

Dear Editor and Referee,

The reviewers are thanked for their insightful comments; these have helped to improve the manuscript considerably. Please see our detailed answers to the referees' comments below. Line numbers refer to the R1 version of the text.

Specific comments:

- *As mentioned above, authors discussed about the source and sink of the dissolved Al with mainly controlled by remineralization of the biogenic particles because of the positive correlation of the Si and Al concentrations in the water column. However, there is no plots between these parameters in this manuscript. Also, it is not clear that the correlation of these parameters was obtained within the same water depths (Euphotic zone in Section 3.2.2 or water column in Section 3.3.1) and/or same water masses (since it is interesting that the advected water mass (i.e. MOW) showed the different correlation of Si/Al.) Need to clarify this information in this manuscript.*

→ We have clarified the issues as they were also raised by referee 2 and 3, and included this information in the manuscript.

- *Abstract: Line 19. “: : . and removal by phytoplankton.” Dissolved Al is not a bioactive metal (in the current knowledge), thus this sentence is probably misleading readers. This sentence should be rephrased with “removal by biogenic particles (i.e. phytoplankton)”.*

→ We have rephrased the sentence as suggested.

Page 1, line 18-19: Surface water dAl concentrations were low (median of 2.5 nM) due to low aerosol deposition and removal by biogenic particles (i.e. phytoplankton cells).

- *Section 2.2 Dissolved Al analysis. (Page 4, first paragraph) Authors described the analytical method with the loading time (second) only. It is very helpful for readers to add the volume or loading time and the flowrate in this sentence. For example. “The loading time was adjusted to 120 s (flowrate ? mL/sec, or ?? mL) and was extended up to 180 s (flowrate ? mL/sec, or ? mL) for samples: : :”. Same as the rinsing volume and elution volume.*

→ We have included the flowrates.

Page 4, line 6-10: The loading time was adjusted to 120 s ( $2.5 \text{ mL min}^{-1}$ ) and was extended up to 180 s for samples with low dAl concentrations ( $<2 \text{ nM}$ ). After sample loading, the column was rinsed for 70 s ( $2.5 \text{ mL min}^{-1}$ ) with deionised water ( $18.2 \text{ M}\Omega \text{ cm}^{-1}$ , Milli-Q, Millipore) to remove the seawater matrix major seawater anions that interfere with analysis. Subsequently, the preconcentrated dAl was eluted ( $120 \text{ s}$ ,  $0.6 \text{ mL min}^{-1}$ ),.....

- *Page 5 Line 8. “The blank was subtracted from: : :”. Authors should write the blank value here. Is the value 0.013nM??*

→Done. No, the average blank was  $0.23 \text{ nM} \pm 0.1 \text{ nM}$  (n=28)

Page 4, line 24: This blank (Average blank =  $0.23 \text{ nM} \pm 0.1 \text{ nM}$ ; n = 28) was subtracted from the results obtained.

- Page 7. Line 7. Did authors calculate the averaged dAl value ( $3.1 \text{ nM}$ ) including Station 1, 2, 4? The dAl value at Stations 1, 2, 4 were quite high ( $>20 \text{ nM}$ ) in the Figure 2. Authors should specify the station number in this sentence. Add the station information for ENAB and IcB as well.

→You are right. In fact the average number given does not include stations 1, 2, and 4. We have clarified the information.

Page 6, line 15-18: Average surface dAl concentrations decreased from  $3.3 \pm 1.7 \text{ nM}$  (n=5) in the IB (Stations 1, 2, and 4 are excluded due to elevated dAl concentrations due additional inputs from the Tagus estuary) to  $3.2 \pm 0.8 \text{ nM}$  (n=4) in the ENAB (Stations 21 to 26) and  $2.8 \pm 1.2 \text{ nM}$  (n=5) in the IcB (Stations 29 to 38),

- Page 8. Line 14. The correlation here was referred to Section 3.3.1. However, this section is describing for surface/Euphotic zone, not deeper water. Need to specify or rephrase it.

→We have clarified this.

Page 7, line 24-27: One way ANOVA analysis was performed for the pAl to dAl ratio in the surface waters ( $>50 \text{ m}$ ) in each of the four basins which showed strong dAl to  $\text{Si}(\text{OH})_4$  correlations with depth (LB, IrB, IcB and ENAB, see section 3.3.1).

Technical corrections:

- Page 5 Line 19. “The Fisher-based test”, is this mean “Fisher’s exact test”?

→You are right. With “Fisher-based test” we meant “Fisher’s exact test”. We have changed the name.

Page 5 line 4-5: The Fisher’s exact test was used for.....

- Page 6. Line 13. “Subarctic North Atlantic Arctic”. Is this “Arctic”?

→The Irminger Basin and Labrador Basin (d and e on figure 1) are part of the biogeochemical province SANARCT. It is not the Arctic but the latter biogeochemical province includes regions which are in the Arctic and which share similar physical and ecological characteristics.

- Page 6. Line 25 and 26. The numbers should be written as (iv) and (v), not (iii) and (iiii).

→Changed.

- Page 7. Line 6. "... and 30.99nM (Station 2)." Figure 2 shows the highest dAl value was observed at Station 4. Is this station number 4 in this sentence?

→Indeed, there is a mistake on figure 2. The highest dAl concentration corresponds to station 2. Corrected. Station 2 is now shown in figure 3.

- Page 9. Line 24. High riverine dAl signal was observed previously in the Bay of Bengal (see the reference of Grand et al (2015)).

→We have included the suggested reference.

**Page 8, line 3-6: Our results indicate that a fraction of riverine dAl can be advected offshore, as observed in the Bay of Bengal (Grand et al., 2015),....**

- Figure 1. Station number in Figure 1b would help reader to understand the figure better. Figure caption "C: Atlantic Artic (ARCT)" should show "C: Subarctic North Atlantic Arctic (SANRCT)" in order to corresponding the text.

→We have changed figure 1 based on the review by Dr. Resing. We have added station numbers on figure 1b.

- Figure 2. Figure caption. "... : : Green: NAST (A in Fig 1); Orange: NADR (B in Fig 1); SANRCT (C in Fig 1).."

→We have redone figure 2. Therefore the caption has been changed accordingly.

- Figure 5. It would be better to show "Greenland" in the Figure.

→We have added "Greenland" on the three plots.

- *Figure 6. (A) why the station 2 was highlighted with red color? (C) It would be better to put the station numbers, black dots and the geographic labels “Newfoundland” etc. like Fig 6a. In order to help reader, modify the figure 6 with focusing shallower depth or add separate figures (see above).*

→It was a mistake. Suggested changes done.

Grand, M. M., Measures, C. I., Hatta, M., Hiscock, W. T., Landing, W. M., Morton, P. L., Buck, C. S., Barrett, P. M., and Resing, J. A.: Dissolved Fe and Al in the upper 1000 m of the eastern Indian Ocean: A high-resolution transect along 95°E from the Antarctic margin to the Bay of Bengal, *Global Biogeochemical Cycles*, 29, 375-396, 2015.