High-resolution gravimetric and magnetic map of the Salamanca Magnetic Anomaly (Spain)

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Résumé

The Salamanca Magnetic Anomaly (SAMA) is a reverse polarity magnetic anomaly that was revealed for the first time in the aeromagnetic map of the Iberian Peninsula in the 80's. The SAMA features a maximum amplitude of 56,1 nT but later acquired gravimetric and magnetic ground data, do not show a correlation with an outcropping source, as the maxima are randomly distributed and do not group with a precise lithology. Since the aeromagnetic map lacks resolution and preliminary magnetic ground data does not show a good correspondence with it, we have undertaken a larger magnetic survey that includes gravity measurements to discern the density of the magnetic rocks and to discriminate between the main lithologies of the area. The study area extends 45 km to the south of the city of Salamanca. There, major NE-SW oriented faults put into contact Neoproterozoic and Paleozoic rocks of the Iberian Massif with Cenozoic sedimentary rocks of the Duero basin. In addition, the Variscan Salamanca Detachment Zone allowed that deep rocks and crustal melt products reached shallow crustal levels in a process that might be related with the sparse Sn-W mineralization existing in the area. Altogether, high-resolution gravity and magnetic maps are capable of distinguishing rocks with different densities at depth (dense rocks like slates and some igneous rocks with respect lighter rocks, like pegmatite, quarzite and Cenozoic terrigenous rocks), shedding light on the tectonic context of the mineralization and the origin of the magnetic maxima. Integration with previous data will provide very valuable information to establish the geometry and depth of the source of the SAMA and will allow to improve the knowledge of the evolution of the latest stages of the Variscan orogeny. This research was supported by: *JCyL* and *FEDER* (ref. SA084P20), *Fundación Memoria de D. Samuel Solórzano Barruso* (FS3-2021, USal), Grant PID2020-117332GB-C21 funded by MCIN/AEI/10.13039/501100011033 and TED2021-130440B-I00 (Spanish government), *Ayuda para la recualificación de sistema universitario español 2021-2023* (USal).

Mots-Clés: Salamanca magnetic and gravimetric map, Salamanca Magnetic Anomaly, Duero Cenozoic basin

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