n-Alkanes in sediments from the Yellow River Estuary, China: Occurrence, sources and historical sedimentary record

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A total of 21 surface sediment samples from the Yellow River Estuary (YRE) and a sediment core from the abandoned Old Yellow River Estuary (OYRE) were analyzed for *n*-alkanes using gas chromatography-mass spectrometry (GC-MS). *n*-Alkanes in the range C_{12}-C_{33} and C_{13}-C_{34} were identified in the surface and the core sediments, respectively. The homologous series mainly exhibited bimodal distribution pattern without odd/even predominance in the YRE and OYRE. The total *n*-alkanes concentrations in the surface sediments ranged from 0.356 to 0.572 mg/kg dry weight (dw), with a mean of 0.434 mg/kg dw. The evaluation of *n*-alkanes proxies indicated that the aliphatic hydrocarbons in the surface sediments were mainly derived from a petrogenic source with a relatively low contribution from submerged/floating macrophytes, terrestrial and emergent plants. The dated core covered the time period 1925 to 2012 and the mean sedimentation rate was ca. 0.5 cm/yr. The total *n*-alkanes concentrations in the core ranged from 0.0394 to 0.941 mg/kg dw, with a mean of 0.180 mg/kg dw. The temporal evolution of *n*-alkanes reflected the historical input of aliphatic hydrocarbons and was consistent with local and regional anthropogenic activities. In general, the investigation on the sediment core revealed a trend of regional environmental change and the role of anthropogenic activities within this period. Overall, the systematic study of the potential sources and temporal evolution of *n*-alkanes in the surface sediments and sediment core can provide valuable insights into future investigations of other organic compounds in the Yellow River Delta. This investigation provided an assessment of the current impact of fossil fuel combustion and petroleum hydrocarbon.