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Sedimentary facies of upper slope contourite deposits off Capo Vaticano (southern Italy, Mediterranean Sea): results from high resolution seismic profiles and sediment cores

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The upper continental slope off Capo Vaticano (Calabro-Tyrrhenian continental margin) is characterized by a contourite depositional system (postglacial elongated drifts) built by a northward-directed bottom current, likely similar to the present-day modified-LIW, outflowing from the Messina Strait. In this area, both along-slope and down-slope processes shaped the seafloor during the Late-Quaternary, producing a complex and dynamic environment. Here, the knowledge of sedimentary processes and controlling factors, particularly for contourite deposition is rather limited; nowadays, it is based only on high resolution seismic stratigraphy, whereas studies regarding the nature of contourite deposition and sedimentary facies are still lacking. In this study, we show preliminary results from the integrate analysis of sediment cores (visual description and grain size analysis) and high resolution seismic profiles, in order to reconstruct the shallow stratigraphy and to characterize contourite deposition during the postglacial period.

The two gravity cores were collected at 153 and 156 m water depth, from drift and moat domains of an elongated-separated drift. The sediment cores (2.30 m and 3.55 m long) recovered the uppermost part of drift deposit. They reveal the occurrence of intervals of sandy-silty layers or lenses embedded within muddy intervals. Sedimentary structures and vertical trend of grain-size suggest the occurrence of partial (e.g., topcut-out type) and complete (C1 to C5) contourite bi-gradational sequences, ca. 40-60 cm thick. Complete sequences characterize the drift domain, where three sequences can be recognized. In the moat domain, where seismic profiles indicate thin contourite facies separated by erosive/non depositional surfaces, the cored contourite interval is composed of silty-sandy laminae and pockets, dispersed in a muddy matrix, and by a basal layer of muddy fine sand. In this case, the subdivision of contourite deposits into classical sequences is not straightforward, however at least one sequence can be recognized.

The integration of core data and seismic profiles indicate that sandy-silty intervals correlate with high-amplitude seismic reflectors observed on profiles crossing the drift. In contrast, muddy intervals correlate with transparent facies. Particularly, the homogeneous mud recovered in the first 1.15-1.3 m of the gravity cores is associated with a semi-transparent seismic facies possibly related to the highstand hemipelagic deposition. Seismic profiles also indicates that contourite deposits overlies a wedge-shaped infra-littoral prograding deposit, likely formed during the LGM period. Therefore it is proposed that contourite facies were deposited during the postglacial sea level rise, whereas hemipelagic mud dominated during the Holocene highstand.

Both gravity cores and seismic stratigraphy show that contourite processes varied during the postglacial period. Based on this preliminary results and on ongoing studies on sediment composition and foraminiferal assemblages we will try to analyze the influence of climate/sea-level variations, variability of bottom current velocity/position and changes in sediment provenance on contourite deposition.