Geophysical Research Abstracts
Vol. 12, EGU2010-12404, 2010
EGU General Assembly 2010

Multiparameter monitoring of a salt cavern collapse (Cerville-Buissoncourt site, France)

Xavier Daupley (1), Robert Fabriol (2), Isabelle Contrucci (1), Séverine Bernardie (2), Ngoc-Tuyen Cao (1), Philippe Jousset (2), Emmanuelle Klein (1), François Lebert (2), and Bazargan Behrooz (2)

(1) INERIS, DRS, Verneuil-en-Halatte, France (Xavier.Daupley@ineris.fr), (2) BRGM, Orléans, France

Since 2004, in the framework of GISOS (Scientific Interest Group on the Impact and Safety of Underground Structures), INERIS and BRGM participated in a monitoring experiment of a salt cavern located in the Lorrain salt basin, few kilometers away from Nancy (France). The site is located in the mining concession of Cerville Buissoncourt, owned by SOLVAY. The mining method used consists in extracting the full salt formation by solution mining until the collapse of the overburden. Thereby, the opportunity offered by this collapse was taken to test various monitoring techniques to detect its early warning signs and to improve scientific and technical knowledge of salt caverns mechanical behavior and evolution. Several geotechnical and geophysical methods have been further implemented on site in addition to the monitoring carried out by the operator, which are : microseismic, hydroacoustic, broadband seismology, surface measurements (tacheometer and RTK GPS), drilling extensometry, hydro-chemistry.
In early 2009, after several significant changes in the cavity behavior, and as it had reached its critical dimensions, the operator decided to trigger its collapse. For this, pumping operations in the cavern were carried out to reduce brine level and hydrostatic pressure that contributed previously to the cavern stability. These operations, conducted during 4 days, were monitored in real time. They led to the collapse of the cavity on February 13th, 2009. Comparative analysis of the measurements acquired by the several monitoring techniques allows describing in detail the different evolution stages of the cavity and the early warning signs of its collapse.