Extreme Wave Boulders at Premantura: the stamp of the storms in the northern Adriatic Sea

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Storms and storm surges could increase their impact on rocky coasts in the next years due to global warming. In recent years, the study of boulders moved by storm waves seems to have played an important role. A key indicator that can follow extreme storm events on rocky shores includes coastal boulders detached from the bedrock. These deposits became in focus of a several studies since play a significant role in coastal hazard assessment. First studies regarded deposits of boulder related to tsunami events, but recently many sites with large clasts related to storm waves have been discovered, also in semi-enclosed shallow basin, such as the Adriatic Sea, in the Mediterranean area.

In this study we widened the mapping of boulders recently studied at Premantura promontory (southern Istria, Croatia) in order to better assess the role of coastal morphology in boulder sedimentation. In particular, we present and discuss the role of boulder deposits in several islets close to the promontory, also considering that at the island of Sekovac boulders are definitively of artificial origin and later moved by extreme waves.

The investigation of the position, size, and mass of each boulder was created through the application of Uncrewed Aerial Vehicle Digital Photogrammetry (UAV-DP) and Structure from Motion (SfM) technique, defining the GCPS points, and providing high-resolution data.

Boulders were identified and categorized using UAV-DP products, and their validation was done through the comparison with outputs of traditional geomorphological investigations such as field surveys including direct axis measurement and the use of Google Earth images for boulder mapping.