Distribution, Behavior and Fate of PCBs in the Marine Environment*
—Lecture by the Member Awarded the Okada Prize of the Oceanographical Society of Japan for 1985—

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Abstract: I am extremely grateful and honored for being awarded the Okada Prize (1985) for my study. The present article reviews my research on the distribution, behavior and fate of PCBs in the marine environment. The outline of this study is summarized as follows:
1. Polychlorinated biphenyls (PCBs) were detectable in the wide range of environmental media and biota of the Seto-Inland Sea, Japan, in which much high concentrations were found in sediment and biological samples due to their hydrophobic, lipophilic and less biodegradable properties as well as their extensive production and use in estuarine and coastal regions.
2. PCBs extend the boundaries of their distribution all over the global environment, being evidenced by their occurrence in open ocean atmosphere, hydrosphere and biosphere, even in Antarctica. The global contamination of PCBs is much more prominent in northern hemisphere than in southern hemisphere.
3. The sinking rate of PCBs from surface to deeper layers in open ocean water column is relatively slower in tropical waters than in high latitude ones. This implies the possible prolonged contamination of persistent synthetic organic chemicals in the tropical marine environment.
4. The bioaccumulation processes in marine ecosystems can be explained by the physicochemical and biochemical properties of PCBs and the metabolic capacity of organisms. In higher animals, additional factors such as parturition and lactation are also related to this process.
5. Total PCB load in global environment was estimated to be about 370 thousand tons. Of this, most amounts were in coastal sediment and open ocean water. Presently, about 780 thousand tons of PCBs are still in use mainly in electrical equipments. In order to reduce the PCB levels in marine environment, pertinent measures to prevent the further discharge and safe disposal of PCBs are required.

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