Contribution of magnetic fabric to the knowledge of Mesozoic and Cenozoic kinematic evolution in the Central High Atlas

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Magnetic fabric has become a first-order tool for the study of the evolution of inverted sedimentary basins, as has been demonstrated in the last decade (García-Lasanta et al. 2018 and references therein). Its application is based on its broad and reliable applicability to characterize the structural context of a region where structural markers are often punctually located or scarce. Determining the contribution of basinal (extensional) and compressional (inversion) deformation to the total magnetic fabric is a major issue in understanding the internal deformation underwent by the basin fill.

The main goal of this work is to integrate the available data of anisotropy of magnetic susceptibility (AMS) performed during the last ten years in the Mesozoic series of the Central High Atlas. It has a total of 645 sites (7477 standard specimens), 484 of them (5657 standard specimens) are measured in the framework of the actual CGL2016-77560-C2-P research project (Spanish Ministry of Science and Innovation), and it has been integrated with 161 sites (1820 standard specimens) obtained in the precedent research projects (CGL2012-38481, CGL2009-08969 and CGL2009-10840). Samples were measured in a KLY3-S Kappabridge (AGICO) susceptometer at the Zaragoza University. Magnetic subfabric analysis were also done (AMS-LT and AARM) for representative selected sites, that allow us to identify anomalous fabrics. Magnetic carriers were determined by carrying out temperature-dependent susceptibility curves (from 40 to 700°C) combining the susceptibility bridge with a CS-3 furnace, an also by means of the acquisition curves of isothermal remanent magnetization (IRM), backfield curves and hysteresis loops using a
variable field translation balance MMVFTB at the Paleomagnetic Laboratory of the Burgos University. Rock magnetic experiments indicate the presence of paramagnetic behavior in most samples, the presence of magnetite as main ferromagnetic contribution, and of hematite in the red beds.

The application of the ASM has made it possible to obtain data of well-defined foliations and magnetic lines from the analysis of a large number of samples, and therefore representative of the Mesozoic rocks that emerge in the High Central Atlas. Viewing the data as a whole, magnetic ellipsoids can be divided into three main types depending on the orientation of the main axes, and can be related with the kinematic evolution of the Central High Atlas: 1) $k_{\text{min}}$ normal to bedding and sub-horizontal $k_{\text{max}}$ with a NW-SE main maximum, which is mainly associated with gentle synclines and can be related to Mesozoic extensional tectonic; 2) $k_{\text{int}}$ normal to bedding and sub-horizontal $k_{\text{max}}$ with a NE-SW main maximum, which can be interpreted as modified by compressional tectonics; 3) $k_{\text{max}}$ normal to bedding, which are located near thrust planes or near the core of narrow and tight anticlines and can be interpreted as related with transport direction or salt tectonics and re-tightening of structures. The predominance of one or another type of fabric varies spatially; so that in the Western and Eastern sectors type 1 fabric dominates (more than 60% of the samples), whereas in the central sector this percentage decreases to 48% of the samples.