

Editor Decision: Publish subject to minor revisions (review by editor) (08 Apr 2021)

Correction of the manuscript CP-2020-154 : *Climate reconstructions based on GDGT and pollen surface datasets from Mongolia and Siberia: calibrations and applicability to extremely cold-dry environments over the Late Holocene.*

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April 2021

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1 List of relevant changes made in the manuscript

We thank the reviewer 3 for his attentive reading and his accurate comments. We have followed all his recommendations for this second round of minor revisions. Mainly the correction are:

- **Wording and text modifications**

1. The SSM calibration has been run again after removing the two pond mud samples following the recommendation of referee 3.
2. The results and discussion still follow the same trend than the previous version of the manuscript. The only main change is the mr4 which has been preferred as best model instead of the previously mr3 model.

- **Figures updates**

1. A supplementary figure has been added into the supplementary material: an example of the peak chromatogram integration method applied in this study.
2. Because the calibration presented in this study has also been modified (removing the 2 pond mud samples), all the results have been changed and especially the table 2, the supplementary table S3 and the figures 7, 8 and 10. The figures have been plotted again with the new calibration.

2 Responses to the comments of Reviewer 3 (Anonymous Referee)

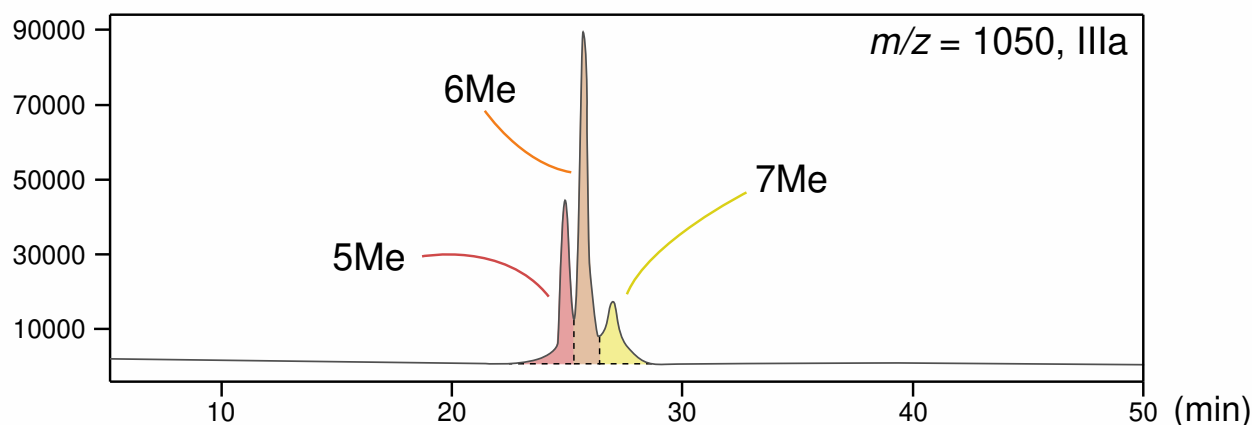
2.1 General comments:

After reading the rebuttal and the manuscript, I feel that most of my concerns have been addressed. However, I cannot agree with the authors that they still use lake sediments in developing the calibrations for soils. Despite similar GDGT distribution between soil and lake sediments, we cannot simply conclude that GDGTs in lakes are derived from soils, because the study area is very arid and surface runoff is limited. Besides, in situ production of GDGTs in any lakes across the globe appears to be significant.

Response and applied changes: The calibration method presented in this study has been compiled without the 2 pond muds samples. The results are significantly similar. In this version of the manuscript you will find the new calibration without the 2 pond muds following your recommendations. We have introduced this new calibration (L. 397) has “To guarantee the homogeneity of the calibration, the SSM has been applied on the total surface dataset excepted the two pond mud samples (even if their GDGT input seems to be validated by the BIT and IIIa/IIa indexes in Supplementary Fig. S2)”

I suggest you need to show a chromatography figure in the supplementary material which contains the separation of 5-, 6-, and 7-methyl brGDGTs.

Response and applied changes: We do understand the purpose of such a figure. Thus, we have added the following Rebuttal Fig. 1 in Supplementary Figure S1.



Rebuttal Fig. 1: Example of the peak chromatogram integration method applied in this study. This chromatogram shows the IIIa compound integration ($m/z = 1050$). This example is extracted from the MMNT5C12 sample.

2.2 Specific comments:

Besides, I found a number of typos and language issues, a part of which was shown below. I invite the authors to carefully check the manuscript.

Line 103 'on' changed to 'in'

Line 141 'for' changed to 'with'

Line 196 brings

Line 244 C46 GTGTs (GTGTs with...)

Line 339 GDGT-0

Line 340-341 Consider revising this sentence

Line 343 lead to

Line 339, 347 and 348 crenarchaeol

Line 373 the first component

Line 376 as opposed

Line 380 Add an article before 'very'.

Figure 4 captions Add '-' after '6 and 7'.

Line 374 5-methyl It should be noted that Ia is not 5-methyl brGDGTs. Please delete.

Line 385 applied to

Line 386 Delete 'the' before 'Supplementary'

Line 400 delete on

Line 409 delete of

Line 412 favor

Line 413 drive

Line 437 case community's parameter

Line 450 'archaeal' changed to 'bacterial'.

Line 457 respond

Line 544 calibrations

Line 620 appears

Line 625 'in' changed to 'on'

Line 630 delete 'from'

Response and applied changes: All these typos and language issues have been corrected in the final version of the manuscript as well as every mistakes in the whole manuscript following

the Referee 3's recommendations.

Supplementary table 1 I found that the formula for MBT' is wrong. 5-methyl brGDGTs were missing in the formula. None of 7-methyl brGDGTs should be involved. If you calculate it using this formula. The data for MBT' might be wrong. Please check the data in the manuscript.

Response and applied changes: Actually it is only a mistake of typo in the published version of the formula, the formula was correct within the R script. We have changed the formula in this version.

3 Marked-up manuscript Version

Notes : The following manuscript is marked in blue to highlight the modification made for this second round minor revisions.