

Interactive comment on “The silicon stable isotope distribution along the GEOVIDE section of the North Atlantic Ocean” by Jill N. Sutton et al.

D. Cardinal (Referee)

damien.cardinal@locean-ipsl.upmc.fr

Received and published: 30 May 2018

Review of bg 2018 165

This paper presents dissolved Si isotopic data of intermediate and deep water masses in the North Atlantic. This is a key area for the Meridional Overturning Circulation. The GEOVIDE section has sampled 10 stations analysed in this study that are particularly relevant. The results presented here is the third study on the North Atlantic. It increases the offset found by Brzezinski & Jones (2015) compared to de Souza et al. 2012 in Si isotopic data in the region (from +/- 0.1 pmil to +/- 0.2 pmil), which was unexplained by the recent intercalibration published (Grasse et al. 2017). To consolidate their data, the authors have made an inter-comparison of 6 GEOVIDE samples (as required by

Printer-friendly version

Discussion paper



GEOTRACES protocol) with ETH Zurich and the results compare very well. Even though the cause of the offset among the three North Atlantic studies remains still unsolved, this makes their data trustable.

The paper is very well written and concise. The results are discussed in terms of mixing of the high number of water masses present along the transect since the authors generally did not find a significant imprint of dissolution of biogenic silica at depth.

Therefore I recommend publication of this work and I've listed below my few minor to moderate comments on the paper.

Damien Cardinal

- P4 L2 vs. Table 1: in the text neb flow rate is 100 uL/min while it is 60 uL/min in Table 1. Homogenise.

- Fig. 4 and in the text associated. 1) In this figure, the authors compare their GEOVIDE data with the two previous studies in the North Atlantic of Brzezinski & Jones (2015) and de Souza et al. (2012). Since Brzezinski & Jones chose to correct the offset between their data and the ones of de Souza et al. by ± 0.11 pmil, I suggest the authors here clearly mention that they always use the non-corrected data (which I believe is the right way to proceed) to avoid confusion with corrected data discussed in Brzezinski & Jones. 2) Important. Provide error bars of the three slopes and intercepts. Variability of GEOVIDE dataset seems higher. This should be checked and discussed. It is particularly needed given the offset found between the three data set that remains unsolved.

- Fig. 5d is a key figure and is much too small when printed. Moreover the D_{Si} concentration is missing. I suggest to restrict Fig. 5 to the current panels a, b, c and to add a fig. 6 with current panel 5d + a panel with D_{Si} concentration. Alternatively, Fig. 5 could cover a full A4 page and not just less than half of it.

- Could the authors provide a table with d_{30Si} and D_{Si} end-members of water masses

Printer-friendly version

Discussion paper



as calculated from their isotopic data and the contribution based on OMP from Garcia-Ibanez et al. (2017)? This would be very useful.

- Supplementary Table S1: provide in the Table caption the definition of $Si^* = DSi - NO_3$

Interactive comment on Biogeosciences Discuss., <https://doi.org/10.5194/bg-2018-165>, 2018.

BGD

Interactive
comment

Printer-friendly version

Discussion paper

