

Tectono-sedimentary evolution of Cretaceous-Neogene carbonate breccias of southwestern Sicily (Italy)

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The study area is located in southwestern Sicily, north of the town of Sciacca. In this area outcrops the outermost portion of the Sicilian Fold and Thrust Belt, consisting of units belonging to the Saccense Domain and related Neogene-Quaternary syntectonic cover.

Data collected on field, during the production of Sheet 628 “Sciacca” of the Geological Map of Italy, have provided new tools for understanding the geological evolution of this sector from a stratigraphic and structural point of view and to obtain information about the interaction between tectonics and sedimentation processes. The investigated area includes the ridge extending from west to east in the northern sector of the Sheet and consisting of thick bodies of carbonate megabreccias whose elements belong mostly to Meso-Cenozoic carbonate dispersed in a silty matrix. There are mainly three sectors in which these megabreccias outcrop: the Pizzo Telegrafo sector, the Rocca Ficuzza sector and the Coda di Volpe sector.

In the Pizzo Telegrafo sector, breccias with well-cemented reddish-yellow calcilutite matrix outcrop extensively. The elements of these breccias consist mostly of heterometric and angular fragments of limestone of Jurassic, while the matrix contains an association of radiolarian, planktonic foraminifera and calcareous microfossils that allow us to assign an age referable to Hauterivian-Albian (Lower Cretaceous).

In the Rocca Ficuzza sector, the succession consists of whitish limestones of Jurassic observable at the base of the southern slope. In the upper part the limestones pass, with a discontinuity surface, to megabreccia bodies consisting of fragments of Meso-Cenozoic carbonates in a reddish silty matrix. The matrix contains planktonic fauna and flora of the Piacenzian, interbedded with whitish marls of the Pliocene.

Finally, in the Coda di Volpe sector, the outcropping breccias unconformably lie above the carbonate platform of Jurassic. In this sector the breccia bodies consist of fragments belonging to the underlying Meso-Cenozoic carbonates and glauconitic sandstones dispersed in a reddish silty matrix containing a rich calcareous plankton assemblage. Biostratigraphic observations conducted on the matrix allowed us to tie the chronostratigraphic attribution of these bodies to the Miocene.

The deposits constituting the matrix of these breccias outcrop extensively at the adjacent areas of the investigated sectors and often, being located at the active fronts of the main thrusts, are involved in the deformation and evolution of these structures. The formation of such megabreccias has been interpreted as resulting from gravitational phenomena from the flanks of tectonically controlled escarpments developed initially during the Jurassic and reactivated during different tectonic phases from the Cretaceous until the Pliocene.