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A classic example of salt diapir rise and fall: the Rohia trough (Central Tunisia) – Analogue modeling constrained by natural data (seismic and borehole data)

Rim Zidi (1,3), Bruno C Vendeville (2), Ophélie Korczak (2), and Mohamed Ghanmi (1)

(1) University Tunis El Manar , Faculty of sciences of Tunis, Geological department , Tunisia (rimzidi1@outlook.com), (2) Univ. Lille, CNRS, Univ. Littoral Côte d'Opale, UMR 8187, LOG, Laboratoire d'Océanologie et de Géosciences, F 59000 Lille, France , (3) Entreprise Tunisienne d'Activités pétrolières (ETAP), Tunis, Tunisie

Abstract
We used an analogue modelling approach to investigate the effect of halokinetic movements on the genesis of the NW-SE-trending Rohia trough that belongs to the central Atlassic structural domain in Central Tunisia. This area is characterized by NW-SE-trending tectonic troughs and by NE-SW-trending folds. According to seismic data, the viscous, Triassic material in our study area is at an abnormally high stratigraphic position, close to the subsurface, and has the shape of diapiric intrusion beneath the NW-SE-trending Rohia rift system. Furthermore, according to borehole data, the Rohia trough shows a significant stratigraphic gap covering the Upper cretaceous-Paleocene, where these series are either absent or much thinner than outside the trough. Indeed, the younger Eocene layers were deposited unconformably onto the Aptian strata, and, this time, are much thicker within the trough than above its shoulders. We used analogue models in order to reproduce the evolution of the Triassic evaporitic material and its brittle, post-Triassic overburden. Models comprised a basal layer of viscous silicone polymer (representing the Triassic evaporites), and layers of dry quartz sand analogue of the post-Triassic deposits. Results of our analogue modeling, combined with natural data allow us to delineate the evolution of the Rohia trough time. The Rohia trough formed and grew as a NW-SE-trending extensional structure during the Tethyan extension and the Upper Cretaceous extension, which allowed (1) for reactive diapirism to occur and the Triassic evaporites to rise and (2) for only thin sediments to be deposited above the diapir's rising crest. By contrast, during the extensional Paleogene extensional phase (Oligocene), during which the salt's source layer had been thinned, extension caused the salt ridge to fall, thus allowing for thick amounts of Cenozoic sediments to be deposited.