

Interactive comment on “Extraterrestrial dust as a source of bioavailable Fe for the ocean productivity” by Rudraswami N. Gowda et al.

Anonymous Referee #4

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The paper has a unique aspect connected to extraterrestrial dust and the ablated smoke with nutrition for phytoplankton in the ocean. Authors suggest that micrometeorite flux may help bioactivity, since micrometeorites commonly contains a significant iron-bearing phases and the phases may play an essential role in the bioactivity.

The connection between extraterrestrial materials and biology is interesting. However, the paper is still immature and needs significant or substantial revisions before publication. It is worthwhile paying much more attention.

My comments are below.

Micrometeorite has a chondritic elemental abundance, and the chemical differences among the chemical group are subtle. Thus, Figure 1 nearly depends only on the

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flux for the chemical group. However, it is not sure how you estimate the flux ratio for a different chemical group, and this is important rather than the comparison with the various research group data on flux.

Your presented data is only focused on micrometeorites and I agree that the samples are extraterrestrial. The data is not enough for meteor smokes. It seems that meteor smokes rather than micrometeorites may be directly relevant to the present study. Would all meteorite smokes fall on the Earth's surface? How do you estimate it? How about the escape to the space or stay in the atmosphere in the stratosphere? How to determine the ratio of meteor smoke falling on the Earth surface, ablated from micrometeoroid to form micrometeorite? You only mention that meteorite smoke contribution is significant for your theme. You need some data, or it may be from available and reliable references.

You list data of micrometeorite from the Polar region. It would help if you discussed the Antarctic micrometeorite. It is distinguished from micrometeorite from the deep-sea. For example, line 163, "5228 deep-sea and Antarctic ...". Appendix Table. AAS means from deep-sea? If so, could you mention about that? It is the same as the polar sample. It would help if you also had a reference for the contrasting sample. The detailed sampling method in the polar region are not written, or any concerns on this are not referred to in "2. Samples and Analytical Techniques".

As for chemical compositions, Fig. 2 and Appendix table are shown. Are they bulk chemical compositions for each micrometeorite? Then how did you determine it? Broad beam diameter, beam current, correction method, and so on. You used both SEM-EDS and EPMA. How did you distinguish the two? This is not written in the section of "2. Samples and Analytical Techniques".

You present the etching texture of micrometeorites in Fig. 2. It seems that all are from deep-sea. How about the percentage of the etched micrometeorites? It would help if you mentioned it to estimate the contribution in more detail.

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