

## **A century-long sedimentary record of pesticide use in the Küçükçekmece Lagoon region, Turkey**

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Organochlorine pesticides (OCPs), extensively used for pest and disease control since the 1940s, can be bioaccumulated through food chains and cause adverse impacts on the environment and human health. Their use and manufacture have been banned or restricted in the 1980s in most countries. OCPs have a strong affinity to suspended particles, so they subsequently settle down into sediment. Sediments in aquatic systems could also become another source of OCPs, due to water turbulence, dredging and bioturbation.

Piston coring recoveries in the Küçükçekmece Lagoon, a coastal wetland protected from the sea by a narrow strip of sandbar in the western part of Istanbul, indicated mostly homogeneous and seasonally layered lithological textures throughout the cores. The sediment profiles seem to be not subjected serious physical rearrangements, so that there is the opportunity for deposit preservation. The core 5 was analysed to delineate the vertical variations of selected organochlorine pesticide (OCPs) residues using gas chromatography (GC-ECD/MS) and dated using <sup>210</sup>Pb and <sup>137</sup>Cs dating methods.

The total OCP residues ranged from 3.0 to 498.7 ng/g-dw, with the median concentration of 64 ng/g-dw, while  $\alpha$ -HCH and p,p'-DDT were dominant OCPs, with maximum concentrations of 469.3 and 71.0 ng/g dw, respectively. Dated concentration-depth profiles suggest that highest inputs occurred in the first half of last century and followed by significant decreases. Despite the restriction in use, the prevalent nature of OCPs in the core sediment reflects the persistent nature and the lipophilic character of these contaminants. The major sources of the HCHs were from the use of technical HCHs. Sources DDTs identified by specific molecular ratios indicated that DDT residues were mainly originated from technical DDTs from both historical usage and recent input. The organochlorine pesticide residues did demonstrate markedly different distributions reflecting different agricultural and domestic usage in the region.

Even though the risk of sediment toxicity was not so high according to the sediment quality guidelines, the bioaccumulation and the amplification of toxic organic pollutants may have major implications. Therefore, this study on the residual levels of the OCPs, their temporal distributions and the source analysis will not only contribute to understanding the environmental behaviour but also provide the necessary theoretical basis for persistent toxic pollution prevention and lake environmental management. This research was supported by the Scientific and Technological Council of Turkey (112Y104) and the Research Funds of Istanbul University (byp-22247).