

Late Pliocene-Pleistocene stratigraphic evolution of the Menfi wedge-top basin (South-western Sicily - Italy)

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The Menfi basin represents one of south-western Sicily's largest wedge-top basins (WTBs), identified by a broad depression mainly oriented NW-SE belonging to a larger Plio-Pleistocene foreland basin system. This basin lies in the outer sector of the Sicilian Fold and Thrust Belt, which consists of Meso-Cenozoic S-verging tectonic units (Saccense Domain) unconformably overlain by Late Miocene-Early Pliocene and Late Pliocene-Pleistocene WTB deposits (Vitale & Sulli, 1997; Catalano et al., 1998; Gasparo Morticelli et al., 2015; Pucci et al., 2023). The field data and samples used for this work were collected during the geological surveys carried out within the Italian National Cartography Project at 1:50.000 scale-CARG Project (sheets n.628 - “Sciaccia” and n.618 - “Castelvetrano”), also supported by the analysis and interpretation of different previous data. Sedimentological and stratigraphic analyses were carried out on different outcrops, integrated by detailed calcareous plankton biostratigraphy (planktonic foraminifera and nannofossils), which allowed the reconstruction of a complete chronostratigraphic framework of the Plio-Pleistocene succession. In detail, the stratigraphic succession of the Menfi WTB is constituted at the bottom by hemipelagic marly clays and sandy-silts, laterally and vertically passing to shallow water biocalcarenes (Marnoso-Arenacea del Belice Fm.), Piacenzian-Gelasian in age. This unit is overlain by hemipelagic clayey marls, alternated with inner shelf bio-calcarenes and sands, of the Agrigento Fm. (Calabrian). Conformably overlying the Agrigento Fm., hemipelagic clays and marls with local intercalation of sands and calcarenites, late Calabrian-Chibanian in age, are present. Lastly, marine terrace deposits and continental deposits (late Chibanian to recent in age) unconformably overlie different terms of the Menfi WTB succession. The stratigraphic succession shows an average S-SW dip direction thickening towards the coast and reaching values greater than 1 km. The depositional geometries highlight the interplay between tectonic and sea-level changes characterised by syntectonic sedimentation during the Late Pliocene-Early Pleistocene. In this period main unconformities were generated followed by the deposition of a continuous Calabrian-Chibanian succession, containing only minor hiatuses.

In conclusion, progressive variations of the accommodation space during the growth phases of the Menfi WTB were observed. Notably, in the central-western part, hemipelagic and neritic conditions persisted until the Chibanian, while towards south-east they ended in the late Calabrian.

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