

Sampling of suspended particulate matter and sediment in the framework of the German Environmental Specimen Bank (GESB)

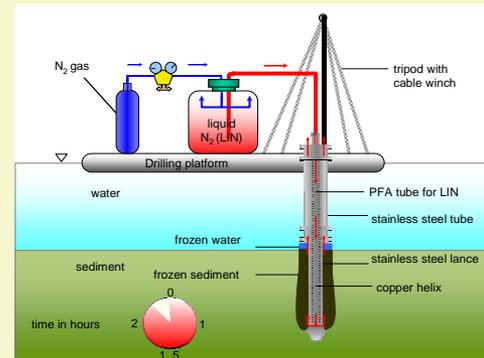
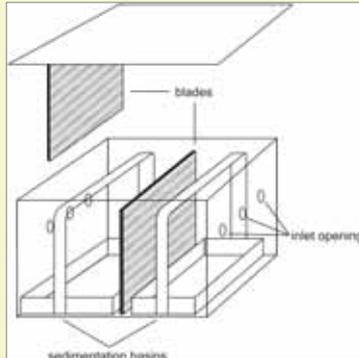
Mathias Ricking, Andreas Winkler and Asaf Pekdeger

Freie Universität Berlin, Dept. of Earth Sciences, Hydrogeology, Geochemistry and Mineralogy, Berlin, Germany

INTRODUCTION

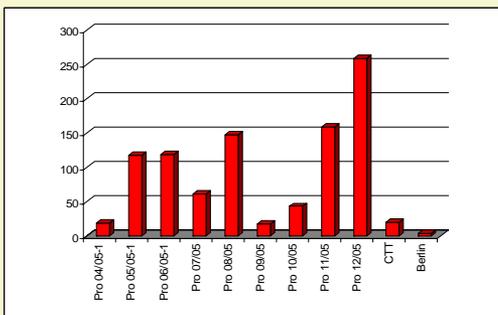
During 2002-2005 the initial tests and development of the sampling devices was realized. Since 2005, at 13-14 locations in selected rivers and lakes, monthly suspended particulate matter (SPM) samples and every 5-10 years, sediment cores are sampled on a routinely basis. These locations were chosen carefully to represent different contamination areas (rural and urban/industrial) within the drainage basin of the selected rivers and to give information on the degree of contamination of the aquatic ecosystem.

The SPM samples are taken continuously by means of a sedimentation box (SB) (see Figure 2) Inside the box the flow velocity is reduced and the SPM particles accumulate within the sedimentation basins. Sediment cores are taken by means of a stainless steel liquid nitrogen freeze-coring system for fine grained material with water contents of up to 90% or higher in the top segments of the cores.



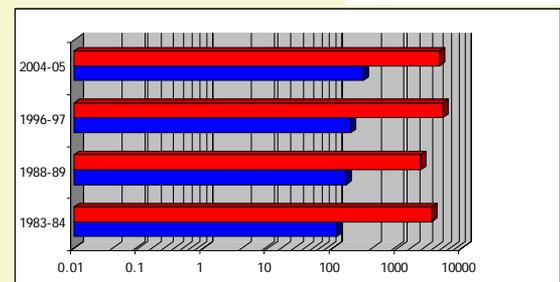
ONSITE CHARACTERISATION OF SUSPENDED PARTICULATE MATTER AND SEDIMENTS

Immediately after sampling SPM samples are characterized for color, odor, sulfides, carbonates, consistency/texture, biota and subsequently sieved < 2 mm after a 10 minutes homogenization. Subsequently the samples are frozen as ice cubes and stored at < -150°C. The sediment cores are characterized onsite for the same parameters, sliced into 20 – 40 cm segments and subsequently stored at < -150°C above liquid nitrogen. For processing strict standard operation procedures (SOPs) are developed and modified due to new experiences.



RESULTS

Figure 7 and 8 illustrate the suitability of the sampling methods for retrospective and actual monitoring. Figure 7 shows the monthly analysis of HCB in SPM samples from the site Prossen, even at high-flow conditions in spring 2005. The first months missing in figure 7 are due to a change in sampling location within the reach. Figure 8 shows the contamination chronology in a harbor on the Rhine River.



References

- Schulze, T., Ricking, M., Schröter-Kermani, C., Körner, A., Denner, H.-D., Weinfurtner, K., Winkler, A., Pekdeger, A. 2007. The German Environmental Specimen Bank. Sampling, processing, and archiving sediment and suspended particulate matter. *J. Soils Sediments* 7, 361-367.
- Ricking, M. 2009: Behavior of HCB in different solid phases – a case study on sediment and SPM samples of the ESB; ESRP in prep.