

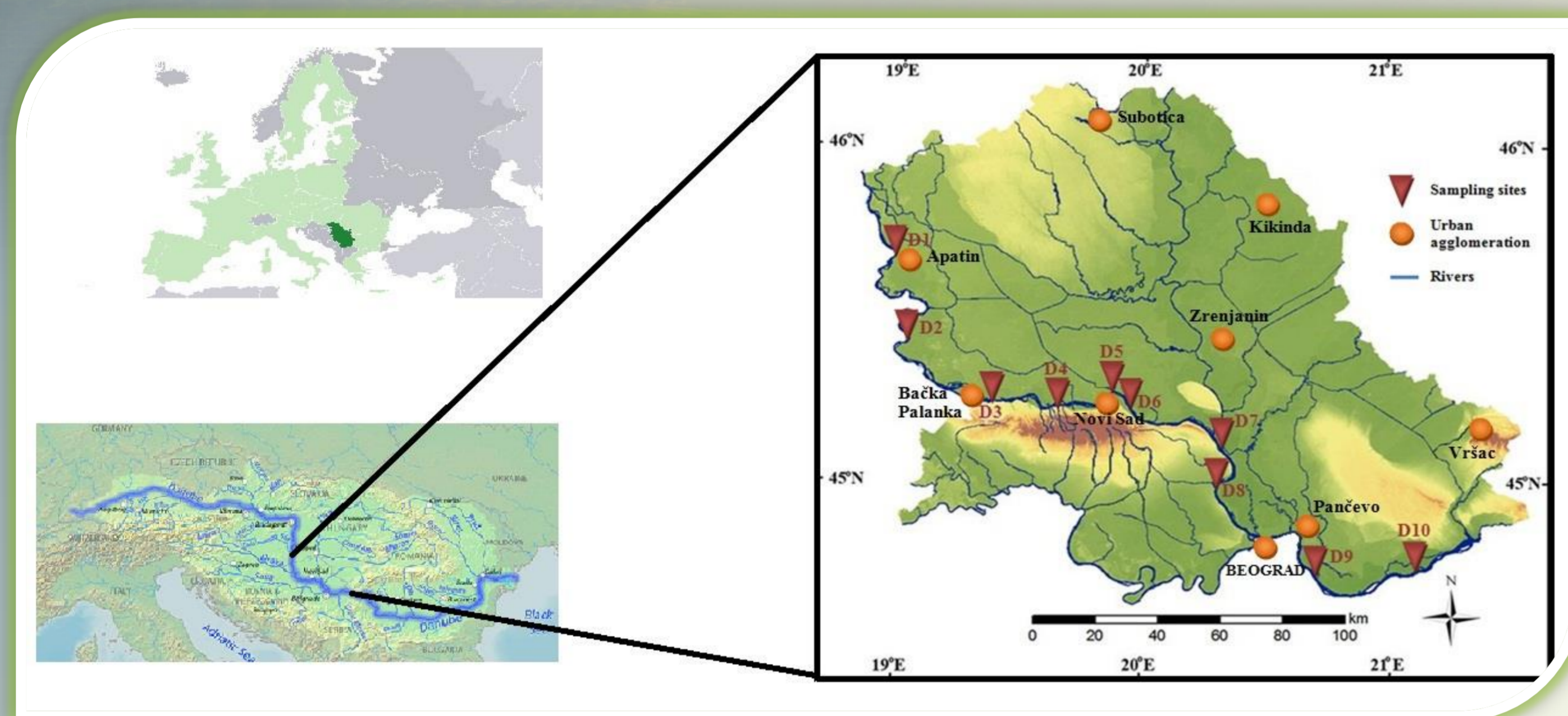


APPLICATION OF SCIENCE IN ENVIRONMENTAL DECISION MAKING: ALTERNATIVE MONITORING OF DISSOLVED LIPOPHILIC ORGANIC POLLUTANTS IN THE DANUBE RIVER

