Geophysical Research Abstracts
Vol. 20, EGU2018-2576, 2018
EGU General Assembly 2018

Analogue modelling of a salt ridge formation and its reactivation in transpression Case Study: the Labaeid-Sbibba-Trozza lineament fracture zone, Central Tunisia

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Abstarct
We used analogue modelling to investigate the effect of early halokinetic movements on the later structural evolution of a major tectonic corridor located in central Tunisia, the Labaeid-Trozza (Labaeid being a monocline related to the Sbiba reverse fault trending E-W and Trozza structure trending NE-SW), all two connected together. This structural domain, which contains Upper Triassic mobile evaporites, was first subjected to a N-S Tethyan extensional phase, during the early Cretaceous. This extensional phase led to the formation of two grabens and the associated reactive rise of two underlying salt ridges beneath the post-Triassic in both the Labaeid and Trozza areas. The region was later affected by a NW-SE compressional regime during the Late Cretaceous and Atlassic phases. The presence of the salt ridges has greatly affected the local tectonic response. (1) The Labaeid-Sbiba structure was reactivated in right-lateral transpression, whereas, (2) the Trozza structures was reactivated in frontal compression. In our study area, the salt ridges that had formed during the Early Cretaceous period along the Labaeid-Trozza fault corridor were both reactivated during the youngest compressional phases (Paleocene to Villafranchian, especially during the Tortonian). We conducted a series of analogue models comprising a basal ductile, viscous layer of silicone, analogue to the evaporitic late-Triassic series. Our investigation has allowed us to propose that the present lineament fracture zones of the Labaeid and Trozza were early salt ridges formed during the Lower Cretaceous due to extensional regime, and that continued to grow passively under the effect of sediments supply. During the NW-trending compressional phase the salt ridges have been squeezed by transpressional (Labaeid-Sbiba), or purely compressional (Trozza) movements, and the some of the salt material was locally expelled up to the surface, leaving some local, discontinued relicts of Triassic evaporitic rocks cropping out along the master faults, as it is observed in the field along both structures.