

## **Curie-depth point and geothermal gradient map of the Iberian Peninsula and its margins**

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The thermal structure of the Iberian Peninsula and surrounding offshore areas is the result of a long and complex geodynamic history. The distribution of temperature in depth is a combination of past and present processes such as, collisions, thickening and subsequent thinning of the crust or subduction. Furthermore, the thermal structure is dependent on petrology, radiogenic heat production and thermal conductivity of the layers, hindering its understanding.

In this context, we have computed a complete map of the Curie-Depth Point (CDP) from a compilation of aeromagnetic data, which accounts for the depth at which ferromagnetic minerals reach their Curie temperature (580°C for magnetite) and become paramagnetic. The final magnetized layer thickness appears on the range of 13 km to 27 km. As expected, this isotherm is shallow in offshore zones, where the crust is thinner while in continental areas, the CDP appears deeper. We have compared our results with a Moho depth map of the same area. Offshore, the CDP is usually located beneath the Moho which may imply a magnetic upper mantle, partly formed by serpentinites that might have played an important role in the evolution of some areas like the Western Mediterranean. On the contrary, for continental areas the CDP is located above the Moho, with NW Iberia featuring the deepest CDP values. We correlate these values with the late orogenic Variscan evolution that led to crustal thinning and intense thermal metamorphism that melted and re-equilibrated the crust. Finally, we have derived a complete map of the thermal gradient of the Iberian Peninsula and offshore areas.