T41A-0594: Fore-arc Deformation in the Paola Basin Segment (Offshore Western Calabria) of the Tyrrhenian-Ionian Subduction System

Thursday, 14 December 2017
08:00 - 12:20
New Orleans Ernest N. Morial Convention Center - Poster Hall D-F

The 3D stratigraphic architecture and Late Neogene to Recent tectonic evolution of the Paola Basin (offshore western Calabria), a segment in the fore-arc of the Tyrrhenian-Ionian subduction system, is reconstructed by using a grid of high-penetration reflection seismics. Oligocene to Messinian deposits are interpreted all along the profile. They tend to fossilize preexisting topography and reach the largest thicknesses between (fault controlled) basement highs. Plio-Quaternary deposits are found over the entire area and display variations in thickness and tectonic style. They are thicken up to 4.5 km in the depocenter of the basin, and decrease both in the east and west termination of the lines. The Paola Basin can be partitioned into two sectors with different tectonic deformation, separated by a NNW-SSE elongated area that coincides with the basin depocenter. Tectonic features associated with strike-slip restraining and releasing bends are widely spread over the western sector of the basin. Overall, they form an approximately NS-trending and geomorphically prominent ridge separating the Paola Basin from the Marsili abyssal plain. A high-angle, NNE-trending, normal fault system develops on the south-west tip of the basin, where the faults offset the Messinian horizon of ca. 500 m. Data suggest that limited vertical slip occurs along reverse faults detected at the border and inside the sedimentary infilling of the Paola Basin, reaching thickness of more than 3.8s two way travel time. The reflection sequence pattern can be interpreted as a result of the infilling of the thrust-top basin related to a prograding system, located between a growth ramp-anticline to the west and a culmination of basement-thrust sheets to the East. We propose that the Paola Basin developed near the northern edge of the Ionian slab where tearing of the lithosphere is expected. Also, the strike-slip fault system is a kinematic consequence of obliquely convergent subduction settings, where interplate strain is partitioned into arc-parallel strike-slip zones within the fore-arc, arc or back-arc region.

Plain Language Summary

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