

Abstract

In this study, we analyze the impact of the sea level rise induced by climate change on the coastal cultural heritage site of Motya, the Phoenician colony (IV–III millennium B.P.) located in the San Pantaleo island, NW corner of Sicily (southern Italy). In particular, we assessed the effects of this phenomenon on the human settlement in the past 2400 years and the expected sea level rise scenario for the next decades. A detailed flooding scenario for 2100 from direct observations and two models, taking into account the contribution of Vertical Land Movements (VLM), is provided. The surface topography is derived from a novel high-resolution/high-accuracy digital surface model (DSM), which was performed through an Unmanned Aerial Vehicles (UAV) survey, whereas the rate of VLM was estimated by the analysis of geodetic data at three Continuous Global Positioning System (CGPS) stations located close to the island. To estimate the local mean sea level and to correct the tide level (TL) at the epoch of UAV survey, the hydrometric recordings of the nearest sea level gauge station located at Porto Empedocle (Sicily), were used. Two flooding scenarios for 2100 were then represented on the high-resolution DSM, using the regional sea-level projections of the International Panel on Climate Change (IPCC) for the Mediterranean region. According to the RCP 8.5 climatic model, a difference of about + 59 cm above the local mean sea level between the current and the expected coastline positions at 2100 A.D., was found. In addition, by adding the average half amplitude of the daily tide, equal to about 30 cm, a maximum flooding scenario was determined. Finally, in the maximum condition of sea level rise, a significant flooding on the archaeological structures is expected for the Kothon area and along the North-West coast of the island.



Figure

Location of Mothya

How to cite

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