unclosed parenthesis in "(St. 84 and 90; (Figure 5b)".
- Figure 6: please insert the unit of measurement for Si*. Moreover, in the Figure there is "[Nitrate]/[D_{Fe}]" while in the caption there is "[Nitrate]/D_{Fe}", please uniform (D_{Fe} is presented without parentheses in the whole manuscript).
- Line 325: please revise the "which commonly produced by" part, I do not think the sentence is fluid.
- Line 367: "a phytoplankton blooms": it should be either "a phytoplankton bloom" or "phytoplankton blooms", please correct.
- References are not well uniform in the use of the doi. Maybe there are also some parts missing (e.g. pages or article number for Arrigo 2008, Lam 2011, Lannuzel 2016, etc.).

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