

All is not lost! Remagnetizations during vertical axis rotations with “Iberico” flavor

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Remagnetizations are ubiquitous in Earth's orogens. Remagnetized rocks have suffered a set of geologic processes acting alone or in concert capable to erase and overprint the original natural remanent magnetization. Although many times disregarded because of the information loss -the rock record before the orogenesis cannot be recovered-, remagnetized rocks can be excellent to unravel structural, orogenic and plate kinematics if studied properly.

The winding Variscan belt in Iberia, featuring the Cantabrian orocline (NW Iberia) and the Central Iberian curve, is a foremost expression of the late Carboniferous amalgamation of Pangea, which produced remagnetizations spanning almost the entire globe. Also in Iberia, late Carboniferous remagnetizations are widespread often hindering paleomagnetic interpretations in terms of pre-Pangean geologic history. In contrast, such remagnetizations facilitated the kinematic study of the Cantabrian orocline. Immediately to its south is located the Central Iberian curve whose geometry and kinematics are under debate. Recent studies suggest that this putative structure cannot have formed in the same process as the Cantabrian orocline.

Here we present a paleomagnetic and rock magnetic study from Paleozoic rocks from the southern limb of the Cantabrian Orocline and the Pyrenees. Our new results show two distinct remagnetization events in these Paleozoic rocks: (1) Mesozoic or Cenozoic remagnetization and (2) late Carboniferous-Early Permian remagnetization characterized by consistent shallow inclinations, but largely scattered declinations indicating a counter clockwise (CCW) vertical axis rotation. We identified pyrrhotite as magnetic carrier in limestones at both times of remagnetization.

We interpret the declination scattering as a remagnetization coeval to the vertical axis rotation. The described CCW rotations are those expected for the southern limb of the Cantabrian orocline and are in disagreement with a late Carboniferous secondary origin for the Central Iberian bend, extending the Cantabrian orocline to at least most of the Iberian Peninsula.

References:

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