

Interactive comment on “Organic signatures in Pleistocene cherts from Lake Magadi (Kenya), analogs for early Earth hydrothermal deposits” by Manuel Reinhardt et al.

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Comment from referee: This study describes the co-occurrence of immature “biolipids” with early to peak oil window maturity “geolipids” in a range of chert samples. Overall, the manuscript provides an interesting case study for such a co-occurrence of organic molecules. The described biolipids appear syngenetic to the samples, as some compounds are constrained to specific environments (e.g. archaeol). However, the thermally mature geolipids can occur in a wide range of settings and are quite abundant. Previous work on hot springs in New Zealand, for example, recorded petroleum seepage as a result geothermal activity. Therefore, the syndepositional hypothesis is valid

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from paleoenvironmental settings indicating hydrothermal processes (as in this study). The addition of in-situ Raman evidence for kerogen of a range of different maturities bolsters the validity of the syndepositional hypothesis for the Lake Magadi samples.

Comment from referee: Nevertheless, the authors have not provided any convincing evidence that the occurrence of the geolipids are not an artefact of hydrocarbon contamination - the most parsimonious explanation. While the authors used system blanks to track laboratory contaminants, they did not provide any evidence to account for hydrocarbon contaminants already on the rock samples (prior to laboratory analysis). Such contaminants can be introduced even before sampling/handling and storage. The low organic carbon contents (<0.4 wt%) of the samples makes any introduced contaminants even more visible. In recent years, a range of analytical techniques have been established to quantitatively track hydrocarbons from the outer rock surfaces to the interior. It would have been interesting to see what the results of such a study would have been on the cherts from Lake Magadi.

Author’s response and planned changes in manuscript: We are aware of this problem and therefore conducted interior vs. exterior experiments on two Magadi cherts. The results support syngeneity of the geolipids and will be included into the supplement.

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