

Contaminated Sediment Sites

Polymeric Sampling Devices—Multiple

Summary

Media:	Sediment porewater, surface water, flux
Study Type:	Review article
Technology:	LDPE, PDMS, POM, DGT, SPMD, peepers and other (e.g., Tenax, XAD) (equilibration)
Peer Reviewed:	Yes
Publication Date:	June 2023

Study Description

- Provides a comprehensive overview of the application of passive samplers in assessing the effectiveness of remedy at 102 contaminated sediment sites with a range of compounds, such as PAHs, PCBs, DDX (DDT and its metabolites), organochlorine pesticides (OCPs), polychlorinated dibenzo-*p*-dioxins and -furans (PCDD/F), polybrominated diphenyl ethers (PBDEs), and various metals.
- Compares the post-remediation reductions in compound concentrations, as determined by PSD-based metrics, against those derived from conventional metrics, including bioaccumulation, toxicity, bulk sediments, porewater grab samples, and water column grab samples.
- Quantitative metrics used for the comparison include Pearson correlation coefficient, Lin's concordance correlation coefficient, arithmetic mean of the ratios between paired observations, and percentage of paired observations falling within a factor of 2 of each other.

Remedial Phase

The study compared pre- and post-remediation concentrations to evaluate the effectiveness of remedies, such as capping, in-situ amendment, dredging, and monitored natural attenuation (MNA). Data sources included lab-based feasibility studies, field pilot studies, and field full-scale studies. Most studies examined sediment amendments in labs during the feasibility study phase, with only nine using PSD in full-scale field remediation. PSDs were more commonly used for evaluating capping and in-situ amendment remedies, and less so for dredging and MNR.

Outcome

PSD-based metrics agreed with conventional metrics in more than 60% of remedy assessments. The study recommends adding PSDs to the toolkit for long-term monitoring of remediated sediment sites.

Case Study Reference

Grundy, James S.; Matthew K. Lambert; and Robert M. Burgess. 2023. Passive Sampling-Based Versus Conventional-Based Metrics for Evaluating Remediation Efficacy at Contaminated Sediment Sites: A Review. *Environmental Science & Technology*, June 26. <https://doi.org/10.1021/acs.est.3c00232>