OUR PLANET FROM SPACE

LAND SUBSIDENCE, SEA LEVEL RISE AND FLOODING SCENARIOS BY 2100

Sea level rise affects over 400 million people around the world which could increase considerably 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 1880.

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

graphic design Laboratorio Grafica e Immagini | INGV

COS CENTRO OSSERVAZIONI SPAZIALI DELLA TERRA

ISTITUTO NAZIONALE DI GEOFISICA E VULCANOLOGIA

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 of over 30 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 beaches, 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 along the coasts from space and ground observations.

InSAR techniques in combination with GNSS networks are crucial for the assessment of coastal land subsidence

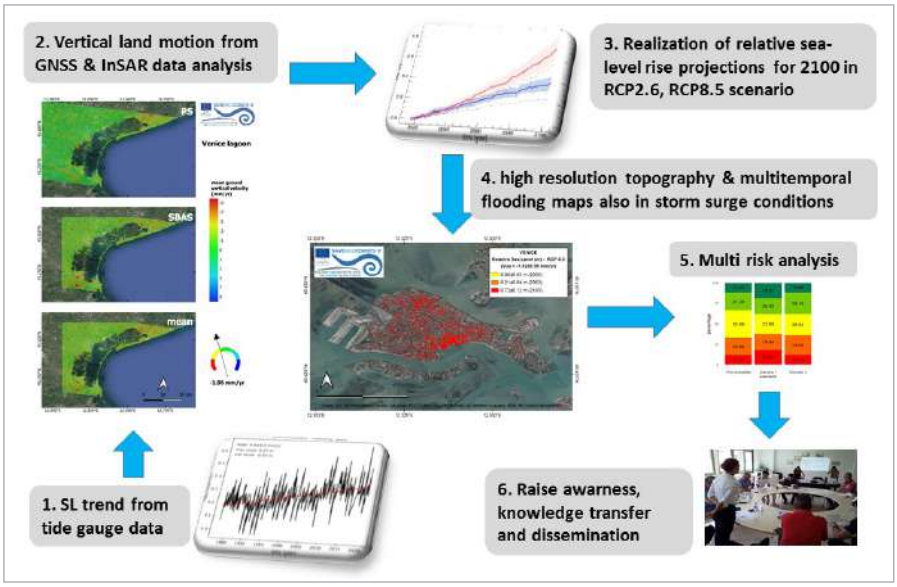
For the realization of flooding scenarios, it is important to have available high-resolution Digital Terrain Models, on which to project the extent of marine flooding in the coming years.

The Mediterranean 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 Km^2, equal to approximately 5.5 million football fields or the extension of Switzerland.

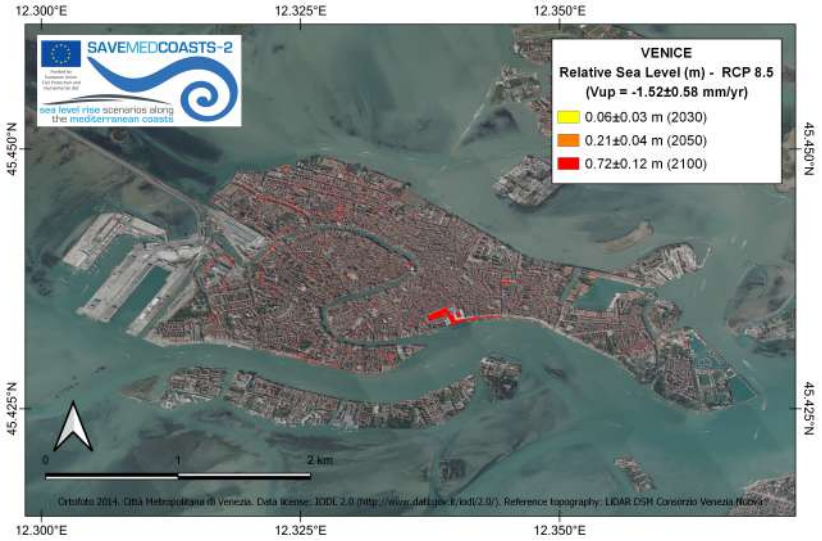
The figures shows some flooding scenarios up to 2100 for Venice and eastern Sicily.

For more information
www.savemedcoasts2-eu

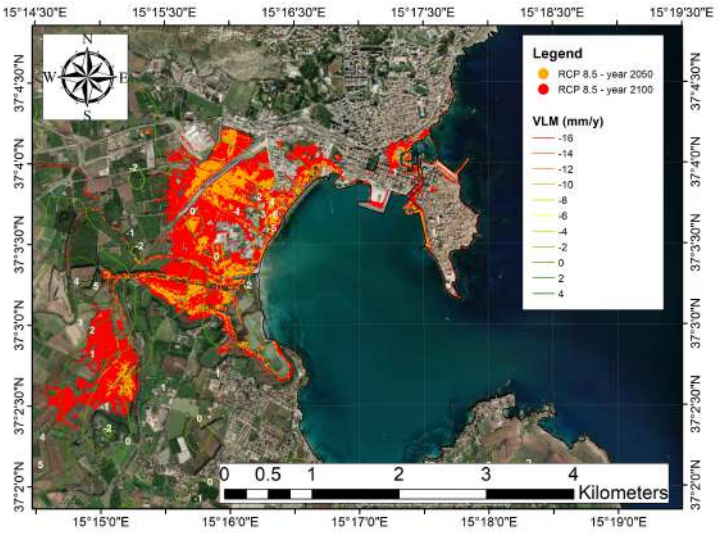
All the space-related INGV flyers are here!



The workflow adopted to estimate 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).



The bay of Syracuse (Italy). In colors are reported the expected extension of land flooding in 2050 and 2100 for RCP 8.5 climatic scenarios for a mean land subsidence at 7±2.5 mm/year estimated from InSAR and GNSS data. The expected maximum loss of land is 2.378 km2 (from Anzidei et al., 2021).