



**Singapore-Delft
Water Alliance**



The Exchange of Persistent Organic Pollutants Across The Air-Sea Interface In Singapore's Coastal Environment

by
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Abstract

Coastal areas are vulnerable to the accumulation of persistent organic pollutants (POPs), such as PAHs, OCPs and PCBs from external inputs. Dry particulate and wet depositions, and air-water diffusive exchange in the Singapore's south coastal area, where most of chemical and oil refinery industries are situated in, were estimated. Seasonal variation of atmospheric depositions was influenced by meteorological conditions. Air-water gas exchange fluxes were shown to be negative values for PAHs, HCHs and DDXs, indicating Singapore's south coast as a sink for the above-mentioned SVOCs. The relative contribution of each depositional process to the total atmospheric input was assessed by annual fluxes. The profile of dry particulate deposition, wet deposition and gas exchange fluxes seemed to be correlated with individual pollutant's properties such as molecular weight and Henry's law constant, etc. For the water column partitioning, the organic carbon-normalized partition coefficients between particulate and dissolved phases (KOC) for both PAHs and OCPs were obtained. The relationships between KOC of PAHs and OCPs and their respective octanol-water partition coefficient (KOW) were examined. In addition, both adsorption onto combustion-derived soot carbon and absorption into natural organic matter for PAHs in marine water column were investigated. Enrichment factors in the sea-surface microlayer (SML) of the particulate phase were 1.2~ 7.1 and 3.0 ~ 4.9 for PAHs and OCPs, and those of dissolved phase were 1.1 ~ 4.9 and 1.6 ~ 4.2 for PAHs and OCPs, respectively. These enrichment factors are relatively higher than those reported for nearby coastal areas, which are most likely due to more organic surfactants floating in the south coastal surface of Singapore.

About the speaker



He Jun obtained his M.Eng and B.S. degree from Nankai University, PR China in 2004 and 2001, respectively. In 2005, He joined Division of Environmental Science and Engineering of NUS for PhD study under the supervision of A/P RajasekharBala. He is currently a research fellow with Singapore-Delft Water Alliance working in Upper Peirce Project on Integrated Water Quality Monitoring and Modeling in a Tropical Reservoir. His research Interests include interactions at the air-water interface, fate & transport of pollutants in a multi-media environment, biogeochemical cycles, effects and mechanisms of eutrophication as well as analytical instrumentation.

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