Use of SPMD to evaluate the contamination by PAHs along an anthropisation gradient inside a large river basin.

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The efficiency of SPMDs to capture bioavailable hydrophobic contaminants in a quantitative manner is still an unresolved question in the field. The use of PRC has greatly improved the quantitative assessment of the sampling rate of SPMD in the field. It was demonstrated that in situ exchange coefficients (uptake and export coefficients) could be much different from the same coefficients evaluated in the lab. However, several questions remain open. It is known that the limiting factor for diffusion into the sampler is not unique, which may narrow the relevance of the information brought by PRCs. The relevance window of a given PRC should be better examined taking into account the hydrodynamic conditions as well as other factors such as the development of a biofilm on the passive sampler. Another problem is related to dissolved organic matter (DOM), which is expected to decrease the rate of sorption of dissolved hydrophobic contaminants into the sampler, and also to decrease bioavailability. This rises two questions: (i) is SPMD a quantitative model - regarding the protective effect of DOM - for given biological species and (ii) how should results obtained by SPMD be corrected to take into account the effect of DOM to infer total dissolved concentrations.

Two years sampling campaigns were organised in the river Seine basin to assess the reliability of SPMD (and DGT) data, compared to total dissolved and particulate PAH concentration in a set of environmental conditions. The role of DOM was clearly demonstrated, but less clear information was obtained regarding biofouling.

This work was completed in the frame of the PIREN-Seine programme. An objective of the programme was to evaluate the bioavailability of contaminants and associated monitoring tools (DGT and SPMD) in a large river basin. Joint sampling campaigns were organised to compare the efficiency of both type of sampling systems in the same local environments.