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Application of the paleomagnetism analysis in the kinematics characterization of salt diapirs: the Bicorb-Quesa salt diapir case (Prebetic Zone, SE Spain)

M. Rubinat (1), E. Roca (1), B. Beamud (2), and R. Soto (3)

(1) Geomodels, Departament de Geodinàmica i Geofísica, Universitat de Barcelona, (2) Paleomagnetic Laboratory (UB-CSIC), Institute of Earth Sciences "Jaume Almera", (3) IGME Zaragoza

The rheology and properties of evaporites and salt rocks play a major role controlling the deformation of salt-related structures. Most evaporites present a visco-elastic behaviour that usually causes high complex 3D salt structures with also complex kinematic histories that can be associated with horizontal, vertical and/or inclined-axis rotations. Paleomagnetism is able to detect rotations but it has not been extensively used on salt tectonics mainly due to the bad magnetic behaviour of salt rocks and evaporites and the high complexity of the internal architecture of determined diapiric bodies.

In this setting, the salt diapirs of the Prebetic Zone in SE Spain, specifically the Bicorb-Quesa and Navarrés ones, fulfilled the characteristics that make them ideal candidates to carry out a pilot study and decipher the utility of the paleomagnetism in the kinematic characterization of salt-related structures. They are good outcropping diapirs with a relative simple internal diapir structure and present red mudstones interbedded within their Triassic evaporitic rocks suitable for paleomagnetic analysis. Moreover, the paleomagnetic analysis was also done in the adjacent syn-diapiric halokinetic continental successions to constrain the kinematics of the overburden. Under these favorable conditions, the paleomagnetic study detected the presence of vertical-axis rotations that together with a description of the internal structure of the diapirs allowed us to constrain the kinematics of the Bicorb-Quesa and Navarrés salt diapirs. This work denotes that paleomagnetism can be considered as a powerful technique to improve our understanding on the kinematics of salt-related structures.