



## **Impact of the Messinian subsalt morphology on the structural evolution of salt tectonics off the Gulf of Lions, Western Mediterranean**

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The young Messinian salt offshore the Gulf of Lions is a shallow décollement layer sandwiched between deep-water marine sequences. In such a context, the interpretation of about 30.000 km of closely-spaced multichannel seismic reflection profiles clearly depicted the subsalt relief, showing that salt tectonics off the Gulf of Lions was driven by an essentially autochthonous salt mass. Seismic interpretation shows as well, that the gravitational kinematics was affected by the Messinian paleogeography. At regional scale, the Messinian subsalt relief reveals a complex morphology marked by either conical (divergent) or concave (convergent) shapes of subsalt morphology. This basin shape triggered a mechanism of radial gravitational gliding. Radial gliding is illustrated by the Messinian salt isopach map and is also reflected by both secondary normal fault families related to strike-parallel extension, and by salt-cored compressional folds related to layer-parallel shortening. At smaller local, subsalt morphology is particularly affected by residual relief formed by both tectonic and sedimentary processes related to the Messinian event. Basement transfer zones (e.g. the Catalan and the Rascasse basement transfer zones) form basement steps that impacted subsalt relief. Scarps along transfer faults represent a category of residual relief that conditioned the emplacement of Plio-Quaternary strike-slip faults offshore the Gulf of Lions. Disposition and geometry of their fault planes favour their interpretation as thin-skinned transfer zones (detached transfer faults) that define salt subsystems limits. Still associated with the Messinian event, detritic deposits form sedimentary wedges with high frontal slope. These step-like features also favoured rooting of basinward-dipping

faults, with local consequences for the Plio-Quaternary tectono-stratigraphic evolution of fault styles. In such a situation, deformation was dominated by overburden subsidence into the evacuated salt horizon, forming local minibasins. Linking of subsalt relief and structural styles illustrated in this work stress that, other than the evaporitic deposition, processes that occurred during the Messinian Salinity Crisis influenced the Plio-Quaternary evolution of salt tectonics offshore the Gulf of Lions.