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Interactive comment on "Better molecular preservation of organic matter in an oxic than in a sulphidic depositional environment: evidence from of *Thalassiphora pelagica* (Dinoflagellata, Eocene) cysts" *by* Gerard J. M. Versteegh et al.

Gerard J. M. Versteegh et al.

versteegh@uni-bremen.de

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Dear Editor,

From the constructive comments by Jacob Vinther, we understand that we were not clear in what we think happened to the microfossils. We implemented the suggestion to better separate between intermolecular and intramolecular interactions. In our case, the former primarily adding molecules to the initial cyst biomacromolecule, the latter modifying the initial structure. Their added effects determine the modification from cyst

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Discussion paper

bio- to geomolecule. To address these points we adapted the text to better elucidate these issues. We disagree to some extent with the suggested terminology in our case - kerogenisation and in-situ polymerization. With respect to the oxygen exposure of the OM for the Kerguelen Plateau sample we added information on the depositional environment. Furthermore, we made more clearly where the differences lay between the cysts from the three samples: the modern analogue (published 2012), the Rhine graben (published 2007) and the Kerguelen Plateau (the new information). Our infrared, pyrolysis and thermochemolysis analyses are unanimous and support each other in that the molecular composition of the material from the Kerguelen Plateau differs less from the modern analogue than the material from the Rhine Graben - e.g. the former generates a carbohydrate signature upon thermochemolysis, the latter does not). On the basis of this evidence we conclude that the molecular preservation of the material preserved in the Kerguelen Plateau is better. Finally there seem to be different concepts (or possibly a semantic issue) with respect the use of 'kerogenisation' and polymerisation when applied to modification of biomacromolecules in a diagenetic context. To avoid these problems we rather refrain from using these as much as possible.

In the attached pdf you will find a detailed account of the changes made.

sincerely,

Gerard Versteegh

Please also note the supplement to this comment:
https://www.biogeosciences-discuss.net/bg-2019-373/bg-2019-373-AC2-supplement.pdf

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