Geophysical Research Abstracts
Vol. 16, EGU2014-7274, 2014
EGU General Assembly 2014

Thin-skinned salt tectonics as a response to crustal movements in a recent convergent setting

Bruno Vendeville (1), Virginie Gaullier (1), Jacques Deverchere (2), and Françoise Sage (3)

(1) Université de Lille 1, Sciences de la Terre, Villeneuve d'Ascq cedex, France (bruno.vendeville@univ-lille1.fr), (2) UMR 6538, Université de Bretagne Occidentale, Technopôle Brest-Iroise - Place Nicolas Copernic, F-29280 Plouzané - FRANCE, (3) UMR 7329 - GéoAzur, University of Paris 6, Valbonne, France

Published data from the seismic survey "MARADJA 1" conducted in August and September 2003 offshore the Algerian coast have imaged the Messinian salt response to tectonic activity within the basement. This helps to understand how the vertical movements of basement blocks have been recorded by thin-skinned salt tectonics. The area is undergoing crustal convergence, as attested by the Boumerdes earthquake (magnitude 6.8), which happened in 2003.

The seismic data have revealed the presence of an elevated plateau, forming a 3D promontory restricted to the area offshore Algiers and is absent west and east of that area. The promontory is likely related to the contractional reactivation of the margin, as was recorded by subsalt thrusts mapped by Domzig et al. (2006). The data provided additional information on the deformation of the Messinian mobile evaporite unit and its Plio-Quaternary overburden. Margin-perpendicular profiles show mostly compressional features (anticlines and synclines) that had little or no activity during Messinian times. By contrast, margin-parallel profiles clearly show that extensional, reactive salt diapiric ridges formed early, as early as the time of deposition of the Messinian Upper Unit, as recorded by fan-shaped strata. These ridges have recorded E-W, thin-skinned gravity gliding above the Messinian salt, as a response to the rise of the basement plateau. We tested this hypothesis using analogue models. Indeed, the rise of the plateau generated preferential E-W extension above the salt, rather than N-S, which was prevented by the compressional regional tectonic stresses related to the convergence of the African and European plates.