



Persistent Organic Pollutants (POPs) in the Yangtze Estuary: Distribution, Accumulation and Effects

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Introduction: Due to their hydrophobic and lipophilic nature, POPs in coastal marine environments tend to rapidly adsorb to suspended particle matters and accumulate in sediments. The Yangtze Estuary is a major commercial artery with high urbanization and industrialization. An understanding of POPs in multiple-phase is very important for the coastal environmental management in this region. Thus, the objectives of the present study are (1) to measure concentrations of POPs in multi-phase, including sediments, plants and animals etc., and (2) to assess the environmental potential risk of POPs along the coastal regions of the Yangtze Estuary.

Method: Samples of sediments, salt marsh plants (*Scipus*) and sediment-dwelling animals (bivalves and crabs) were collected in intertidal mudflats along the Yangtze estuary and nearby coastal areas. The origins of contaminants in the sediments were estimated by their typical fingerprints, such as molecular indices. In addition, the bioavailability of sediment associated POPs was estimated by the BCF for marsh plants and BSAFs for sediment-dwelling animals, respectively.

Results: The concentrations of POPs in the sediments are characteristically at maximum near sewage discharge points. Petroleum-derived contamination was a dominant source for PAHs in the sediments. The Yangtze River runoff and the atmospheric transfer were thought to be the two main sources of DDTs, HCHs and PCBs. As for the *Scipus*, a significant seasonal effect was observed for HCHs, DDTs and PCBs accumulated in above-ground tissues and roots. The concentration of t-HCH was higher in the above-ground tissues than in their roots in April, while t-DDT and t-PCBs in

their roots show higher levels, respectively. However, the levels of HCHs, DDTs and PCBs were higher in above-ground tissues than in roots in July. BCFs of HCHs, DDTs and PCBs exhibited lower values with higher levels of contaminants in sediments, and higher values with lower levels in sediments. As for the sediment-dwelling animals, HCHs and DDTs showed the higher levels at fresh water area in the estuary and lower at brackish water area. There was no significant relationship between contaminants concentrations and lipid contents both in mollusks and crabs. BSAF estimations show a significant “one high with two low” and “one low with two high” effect in the Yangtze Estuary.

The degree of POPs contamination in the sediments of the Yangtze estuary is moderate in comparison with other estuarine and tidal flat surface sediments in the world. However, there are still potential environmental risks for POPs in the study area.