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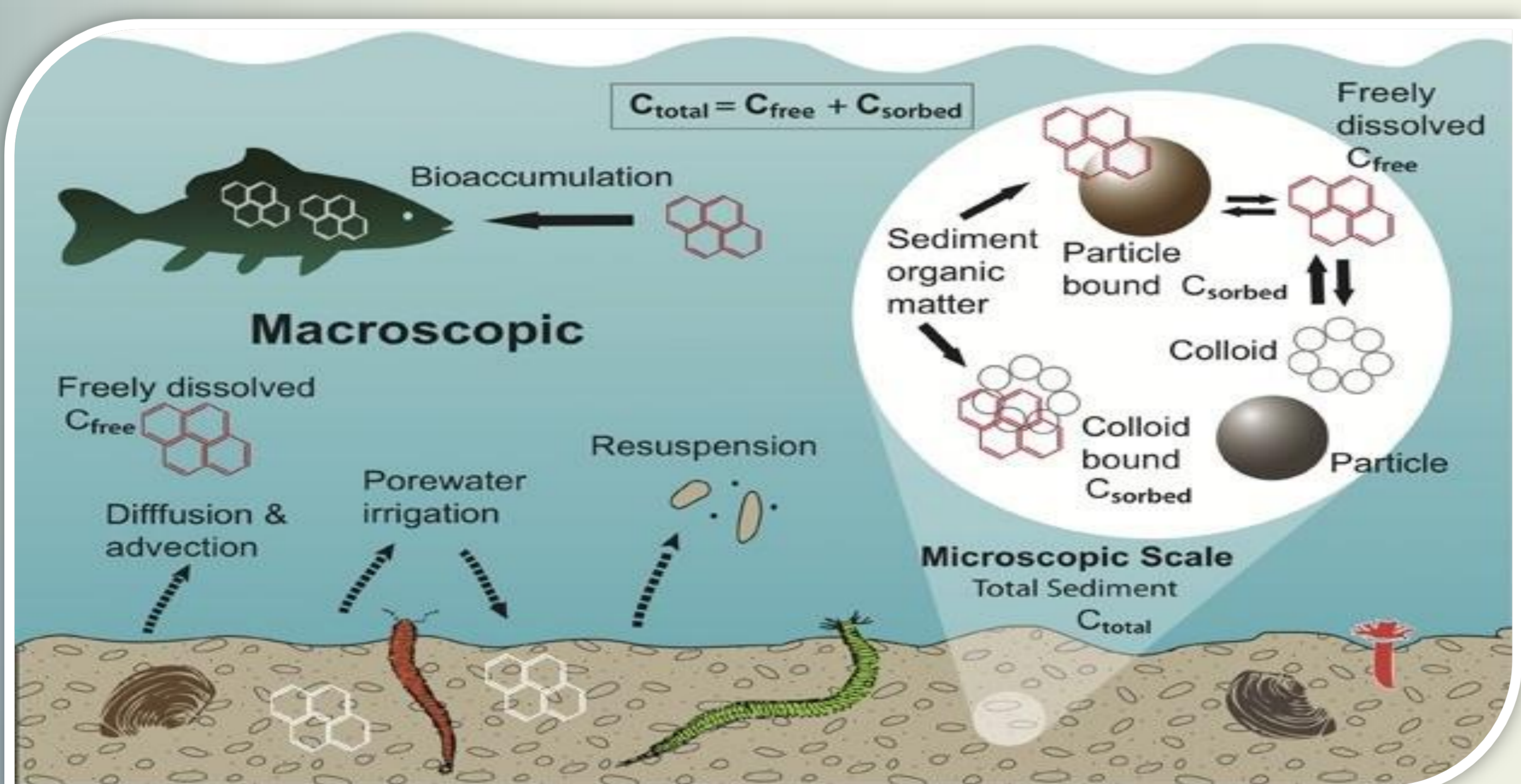
- During 2012 monitoring of Danube River sediments (Serbia) was conducted.
- 10 sampling sites- Apatin (D1), Labudnjača (D2), Neštin (D3), Begeč (D4), Ratno Ostrvo (D5), Šangaj (D6), Knićanin (D7), Belegiš (D8), Ritopek (D9), Dubravica (D10).
- Passive sampling of lipophilic organic contaminants (LOC) in the sediment was performed using silicone rubber samples.



