

## MIDDLE MIOCENE - PLEISTOCENE SEDIMENTARY-TECTONIC HISTORY OF SICILY

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## Abstract

The large, comprehensive pre-Caltanissetta basin developed from some time near the transition from Early to Middle Miocene. It was bordered to the north by a roughly W - E trending structure across northern Sicily. Décollement of parts of the older sediment cover in the north and their transport by large-scale gravity sliding to the south resulted in the deposition of the 'first generation' argille scagliose in the rapidly subsiding basin. Open marine, clastic successions accumulated in the course of the Langhian - Tortonian time-span; movements along roughly W - E and N - S trending faults caused a beginning accentuation of the submarine relief and an increasing differentiation between various parts of the basin, particularly so in Tortonian time.

High tectonic instability during the transition time between Tortonian and Messinian resulted in the break-up of the former, comprehensive basin. Another, more or less W - E trending complex structure across Central Sicily started to play a very pronounced part, separating the Caltanissetta Basin proper from various other (sub)basins. The Messinian is transgressive on block-faulted older Neogene successions north of this central Sicilian structure; everywhere a differentiation between rapidly and more slowly subsiding blocks caused great thickness-differences of Messinian strata over relatively short distances. The effects of the salinity crisis were superimposed. In Late(st) Messinian time a lowering of the base-level of erosion, probably in part in connection to tectonics, resulted in the deposition of non-marine, clastic sediments. The latter are overlain by open marine marly limestones (Trubi), which reflect the effect of the Early Pliocene flooding.

Shortly after the beginning of the Pliocene parts of Sicily north of the central Sicilian structure started to emerge and an overall regression began in the Caltanissetta Basin. The regression was time-transgressive from the north to the south; for instance, the transition from Narbone clays to Agrigento sands is of Early Pliocene age in the north, whereas it is intra-Pleistocene in the south. The regression from north to south was connected with a rapid subsidence of the more southern area and a conspicuous increase of the basin-slope gradient. This caused unstable argille scagliose masses to be transported downslope, incorporating younger strata, such as Trubi limestones ('second generation' argille scagliose). Parts of the Neogene sequences were intensely folded during the large-scale gravity sliding and even nappe-like units developed. The regressive sequence Narbone clays - Agrigento sands filled up the rugged, submarine relief from north to south in the course of the Early Pliocene - Pleistocene time-span.

The Late Cenozoic history of the Ragusa Platform was very different; in Early Miocene time, mainly carbonates were deposited, open marine marls and clays accumulated in the Langhian - Tortonian, bioclastic limestones with some evaporites in the Messinian. Basaltic intercalations occur in Tortonian - Messinian transitional strata and in the Pliocene Trubi limestones. Trend analyses in the Caltanissetta Basin and observations along the western margin of the Ragusa Platform suggest that the platform is bordered by a strike-slip fault. Left-lateral displacements of a magnitude of some kilometers of the Ragusa Platform relative to the Caltanissetta Basin may have taken place since Early Pliocene time.