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Late quaternary evolution of the continental shelf offshore Marzamemi (southern Sicily, Ionian Sea) and implications on the distribution of associated mesophotic bioconstructions

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Coralligenous (C) bioconstructions include calcareous build-ups of biogenic origin that typify selected regions of the Mediterranean Sea. These peculiar habitats thrive from shallow waters (15-20 m of water depth (w.d.) up to the limit of the mesophotic zone, and they formed since the Holocene transgression. They are from few to tens of meters large, displaying variable lateral continuity and thickness. Peculiar C outcrops are present offshore Marzamemi (southeastern Sicily, Ionian Sea). Their extension and distribution across the shelf were investigated within the project CRESCIBLUREEF - Grown in the blue: new technologies for knowledge and conservation of Mediterranean reefs. We produced a new 17 km² high-resolution bathymetric map using a R2-Sonic 2022 system, ground-truthed by ROV video inspections. From a geomorphological point of view, the shelf is typified by four distinct marine terraces. Climate change and tectonic uplift are the dominant forcing mechanisms responsible for the formation of long and narrow terraced landforms in a variety of geomorphic settings; and marine terraces are largely used to reconstruct the Quaternary glacial and interglacial climates. The coupling of documented uplift rate in this region (ca. 0.2 mm/yr since the Tyrrhenian time) and the evidence reported in literature for late Quaternary relative sea-level curves shows a good correlation between the distribution of C outcrops and local, short stasis of sea level transgression periods, culminated with the rapid Flandrian transgression. C outcrops are mainly spread over the first and last terraces at two specific depth ranges: from 36 to 42 m of w.d., and from 86 to 102 m of w.d., respectively. Settlement and growth were mainly favored by a low sedimentation regime. Indeed, lowstand stages were likely characterized by erosional forces. This is particularly noticeable in the middle of our study area, where we have a paleo-incision typified by peculiar erosional features we were able to map. The role of the inherited continental shelf landscape in creating favorable substrate for the settlement and growth of C during the Holocene is here investigated.