Comparison of organic temperature proxies (UK'37, LDI) in the East Sea (Sea of Japan)

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$U^{K'}_{37}$ and TEX_{86}, which are based on alkenones and glycerol dialkyl glycerol tetraethers (GDGTs), respectively. Both temperature proxies are the commonly used organic biomarker for reconstruction of sea surface temperature (SSTs) last several decades.

Recently, Rampen et al. (2012) introduced a new organic temperature proxy, long chain diol index (LDI) which is strongly correlated to SSTs. However this new potential paleothermometer needs to be further validated in various environments. In this study we applied the LDI proxy to the East Sea, by analysing sinking particles collected by sediment trap (EC1, from Mar 2011 to Jan 2012) as well as down-core sediments (ES14-BC01, ES14-BC03).

Alkenone fluxes were higher than diol fluxes. The flux weighted temperature of $U^{K'}_{37}$ and LDI in the sediment trap were ca. 12.0 and 17.7℃, respectively. LDI based value was similar to the annual mean temperature (16.4℃), while $U^{K'}_{37}$ based value was similar to the temperature in spring season (11.1℃) during which alkenone fluxes were especially high. Down-core temperature reconstructions suggest a strong corelation between LDI and UK'37. Although, the air and sea surface temperature records tend to increase last 30 years, the SSTs reconstructed with lipid biomarkers show the opposite trend, probably in response to the increase in upwelling-driven organic matter fluxes.

Reference

Rampen *et al*. 2012. Long chain 1,13- and 1,15-diols as a potential proxy for palaeotemperature reconstruction. Geochimica et Cosmochimica Acta. 84, 204-216.