

# High-resolution seismic stratigraphy, multibeam bathymetry of the Capo Vaticano region (Tyrrhenian Sea) coupled with oceanographic data: interplay between alongslope bottom currents and downslope processes

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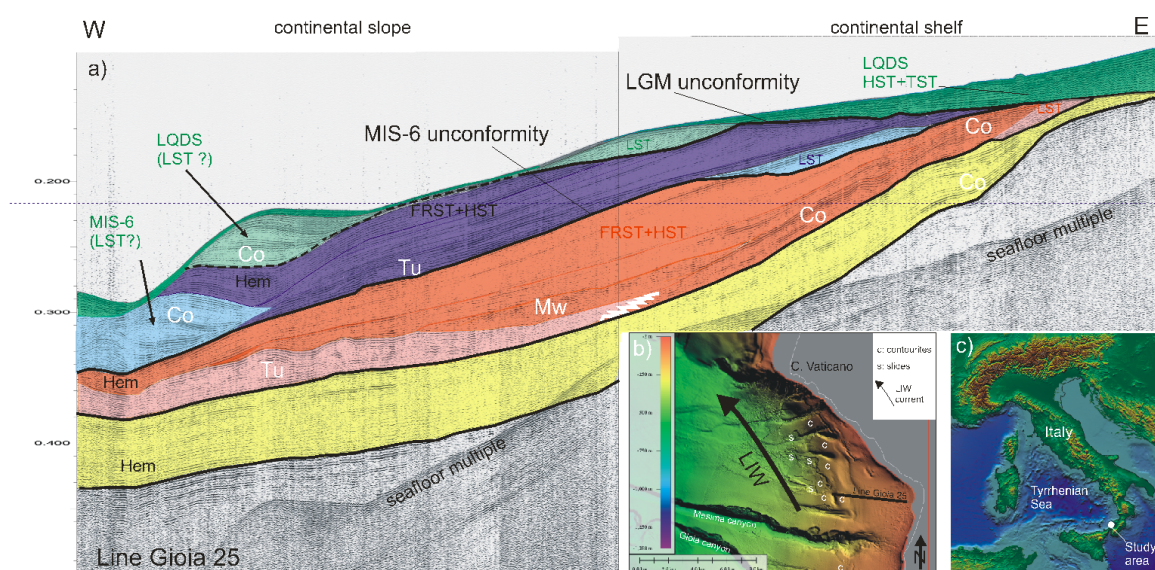
**Abstract:** We shows preliminary results from high-resolution seismic reflection profiles (1.5kJ Sparker and Chirp), multibeam bathymetry and oceanographic surveys (CTD and ADCP) carried out in 2011 and 2013 south Capo Vaticano (southern Tyrrhenian Sea, Italy). The collected data reveal the widespread occurrence of contourites on the upper slope-outer shelf sectors. These newly discovered contourites are interbedded with hemipelagic deposits and locally with turbidite and/or mass wasting deposits. The interaction between along slope bottom currents and downslope processes can be observed both on the seafloor and within buried depositional sequences of upper Pleistocene age. Sequence stratigraphic interpretation suggests that Capo Vaticano contourite deposits developed within high-order depositional sequences formed during upper Pleistocene eustatic cycles, possibly during lowstand phases.

**Key words:** contourites, turbidites, sequence stratigraphy, topographic control.

The multibeam bathymetry and high resolution seismic reflection profiles (chirp and 1.5kJ sparker) collected during two oceanographic cruises carried out in 2011 and 2013 off Capo Vaticano (Urania R/V, CNR) reveal various types of bottom-current features comprising both depositional elements (sediment drifts) and erosional elements (Fig. 1), forming at least four contourite depositional systems.

The newly discovered contourite deposits are located south to Capo Vaticano, offshore the Petrace

river and Capo Vaticano, between ~500 and 95m water depth. The sediment drifts are rather small in size (up to 10km long and 2km wide). Most are elongate separated drifts aligned roughly parallel to the regional bathymetric contours. Erosional elements comprise moats, abraded surfaces and depressions. On the upper continental slope the deposits are affected by widespread gravitative instability produced by several shallow slides, covering a seafloor surface > 20km<sup>2</sup>.



**FIGURE 1.** a) Selected sparker profile across the Capo Vaticano offshore showing contourite deposits (Co), hemipelagites (Hem), turbidites (Tu), mass wasting deposits (Mw) and major unconformities separating upper Pleistocene depositional sequences; b) Shaded relief of the Capo Vaticano offshore area with indication of contourites (c) and slides (s); c) Location of the study area.

The spatial distribution of sediment drifts and erosional features suggests an origin from north-northwestward-flowing bottom currents, related to the Levantine Intermediate Water (LIW in Fig. 1) and to a surficial current, both fitting with current flows observed by CTD and ADCP measurements carried out in the 2013 survey (TyGraF cruise, Urania R/V) in the framework of the Ritmare project (<http://www.ritmare.it>).

Capo Vaticano contourites are interbedded with hemipelagic deposits and locally with turbidite and/or mass wasting deposits (Fig. 1). Across the study area, lateral heteropies with turbidite and/or mass wasting deposits are present, suggesting interaction between along slope bottom currents and downslope gravitative processes. Such interactions can be either observed within recent deposits or in buried upper Pleistocene deposits.

Along the south eastern Tyrrhenian margin, other contourite deposits have been described from the Capo Suvero offshore (Amelio and Martorelli, 2008) and NW to the study area (Marani et al., 1993). The contourites described in this study confirm the relevance of bottom-current processes and contourite formation for the upper Pleistocene-recent stratigraphy of this continental margin. Moreover their presence highlights the relevance on contourite development of the topographic control exerted by local morpho-structures, such as headlands (i.e. Capo Vaticano; Martorelli et al., 2010)

and canyons (e.g., the Gioia-Mesima canyon system), as well as the complex interplay between hemipelagic, turbidite and contourite sedimentation.

Classic high-resolution sequence stratigraphic interpretation suggests that Capo Vaticano contourite deposits developed within high-order (e.g., fourth-order) depositional sequences formed during upper Pleistocene eustatic cycles, possibly during lowstand phases (Fig. 1). A more detailed analyses of the high-resolution seismostratigraphic dataset will attempt to better define systems tracts within depositional sequences and arrangement of the observed contourites within system tracts.

## REFERENCES

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