Geometrical and chronological constraints for magnetic signatures in the Central High Atlas

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New residual magnetic map is presented to help decipher the magnetic imprints in the Central High Atlas (CHA) fold-and-thrust belt. The total intensity map shows a main direction mimicking the N070 trend which features the Atlas range. Detailed structural and paleomagnetic studies performed in the selected area demonstrate that similar shortening figures are observed in western and eastern portions. Differences in structural style are the consequence of (i) the inherited structure from the Triassic-Jurassic rifting stage, to Cenozoic inversion, (ii) the differential displacement through the Upper Triassic detachment level and (iii) superposition of cover thrust sheets.

Remarkable magnetic anomalies are recorded, from negative values (<-400 nT) in the southern foreland, to positive (>500 nT) in the core of the range. The western sector of the chain is defined by intermediate to high anomalies, probably related to NE-SW basement structures, which favored the emplacement of Triassic CAMP basalts and/or Jurassic gabbro bodies, within the syn-rift sequence. The central part of the range is characterized by high and very high positive anomalies with an irregular distribution, probably linked to Middle-Late Jurassic diapirism produced during extension and intrusion of gabbroid bodies at the core of diapirs, whose structure nucleated NE-SW anticlinal ridges. The eastern sector is characterized by intermediate to low intensity anomalies, likely associated to thick series of basinal Jurassic limestones, whose sequences were stacked (during the Cenozoic compressional stage) by means of kilometer-scale thrusts. Very high positive, linear anomalies seem to be related to Jurassic gabbro intruding directly into the carbonate facies in the eastern sector. Widespread negative anomalies are detected in the foreland southern basin. In this case, the remanent signature could be related to the Paleozoic magmatic provinces.
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