

Sediment records of long chain alkyl diols in an upwelling area of the coastal northern South China Sea

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Long chain alkyl diols (LCDs) in sediment cores were studied in the Yuedong Upwelling (YDU) area in the coastal northern South China Sea to investigate whether sea surface temperature (SST) and upwelling intensity over the last few decades can be traced by the diol-derived indices, i.e., the LDI (long chain diol index) as a proxy for SST and the DI-1 and DI-2 (diol index 1 and 2) as proxies for upwelling intensity. The influence of riverine LCDs (e.g., 1,13- and 1,15-diols), which may affect LDI-reconstructed SSTs, was largely ruled out based on the comparison between LCD distributions in suspended particulate materials in the Pearl River estuary and the core sediments. LDI-derived SSTs in downcore sediments matched well with local annual mean SSTs. The records of DI-2 changed in parallel with the local wind stress and inversely with SST at times of upwelling, suggesting that DI-2 is an effective proxy for upwelling intensity of YDU. The DI-1 showed a generally inverse variation pattern with DI-2, implying a major influence by SST, and it is thus not an applicable upwelling indicator for YDU. A negative relationship of DI-1 and a positive relationship of DI-2 with LDI-derived SST were observed. This occurrence might be attributed to El Niño–Southern Oscillation (ENSO), because the SST and upwelling intensity were largely modulated by ENSO, showing a warm annual mean SST during the years of enhanced El Niño and intensified summer upwelling.