

The history of Lake Maggiore industrial pollution traced through lake sediment and long term monitoring of the biota

In Lake Maggiore large watershed (ca. 6,600 sq. km), industrial activities along the XX century led to the discharge into the lake or its tributaries of several pollutants, such as DDT, PCBs and mercury.

Other pollutants, such as PAHs and flame retardants (such as PBDEs) are still reaching the lake.

Analyses of some of these pollutants in lake biota were performed continuously since 1998 and form a unique time series.

We used in parallel lake sediment cores to infer the history of lake contamination, and analyses of biological samples to describe the distribution of these pollutants in the lake food web and its year-to-year variability.

Furthermore, analysis of the sediment of the main rivers flowing towards Lake Maggiore was used to get information on present sources of pollution.

Results also show that legacy pollutants, which are no more used nor produced, still reach the lake from polluted soils located around the industrial sites, in particular during heavy rainfall. In particular, we paid special attention to Hg and to DDT and its metabolites, because of the presence of a large pollution source close to the River Toce, one of the main inlets of Lake Maggiore.

Although DDT production ended in 1996, p,p'-DDT is still found in river sediment and in molluscs collected in Lake Maggiore, deriving probably from polluted soils. On the contrary, p,p'-DDE prevails in fish tissues, zooplankton and molluscs.

Finally, high values of the concentration of some pollutants in the sediment of Lake Maggiore outlet (River Ticino) show that the lake does not act as a perfect sink for these compounds.

Considering present day pollution, PAHs derive from diffuse sources and are found in the sediment of all tributaries, while PBDEs were found only in the sediment of two inlets, revealing the presence of active point sources.

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