Geophysical Research Abstracts
Vol. 21, EGU2019-16708, 2019
EGU General Assembly 2019

Contractional salt tectonics in the Southern Pyrenees: the Mediano Anticline and Clamosa Dome diapir

Pablo Santolaria (1), Núria Carrera (1), Craig L. Schneider (2), Josep Anton Muñoz (1), and Pau Arbués (1)

(1) University of Barcelona, GEOMODELS Research Institute, Spain (pablo.santolaria.otin@gmail.com), (2) ConocoPhillips, USA

Located in the Southern Pyrenees, the Mediano Anticline and Clamosa Dome diapir represent part of a set of salt structures that developed all along the footwall of the Montsec thrust. These salt structures are parallel to the most prominent thrust salient in the entire Pyrenees as defined by the Montsec thrust and the structures in the Gavarnie-Sierras Exteriores thrust sheet where they are located. The Mediano anticline is a detachment fold cored by up to 3 km of Triassic evaporites and shales (a highly mobile unit that represent the regional detachment of the Pyrenees). It is one of the NNW-SSE to N-S trending folds at the western part of the thrust salient. Paleomagnetic and structural studies have revealed that these folds first developed slightly oblique to the Pyrenean main E-W trend and then they underwent syn-folding to post-folding clockwise vertical axis rotations during Eocene to Oligocene times. In its turn, the Clamosa Dome diapir features a roughly triangle-shaped outcrop of Triassic evaporites and shales that exceeds about twice the wavelength of the Mediano Anticline. Bounding units include 0.5-2 km wide blocks of the pre-growth sequence (Jurassic and Upper Cretaceous to Cuisian), syn folding-diapirism sequences (Lutetian to Bartonian) and Priabonian to Oligocene fluvial to alluvial deposits.

This study aims to characterize the 3D geometry of the area to finally propose a structural model relating the development of the Mediano anticline with the Clamosa Dome diapir in the footwall of the Montsec thrust. The proposed model adds some hints into the comprehension of salt tectonics in purely contractional scenarios and goes a step forwards into the understanding of salt evacuation processes in this area of the Pyrenees.

Based on a detailed geological map, densely populated with dip data (among other observations) together with the interpretation of adjacent, available seismic lines (time-to-depth converted and tied to exploration wells), we have constructed series of regional to local cross-sections which set the foundation of a preliminary 3D model.

Our results show that: i) despite Mediano Anticline and Clamosa Dome diapir shared a common regional evolution, further diapirism in Clamosa has overprinted the contractional folded geometry, changing, for example, the trend of growth sequences, ii) the eastern boundary of the Clamosa Dome diapir is represented by a reactivated Montsec thrust and related splays, iii) extension associated with vertical-axis rotation triggered the formation and reactivation of inherited faults favouring further diapirism.

The proposed kinematic model suggests the occurrence of a pre-folding salt inflated area in the footwall of the Montsec thrust at its late stages of emplacement (∼Cuisian), a peak of salt accumulation during folding together with crestal extension (Lutetian) and a final slight collapse of the diapir (Oligocene).