

## ***Interactive comment on “The Acceleration of Dissolved Cobalt’s Ecological Stoichiometry due to Biological Uptake, Remineralization, and Scavenging in the Atlantic Ocean” by Mak A. Saito et al.***

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Review of bg-2016-511, The Acceleration of Dissolved Cobalt’s Ecological Stoichiometry due to Biological Uptake, Remineralization, and Scavenging in the Atlantic Ocean by Saito et al.

General comments I really enjoyed reading this manuscript, which comprehensively describes the large Co dataset from the Saito group’s recent Atlantic Ocean expeditions. The issue of Co scavenging is slightly contentious. The sections describing the evidence for Co scavenging based on this data are compelling. I recommend this

C1

manuscript for publication, with only some minor points requiring clarification.

Specific comments P4, line 14: Insert “the determination of” before dissolved cobalt P5, line 5: Corresponding P9, line 42: Occurs P9, line 43: phosphatase P10, line 9: Perhaps “(conserving)” should appear after the first appearance of “sparing” in the Abstract and Introduction P10, line 14: Have P10, line 21, and the corresponding reference: The citation should be for Groß et al. 2013 P10, line 33: “. . .of the total cobalt. . .” P11, line 20: Replace “through” with “after” or “following” P11, line 37: Replace “towed” with the approximate depth of the samples, ~2 m P12, line 4: “. . .the depth distributions. . .” P12, line 9: “. . .protein concentrations and their metal contents. . .” P12, line 14: “. . .subtropical gyre. . .” P12, line 22: You pose the question, “Could zinc have been scarce enough to encourage zinc-cobalt substitution within metalloenzymes such as alkaline phosphatase?”, but do not explicitly answer until the end of Section 3.2.6. While this not a problem in itself, you might consider moving the paragraph starting at line 37 to the end of Section 3.2.6, and adding a short sentence to state that you will examine this question in the following two sections (3.2.5 and 3.2.6) P12, line 42: How is “biogeotraces” normally written – BioGEOTRACES? P13, line 4: Add a reference to Figs 2a and b P16, line 30: “vectors” P16, line 37-38: “. . .dominated by the scavenging removal term (Scav) which transitions. . .” P18, line 18: Should Ocean Data View be referenced? P18, line 40: “. . .which was used based on an aggregate. . .” P20, line 4. This sentence feels out of place here (and at the end of the Abstract). While it points to important future considerations, it doesn’t fit with anything else in this manuscript. However, having read the complementary manuscript by Noble et al, I understand where the authors are coming from. I suggest adding a sentence linking this sentence with the more in depth discussion on this subject that can be found in the Noble manuscript. Fig. 2 caption: Define OMPA Fig. 2: The Ross Sea data is not mentioned in the caption Fig. 4a: I cannot read the vector labels Fig. 6 caption: For ease of reading and consistency between this manuscript and Noble et al, you might consider adding a dash to your station numbers, e.g. USGT11-18 or simply 11-18 Fig. 10b: The legend and the vector colours don’t match (green and yellow) Fig.

C2

14. How useful a metric is  $Co^*$  given the challenges in defining Q? Although, it is telling to see negative  $Co^*$  in the eastern plume

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