

Vertical distribution of archaeal tetraether lipids in suspended particles from the East China Sea and implications for sedimentary TEX₈₆ records

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The TEX₈₆ (or its modified forms, i.e. TEX₈₆^H and TEX₈₆^L) has been widely used for evaluating past ocean temperature changes. However, it remains uncertain as to how well it reflects surface temperature in shallow marginal seas. In this study, we have analyzed biomarker lipids in suspended particulate matter (SPM) samples collected from different water depth of the East China Sea (ECS, with water depth < 100 m) in summer season. Our results showed that the maximum concentration of isoprenoid glycerol dialkyl glycerol tetraethers (*i*GDGTs) appeared in bottom waters at all sites, whereas phytoplankton lipids (brassicasterol and dinosterol) showed highest concentration in surface waters. This suggests thaumarchaeota lives in deeper water column than phytoplankton in the ECS. Consistent with the maximum *i*GDGTs concentration in bottom waters, the best correlation was observed between SPM TEX₈₆^H values and 2–4 weeks averaged water temperatures from the bottom water samples. By compiling published surface sediment data from the ECS, we found that the correlation of TEX₈₆^H with bottom water temperature (BWT) was better than with sea surface temperature (SST). Therefore, sedimentary TEX₈₆^H is a BWT proxy in the shallow ECS.