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Applicability of passive sampling to groundwater monitoring

Catherine Berho, Anne Togola, Jean-Philippe Ghestem

BRGM, 3, avenue Claude Guillemin, 45060 ORLEANS cedex 2, France,

E-mail contact: c.berho@brgm.fr

Abstract for a poster presentation

Topic : Environmental & analytical chemistry - B01 - Advances in passive sampling and dosing techniques

Key words : groundwater, PDBs, DGT, POCIS

Passive sampling technology has become of great importance in the field of environmental monitoring for several years, due to its well-known advantages (low perturbation of the sample, time weighted average concentration estimation …). Although passive samplers have been successfully used in a variety of field studies in surface waters, only a few studies have tested their applicability in groundwater. Indeed, groundwater presents specificity such as a low velocity of water which might affect the uptake of compounds in passive samplers. Moreover, the use of passive samplers in groundwater supposes the water in the well to be representative of the whole groundwater.

The aim of this work is to test several passive sampling devices (DGT, POCIS, PDBs) for the monitoring of metals, pesticides, and volatile organic compounds (VOC) in groundwater in order to identify the pros and cons of this technique for groundwater applications. Several campaigns of measurements were conducted in order to compare the results obtained by passive sampling with those obtained by classical sampling. All passive samplers were deployed in replicates in a well and at different depths to study the stratification of pollutants. First results demonstrated that:

- A good repeatability is observed on the passive sampling results,
- VOC concentrations obtained by PDBs are in accordance with those obtained by classical sampling in the well. These results highlighted that PDBs allow the measurement of the VOC concentrations at different depths easily,
- In some cases, the low water velocity seems to limit the uptake of compounds for integrative passive samplers. This factor has thus to be taken into account for the calculation of the concentration in water.

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