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The Middle-Late Quaternary littoral deposits of Western Sicily coastal belt (southern Italy): sedimentology and geomorphology.

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A multidisciplinary study has been carried out on the littoral deposits located along the western Sicily coastal belt, central Mediterranean region, with the aim of unravelling their origin and evolution through analysis of their lithology, texture, sedimentary structures, and geomorphological features.

The deposits crop out between the towns of Trapani and Marsala and are distributed from the present-day coastline up to 120 m above sea level, forming four major discrete ridges in the landscape, each of separated by topographic depressions with flat or slightly concave upwards surfaces. The ridges ranging between 5 to 30 m in height, display a NNE-SSW trend almost parallel to the present-day coastline, and are 1–2 km apart from each other.

The littoral deposits rest above an extensive unconformity surface separating them from the Lower Pleistocene calcarenite unit (Marsala synthem) or older (Oligocene-Miocene) mostly marly-shaley and arenaceous units.

Along the ridges, the following four lithofacies have been encountered, from the bottom to the top: i) transgressive lag composed of rounded pebbles, sandstones, and breccias of Tertiary limestone in a silty matrix containing small fragments of Mollusca shells; ii) medium to coarse, well sorted sands with plane-parallel lamination, passing upwards to medium-to-coarse sand containing polygenic well rounded pebbles interpreted as longshore current and wave-reworked river mouth deposits; iii) tabular or lens shaped, well stratified calcarenites with low- and high-angle lamination, interpreted as upper shoreface and foreshore deposits; iv) medium-to-coarse, cemented, mostly carbonate-rich sands with subordinate percentage of quartz granules, containing sparse reworked foraminifera and terrestrial gastropods, showing evident large-scale tabular and concave cross-lamination (each lamina is 0.5–2 cm thick). The deposits consisting of this lithofacies form convex elongated sedimentary bodies with thickness ranging between 2 and 15 m where up to three sub-units, separated from each other by upward concave erosional surfaces marked by paleosoils, can be recognized. This lithofacies is interpreted to be associated with an aeolian dune sedimentary complex developed on a coastal environment.

In addition, in the topographic depressions separating the ridges, coastal fine-grained sandstone containing sparse marine fauna with fragments of shells of bivalves and gastropods and matrix-supported well-rounded quartz-arenitic pebbles suggests a deposition in a fluvial-influenced coastal lagoon environment.

The overall geomorphological setting, stratigraphy and sedimentary features observed in the study area suggest the development of a complex coastal barrier environment associated with

shoreface, beach-barrier coastal dunes and back barrier lagoon and fluvial-coastal system. This resulted from the complex interplay between coastal, aeolian and fluvial processes in an area intensely which during the Middle-Late Pleistocene has been affected by sea-level fluctuations and tectonic uplift inducing the progressive westward migration of the coastline to the present-day position.