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Hazards in the coastal karst of Balai (NW Sardinia, Italy)

Laura Sanna (1,2), Michele Uda (2), and Vincenzo Pascucci (3)

(1) National Research Council of Italy, Institute for Biometeorology, Sassari, Italy (sanna@ibimet.cnr.it), (2) Gruppo Speleo Ambientale Sassari, Italy, (3) Università degli Studi di Sassari, Dipartimento di Architettura, Design, Urbanistica, Italy

The coastal karst area of Balai headland is located in the central part of the Gulf of Asinara (North-West Sardinia, Italy) near the city of Porto Torres, comprised between the homonymous harbour and Platamona beach. This karst plateau has a monocline geometry truncated by the coastal escarpment, up to 40 m-high, that in the last decades has been affected by slope instability related to human activities and/or climate change.
The area is characterised by a flat morphology constituted of Miocene limestone gently dipping towards the North-West. Its altitude ranges from 0 to 50 m asl. The 3 km-long cliff is locally interrupted by some small gravelly coves. Along the longitudinal profile of the headland, three main morphological steps have been identified at 15, 8 and 6.5 m asl. They represent past wave cut platforms.
The shoreline is well marked and the coves cut into the land up to 50 m in length, perpendicularly to the coast. They follow the direction of a series of parallel NE-facing fractures.
The modern tidal notch is well exposed along the carbonate cliff at the present sea level. Along the limestone cliff, notch development is amplified by mixing of sea and fresh water coming from submerged springs. Moreover, this marine erosion feature is a good sea level marker in microtidal conditions, such as Mediterranean Sea, and an indicator of tectonic stability, of the Sardinian microplate. In some coves, two generations of fossil notches have been observed at 6.5 m asl and -1 m bsl, respectively, along with lithophaga boreholes up to 8 m asl. Both indicate the past eustatic conditions.
All these geomorphic features make Balai promontory an interesting geological spot for studying past sea level fluctuations and present slope movements, trying to distinguish hazards due to climate change from those directly related to anthropogenic forces such as wave-induced damage due to waterborne navigation.