

Progress and challenges of electromagnetic exploration: four decades of research at the University of Barcelona

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SUMMARY

Over the last four decades, the University of Barcelona has been at the forefront of electromagnetic (EM) research. This article highlights the significant advances made by our team, marking the progress and challenges in both methodological development and practical application.

During this period, we have trained several generations of researchers many of whom are still active in MT or EM research at various universities and institutions worldwide. As a historical starting point, we emphasize the first publication and the acquisition of the first instrument in 1984 as a starting point.

We review our main contributions on geodynamics and tectonic contexts, including regional studies on the Iberian Peninsula (Pyrenees, Betics, Cantabrian ranges), the Atlas and the Canary Islands. Our first MT survey was conducted in the Pyrenees in the early 90's, within the framework of the ECORS project, after which new surveys were carried on as part of different competitive national and international projects. On a smaller scale, since the 2000's we have started to apply MT for reservoir characterization (CO₂ storage in Hontomín (Burgos) and for geothermal cases (in Mallorca, Canaries and Vallès fault in the Mediterranean coastal range) as well as for hydrogeophysics. Our methods for inversion and interpretation have evolved from 2D inversion to complex 3D modeling and inversion, also promoting tools for dimensionality and anisotropy analysis.

Finally, this review looks at the challenges that remain and the future research directions for our group, in the hope of continuing to make progress in this dynamic field.

Keywords: Pyrenees, Betics, Canary Island, reservoir characterization

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