

Passive sampling for the monitoring of organic pollutants (PAHs, BTEX) in groundwater. Application to a former industrial site

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Classical techniques for groundwater sampling can affect the measurement of chemical composition of water. Sampling devices such as low-flow peristaltic pumps can sample water slowly from wells to obtain representative samples but can also involve sorption of hydrophobic compounds to the tubing and losses of volatile compounds through volatilization. In this context, passive sampling technology presents several advantages associated with a low perturbation of the sample, including simplicity, low cost, no power requirement and possible estimation of time weighted average (TWA) concentration of pollutants.

The aim of this work is to present results obtained with two passive sampling devices, an integrative passive sampler (SPMD - Semi Permeable Membrane Devices) and an equilibrium passive sampler (PDBs -Passive Diffusion Bags) for respectively the estimation of PAHs and BTEX concentrations in groundwater at a former industrial site. Results were compared with those from classical analysis (LC/UV/fluorescence and ITEX/GC/MS for PAHs and BTEX respectively) on water samples obtained with a discrete interval sampler. The discrete sampler allows sampling with minimal disturbance of the water in comparison with classical sampling. SPMD were deployed for several time durations to estimate the kinetic accumulation of compounds. PDBs were deployed to estimate the BTEX concentrations in groundwater. First results demonstrated that BTEX concentrations in PDBs samplers were in good agreement with those estimated in water samples with the discrete interval sampler. This demonstrates that PDBs can estimate the VOC concentrations in the well at a define depth. For most of PAHs, the kinetic accumulation was linear over the deployment period. For some PAHs, time average concentrations (TWA) estimated with SPMD could be in good agreement with those found in water samples.

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