The map of the sampling sites



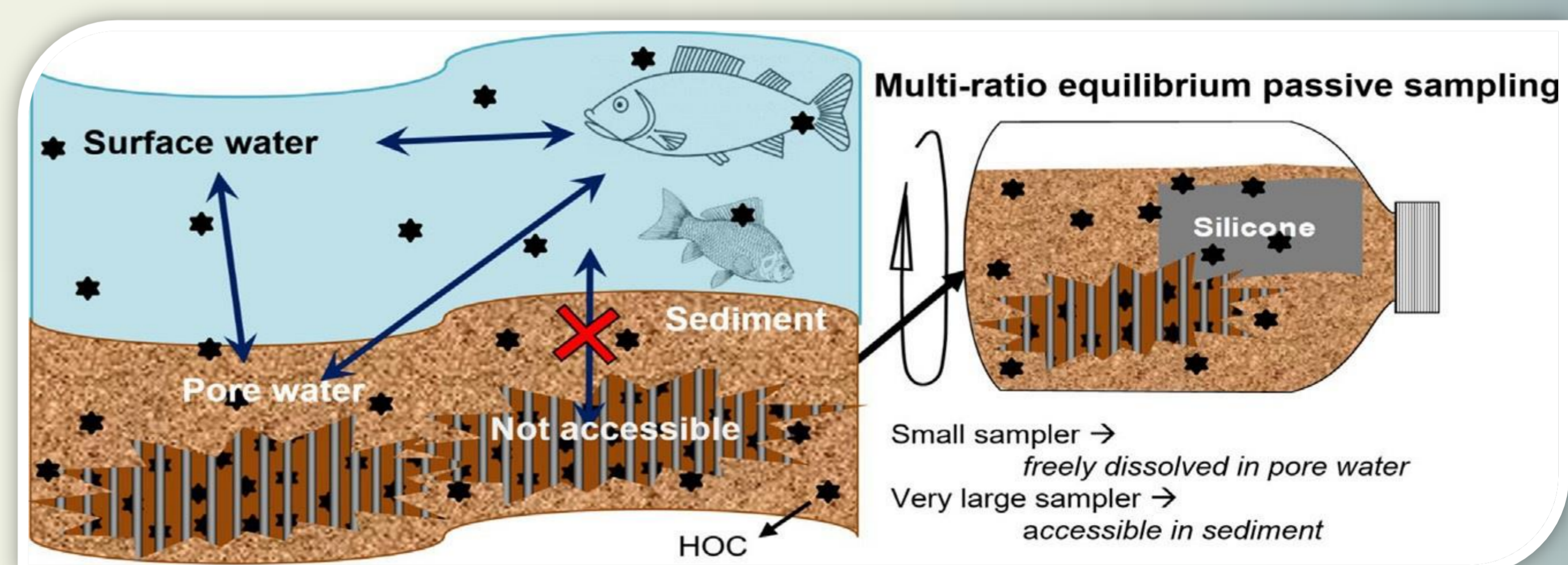
Sediment sampling, preparation and analysis of passive samplers



Conceptual view of contaminant cycling in sediment highlighting the central role of freely dissolved concentration

