4.62.P15

A new method for the measurement of air/soil sorption of CFCs

M. HOFER[1], S. KLUMP[1], P. PREUSCHOFF[1] AND R. KIPFER[1,2]

[1] Department of Water Resources and Drinking Water, Swiss Federal Institute of Environmental Science and Technology (EAWAG), CH-8600 Duebendorf, Switzerland (hofer@eawag.ch)

[2] Department of Isotope Geology, Swiss Federal Institute of Technology (ETH), CH-8092 Zurich, Switzerland

For more than 20 years, chlorofluorocarbons (CFCs) have been used for dating purposes in groundwater studies. The time elapsed since the infiltration of groundwater can be obtained by comparing the CFC concentrations measured in water samples with historic atmospheric concentrations, assuming that the CFCs were in atmospheric equilibrium at the time of infiltration. However, in many groundwaters CFCs are highly supersaturated, which makes CFC dating impossible.

Apart from contamination as a result of industrial release, dumps and accidents or because of increased atmospheric concentrations in urban areas, the sorption of CFCs from the air on to soil has been proposed as a possible reason for this supersaturation [1].

To address this problem we developed a new vacuum extraction method which allows rapid and quantitative determination of the equilibrium concentrations of CFCs in dry or wet soils in contact with air. (The methods used to determine the CFC, argon and nitrogen concentrations themselves are those described by Hofer and Imboden [2].) A 15-cm long copper tube which can be sealed gas-tight is filled with 0.1 - 6 g of soil. The soil is made CFC- and water-free by baking in a vacuum at 100 °C. After cooling, known amounts of water and air are added to the soil sample and the copper tube is locked gas-tight. After air/soil equilibrium has been attained, the copper tube is divided into two sections using a clamp. In the first section, the CFC concentrations in the equilibrated air are measured. In the second section, the sum of the CFCs in the residual air and those sorbed on to the soil are measured. From these two measurements, the equilibrium concentrations can be calculated.

References

[1] Russell, A. D.; Thompson, G. M. (1983) *Water Resour. Res.* **19**, 57-60.

[2] Hofer, M.; Imboden, D. M. (1998) *Anal. Chem.* ***70***, 724-729.

4.62.P16

Integrated 3D visualization of GPR data and EM-61 data

S. KADIOGLU[1] AND J.J. DANIELS[2]

[1]Ankara Univ. Geoph. Eng. Dept., 06100 TURKEY

[2]The Ohio State Univ., Dept. of Geol. Sci. , OH 43210, USA

Abstract

This paper based on 3D interpretation of the GPR data and integration with EM-61 data in a 3D volume in order to determination of the metallic objects in the study area. The aim of the study is to show the importance of the 3D integrated visualization of the GPR data and the EM-61 data for monitoring the buried objects. If true data integration is done, active interpretation can become more successful.

Data Displaying and Interpretation

GPR method is a high frequency electromagnetic method [1]. The GPR data and EM-61 data were collected with parallel 2D profile lines. The lines were spaced 0.61m apart. There were 61 lines. Fig. 1. shows the interactive 3D GPR and EM-61 data and integrated with two data sets visualizations. Dark gray color indicates the metallic objects in figure. In Fig. 1.c., the light gray color shows the metallic objects (marker A), the dark gray color shows the non-metallic concrete area (marker B), the pale gray color indicates pure grassy soil area (marker C), and light white color composition indicates back filled area of the site.

Conclusion

True data integration is more important. Here GPR and EM-61 data were integrated to locate metallic objects sucsessfully.

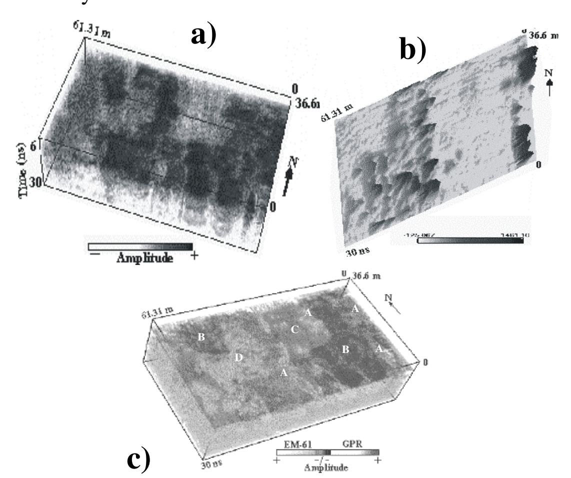

Figure 1. a) 3D block views of the GPR data, **b)** Half bird's eye view of the EM-61 data, **c)** Integrated 3D visualization of the GPR data and the EM-61 data

References

[1] Kadioglu, S. and Daniels, J. J. 2002, A Hybrid 2D/3D GPR Survey of Brownfield Site Along Lake Street in Chicago, Illinois (USA), Int. Conf. on Earth Sci. and Electronics-2002,TURKEY,Vol.2,P.255-26.