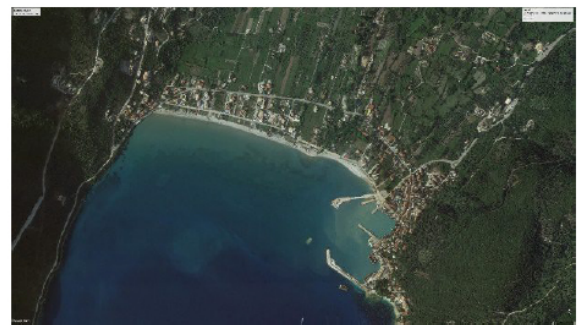


Coastal 3D mapping using very high resolution satellite images and UAV imagery: new insights from the SAVEMEDCOASTS project

Summary

Global climate changes are a main factor of risk for infrastructures and people living along the coasts around the world. In this context, sea level rise, coastal retreat and storm surges pose serious threats to coastal zones. In order to assess the expected coastal changes for the next decades, a detailed knowledge of the site's topography (coastline position, DTM, bathymetry) is needed. This paper focuses on the use of very high-resolution satellite data and UAV imagery for the generation of accurate very high and ultra-high mapping of coastal areas. In addition, the use of very high-resolution multi-spectral satellite data is investigated for the generation of coastal bathymetry maps. The paper presents a study for the island of Lipari and the coasts of Cinque Terre (Italy) and the island of Lefkas (Greece). For Lefkas, two areas of the island were mapped (the city of Lefkas and its adjoining lagoon in the north side of the island, and the Bay of Vasiliki at the south part of the island) using World View 1, and World View 3 satellite images, and UAV imagery. The satellite processing provided results that demonstrated an accuracy of approximately 0.25 m planimetrically and 0.70 m vertically. The processing of the UAV imagery resulted in the generation of DTMs and orthophotos with an accuracy of approximately 0.03-0.04 meters. In addition, for the Vasiliki bay in the south of the island the World View 3 imagery was used for the estimation of a bathymetry map of the bay. The achieved results yielded an accuracy of 0.4 m. For the sites of Lipari and Cinque Terre (both in Italy), UAV surveys allowed to extract a DTM at about 2 cm of pixel resolution. The integration of topographic data with high resolution multibeam bathymetry and expected sea level rise from IPCC AR5 2.6 and 8.5 climatic scenarios, will be used to map sea level rise scenarios for 2050 and 2100, taking into account the Vertical Land Motion (VLM) as estimated from CGPS data. The above-mentioned study was realized during the implementation of the SAVEMEDCOASTS project (Sea level rise scenarios along the Mediterranean coasts, funded by the European Commission ECHO A.5, GA ECHO/SUB/2016/742473/PREV16, www.savemedcoasts.eu).



How to cite

Petros Patias, Charalampos Georgiadis, Marco Anzidei, Dimitrios Kaimaris, Christos Pikridas, Giorgios Mallinis, Fawzi Doumaz, Alessandro Bosman, Vincenzo Sepe, Antonio Vecchie, "Coastal 3D mapping using very high resolution satellite images and UAV imagery: new insights from the SAVEMEDCOASTS project," Proc. SPIE 10773, Sixth International Conference on Remote Sensing and Geoinformation of the Environment (RSCy2018), 107730V (6 August 2018); doi: 10.1117/12.2325540