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Land subsidence and sea-level rise for six coastal zones of the Mediterranean region: implications for flooding scenarios for 2100 from the SAVEMEDCOASTS-2 project

Michele Crosetto¹, **Marco Anzidei**², Giovanna Forlenza², José Navarro¹, Petros Patias³, Charalampos Georgiadis³, Fawzi Doumaz³, Maria Lucia Trivigno⁴, Antonio Falciano⁴, Michele Greco⁵, Enrico Serpelloni², Antonio Vecchio⁶, Qi Gao¹, and Anna Barra¹

¹CTTC/CERCA, Geomatics Division, Castelldefels (Barcelona), Spain

²Istituto Nazionale di Geofisica e Vulcanologia INGV, CNT, Roma, Italy

³Aristotle University of Thessaloniki, Greece

⁴Centro di Geomorfologia Integrata per l'Area del Mediterraneo, Potenza, Italy

⁵Engineering School, University of Basilicata, Potenza, Italy

⁶LESIA, Observatoire de Paris, Université PSL, CNRS, Sorbonne Université, Univ. Paris Diderot, Meudon, France

Here we show and discuss the first results arising from the SAVEMEDCOASTS-2 Project (Sea Level Rise Scenarios along the Mediterranean Coasts - 2, funded by the European Commission ECHO), which aims to respond to the need for people and assets prevention from natural disasters in the Mediterranean coastal zones placed at less than 1 m above sea level, which are vulnerable to the combined effect of sea-level rise and land subsidence.

We use geodetic data from global navigation satellite system (GNSS), synthetic aperture radar interferometric measurements (InSAR), Lidar and tide gauge data, and the latest IPCC - SROCC projections of sea-level rise released by the Intergovernmental Panel on Climate Change, to estimate the Relative Sea Level Rise to realize marine flooding scenarios expected for 2100 AD in six targeted areas of the Mediterranean region.

We focus on the Ebro (Spain), Rhone (France), and Nile (Egypt) river deltas; the reclamation area of Basento (Italy), the coastal plain of Thessaloniki (Greece), and the Venice lagoon (Italy). Results, from Copernicus Sentinel-1A (S1A) and Sentinel-1B (S1B) sensors, highlighted the variable spatial rates of land subsidence up to some cm/yr in most of the investigated areas representing a relevant driver of local SLR. All the investigated zones show valuable coastal infrastructures and natural reserves where SLR and land subsidence are exacerbating coastal retreat, land flooding, and storm surges.

The hazard implications for the population living along the shore should push land planners and decision-makers to take into account scenarios similar to that reported in this study for cognizant coastal management.