



OUR PLANET FROM SPACE

LAND SUBSIDENCE, SEA LEVEL RISE AND FLOODING SCENARIOS BY 2150

Sea level rise will affect about one billion people around the world in the coming years.

The last AR6 Report released by the IPCC (Intergovernmental Panel on Climate Change), shows that the current global warming and sea level rise are mainly caused by human activities with the beginning of the industrial era, since the end of 1800.

In the span of a single generation, this could have an unprecedented socio-economic impact on coastal populations.



In XIX Century the sea level has risen between 14 and 17 cm but compared to the last century the current rate has more than doubled and continues to increase at an accelerated rate. Today, the sea level is rising at the rate at about 40 cm per century. Since this is not constant due to multiple physical factors that act in time and space in a variable manner, the mean sea level could be even higher by 1 m by the end of this century.

Along the subsiding coasts, the local sea level is accelerated by the sum of sea level rise and vertical land movements. The most exposed coasts are those characterized by low lying coasts, such as river deltas, river deltas, lagoon areas and coastal plains. To evaluate the current and expected effects in the coming years, it is therefore important to measure the absolute and relative sea level trend along the coasts from space and ground observations. InSAR techniques in combination with GNSS networks are crucial for the assessment of coastal land subsidence. In addition, for the realization of flooding scenarios, it is important to have available high-resolution Digital Terrain Models, on which to project the extent of marine flooding in the coming years.

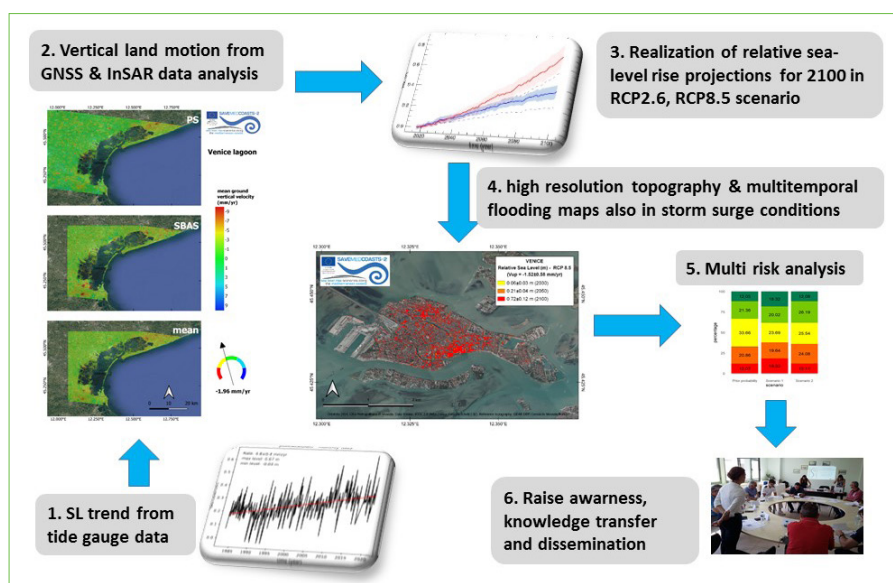
The Mediterranean basin shows more than 160 main coastal plains and several river deltas placed at 2-3 m above the current mean sea level, which are the most exposed zones to the risk of flooding by 2100. The total exposed area is about 39,000 Km², equal to approximately 5.5 million football fields or about the extension of Switzerland.

Many coastal sites in the Mediterranean, such as ports, railways, roads, tourist, industrial, environmental and cultural sites, are already exposed to sea level rise.

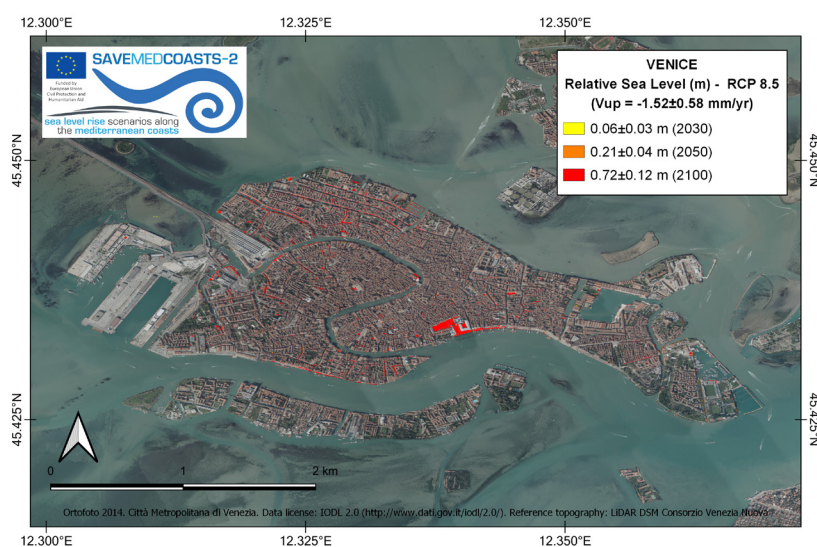
For more information
www.savemedcoasts2-eu



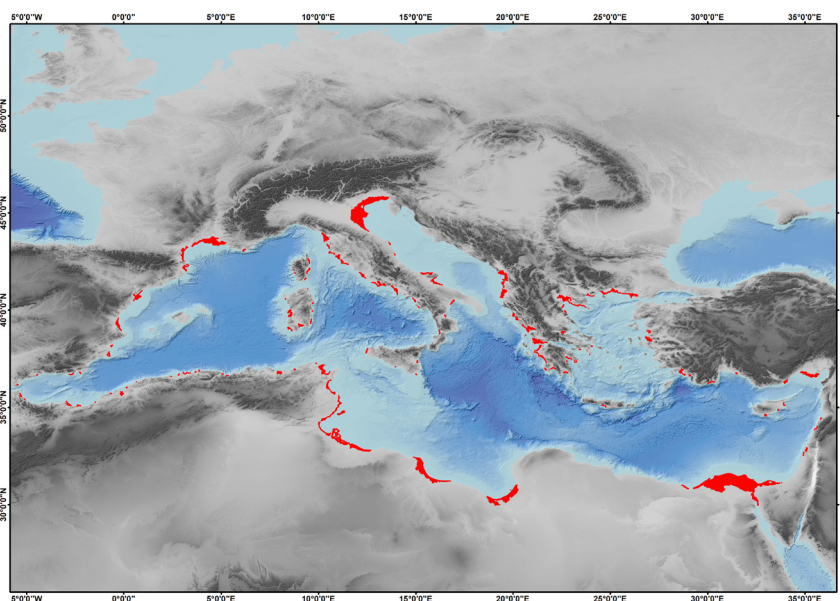
All the space-related INGV flyers are here!



The workflow adopted for the SAVEMEDCOASTS2 and GAIA projects to estimate the multi-temporal flooding scenarios up to 2100 and related multi risk analysis



The city of Venice (Italy). In colors are reported the expected extension of land flooding in 2030, 2050 and 2100 for RCP 8.5 climatic scenarios for a mean land subsidence at 1.52 ± 0.58 mm/year estimated from InSAR and GNSS data (from www.savemedcoasts2-eu and Anzidei et al., 2025 <https://doi.org/10.3390/rs17050820>).



The coasts of the Mediterranean most exposed to sea level rise (in red). (from Vecchio et al., 2024 DOI 10.1088/1748-9326/ad127e)