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Assessment of the distribution and emission sources of isomers (PAHs and PCBs) in the Nakdong River Estuary (NRE), South Korea

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We investigated the elemental composition and the presence of various toxic organic compounds using data since 2015 data-set, such as polycyclic aromatic hydrocarbons (PAHs) and polychlorinated biphenyls (PCBs), in surface sediments to trace the spatial distribution of the sources of pollution deposited in Nakdong River Estuary (NRE), Busan, South Korea. The concentrations of these pollutants were lower than those in samples from the
Han River or other coastal and river deposits in South Korea. The levels found in this study met the criteria set for sediment management guidelines set by NOAA. Some sampling points had higher concentrations than other sampling points, which results in the sedimentological analysis assumed to be due to topographical characteristics and the adjacency of a barrier island to an industrial complex. To confirm this, a more precise
investigation is required in the future. The PAH emission sources for the pollutants identified at most sampling points were related to either a petroleum combustion source or a biomass combustion (grass/wood/coal *etc*.) source, while at some sampling points, there was a closer relation to combustion sources. The major emission sources of PCBs were assumed to be related to commercial uses. One limitation of this study was that only
one set of samples was collected for the analysis from some of the barrier islands in the estuary of the Nakdong River (*i.e*., Eulsukdo, Sinjado, and Jinwoodo barrier islands). The researchers of geochemical analysis about NRE propose that continuous monitoring of various pollutants in association with inland contamination sources should be considered in future studies.

Table. Summary of total parent polychlorinated biphenyl (PCB) concentrations (pg g^{-1} dry wt) in sediments from various sites worldwide.

Location	Mean ± S.D. (ng g^{-1} dry wt)	Reference
Daliaohe, China	2,300	Wu et al.
Luanhe, China	1,400	Wu et al.
Haihe, China	3,200	Wu et al.
Huanghe, China	1,300	Wu et al.
Changjiang, China	7,100	Wu et al.
Huangpujiang, China	19,900	Wu et al.
Qingtangjiang, China	12,800	Wu et al.
Jiulongjiang, China	800	Zhang et al.
Mandovi River Estuary, India	170,000	Iwata et al.
Ciliwung River, Indonesia	79,000	Iwata et al.
Mataniko River, Solomon Islands	5,000	Iwata et al.
Osaka Bay, Japan	63,000	Iwata et al.
Keelong River, Taiwan	23,000	Iwata et al.
River Seine, France	50,000–8,000,000	Chevrevil et al.
Scheldt Estuary, Netherlands	69,000–257,000	Van Zoest and Van Eck
South Carolina Estuary, USA	622,000	Marcus and Renfrow
The San Francisco Estuary, USA	164,000	Phillips and Spies
Parramata River, Australia	160,000	Iwata et al.
Swan River, Australia	35,000	Iwata et al.
Yellow Sea	920	Tanabe et al.
East China Sea	810	Tanabe et al.
Mediterranean	800	Burns and Villeneuve
Bering Sea	130	Iwata et al.
E.N. Pacific	<1,000–1,600	Risebrough et al.
Antarctica	70	Ayris et al.
Barrier islands of Nakdong River, Korea	371.6 ± 178.2	This study