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Geomorphological Signature of Late Pleistocene Sea Level Oscillations in Torre Guaceto Marine Protected Area (Adriatic Sea, SE Italy)

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Received: 10 September 2019; Accepted: 12 November 2019; Published: 16 November 2019

Abstract: Morphostratigraphy is a useful tool to reconstruct the sequence of processes responsible for shaping the landscape. In marine and coastal areas, where landforms are only seldom directly recognizable given the difficulty to have eyewitness of sea-floor features, it is possible to correlate geomorphological data derived from indirect surveys (marine geophysics and remote sensing) with data obtained from direct ones performed on-land or by scuba divers. In this paper, remote sensing techniques and spectral images allowed high-resolution reconstruction of both morpho-topography and morpho-bathymetry of the Torre Guaceto Marine Protected Area (Italy). These data were used to infer the sequence of climatic phases and processes responsible for coastal and marine landscape shaping. Our data show a number of relict submerged surfaces corresponding to distinct phases of erosional/depositional processes triggered by the late-Quaternary interglacial–glacial cycles. In particular, we observed the presence of submerged marine terraces, likely formed during MIS 5–MIS 3 relative highstand phases. These geomorphic features, found at depths of ~26–30, ~34–38, and ~45–56 m, represent important evidence of past sea-level variations.

Keywords: morphostratigraphy; sea-level changes; marine terraces; river incisions; Adriatic Sea

1. Introduction

Ice-cores and marine sediment records indicate that the climate of the last 500 ky was characterized by ~100 ky warm–cold cyclicity [1,2] which led to repeated transitions between glacial and interglacial periods. These transitions triggered cycles of accretion and melting of the major ice-sheets with consequent major oscillations of sea-level position [3–5] and significant modifications of the on-land and sea-floor landscapes.

Morphostratigraphy applied to landscape evolution has allowed recognition of relict sequences of past morphogenetic processes associated with these glacial and interglacial climatic phases [6,7]. In particular, past landscapes have been often reconstructed through a combination of geomorphological and sedimentological analyses [8–10]. In the Mediterranean Sea, this multidisciplinary approach has proved to be very useful to understand genesis and evolution of particular landforms and sea-floor