

Comparison of late Quaternary sea surface temperature reconstructions based on organic proxies ($U^{K'_{37}}$, $TEX^{H_{86}}$, LDI) from offshore California

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Organic proxies for estimating the sea surface temperatures (SSTs) are widely used in paleoceanography. Depending on the regional characteristics, they may be influenced by seasonality, water column oxygenation and/or nutrient input; representing limitations and certain uncertainties in the downcore record. Therefore, multi proxy applications are needed to better understand the limitations and evaluate the results.

Here, we present SST reconstructions for the last 150 thousand years from ODP Site 1012 offshore California using three independent organic proxies; $U^{K'_{37}}$ based on alkenones (1), $TEX^{H_{86}}$ based on GDGTs (2) and LDI based on long chain diols (3) together with different productivity and upwelling indicators (e.g., total organic carbon and nitrogen content, $\delta^{15}N_{sed}$).

The organic proxy records show similar SST trends throughout the core but the amplitude is largest for the LDI (14°C). LDI SSTs correlate better with $TEX^{H_{86}}$ SSTs ($R^2=0.72$) than with $U^{K'_{37}}$ SSTs ($R^2=0.37$). Particularly during warming or cooling periods during the glacials, $U^{K'_{37}}$ and LDI SST records show opposite trends. Interestingly, the offset (from -8°C to +4°C) between LDI and $U^{K'_{37}}$ correlate with $\delta^{15}N_{sed}$, suggesting influence of nitrate and/or oxygen availability above the core location on these proxies.

References

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- (3) Rampen et al., 2012. *Geochimica et Cosmochimica Acta*, 84, 204-216.