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Monitoring of coastal erosion using remote images: comparison between physically and remotely acquired data on a limestone coast

Joanna Causon Deguara[1], Ritienne Gauci[1], and Rob Inkpen[2]
[1]Department of Geography, University of Malta, Msida, Malta
[2]School of Environment, Geography and Geosciences, University of Portsmouth, UK

Boulder-sized sediment on rocky coasts are considered as signatures of extreme wave events. The dynamics of wave–coast processes and wave magnitude capable of detaching and transporting these boulders have been discussed extensively in the last decade. A substantial number of studies were focused on identifying whether regular storm waves are powerful enough to cause boulder dislodgement or whether this required wave types of a larger magnitude such as tsunamis. The use of numerical models has been central to many of these studies. These models are based primarily on boulder data such as dimensions, volume and weight. However, measuring boulders is not always straightforward and may be a very cumbersome and time-consuming process due to issues such as boulder size which may require more than one person to measure and accessibility.

The availability of images taken remotely such as through the use of unmanned aerial vehicle technology had possibly facilitated the monitoring of coastal areas. Through related software such as Agisoft it is possible to calculate measurements in 2D and 3D of various features including boulder dimensions from aerial images obtained through UAV. However, the reliability and preciseness of such measurements needs to be determined.

This study seeks to analyse the accuracy of such measurements by comparing boulder data obtained through physical measurements to those obtained from digital models created from UAV images. The study area is located on the southeast of the island of Malta. (Central Mediterranean) where the coast has developed in multiple limestone strata that dip gently towards the shoreline. Dimensions of approximately 200 boulders in different settings such as clusters or ridges have been compared.