

Interactive comment on “Seasonality of archaeal lipid flux and GDGT-based thermometry in sinking particles of high latitude oceans: Fram Strait (79° N) and Antarctic Polar Front (50° S)” by Eunmi Park et al.

Anonymous Referee #1

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This is a very detailed assessment of the sinking dynamics and depth distribution of marine GDGTs and associated proxy indices at two high latitude locations. Particularly, I find it remarkable that OH-GDGT may be a promising alternative temperature proxy to GDGTs in these regions.

I have a couple of mostly minor comments/suggestion below. I am, however, a bit concerned about leaving out data points, without reasonable justification (see comments below).

C1

P1-12 remove 'the'

P1-13 'proxies' and 'proxy index'

P1-15 '... where the original TEX86 proxy calibration shows a larger scatter.'

P1-21 remove 'during transport', it's redundant

P2-10 '... a logarithmic calibration of TEX86L, excluding the Crenarchaeol regio isomer, was suggested ...'

P4-20 'stratification' instead of 'stability'?

P5-05 'Afterwards'

P8-12-15 Why were these samples excluded? Is there reason to believe that something is wrong with the analyses? If not, the statistics should include all samples.

P9-25 check subscript

P10-6 '... vary depending on their composition... '

P10-10 '... preferentially incorporated into ...'

P10-20-22 Again, please provide reasoning for excluding samples from correlation analyses, or revise.

P12-21-22 What evidence do you base this statement on? Include explanation, or reference to figure.

P12-23-24 This argument is not quite clear to me. Which 'result' are you referring to?

P14-25-28 How exactly (over which nutrient) do you think Thaumarchaeota compete with phytoplankton? Does phytoplankton use ammonium as a N source?

P15-7-10 At which depth die Fischer et al. observe similar patterns? It is also not clear, which location are you referring to. Therefore, the conclusion you make is not clear either.

C2

P16-30 This statement should be stronger (remove 'potentially'), because water T has an effect on GDGTs, and not the other way round.

P17-2 'Larger scatter towards colder temperatures ...' P17-4 '...relationship of maSSTs AND TEX86L values ...'

P18-7 'similar range as'

P18-13 'Warm biases AS with the ...'

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P19-16-17 '... or OH-GDGT-based calibrations ... the limitations of a single global TEX86L calibration ...'

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C3