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Bottom current shaping the Southwestern Adriatic Margin (Central Mediterranean)

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The Southwestern Adriatic Margin (SAM) offshore Apulia is a key site to study bottom current activity and their effect on sedimentation. The SAM is impacted by the complex interaction of two southward-flowing bottom water masses: the cold North Adriatic dense Water (NAdDW), forming in the shallow northern Adriatic through cold wind forcing and winter heat loss, and the highly saline Levantine Intermediate Water (LIW), generated in the Eastern Mediterranean through intense evaporation and flowing along the slope in a depth range of 200-600 m.

Chirp-sonar profiles, TOBI mosaics, multibeam data and sediment cores reveal distinctive sediment drifts types (elongated, plastered and isolated drifts along the SAM) and, in particular, extensive fields of sediment waves. Non-depositional and erosional features related to bottom current activity include moats, between the crest of sediment drifts and the steep upper slope, widespread upper-slope erosional areas and extensively furrowed areas, particularly where changes in slope orientation force the current circulation.

Distribution, morphology and size of bottom-current features along the SAM results from an interaction between current regime and complex margin morphology, characterized by structural highs perpendicular to the slope contour, multiple slope incisions and extensive slide deposits (e.g. blocky slide deposits). Morphobatymetric and seismic stratigraphic data on the SAM evidence that bottom current deposits are best developed where the regional slope flattens seaward of a very steep, often erosional, upper slope. The roughness of the lower slope, in particular, seems to correlate with the complexity and decreasing size of the bottom current deposits.

Like other land-locked basins, the Adriatic underwent dramatic paleogeographic and

paleoceanographic re-arrangements during the Late Quaternary sea-level oscillations. Indeed, during the Last Glacial Maximum (LGM), most of the areas where NAdDW form today were subaerially exposed. Concurrently, during glacial times the LIW production was likely reduced or deepened compared to the present-day conditions. Seismic and cores data allow investigate the impact of changing current regime on late Quaternary slope deposits. These data show that during the glacial periods bottom current appear less intense than they appear during interglacial time.

Other Mediterranean late-Quaternary contourite deposits are either in water depths compatible with the LIW, particularly in the case of shallow sill basins (e.g.: Sicily, Corsica Channel), or at the slope base reflecting the flow of Mediterranean deep waters. The SAM bottom-current deposits, instead, seems to record the changing interaction between these two distinctive bottom-hugging currents along a common pathway.