Underground gas storage: microbial processes and concepts for monitoring them

Speaker: ***Carsten Vogt***

Department of Isotope Biogeochemistry, Helmholtz-Centre for Environmental Research – UFZ, Leipzig, Germany

Contact: carsten.vogt@ufz.de

Co-authors: P. Bombach, H. Richnow

Underground storage of natural gas is widespread using former gas reservoirs, caverns or porous lime or sand stone layers. New interest in large-scale underground storage of energy has been sparked by the expanding renewable energy production worldwide. As hydrogen is a promising energy carrier produced from renewable energy production, the storage of hydrogen in such underground chambers may become economically important in future; hence, information regarding the risk assessment of underground hydrogen storage is needed. Generally, the underground storage of hydrogen can be negatively affected by its physical properties and (bio)chemical reactivity. Oxidation of hydrogen by microorganisms might be the most critical issue related to underground storage; hydrogen can be used by several ecophysiological different chemolithotrophic bacteria and archaea as electron donor, leading to hydrogen loss and production of e.g. methane, reduced sulfur compounds or acetic acid. The assessment and monitoring of potential reactions leading to loss of hydrogen during underground storage will be highly important for the social acceptance and technical safety of hydrogen underground storage. We will introduce and discuss the pros and cons of possible monitoring methods for detecting microbial processes related to hydrogen consumption at underground storage sites.