



10 years of research and downhole experiments at the ICTJA-CSIC test site facilities: scientific boreholes and geophysical logging lab

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In 2007 a new basic infrastructure for borehole logging research was setup at the ICTJA-CSIC. Two scientific boreholes were drilled in 2011 at the University campus in Barcelona as part of the subsurface research infrastructure of the Institute of Earth Sciences Jaume Almera (ICTJA-CSIC) in cooperation with the Faculty of Geology of the University of Barcelona (UB). A third hole was drilled in 2017. Besides the equipped lab facilities 3 scientific boreholes are available and include open hole and PVC cased sections, air and water sections. Almera-1, Almera-2 and Almera-3 boreholes.

Almera-1 borehole is 214.20 m deep and is used as an experimental facility for geological research and also for the development of geophysical logging and monitoring research. A second borehole, Almera-2 was drilled 1 m away from Almera-1, reaching a depth of 46 m. This second borehole was conceived to carry out routine hydrogeological measurements and also crosshole experiments. In 2017 a third borehole was drilled down to 130 m for testing logging tool prototypes of relatively large diameter (8-16 cm).

The subsurface geology and structural picture interpreted from the drilling cores and drilling data has been completed with geophysical logging measurements, geophysical studies and monitoring results. The upper section of Almera-1 hole was cased with PVC after drilling and after the logging operations. An open hole interval was left from 112m to TD (Paleozoic section). Almera-2 drilling reached 46m and cased with PVC to 44m. Since their completion in 2011, both Almera-1 and Almera-2 have been extensively used for research purposes, tests, training, hydrological and geophysical monitoring.

A subsurface connection for cables and tools with the borehole and monitoring research lab inside the ICTJA building facilitate long term and continuous monitoring and control from the lab. The lab is equipped with a complete set of geophysical logging and imaging tools, borehole cameras and borehole monitoring data loggers that are used for downhole experiments and for testing of new tools in the frame of ongoing research projects.

These facilities are extensively used for university and professional training. A summary of results obtained in the last 10 years in cooperation with a large number of researchers is presented.

REFERENCES

Jurado, M.J., Salvany, J.M. Scientific drilling in the campus: Almera-1 borehole, unraveling urban subsurface geology in Barcelona (Spain). A: Congreso Geológico de España. "Geo-Temas (vol. 16)". Huelva: Sociedad Geológica de España (SGE), 2016, p. 617-620.

Teixidó, T., Jurado M.J. Tomografía sísmica vertical inversa 2.5D alrededor del sondeo científico Almera-1, ICTJA-CSIC, Barcelona. "Geo-Temas (vol. 16)". Huelva: Sociedad Geológica de España (SGE), 2016, p. 609-612