

New methods might drastically reduce the costs of investigating polluted sites

October 9 2012



This shows two employees of the UFZ in the study of groundwater, using direct push technology. This is one of several technologies that allow, in combination, contaminated sites to explore more effective and to save costs. Credit: Photo: André Künzelmann / UFZ

New methods might allow polluted sites to be investigated and monitored long term at significantly reduced costs. Authorities and those who have to remediate polluted sites in Europe might therefore be able to save costs and use these to treat other areas. This is the conclusion of the EU research project ModelPROBE, which was coordinated by the UFZ. The results, with which the scientists aimed to lower the workload of authorities and consultants, include a handbook detailing the methods for characterising contaminated sites and a freely-accessible e-learning course.

In order to detect [pollution](#) in the subsoil, until now for the most part samples of soil and [groundwater](#) have been taken. Pollution may only be detected, however, if the samples are taken at the optimum points and in a sufficiently dense measurement network. Their [accuracy](#) determines how well the pollution can be detected. The scientists have therefore worked on time-delayed geophysical [measurements](#) in order to improve the accuracy of the probing and also to record the effects of hydraulic changes and microbial activity. The ModelPROBE project also integrates new methods with which important information on pollution in the soil can be gained for example by analysing the vegetation. Based on these non-invasive site-investigation methods, the extent of the contamination and the heterogeneity of the subsoil are then localised. "Using direct push probes with linked geophysical and hydrological probing systems and combined with chemical, toxicological and isotope analyses, so-called hot spots are then monitored in order to determine the limits of and identify the contaminated area without fear of legal action," explains the project coordinator Prof. Matthias Kästner of the Helmholtz Centre for Environmental Research (UFZ). Biological processes such as pollutant decomposition and toxic effects at the site are monitored using passive samplers, biosensors and microcosms with subsequent isotope and biomarker analyses. Due to this complex monitoring process, scientists not only from the Environmental Biotechnology Department, but also from the Groundwater Remediation, Monitoring & Exploration Technologies, Bioanalytical Ecotoxicology and Isotope Biogeochemistry Departments were involved.

These methods were tested not only in Zeitz, but also by project partners in Italy, Norway and the Czech Republic. The aim was to gain a fresh insight into soil and subsoil contamination at different levels including integrated statistical analysis and modelling and to provide a solid foundation for future risk assessments and sustainable rehabilitation concepts.

More information: E-Learning:
modelprobedisseminationsystem.com/

Book: M. Kästner, M. Brackevelt, G. Döberl, G. Cassiani, M. Petrangeli Papini, C. Leven-Pfister & D. van Ree Eds (2012): MODEL-DRIVEN Soil probing, site assessment and evaluation – Guidance on technologies. ISBN 978-88-95814-72-8.

Provided by Helmholtz Association of German Research Centres

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