

## **Anthropogenic organic contaminants in sediments of the southern Chinese coast: Sources and impacts from Chinese socioeconomic development**

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Multiple geochemical markers, including organic contaminants, were used to relate sediment organic chemical pollution in the coastal zone and marginal seas off southern China to Chinese socioeconomic development. Nearshore, median concentrations of  $\Sigma n\text{-C}_{15-35}$  ( $n$ -alkanes with 15–35 C atoms),  $\Sigma\text{LAB}$  (sum of  $\text{C}_{10}$  to  $\text{C}_{13}$  linear alkylbenzenes), and  $\Sigma_{26}\text{PAH}$  (sum of 26 polycyclic aromatic hydrocarbons) were 730, 40, and 230 ng/g, respectively. Natural hydrocarbons were mainly derived from terrestrial higher plant waxes. Compositions of LABs indicated that wastewater had been directly discharged or transported in significant amounts to the eastern and western coastal areas of Guangdong Province. Anthropogenic hydrocarbons were derived largely from vehicular emissions and combustion of domestic coal and biomass. Eastern and western coastal sediments contained higher levels of LABs but lower levels of PAHs than those of the Pearl River Estuary, a coastal area of the Pearl River Delta. These observations are consistent with lesser economic development (i.e., poorer wastewater treatment) but greater energy consumption in eastern and western Guangdong compared to the more-developed Pearl River Delta region. Offshore, spatial and temporal variations in total organic carbon (TOC) and  $n$ -alkanes were determined from sediment cores from the inner shelf of the East China Sea (ECS), and the South China Sea (SCS). Concentration ranges of TOC were 0.63–0.83, and 0.33–0.85% in the ECS and SCS, respectively, while those of  $\Sigma n\text{-C}_{14-35}$  were 0.13–1.97 and 0.35–0.96  $\mu\text{g/g}$  dry weight, respectively. Terrestrial higher plants were an important source of aliphatic hydrocarbons in marine sediments off China, particularly in this region. Temporally, TOC and  $\Sigma n\text{-C}_{14-35}$  concentrations increased with time and peaked at either the surface or immediate subsurface layers. The likely reason for this observation is the elevated inputs of organic materials to marginal seas off China in recent years, in part from the impacts of intensified anthropogenic activities in mainland China. Supporting this hypothesis was source diagnostics suggesting that aliphatic hydrocarbons were mainly derived from biogenic sources, with a minority in surface sediment layers from petroleum sources.