



Exploration and characterization of CO₂ storage sites using electromagnetics methods: results of 2D magnetotelluric study at El Hito (Cuenca), Spain.

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Integration of different geophysical, geological and geochemical methods will play a key role for the spatial and temporal characterization of underground CO₂ storage sites. Among the geophysical techniques electromagnetic methods may help on both, site characterization and monitoring of the CO₂ plume, mainly on deep saline reservoirs.

In this work we present the characterization of a deep saline aquifer in Spain using Magnetotelluric data. The target structure, El Hito anticlinal, is located south of Loranca Basin (in the eastern part of Tajo Basin, Central Spain). The longitudinal axis of the structure extends in a Northwest-Southeast direction, with 20 km length and 4 km width. The main reservoir, with a 100 m thickness, is located at 1400 m depth and the folds affect mainly the Mesozoic cover. However, geophysical data show that the basement below the Upper Triassic evaporitic facies (Keuper formation) is affected by structural highs.

In total 51 MT sites were acquired along three Southwest-Northeast profiles between 10 km and 24 Km length. The data were acquired in two different field surveys. In the first stage (March 2010) only one profile was acquired, the southern profile, with 16 stations. Once the data has been analyzed and inverted the second field survey (August 2010) was carried out with 35 station separated 0.5 km, ten of them completed the eastern part of the first profile and the rest distributed in other two lines. A remote reference station was placed 20 km away from the middle of the structure in both field surveys.

The 2-D electrical resistivity models, obtained from the data inversion in the period range 0.001 to 10 s, matches the geological units observed at El Hito-1 well-log. This is the only well in the area, and it is situated in the anticline core, in the center of the structure. The conditions of this structure as a future CO₂ reservoir would be determined integrating this electrical models with geological data.