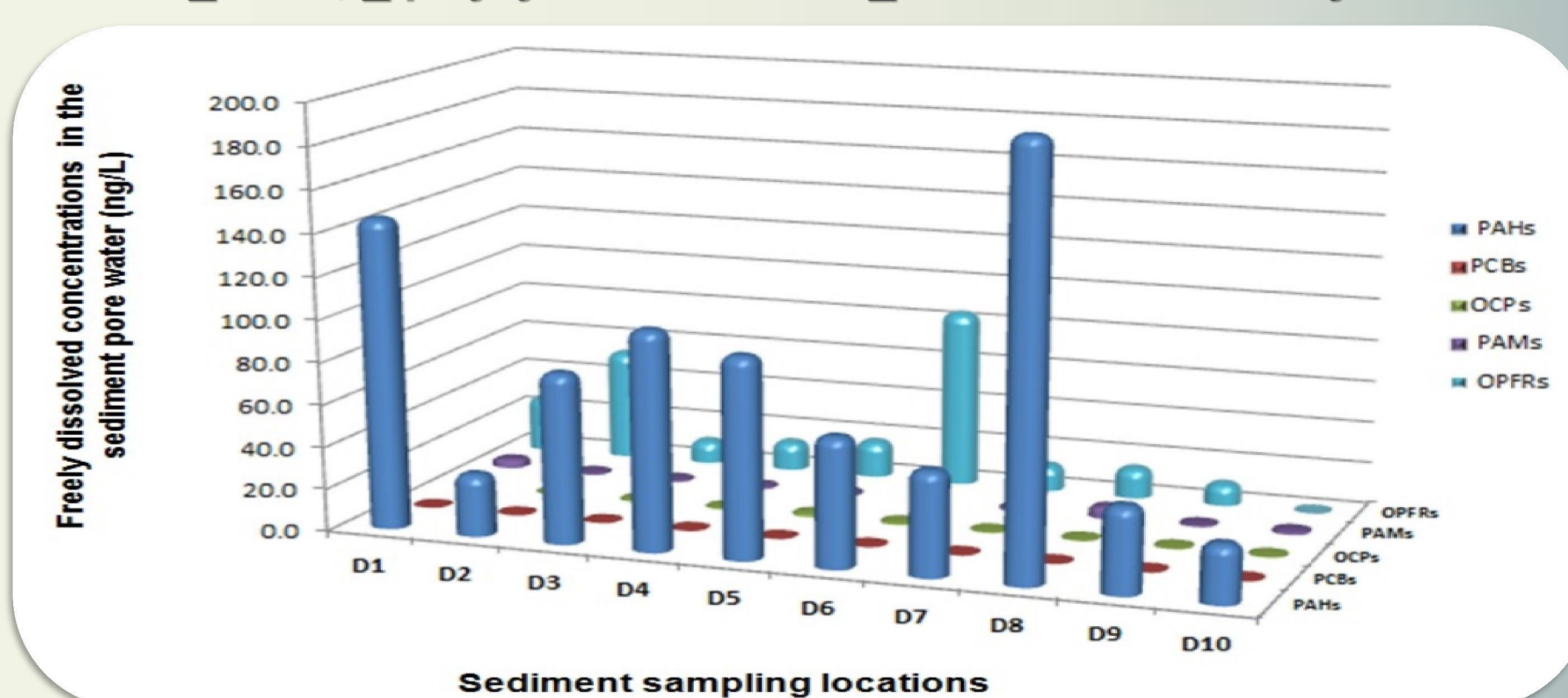
Freely dissolved concentrations (C_w) in the sediment pore water and the accessible/releasable concentrations (C_{AS}) of LOC in sediment are two complementary parameters of bioavailability and are both highly relevant for risk assessment.

- Multi-ratio equilibrium passive sampling (MR-EPS) was developed, providing estimates of both bioavailability parameters, i.e. contaminant's accessibility in sediment and concentrations in porewater.
- Equilibrations of passive samplers with sediment at largely different sampler-sediment mass ratios, allow construction of a part of a (de)sorption isotherm, which yields the C_w in the pore water at a low sampler-sediment ratio (minor depletion of the sediment phase) and the accessible or releasable concentration in the sediment at high sampler-sediment ratio (maximum depletion of the sediment phase).



