Biogeosciences Discussions

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# Reply on RC1

Alastair J. M. Lough et al.

Author comment on "Tracing differences in iron supply to the Mid-Atlantic Ridge valley between hydrothermal vent sites: implications for the addition of iron to the deep ocean" by Alastair J. M. Lough et al., Biogeosciences Discuss., https://doi.org/10.5194/bg-2022-73-AC1, 2022

We thank reviewer one for their positive feedback on our manuscript.

We will include the dates of sampling on line 92 (22$^{nd}$ December 2017-27$^{th}$ January 2018) in the revised manuscript.

To clarify the contents of table 2, for all the of the sampling in this study trace metals and He are never collected at exactly at the same depth, as we relied on the real time signals from the sensors to decide when and where to take samples. The distance between standard and trace metal clean sampling depths is in the range of 2-30 m. You can see from figure 3 that the sampled depths do not match up exactly between the standard and clean casts and the sampling resolution is higher on the clean casts.

This contrasts with previous studies (Fitzsimmons et al., 2017; Resing et al., 2015; Saito et al., 2013) using He to assess inputs of trace metals from hydrothermal vents, where samples were taken at the same depth on the standard and trace metal clean sampling casts, then integrated within a specific depth range of the plume e.g. between 1000-2000 m. Even though plumes sampled over a ridge will have shifted between casts as we demonstrate in figure 2. We argue that it's better to use the sensor data to determine sampling depths rather than using pre-determined evenly spaced sampling depths.

In table 2 the number of measurements used for integration from the standard rosette does not match up with the trace metal rosette in the second column because less He samples were taken than trace metal samples. The number of trace metal measurements used between the second and forth column do not match up exactly because there were more dMn measurements from the trace metal rosette than the standard rosette, hence because method 2 uses xsHe values derived from dMn measurements from the trace metal rosette, the number of integrated depths is higher for some rows.

TDMn samples were only collected at a couple of sites and were usually within or close to the analytical uncertainty of dMn. We will add TDMn values to Figure S3 and S5.