Geophysical Research Abstracts, Vol. 7, 09706, 2005
SRef-ID: 1607-7962/gra/EGU05-A-09706

1 NMR Imaging methods to study three-dimensional heavy metal distribution affected by uptake in a rhizobox system

A. Moradi[1], **S.E. Oswald**[2], **R. Schulin**[1], **and B. Nowack**[1]

[1]Institute of Terrestrial Ecology (ITÖ), ETH Zürich, Schlieren, Switzerland (ahmad.moradi@env.ethz.ch, schulin@env.ethz.ch, nowack@env.ethz.ch).

[2]Hydrogeology Department, UFZ Centre for Environmental Research, Theodor-Lieser-Strasse 4 D-06120, Halle/Saale, Germany (sascha.oswald@ufz.de)

Plant activities are affected by heavy metals dissolved in the rhizosphere and accumulated in plant biomass, sometimes as nutrients and sometimes as contaminants. A limitation to improve the understanding of soil-plant interactions is the poor experimental accessibility of processes in the rhizosphere. In this project we propose a combination of a non-destructive measurement technique, Nuclear Magnetic Resonance Imaging (NMRI), and a recently developed novel rhizobox system, to simulate a plant root system taking up heavy metals. The potential of different NMR methods will be discussed and the results of a preliminary study with different methods will be shown. The use of the new rhizobox technique will allow studying the micro scale distribution of such metals in the rhizosphere in relationship to a precisely recorded rooting geometry without interfering with transport, speciation, uptake or other processes. The geometry of the system is well-defined and additional data can be collected by the analysis of mini-suction samples and ion-sensitive electrodes. Altogether, the highly-resolved data sets of the dynamic changes in metal distribution in the rhizosphere could be used as basis for advanced numerical porous media modelling of reactive solute transport.