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Influences of hydrodynamic processes on organic geochemical temperature proxies' applications in a shallow marginal sea

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There is evidence that sedimentary organic matter is susceptible to lateral transport during deposition influenced by hydrodynamic processes in the ocean, which restrict the applicability of molecular proxies for paleo-environment reconstruction. In this study, we examined the abundances of marine biomarkers including isoprenoid glycerol dialkyl glycerol tetraethers (*iso*-GDGTs), dinosterol, brassicasterol, and alkenones in bulk samples and three grain-size fractionated samples (20, 20-63, and 63 μm) from 12 surface sediments retrieved from the South Yellow Sea to investigate the potential influences of hydrodynamics on the proxies' applications. Our results showed that contents of marine biomarkers differed significantly with sampling stations. The abundances of marine biomarkers varied between grain-size fractionated sediments, and are more likely adsorbed to 20 μm grain-size fraction, being more susceptible to lateral transport due to hydrodynamic forcing. The molecular sea surface temperature (SST) proxies: U^{K}_{37}' and TEX_{86} indexes, showed significantly different values between grain-size fractionated samples and even spatially differed with stations. Deviation between U^{K}_{37}'-derived SST and annual mean SST were observed in the shallow part of the Yellow Sea, likely due to the lateral transportation of sortable silt fractions under the influences of coast currents. In addition, we proposed a new SST correction approach using interpolation modelling to obtain more accurate SST information. Our findings suggested that hydrodynamic processes are important controlling factors for the spatial distribution of marine biomarkers and the applicability of molecular proxies to reconstruct paleo-environment in the ocean.