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# Assessing the geothermal potential of Paleocene-Eocene formations in the Pau region: preliminary results from an integrated approach

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## Résumé

In response to current energy transition goals and the growing need for energy sovereignty, geothermal resource assessment has become a strategic priority in France. As part of this effort, a regional study is underway in the Pau area (SW France) to characterize the lithological, diagenetic, and petrophysical properties, as well as the geometry and spatial extent of three Paleocene–Eocene formations: the Lasseube Limestone, the Calcaires Repères, and the Infra-Molassic Sands.

Initially investigated by the gas industry, these formations present significant challenges for geothermal exploration due to their pronounced heterogeneity. This complexity arises from a combination of depositional variability, contrasting diagenetic states, and successive tectonic events that have affected the basin, both during and after sedimentation. Together, these factors reflect the multi-phase geological evolution of the North Pyrenean foreland basin and exert a strong influence on deep fluid flow. As such, integrating diverse datasets is essential for assessing the geothermal potential of formations shaped by such a complex basin history. Recent field campaigns, along with the analysis of core samples from nine wells in the Pau area, have enabled the first series of petrographic and petrophysical investigations. These initial results, combined with borehole data, 2D/3D seismic interpretations, and outcrop observations, provide valuable insights into the early Cenozoic tectono-sedimentary evolution of the region. They also shed light on the interplay between sedimentary facies, fracturing, and fluid flow behavior in the targeted formations, contributing to a more refined understanding of their heterogeneity.

**Mots-Clés:** Geothermal energy, Aquitaine basin, Paleocene, Eocene, Reservoir characterization

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