

New insights into the structural setting of North-Western offshore Sicily, Central Mediterranean

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The North-Western offshore region of Sicily, located at the convergence zone of the Eurasian and African tectonic plates is characterized by intricate geological and tectonic setting. The opening of the Tyrrhenian back-arc basin led to the development of Plio-Quaternary extensional basins, which are characterized by inversion structures. These structures located in the extensional basins of the examined region, have been identified after the interpretation of several multi-channel seismic reflection profiles. The structural and stratigraphic analysis was performed in compliance with the grid of seismic reflection profiles and the boreholes available in the public ViDEPI database. The in-depth analysis of these inverted tectonic structures is attention-worthy. We identified three basins in the area that highlight the inversion of variable intensity. They were all formed during the Early Pliocene rifting phase, paired with extensive volcanic activity; the basins also suffered a contractional episode afterward that resulted in their tectonic inversion. An inversion is registered within these basins involving the Plio-Quaternary deposits. One among these basins shows a strong impact of inversion on the entire sedimentary fill and it affects the sea floor.

This contractional episode has been linked to the proximity of the Sicily Maghrebian thrust front (Argnani & Torelli, 2001) or a shift in the stress direction, signifying a compression in the N-S stress direction (Catalano & Milia., 1990; Sulli, 2000).

Our analysis of inversion features is in agreement with previous studies in the NW offshore of Sicily and provides insights into the deformation history of this region.

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