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Rapid changes in distribution and fate of Polycyclic aromatic hydrocarbons (PAHs) in sediments from the East China Sea and their response to human-induced catchment changes

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Human-induced catchment changes have affected the sedimentary processes in marginal seas, which will impact the transport and burial processes of materials and inevitably impact marine biogeochemical cycles. Polycyclic aromatic hydrocarbons (PAHs) in surface sediments from the East China Sea (ECS) at two time nodes (2006 and 2018) were compared to understand the response of PAHs to human-induced catchment changes. PAH concentrations in the ECS ranged from 8–414 ng g⁻¹ (dry weight), with a mean value of 112±77 ng g⁻¹, relatively lower than that in 2006 (38–308 ng g⁻¹, with a mean of 122±60 ng g⁻¹). Sharp decreases in sediment loads have triggered erosion in subaqueous delta and changed the distribution of sediment components, which may eventually influence the distribution pattern of PAHs. The obvious spatial differentiation of PAHs between 2006 and 2018 suggested that the depositional center of PAHs shifted from the estuary to the inner shelf area. PAH deposition patterns in the ECS were primarily influenced by riverine input before 2006, but are now dominated by winnowing processes related to long-distance transport due to sharply decreased sediment loads. Dam construction in the river catchment intercepted large amounts of sediments and PAHs, shifting the Changjiang-derived PAH depositional center from the ocean to reservoirs. Overall, depositional patterns of PAHs in the ECS were largely altered by human-induced catchment changes, which may cause significant impacts on the region's biogeochemical cycles and ecosystem health.