

## **Expeditive assessment of Ionian Lucanian flooding coastal areas due to combined effects of sea level rising and ordinary and extreme storm surge events**

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### **Abstract**

The work moves from the first results proposed by the SAVECOASTMED project (Sea level rise scenarios along the Mediterranean coasts –ECHO/SUB/2016/742473/PREV16) and deals with the implementation of expeditive methodologies for maximum super-elevation level (MSL) assessment at 2100, due to combined effects of sea level rising (SLR) and vertical land motion (VLM) with ordinary and extreme storm surge events on the Lucanian littoral prone to erosion. Such an assessment is of a great importance in coastal flooding areas extension forecasting in order to assess coastal risk and/or vulnerability.

The analysis were performed by the use of expeditive methods based on linear wave theory and surf-zone hydrodynamics, referring to the analysis of atmospheric and wave conditions by hindcasting methods during the period 1979-2016 for the whole Mediterranean Sea.

In such a framework might be useful to outline that the reconstructed climate wave conditions and the methodology applied arise from a heterogeneous wave data availability due to a not uniformly spreading of wave gauges in Mediterranean Sea. That is, the wave data for the Lucanian coastal area and for each return time have been derived through the omni-directional analysis addressing to a quick assessment of the potential flooding areas for different return time and boundary condition induced by the cumulative effects of the different components of sea level rising and vertical land motion.

Furthermore, an advanced open source complex numerical model was used and applied to simulate the potential scenarios induced by storm surge events coupled to sea level rise in the pilot sites. The approach is finalized to the strongly related to deliverables of the action E.3 - Assessment of coastal flooding risks scenario changes induced by severe storm events and erosion dynamics.

In such context, hydrodynamics and wave processes were simulated by Delft3D package with “online coupled wave-flow” model. This type of dynamic interaction takes into account the effect of wave on current and the effect of flow on waves. In detail, the flow field is repeatedly computed by the hydrodynamic module and is provided to the wave module at the coupling time steps.

Finally, the potential flooding areas mapping due to the combined effect of sea level rising (SLR) and vertical land motion (VLM) with ordinary and extreme storm surge events have been proposed in order to define flooding risk scenarios for the Ionian Lucanian coast.