*Geografia Fisica e Dinamica Quaternaria* - GFDQ 48 (2025), 157-172, suppl. mat.

DOI 10.4454/1pw9gw82

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# Geomorphological mapping and anthropogenic signature along the rocky coast in the Tigullio Gulf (Eastern Liguria, Italy)

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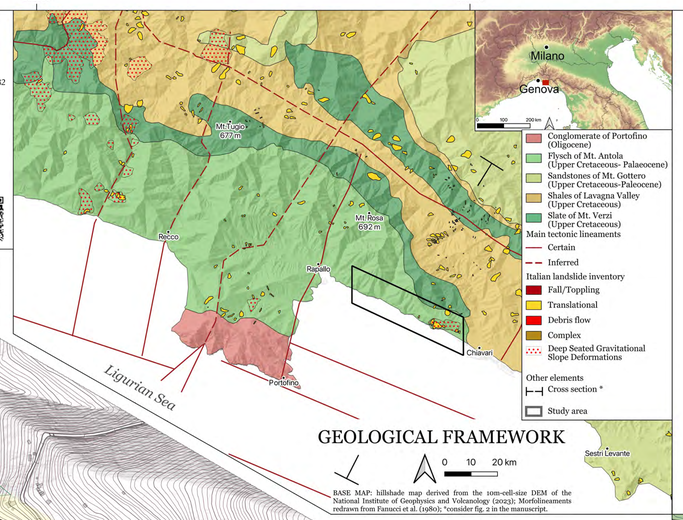
Finanziato dall'Unione europea NextGenerationEU · MUR · Italiadomani · Università di Genova · DISTAV DIPARTIMENTO DI SCIENZE DELLA TERRA, DELL'AMBIENTE E DELLA VITA · UNIVERSITÀ DEGLI STUDI DI MILANO · DIPARTIMENTO DI SCIENZE DELLA TERRA "ARDITO DESIO"

## GEOLOGICAL FRAMEWORK




BASE MAP: hillshade map derived from the 10m-cell-size DEM of the National Institute of Geophysics and Volcanology (2023); Morfolineaments redrawn from Fanucci et al. (1980); *consider fig. 2 in the manuscript.

## LEGEND

### Geological data and structural landforms
- Marly Limestone with shales interlayers
- Bedding
- Inferred Fault
- Tectonic lineament
- Triangular facet

### Meteo-marine elements
- Fluvial sediment supply
- Longshore drift
- Wind

### Fluvial and runoff landforms
- Spring
- Hanging valley step
- V-shaped valley
- Denudation scarp
- Alluvial deposits (sand and gravel)
- Colluvial deposit

### Gravitational landforms
Edge of landslide scarp
Due to fall/topple
- a) Active
- b) Inactive

Due to translational slide
- a) Active
- b) Inactive

Landslide deposit due to fall/toppling
- a) Active
- b) Inactive
- c) Submerged

Landslide deposit undetermined
- a) Active
- b) Inactive
- c) Submerged

Landslide deposit due to translational slide
- a) Active
- b) Submerged
- Debris/mud flow channel
- Slope affected by DSGSD

### Coastal landforms
- Shoreline
- Notch
- Sea cave
- Sea stack
- Submerged stack

Erosional coastal cliff
- Scarp ≤5 m
- Scarp >5 ≤15 m
- Scarp >15 ≤50 m
- Pocket beach

Presumed marine terrace
- a) Outer margin
- b) Inner margin

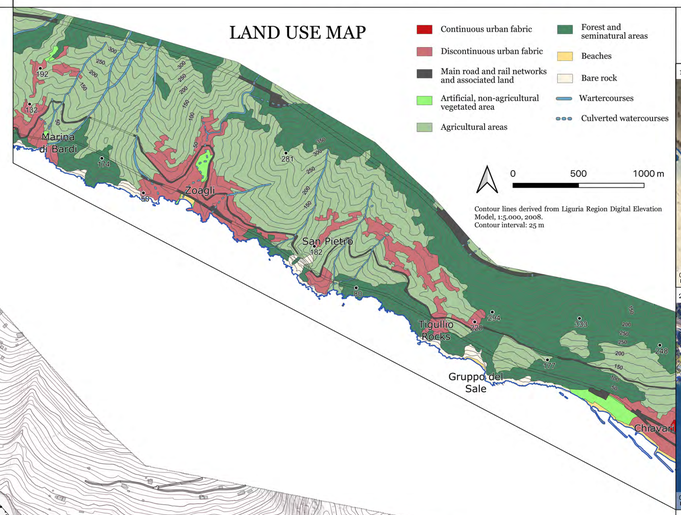
Backshore and offshore deposits:
- Pebble and gravel
- Sand
- Silt
- Seagrass meadow
- Dead matte

