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Interaction between tectonism, bottom currents and mass movements: an exemple from the Bari Canyon System (Adriatic Sea)

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The Bari Canyon System dissects the slope of the Southwestern Adriatic Margin from the shelf edge to the base of slope. The Bari Canyon System is a complex feature showing evidence of seafloor instability through repeated mass transport events up to very recent times.

The location and geomorphology of the canyon system is controlled by the growth of a suite of gentle anticlines superimposed to a long term tectonic tilt of the margin induced by the uplift of the Apulian swell (onshore) during the last 500 ky. The margin tilt, together with the progressive margin progradation into steeper slope regions, favoured the potential instability of the slope. This instability likely represents a key predisposing factor leading to the formation of the Bari Canyon System.

The Bari Canyon System displays three heads, comprised in a crescent-shaped region, and two main E-W trending conduits almost parallel to each other. Side scan sonar mosaics show a canyon floor with high backscatter corresponding to acoustically transparent deposits on Chirp sonar seismic profiles. This evidence suggests a markedly erosional canyon floor with coarse sediment from failed masses which deposited in very recent times, as indicated by the absence of draped sediment at the seafloor.

A peculiar characteristic of the Bari Canyon System is its marked asymmetry: the left-hand canyon walls dip 5°, while the rigth-hand walls dip as much as 14°. This asymmetry allows strong bottom currents (up to 60 cm/s), flowing along slope from the North, to enter the canyon and interact with the complex topography. These in-

teraction generates four main sedimentary features: a) bottom current deposits, representing sediment drifts exclusively distributed upcurrent on pre-existing morphologic irregularities ; b) mass wasting deposits, generally not-buried in the canyon thalwegs and gradually buried toward deeper waters the base of the slope; c) turbidite deposits, including a channel-levee complex overhanging on the canyon floors; and d) erosional areas, such as gullies along canyon walls and furrowed patches close to the canyon floor.

Preliminary stratigraphic and biostratigraphic work on piston cores allow to infer a Last Glacial Maximum (LGM) age to the buried mass wasting deposits. Biostratigraphic data also indicate that sediment drifts have grown since the end of the LGM, likely, during at least part of the Holocene.

The age determination of early phases of the canyon evolution are based on the presence of incised morphologies affecting Pleistocene regressive sequences on the shelf-slope transition. These erosional features are part of the canyon heads that clearly cut through the deposits of the two most recent Pleistocene regressive sequences, which post-date the MIS 8 (230 ky).

Thus, the whole data set suggests that the canyon system formed after MIS 8 (230 ky), that it became a major sediment conduit during the LGM lowstand, when mass failure deposits also accumulated at the base of the slope, and that the system is still active.