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Easing entry barriers into coastal flooding risk analysis for both end users and researchers: the development of a climatic open-access tool

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The coastal zone is one of the most demanded areas for accommodating activities, people and resources. Characterized by an increasing density of population and hosting important commercial activities, they constitute habitats of high socioeconomic value. In fact, more than 60 % of the world population live at a distance lower than 100 km from the coast (Vitousek et al., 1997). The downside of this coastal development is their exposure to natural hazards such as storm surge, extreme waves, tides and high river flows. Furthermore, the climate change represents a future seriously threat (Vousdoukas et al., 2017).

Climate analysis constitutes the first step for the assessment of the climate change impacts and risk management. In the last few years, relevant advances have been done in this field. However, tools and results are frequently excessively complex and time-consuming for stakeholders and end-users; as a consequence, there is a need for developing simpler tools. The main objective of this work is to develop a climatic open-access and user-friendly tool that simplifies the labour of analyzing the joint behavior of the concomitant climatic drivers to either scientists and coastal managers.

This tool integrates four modules: (1) reading the drivers descriptors time series, (2) basic climate analysis including histograms, kernel density functions and a complete summary of the data (among others), (3) fit of the theoretical distribution function to the data for the medium regime and (4) extremal analysis through “Peak Over Threshold (POT)” approach. Those modules, developed in Python, and the respective datasets, can be easily integrated in larger multidisciplinary applications allowing scientists to characterize the maritime, atmospheric and fluvial drivers in the analysis of the climate impacts.

The tool has been applied at different locations along the coast of the Iberian Peninsula. Results, that will be expanded during the Congress, highlight the potential of the developed software, whose methodology can be easily extended to other coastal areas worldwide. The software intends to help managers handling the impact of the environmental drivers on coastal urban fronts through the characterization and simulation of the main drivers and their variability. Therefore, this tool constitutes a preliminary and unavoidable step in the decision-making process for the assessment of the flooding risk.

References:
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