Tectono-sedimentary evolution of a Meso-Cenozoic slope from south-western Sicily (Italy)

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The geological mapping carried out within the activities for the Sheet n.628 "Sciacca" of the Geological Map of Italy (CARG Project) provided relevant information to understand the geological evolution of the south-western sector of Sicily. The data collected on field were of fundamental importance for the reconstruction of the stratigraphic and structural setting of sectors that, framed at a larger scale, help explain the evolution of part of the Sicilian Fold and Thrust Belt (SFTB). The field surveys were carried out at scale of 1:10.000 using digital tools (Field Move software) to obtain georeferenced data that have been represented on the digitized map at scale of 1:50.000.

In the Rocca Nadore area, located in the north-western sector of the Sheet, outcrop the Meso-Cenozoic succession pertaining to the shallow to deep water carbonate facies domain. Here we identified a E-W-trending sharp erosional unconformity between the Hettangian-Pliensbachian weakly dolomitized carbonate platform limestones (Inici Formation) and the Middle-Upper Jurassic reddish nodular-texture calcilutites, rich in ammonites (Buccheri Formation). We interpreted this angular unconformity as an extensional tectonically controlled depositional slope. We conducted a detailed stratigraphic analysis of the deposits lying above the unconformity enabled the identification of the time interval of sedimentation and evidenced various reactivations events. This time span is comprised between the Early Jurassic and the late Oligocene and is recorded in a stratigraphic succession with a maximum thickness of 25 meters. Similar depositional patterns were identified toward north along the Rocca Ficuzza carbonate ridge. In this latter sector, some bodies of carbonates megabreccias consisting of Meso-Cenozoic carbonates fragments in a reddish silty matrix, due to the gravitational collapse from a pre-existing slope, were identified.

This deformation pattern (age, geometry, and orientations) observed in the geological Sheet 628 "Sciacca," allowed to obtain information useful for regional paleogeographic and paleoenvironmental reconstructions. Furthermore, the analyzed sector consists of alternating paleo-structural highs and lows formed by Meso-Cenozoic shallow to deep water carbonate deposits, respectively. Recognition of the stratigraphic patterns and three-dimensional development of carbonate bodies, including boundaries and relationships with surrounding units, can have several spin-offs, including their possible use in support of hydrogeological studies.