

## ***Interactive comment on “A cobalt plume in the oxygen minimum zone of the Eastern Tropical South Pacific” by N. J. Hawco et al.***

### **Anonymous Referee #1**

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General comments “A cobalt plume in the oxygen minimum zone of the Eastern Tropical South Pacific” by N. Hawco et al. is a well written paper of a large dataset from a region with no data published on the same scale. These basin-scale, full depth studies provide invaluable data and insights into the biogeochemical cycling of trace elements in the oceans. My main complaint is that the authors refer forward to figures that haven't been discussed yet, and so I feel the paper needs a bit of restructuring to address this. Other than this I only have a few minor comments/suggestions for the authors' consideration, and recommend this paper for review in Biogeosciences, following minor revisions. Specific comments Line 57. I'm not sure you can definitively say that Co is the least abundant inorganic nutrient, Cd is similarly in the same range, I'd say, “one of the least” Line 64. which suggests. . . Line 88. 100 pM – the space between the value and unit is missing. This error occurs frequently, but not every time. I have not listed

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this observation where it occurs later in the text. Line 170. Include the resistivity of the Milli-Q water here. As Milli-Q is a brand name it might be better to say ultrahigh purity water, or something similar, instead of Milli-Q Line 145. Delete “ is measured” Line 203. 1.5 mL of 1.5 M sodium nitrate Line 215. Broader than what? Just “broad” will do, perhaps with the range of tested concentrations stated. Line 216. Replace “deviation” with “variance” Line 234. in the lab Line 253. You should probably include the initials; C. Parker and K. Bruland Line 281. What was the ratio of HCl:  $\text{HNO}_3$ : HF? Fig. 4. I think it would help the discussion to add some station numbers to this figure Line 351. Baars and Croot (2015) Line 410. You shouldn’t really be referring forward to Figure 13c here. This needs some rearranging so that you are not referring forward. You could simply use the values without referring to Figure 13c until later in the text. There are a number of instances that you are referring to figures that haven’t been described yet, which you should try to avoid as much as possible Line 445. “. . .new cobalt sourced from the shelf is rapidly incorporated into biological cycling and that the capacity for phytoplankton Co uptake. . .” - the biological cycle, or biological cycles Line 502. delete “in the” Line 527. Is there any documentation of reducing sediments on the South American continental shelf that could support your assertion? Line 544. Consistent with release Line 547. Is this sentence reversed? “. . .sedimentation outpaces dissolution of Co and Mn only in very shallow water columns and/or proximal to input, which explains the lack of dissolved benthic maxima for both elements beyond Station 2”. If sedimentation outpaced dissolution of Co and Mn in shallow water/close to source, then wouldn’t we expect to see no benthic maxima? Line 555. Delete second “should provide” Line 603. As I understood the Noble et al (2012) study, the dCo and LCo plumes were extensive, but the dFe plume was much smaller and the dMn plume wasn’t evident, at least in the ODV plot, although they do argue for a sedimentary source for all three elements, explaining the differences in plume areal extent by preferential scavenging of  $\text{Mn} > \text{Fe} > \text{Co}$ . This sentence needs rewording to reflect this. Line 619.  $20 \mu\text{M}$  dissolved  $\text{O}_2$  Line 627. This is also consistent with Sholkovitz and Copland (1981) who estimated that 97% of Co escapes from freshwater systems (Sholkovitz, E.R., and Copland, D., 1981. The

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coagulation, solubility and adsorption properties of Fe, Mn, Cu, Ni, Cd, Co and humic acids in river water. *Geochimica et Cosmochimica Acta.*, 45, 181-189.) Line 683. counterpart? Line 701. Or they can access the Co from the particulate pool? Is there any evidence for this in the literature? Line 706. Prochlorococcus produce ligands too. Might be worth mentioning this as you say that the Prochlorococcus abundance was high Line 729. Delete “of” Line 764: fluctuates References. Check your references as some of them are not displayed properly, e.g. Baxter et al (1998), Line 807, and there are some instances of extra, inconsistent punctuation.

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