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Highlights on the interactions between salt tectonics and crustal tectonics in the Mediterranean

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The deposition during the Messinian Salinity Crisis (MSC, 5.96 – 5.33 My) of a thick layer of evaporites and especially of a mobile halite unit has deeply influenced the architecture and evolution of the Mediterranean margins. The Mediterranean has characteristics that set it apart from most "classic" salt-bearing basins, where salt was deposited after (or right after) of the rifting stage. Instead, in the Mediterranean, salt was not related to a rifting event, and it covers vast areas that are geodynamically active presently. These include regions of divergence (Tyrrhenian Sea), young or mature convergence (Algerian and Ligurian Margins, Ionian Sea, Mediterranean Ridge), oblique convergence (Eastern Cyprus Arc), and strike-slip (Levant Basin).
Despite the progress in seismic processing, the strong acoustic impedance contrast between salt and sediments prevents an accurate seismic imaging of the sub-salt deep structures. Second, the evaporites act as a decoupling layer (thin-skinned tectonics) preventing the propagation of the crustal structures towards the surface. Last, when crustal tectonics generates horizontal and vertical movements in the basement, these movements can trigger a gravitational response in the salt and its overburden, thereby blurring the deeper tectonic signal.
In order to bypass these difficulties, we propose to use salt tectonics as a proxy to better constrain these deep structures both in terms of geometry and timing. Furthermore, the comparison between natural examples (seismic data) with analogue modelling allows a better understanding of the margins' structure and evolution.
We present here a preliminary synthesis of several Mediterranean study cases in different geodynamical settings (convergence, divergence, strike-slip). The complexity and variety of its margins, along with the presence of a widely distributed Messinian salt décollement, make the Mediterranean the perfect area to analyze salt deformation and its relationships with different tectonic styles, including the effects of crustal structures.