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

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In this manuscript, Ardiningsih and coauthors present biogeochemical observations from a cruise transect from the western Antarctic Peninsula offshore into the Southern Ocean. This region is particularly susceptible to changes in climate. Three different hydrographic regions are identified, influenced by watermass type and sea ice cover that are suggested to host different distributions and characteristics of dissolved iron and organic iron-chelating ligands: firstly, surface "winter waters" near the coast and on the continental shelf are strongly influenced by sea ice cover with organic ligand production associated with ice-associated algae and iron supply from glacier melt; secondly, upwelling deep waters on the continental slope are initially low in iron and ligands, but concentrations increase as a result of sediment-water interactions and resuspension; and thirdly, in offshore waters of the Antarctic Zone influenced by seasonal sea ice melt, phytoplankton blooms deplete nutrients and iron, while actively or passively producing organic ligands.

I thought this paper was logically organized and engagingly written, and I think the authors do a good job of balancing the fact that the CLE-AdCSV methodology gives information about how much and how strong the ligand(s) present are but not what compounds, with some well-reasoned evidence-based assumptions. I was particularly interested to read about the tube-dwelling sea ice diatoms, and the interaction between sediments and upwelling circumpolar deep waters.

However, I thought the presentation of results was not optimal. I did find the TS diagrams very informative – nevertheless, all the figures had some issues: 1.) The yellow coastal current arrow blends in to the pale blue bathymetry in Figure 1 (also the "CC" triangle in Fig.2). I would have liked to see actual surface current data (maybe LADCP or something?) at the station locations, and how they compare to the broad-brush arrows used to mark the ACC jets. 2.) Figures 2-6 use a rainbow color palette that is firstly not universally accessible to those with color vision deficiency, and secondly creates a perceptually non-uniform color space that can create misleading gradients in continuous data such as temperature and salinity, as well as dissolved iron and ligand concentrations (e.g. https://blogs.egu.eu/divisions/gd/2017/08/23/the-rainbow-colour-map/ or https://www.nature.com/articles/s41467-020-19160-7). 3.) The use of "Ocean Data View" section plots is an issue for me, both because of the colormap, but also because of the variable size of each colored "blob" for bottle data. In Fig.5a for example, station 84 has wide circles while station 90 has narrower circles (and 96 has even narrower), yet it is not true that station 84's concentrations are applicable on a larger spatial scale than station 90's (or even station 96's) – the fluorescence data in Fig.5b clearly has much shorter spatial variability (from more stations/continuous CTD cast data?) that is similar at all stations. ODV's "patchiness" really emphasizes the sparsity of the ligand and iron measurements here, which is a shame to detract from a precious dataset that clearly has interesting information within it – perhaps horizontally-stacked line profiles might work better than contours? As I said, in general I found the TS plots were more interesting and useful.

Finally, a minor point is that I found the station ordering to be a bit confusing because they are presented in chronological order, while the manuscript suggests an order that is more geographically orientated. I wonder whether the authors could use an alphabetical scheme for this paper with a key in Fig.1 relating the letters back to station number for posterity (so, the stations would be A (72) to E (90) according to distance from the coast)?

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