### Anthropogenic landforms
- Quarry scarp edge
- Abandoned quarry
- Excavation surface
- Urban area

Terraced slope by agricultural activity
- a) Cultivated terraced area
- b) Urbanised terraced area
- c) Covered by wood and shrubs
- Embankment/infill
- Railway ridge
- Entry/exit of a culverted riverbed
- Culverted riverbed
- Concrete riverbed
- Longshore protection
- Breakwater groyne
- Landslide mitigation work

### Other elements
- Cross section

## LAND USE MAP

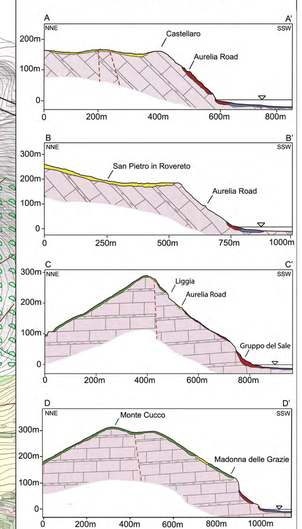



- Continuous urban fabric
- Discontinuous urban fabric
- Main road and rail networks and associated land
- Artificial, non-agricultural vegetated area
- Agricultural areas
- Forest and seminatural areas
- Beaches
- Bare rock
- Watercourses
- Culverted watercourses

Contour lines derived from Liguria Region Digital Elevation Model, 1:5.000, 2008. Contour interval: 25 m

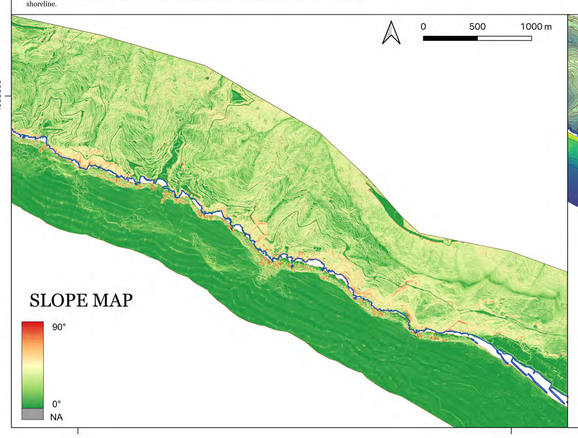
## HISTORICAL MAP AND PRESENT-DAY IMAGE OF THE ZOAGLI COASTAL AREA

## GEOLOGICAL CROSS SECTIONS

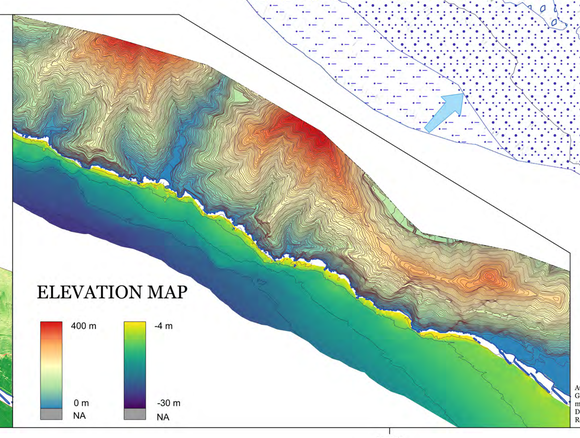



- Landslide deposits
- Colluvial deposits
- Anthropogenic deposits
- Marine deposits
- Marly limestone with shales interlayers
- Tectonic lineament

## SLOPE MAP




## ELEVATION MAP




0 250 500 m

Coordinate reference system: RDN2008 / UTM zone 32N (EPSG 6707)

Contour lines and mount elevation unit: m a.s.l.
Contour interval: 5 m
Base map: 1) hillshade map derived from the 1m-cell-size DEM of the Ministry for Environment, Land and Sea Protection of Italy (2008); 2) hillshade map derived from the 1m-cell-size bathymetric DEM of Regione Liguria (2019); 3) contour lines derived from the 5m-cell-size DEM of Regione Liguria (2023) above sea level; 4) contour lines derived from the 1m-cell-size bathymetric DEM of Regione Liguria (2019) below sea level.
The slope and elevation sketch maps were derived from the 1m-cell-size DEM of the Ministry for Environment, Land and Sea Protection of Italy (2008), and the 1m-cell-size bathymetric DEM of Regione Liguria (2019), with reference to the areas above and below the sea level, respectively. Blue line represent the shoreline.

ACKNOWLEDGMENTS: This map was produced within the funding provided by European Union – Next Generation EU in the frame of the PRIN 2022 project: GEOTRes – Geoheritage threating and resilience: mapping the impact of geomorphic and human processes in sensitive morphoclimatic environments (CUP: D53D23004810006; Responsible for the Unit of Genova University: P. Brandolini; Principal Investigator and Responsible for the Unit of Milano university: R. Azzoni).