



Impact of an old landfill on the organic compound contamination of surface and groundwater - From landfill to the Loire River

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The objective of this study was to acquire data on the transfer of hydrophobic organic contaminants (polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), polybrominated diphenyl ethers (PBDEs) and organochlorine pesticides (OCP)) from an old landfill of Nantes (France) towards the estuary of the Loire River. A collector mainly drains runoff waters collected upstream of the landfill. A former observation of physicochemical parameters of groundwater has highlighted that the groundwater was impacted by the leachate, and probably the Loire River, as the landfill is in connection with the alluvial groundwater table.

The organic contamination was assessed through the sediment analysis of the runoff water collector and using passive samplers (SPMD) deployed in several groundwater piezometers.

The old landfill seems to be a major source of PAH and PCB contamination since their masses adsorbed on passive samplers deployed in piezometers are much more important at this studied site. The masses then decrease with the distance to the landfill to reach values at downstream sites lower than those of the site located upstream. This is probably because the downstream sampling site was under the influence of the Loire River tides, which generates thus a dilution of the contamination.

The sediments from the outlet of the runoff water collector have a content of hexachlorobenzene (HCB) similar to those of the Loire estuary. For both PCBs and PAHs, the contents are higher at the outlet of the collector than in the Loire estuary. Nevertheless, previous studies showed that the PAH, PCB and HCB contents in estuarine sediments are not significantly different between upstream and downstream sites from the outlet of the collector in Loire.

Finally, HCB and dieldrin are the only POC that could be quantified among the selected ones for the study and no PBDEs could be quantified either in passive samplers or sediments.