Geophysical Research Abstracts,
Vol. 10, EGU2008-A-03245, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-03245
EGU General Assembly 2008

Groundwater dynamics in flooded salt mines: an environmental isotope approach

S. Stadler (1), M. Frechen (1)

(1) Leibniz Institute for Applied Geosciences (GGA-Institute), Germany

Within the framework of the investigation of flooded former potash and rock salt mines of Stassfurt, Germany, the stability of the salt body and the overlying rock formations is investigated. Existing cavities or opening created by the dissolution of salt induce subsidence of the ground, which poses a serious challenge to planning land-use. The causes and risks of these subsidence processes are investigated in the framework of a multilateral BMBF-project between the GGA-Institute and BGR Hannover, BTU Cottbus, IHU Stendhal, K-UTEC Sondershausen, TUC Clausthal, WASY Berlin, JoGU Mainz, and IIF Leipzig of which the sub-project "isotope hydrology" is presented here. The aim of the presented sub-project is the characterization of groundwater movement using environmental isotopes (^{2}H, ^{18}O, ^{3}H, ^{3}He/^{4}He, ^{14}C, ^{34}S-SO_4, ^{18}O-SO_4, ^{86}Sr/^{87}Sr, CFCs/SF_6) and hydrochemistry. Beside the establishment of typical hydrochemical and isotope hydrological fingerprints of the individual aquifers, residence times of groundwater and mixing trends are characterized. In addition, hydraulic connections within as well as in- and outflow of water into the flooded mines are investigated to predict and assess potential instabilities and dissolution risks. We present the outline of the project, as well as first results of the ^{34}S-SO_4, ^{18}O-SO_4, ^{2}H, ^{18}O, ^{3}H, ^{3}He/^{4}He and hydrochemical investigations of the highly saline groundwater of electrical conductivities of up to 220 mS/cm.