

I previously reviewed this manuscript and recommended major revision. I have now evaluated the revised version (egusphere-2026-519-ATC1.pdf) together with the authors' point-by-point response. With the minor points below addressed, I consider the manuscript acceptable for Biogeosciences after minor revision.

Major comments:

- (1) Downcore profiles of GDGT-derived indices (MI, RI-OH, and GDGT-0/cren) are still absent.
- (2) The validation between LOI and TOC is currently based on only two cores. How representative is this relationship for the other cores, such as MET1-BH and MET4?
- (3) The manuscript currently contains 10 figures, which seems excessive. The authors may consider reducing the number of figures. For example, Fig. 2 and Fig. 3 could potentially be integrated into a single figure. In addition, some figures can be moved to supplementary files
- (4) The Highlights and Abstract still partly overstate the evidence for tightly coupled ammonia-oxidation cooperation, compared with the more cautious interpretation presented in the main text. In general, highlights should consist of concise bullet points, each expressed as a single sentence. For example, the third and fourth highlights should be rephrased more cautiously.

Minor comments:

Line 802: MDS and NMDS are not consistently used, please use one.

Line 814: ANME-2a/2b and ANME-2a-2b are misused, please use consistently.

Line 831: “no GDGTs were detected” seems not correctly expressed because GDGTs are central to the study and it should be detected in marine sediments. Please rephrase

Line 827: Hadarcheales should be Hadarchaeales

Line 1009: Nitrossopaheria should be Nitrososphaera

Line 1143: RI-OH and RI-OH, second index should be RI-OH'

Line 1154: Fig. 6 should be Fig. 11. Nanoarchaeota–GDGT correlation is cited as Fig. 6; this should refer to the correlation network (Fig. 11).