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Geomorphic shaping of the South-Western Adriatic Margin: the role of tectonic deformation, slope instability and oceanographic processes

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Foreland settings may host tectonically-active basins that are ideal for studying the complex interplay between tectonics, sedimentation, oceanographic processes and landscape shaping. These basins commonly consist of narrow seas characterised by high-sedimentation rates and thick sedimentary units displaying significant lateral variability. The southwestern Adriatic foreland, along the Apennine belt, is a continental margin where high-resolution stratigraphic reconstruction of Quaternary units and swath bathymetry (multibeam morpho-bathymetry and sidescan sonar imaging) provide evidence for multi-scale interaction between tectono-sedimentary and oceanographic processes on the continental shelf and slope.

The stratigraphic architecture of middle-upper Pleistocene sequences, with stratigraphic surfaces acting as potential weak layers, and the distribution of depocenters relative to the location of tectonically active fault systems (particularly the 150-km-long Gondola Fault Zone) are predisposing factors for sediment failure. We illustrate a variety of styles of shelf-margin geomorphic evolution, alternatively dominated by slope failure at places leading to canyon inception. Downslope, the seafloor morphology is the result of mass failure (slide scars and deposits), tectonic relief (fault scarps and seamounts), deposition from contour and/or turbidity currents (gentle to steep flanked seafloor mounds, scours and moats, and sediment wave fields), and slide deposits.

We discuss the possible relationships between the observed variety of geomorphic styles and the variable interplay between long-term (tectonics) and short-term processes (climatic cyclicity affecting sediment flux, sea level and oceanographic regime).