Geophysical Research Abstracts
Vol. 19, EGU2017-19018, 2017
EGU General Assembly 2017


# Magnetic fabrics in tectonically inverted sedimentary basins: a review

Cristina García-Lasanta (1), Teresa Román-Berdiel (1), Antonio Casas-Sainz (1), Belén Oliva-Urcia (2), Ruth Soto (3), and Esther Izquierdo-Llavall (4)

(1) Departamento de Ciencias de la Tierra, Universidad de Zaragoza, Zaragoza, Spain (lasanta@unizar.es), (2) Departamento de Geología y Geoquímica, Unviersidad Autónoma de Madrid, Spain (belen.oliva@uam.es), (3) Instituto Geológico y Minero de España, Zaragoza, Spain (r.soto@igme.es), (4) Departament de Geodinàmica i Geofísica, Universitat de Barcelona, Spain (esther.izquierdo@ub.edu)

Magnetic fabric studies in sedimentary rocks were firstly focused on strongly deformed tectonic contexts, such as fold-and-thrust belts. As measurement techniques were improved by the introduction of high-resolution equipments (e.g. KLY3-S and more recent Kappabridge susceptometers from AGICO Inc., Czech Republic), more complex tectonic contexts could be subjected to anisotropy of magnetic susceptibility (AMS) analyses in order to describe the relationship between tectonic conditions and the orientation and shape of the resultant magnetic ellipsoids.

One of the most common complex tectonic frames involving deformed sedimentary rocks are inverted extensional basins. In the last decade, multiple AMS studies revealed that the magnetic fabric associated with the extensional stage (i.e. a primary magnetic fabric) can be preserved despite the occurrence of subsequent deformational processes. In these cases, magnetic fabrics may provide valuable information about the geometry and kinematics of the extensional episode (i.e. magnetic ellipsoids with their minimum susceptibility axis oriented perpendicular to the deposit plane and magnetic lineation oriented parallel to the extension direction). On the other hand, several of these studies have also determined how the subsequent compressional stage can modify the primary extensional fabric in some cases, particularly in areas subjected to more intense deformation (with development of compression-related cleavage).

In this contribution we present a compilation of AMS studies developed in sedimentary basins that underwent different degree of tectonic inversion during their history, in order to describe the relationship of this degree of deformation and the degree of imprint that tectonic conditions have in the previous magnetic ellipsoid (primary extension-related geometry). The inverted basins included in this synthesis are located in the Iberian Peninsula and show: i) weak deformation (W Castilian Branch and Maestrazgo basin, Iberian Range); ii) transport along the hangingwall of thrusts with very slight internal deformation (Organyà basin, Central Pyrenees); iii) record of incipient compressive strain and foliation development (Cabuerniga basin, Basque-Cantabrian Basin; Lusitanian basin, W Portugal); iv) complete inversion associated with a remarkable transport along the hangingwall of thrusts and relatively large internal deformation (Cameros basin, Iberian Range); and v) major folding and flattening linked to foliation (Mauléon basin, Northern Pyrenees; Nogueres unit, Pyrenean Axial Zone).