From salt diapirs to strike-slip tectonic push-up structures: outcropping examples from the Triassic evaporites of the Betic Cordillera (southeast Spain)

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Triassic units belonging to the External Zones (South-Iberian paleomargin) of the Betic Cordillera (south Spain) enclose thick formations of evaporites including large volumes of salt, among other carbonated and detrital formations, all of them deposited in a fluvial-coastal and epicontinental marine context. This evaporite rocks are involved in a large number of structures that classically has been interpreted as salt diapirs that intruded deep Mesozoic and Cenozoic marine sediments along diverse periods.

Nevertheless, Triassic evaporites appear abundantly in outcrops that are not typical cartographic diapir shapes but having a close relationship with tectonic structures. The role of the tectonics as determinant of the nucleation of diapirs is well known in the literature, particularly in extensional and compressive contexts, but the behavior of evaporites along structures that accommodate large amounts of strain, v. g. main strike-slip faults, is less known.

South-Iberian paleomargin shows diverse scenarios with an increasing sediment thickness towards the southeast. This situation gives rise to a variety of evaporite outcrops, consequence of the combination of the different factors that controlled the deformation. This work tries to elucidate, at least, part of the deformational history from the analysis of the rock fabrics and minor and mayor structures of several Triassic outcrops, situated in the Prebetic and Subbetic domains in Albacete-Murcia provinces.

Typical diapirs are well-preserved in the most external domain (Prebetic), with elliptical or circular Triassic outcrops, and subvertical dipping of surrounding post-Triassic units, that are indicative of a predominately salt driven emplacement, with minor tectonic structures. On the other hand, Triassic related to Subbetic units appear as bands with a complex structural pattern, and show penetrative planar or plane-lineal fabrics, together with other minor structures as stretching lineation, pressure shadows, gypsum fibers, etc., according with the regional kinematics. Between both types, intermediate deformed diapirs with elongated shapes occur near of key structures, as large strike-slip faults. In these outcrops that reach an aspect ratio up to 12:1, penetrative deformation is only present in the borders with a strain gradient towards the main fault.

We conclude that in a preliminary analysis, typical (salt driven) diapirs, tectonic shaped diapirs, or sheared evaporite units, are the end-members of a classification that could help to understand the importance of the evaporites in the configuration of the Betic-Rif orogen, in which transcurrent tectonics has a fundamental role.

Acknowledgment: This research is supported by the project YETRIDEF-IEG-2009 from “Instituto de Estudios Giennenses” and by the Junta de Andalucía research groups RNM 325 and RNM 370.