Geophysical Research Abstracts
Vol. 21, EGU2019-3913-1, 2019
EGU General Assembly 2019

Tidal notches on the rock coast of the Ansedonia promontory (Tyrrhenian Sea, Italy)

Valeria Vaccher (1), Federica Muro (1), Fabrizio Antonioli (2), Marco Taviani (3), Silas Dean (4), Eleonora de Sabata (5), Sara Biolchi (1), and Stefano Furlani (1)

(1) University of Trieste , Mathematics and Geoscience, Italy (valeria.vaccher@gmail.com), (2) ENEA, Climate & Impact Modeling Laboratory, Rome, Italy, (3) ISMAR, CNR, Bologna, Italy, (4) Department of Earth Science, University of Pisa, Italy, (5) MedSharks, Italy

The Geoswim project combines snorkel visual inspections and coastal surveys of the rocky shorelines in the Mediterranean Sea to assess geomorphological lateral variations, to acquire data for evaluating past and future sea-level changes, and to define physical and biological markers. In July 2018 we explored 2,15 km of the Ansedonia promontory, an isolated and large feature located on the Tyrrhenian sector of peninsular Italy. The headland, mainly composed of limestone and breccia with chert and bauxite layers, is affected by folding and faulting driving intense deformation and fracturing. The presence of massive carbonate rocks coupled with important freshwater discharge, including springs, has produced localized karst features. The coastal landscape is also influenced by the wave regime, particularly during autumn-winter months when northern winds prevail.
As in previous expeditions, this survey was conducted using the Geoswim hand-pushed floating raft, which is equipped with cameras, CTD sensors, sonar, and GPS.
We identified and documented the coastal features with particular focus on tidal notches, freshwater springs, potholes, caves, and karst landforms. Our primary biological observations have also been recorded. We also used time-lapse images taken by the Geoswim raft to create 3D models of the tidal zone.
We made many observations and measurements of the present-day tidal notch, which is well-carved throughout the study area. It is max 1.2 m deep and about 0.6 m wide. In some locations, it is carved on isolated limestone stumps producing mushroom-like landforms. Other sites show notch-like landforms combined with a bioconstructed terrace. Tidal notches are not carved on breccia blocks. Remarkably, we discovered a tidal notch at about 6 m a.s.l. within an enlarged fracture, documenting tectonic stability since the MIS5.5. Seventeen sea caves were also mapped and measured. The eastern sector of the study area is notable for complex and extended systems of caves that sometimes interface with freshwater springs, while the western sector is comprised mostly of smaller caves.
Among the main biological indicators are Melaraphe neritoides and Echinolittorina punctata in the supratidal zone; Patella rustica and Chtamalus stellatus inhabit substrates up to 1.5 m a.s.l. Mytilus galloprovincialis is localized next to freshwater springs while Sabellaria ‘reefs’ have been identified on rocky surface at Spiaggia delle Streghe.
In summary, we can hypothesize that the study area has been tectonically stable since the MIS5.5 considering the elevations of the upper tidal notch and the present-day notch. Tidal notches are a common landform along the promontory coastline in response to favourable massive lithology, tectonic stability of the area and also possibly the presence of freshwater outflow, as observed in other Mediterranean localities such as the eastern Adriatic Sea.
This research highlights the need to deepen the study of the interplay between coastal springs outflow and coastal corrosion in the origin and development of tidal notches.