Geophysical Research Abstracts
Vol. 15, EGU2013-4844, 2013
EGU General Assembly 2013

EM Methods Applied for the Characterization and Monitoring of the Hontomin (Spain) CO_2 Storage Pilot Plant

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The work presented here correspond to an on-going project in the frame of the development of a pilot plant for CO_2 storage in a deep saline aquifer funded by Fundacio´n Ciudad de la Energi´a–CIUDEN (http://www.ciuden.es/) on behalf of the Spanish Government. The main objective of the research Project is to monitor the CO_2 migration within the reservoir during and after the injection as well as testing and evaluating different EM monitoring methods. In this way, a good characterization of the zone is imperative to perceive and quantify, as soon as possible, any change owing to the CO_2 injection. Among all geophysical techniques, electrical and electromagnetic methods are especially useful and meaningful to
monitor the CO_2 plume since these methods are sensitive to the electrical conductivity of the pore fluid. The presence of CO_2 inside the pore will replace a fraction of saline fluid within the storage aquifer, reducing the effective volume available for ionic transport. As a consequence, the bulk electrical resistivity of the rock is expected to increase significantly. The proposed EM techniques are the following: 1- Magnetotelluric method, 2-Cross-hole electrical resistivity tomography, 3- Control source electromagnetics. Moreover laboratory experiments are being carried out to monitor the CO_2 flux inside sample cores using ERT.