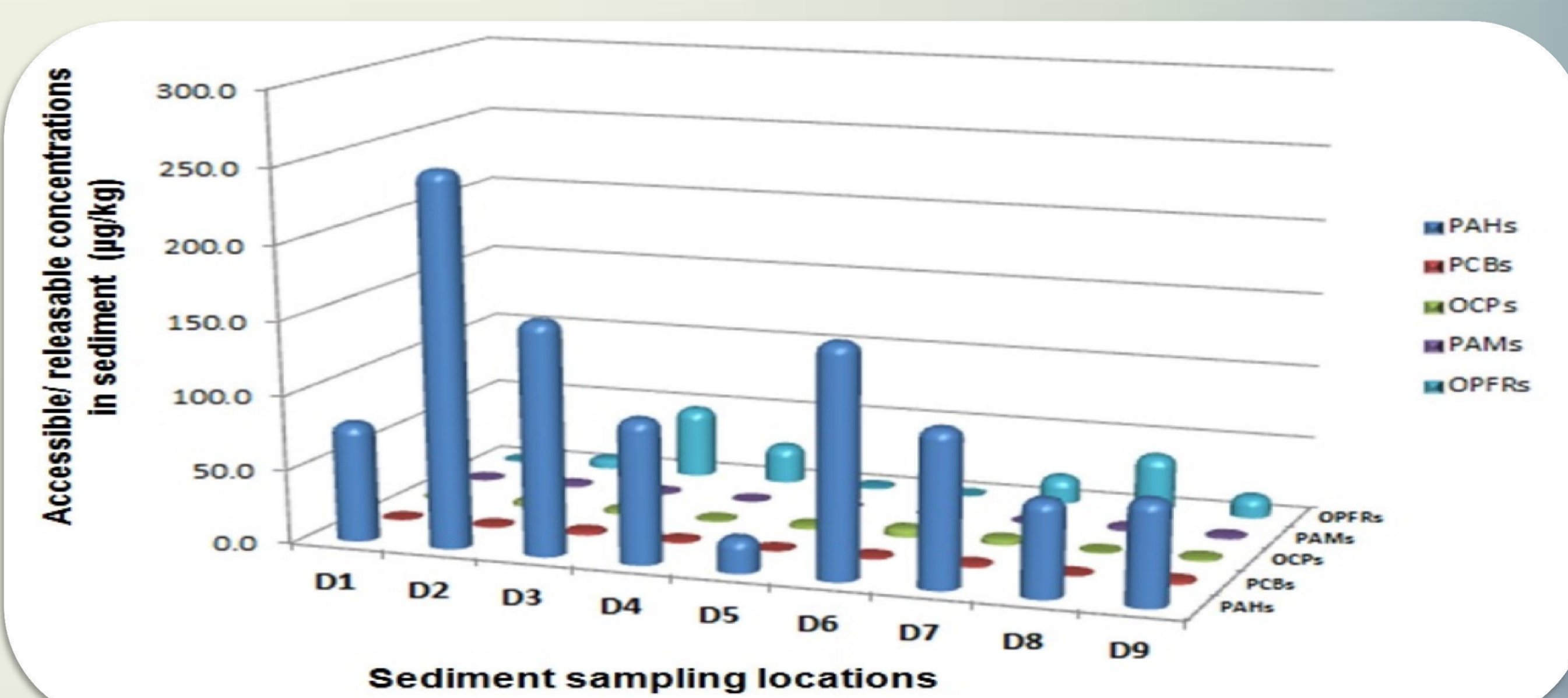
Freely dissolved concentrations in the sediment pore water

- Individual PCBs were quantified with C_w below 0.1 pg/L of 15% equilibration, noting remarkable sensitivity of passive sampling technique sediments.
- The highest detected concentrations, calculated as the mean value of 4 test samples, were recorded for Σ PAHs (locality D8), then for OPFRs (D6), while the levels of Σ OCPs, Σ polycyclic musks and Σ PCBs were extremely low.



Accessible/releasable concentrations of lipophilic organic contaminants in sediment

- Elevated C_{AS} , 0 concentration values are often correlated with high organic carbon content, i.e. high sedimentation sorption capacity.
- The highest registered values of available concentrations in sediment were Σ PAHs at locality D2 (250.22 μ g / kg), followed by Σ OPFRs at locality D3 (47.68 μ g / kg) and Σ OCPs at locality D6 (5.81 μ g / kg). Concentrations of Σ PCBs and Σ polycyclic musks were very low with the highest values recorded at locality D3 and D10, respectively.



Acknowledgements

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