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## **Subsidence discrepancy in the Valencia Trough revealed from reflection seismic observations and backstripping results**

**Penggao Fang**<sup>1</sup>, Geoffroy Mohn<sup>2</sup>, Julie Tugend<sup>3</sup>, and Nick Kusznir<sup>4</sup>

<sup>1</sup>Zhejiang University, School of Earth Science, Hangzhou, China (pgfang@126.com)

<sup>2</sup>Department of Geosciences and Environmental Sciences, Université de Cergy-Pontoise, Cergy-Pontoise, France

(geoffroy.mohn@u-cergy.fr)

<sup>3</sup>Sorbonne Université, CNRS-INSU, Institut des Sciences de la Terre Paris (ISTEP), UMR 7193, France (julie.tugend@sorbonne-universite.fr)

<sup>4</sup>Department of Earth and Ocean Sciences, University of Liverpool, Liverpool, UK (N.Kusznir@liverpool.ac.uk)

The Valencia Trough is commonly included as part of the set of western Mediterranean Cenozoic extensional basins that formed in relation with the Tethyan oceanic slab rollback during the latest Oligocene to early Miocene. It lies in a complex tectonic setting between the Gulf of Lions to the North-West, the Catalan Coastal Range and the Iberian chain to the West, the Balearic promontory to the East and the Betic orogenic system to the South. This rifting period is coeval with or directly followed by the development of the external Betics fold and thrust belts at the southern tip of the Valencia Trough. Recent investigations suggest that the Valencia Trough is segmented into two main domains exhibiting different geological and geophysical characteristics between its northeastern and southwestern parts. The presence of numerous Cenozoic normal faults and the well-studied subsidence pattern evolution of the NE part of the Valencia Trough suggest that it mainly formed coevally with the rifting of Gulf of Lion. However, if a significant post-Oligocene subsidence is also evidenced in its SW part; fewer Cenozoic rift structures are observed suggesting that the subsidence pattern likely results from the interference of different processes.

In this presentation, we quantify the post-Oligocene subsidence history of the SW part of the Valencia Trough with the aim of evaluating the potential mechanisms explaining this apparent subsidence discrepancy. We analyzed the spatial and temporal distribution of the post-Oligocene subsidence using the interpretation of a dense grid of high-quality multi-channel seismic profiles, also integrating drill-hole results and velocity information from expanding spread profiles (ESP). We used the mapping of the main unconformities, especially the so-called Oligocene unconformity, to perform a 3D flexural backstripping, which permits the prediction of the post-Oligocene water-loaded subsidence. Our results confirm that the post-Oligocene subsidence of the SW part of the Valencia Trough cannot be explained by the rifting of the Gulf of Lions. Previous works already showed that the extreme crustal thinning observed to the SW is related to a previous Mesozoic rift event. Here, we further highlight that if few Cenozoic extensional structures are observed, they can be interpreted as gravitational features rooting at the regionally identified Upper Triassic evaporite level. Backstripping results combined with the mapping of the first

sediments deposited on top of the Oligocene unconformity show that they are largely controlled by the shape of Betic front with a possible additional effect of preserved Mesozoic structures. At larger scale, we compare the mechanisms accounting for the origin and subsidence at the SW part of the Valencia Trough with those responsible for the subsidence of its NE part and the Gulf of Lions.