



Impact of deep-water derived isoprenoid tetraether lipids on the TEX86 paleothermometry along the portuguese continental margin

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The TEX86 proxy was developed based on isoprenoid glycerol dialkyl glycerol tetraethers (isoGDGTs) biosynthesized by Thaumarchaeota and afterwards slightly modified to TEX86-H, a logarithmic function for TEX86. However, it remains uncertain how well this proxy reconstructs annual mean SST, especially due to the water depth influence. We investigated the potential effect of deep-water dwelling Thaumarchaeota in the warm and saline Mediterranean Outflow Water (MOW) on the distribution of isoGDGTs by analysing suspended particulate matter (SPM) and surface sediments collected along five land-ocean transects along the southern Portuguese continental margin. To this end, we directly compared for the first time the composition of intact polar lipid (IPL)-derived isoGDGTs of SPM with the diversity, abundance, and activity of Thaumarchaeota based on the genetic analysis of the genes coding for the archaeal ammonia monooxygenase (*amoA*) and the geranylgeranyl glyceryl phosphate (GGGP) synthase involved in the isoGDGT biosynthetic pathway. Our results show that the sedimentary distribution of CL isoGDGTs used in TEX86-H along the Portuguese margin is primarily influenced by water depth due to the increasing contribution of the deep-water population of Thaumarchaeota residing in the MOW.