This study focuses on the preservation and in situ production of isoprenoid GDGTs near hydrothermal vents. It shows that GDGTs are quickly recycled but that sedimentary production of GDGTs causes an overprint, impacting proxies such as the TEX86. The authors propose a way to correct for this bias in modern systems.

I found this study presenting some interesting data which are suitable for publication. I have a few comments, however, which I like the authors to address and I detail these below. My main comment is that the concept presented is not new, i.e. the paper of Schouten et al. 2003 already showed that pelagic GDGTs are rapidly degraded in the Guaymas basin and that there is in situ production of GDGTs by thermophilic archaea causing a change in sedimentary GDGT distribution. This should be more discussed at several places in the manuscript. Further nuancing should also be that this overprint is likely unique for hydrothermal systems due to the exceptionally high degradation rates and unique lipid profile of thermophilic archaea and that the correction suggestion is likely rarely possible or needed.

Detailed comments:

L. 60 (abstract) and 663 (conclusion). I think you can use the correction in modern systems (provided all info is there) but not in paleoclimate studies due to a lack of constraints of several parameters. Furthermore, calibration studies use surface sediments (upper 1 cm), which also in your case is hardly affected by sedimentary overprint. So, which studies would actually really benefit from this correction? Can you provide an example from the literature and eg perform this correction?

L. 64-138. The introduction could be shortened in my view. The TEX86 was initially proposed as an SST proxy but ever since the 2007 publication of Huguet et al. in Paleoceanography this notion has been nuanced and plenty of publications as cited by the authors have shown that the signal is likely generated from (upper) subsurface waters (though might still be used to infer surface conditions). So lines 64 to 138 can be shortened to less than a page by just summarizing that TEX86 was initially proposed as an SST proxy but plenty of studies have shown that it is a subsurface signal. Then you can quickly move to the topic of your paper, i.e. pelagic versus sedimentary source for GDGTs.

L. 116: Sinninghe Damsté

L. 139-145. I challenge the notion that these two studies showed that in situ sedimentary production changed TEX86 values. In fact other studies (eg Lengger studies, Schouten et al., 2010) have shown that the IPLs in the study of eg Lips and Hinrichs are not derived from living Archaea but fossil IPLs because of the excellent preservation of pelagic glycosidic GDGTs (eg Xie et al., 2013, PNAS). This aspect should perhaps be more clear from the introduction, i.e. the simple presence of glycosidic GDGTs in sediments is in itself not proof of in situ sedimentary production.

L.162-181. The justification of using the Guaymas basin to determine in situ production is not only the active subsurface population but also that the GDGT fingerprint of these thermophilic sedimentary archaea is different from the pelagic background, as first established by Schouten et al. (2003) for this basin. Would be useful to clarify this here. If the distributions would have been similar, the signal would have likely been difficult to pick up.

l. 299. Outliers.

l. 302. What is ‘relatively high’ ? Would be good to get some quantitative information on this.

L. 315. The reported concentration is in too many significant numbers. With an error of +/- 4 ug/g sediment you should report concentrations rounded to whole numbers. Change throughout the manuscript.

L. 318-324. Would be useful to mention the estimates of degradation of GDGTs of Schouten et al. (2003) here for the same site: they actually found a difference between crenarchaeol versus other GDGTs. Indeed, what I am struck by is that the drastic change in GDGT distribution of GDGTs in Guaymas basin, in particular the dominance of GDGT4 with high temperatures, of Schouten et al. 2003 is not observed here. GDGT4 may co-elute with crenarchaeol under your UHPLC conditions so only mass spectra can distinguish the two. I presume this was done and also that if there was a co-elution that the amount of GDGT-4 was corrected for the contribution of the [M+2+H]+ ion of crenarchaeol. Can you speculate why there is this difference between the two studies?

l. 369. Schouten et al. (2010) was not the first one to use this equation to model degradation rates of lipids. Please refer to the original literature.

L. 463-467. Note that hydrous pyrolysis experiments typically last 3 days only. Pretty sure the Guaymas sediments were exposed to longer time periods and hence thermal cracking may have occurred at lower temperatures.

L. 479-489. Would be good to mention here that the same was observed in the Guaymas Basin by Schouten et al. (2003) who observed an increase in the RI of core lipid GDGTs with in situ temperature. Interestingly, they got a higher RI then observed here due mainly to a much lower relative abundances of crenarchaeol and a very high GDGT4. Can you speculate why your RI remains lower except for the deepest point in core 4?

L.527-529. I apologize for repeating myself here, but was this not already shown in Schouten et al., 2003, i.e. a replacement of pelagic GDGTs with GDGTs of thermophilic archaea? Other studies which have documented overprints of pelagic GDGTs are those of sedimentary sulfate-methane transition zones where GDGTs of AOM archaea (GDGTs 1-3) overprint GDGTs and thereby impact TEX86 values. This is one of the reasons why the MI index was developed by Zhang et al (2011) to check for this overprint. Would be good to mention this example here.

L. 626-627 and 645-647. It has been demonstrated here that in *hydrothermal systems* there is an overprint of GDGTs in sediments. This is a very important nuance as in these systems degradation rates are substantially higher due to the higher temperature (both biotic and abiotic degradation) as well as production of archaeal GDGTs with a distinctly different profile.