



High-resolution magnetic and gravimetric map of the South of Salamanca (Spain): tectonic insights and implications on Sn-W mineralization

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Within the Iberian Peninsula and specifically in the Iberian Massif (the westernmost outcrop of the Variscan orogen in Europe), several aeromagnetic anomalies stand out, and many of them are related to late-Variscan gneiss domes. However, some of them are not fully understood because: 1) they are not clearly linked to extensional structures and/or gneiss domes, 2) they are not related with the outcropping rocks, and/or 3) the aeromagnetic map does not provide enough resolution to relate them with the local geology. For example, the Salamanca Magnetic Anomaly (SAMA), in the central-western part of Spain, is a conspicuous reverse polarity magnetic anomaly that features a maximum amplitude of 56.1 nT. However, it does not show any relationship with the magnetic properties of outcropping rocks. In this regard, preliminary studies show that the outcropping Ordovician Slates present randomly reverse polarity Natural Remanent Magnetization which is compatible with that of the SAMA but with very low intensity. Therefore, we have undertaken a large magnetic survey of this anomaly and its continuation to the south. Gravity has also been measured in an effort to constrain the source of the SAMA. The study area, which extends to the south of the city of Salamanca is affected by the Alba-Villoria NE-SW oriented Alpine fault that puts into contact Neoproterozoic and Paleozoic rocks of the Iberian Massif with Cenozoic sedimentary rocks. In addition, the Variscan Salamanca Detachment Zone, a late-Variscan extensional structure allowed deep rocks and crustal melt products to reach shallow crustal levels, probably easing Sn-W mineralization in the area. Our new Bouguer and magnetic anomaly data depict the Alba-Villoria Fault and show a straightforward correlation between gravity and magnetic maxima. Although the magnetic maxima could be the potential field response of dense and magnetic slates common in the area, the ones measured do not present high magnetic susceptibility. Accordingly, this new data might indicate that late-Variscan extension triggered the intrusion of dense and magnetic basic rocks in a process that could have contributed to Sn-W mineralization.

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