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Set-up and validation of a Delft-FEWS based coastal hazard forecasting system

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European coasts are increasingly threatened by hazards related to low-probability and high-impact hydro-meteorological events. Uncertainties in hazard prediction and capabilities to cope with their impact lie in both future storm pattern and increasing coastal development. Therefore, adaptation to future conditions requires a re-evaluation of coastal disaster risk reduction (DRR) strategies and introduction of a more efficient mix of prevention, mitigation and preparedness measures. The latter presumes that development of tools, which can manage the complex process of merging data and models and generate products on the current and expected hydro-and morpho-dynamic states of the coasts, such as forecasting system of flooding and erosion hazards at vulnerable coastal locations (hotspots), is of vital importance. Output of such system can be of an utmost value for coastal stakeholders and the entire coastal community. In response to these challenges, Delft-FEWS provides a state-of-the-art framework for implementation of such system with vast capabilities to trigger the early warning process. In addition, this framework is highly customizable to the specific requirements of any individual coastal hotspot. Since its release many Delft-FEWS based forecasting system related to inland flooding have been developed. However, limited number of coastal applications was implemented.
In this paper, a set-up of Delft-FEWS based forecasting system for Varna Bay (Bulgaria) and a coastal hotspot, which includes a sandy beach and port infrastructure, is presented. It is implemented in the frame of RISC-KIT project (Resilience-Increasing Strategies for Coasts – toolKIT). The system output generated in hindcast mode is validated with available observations of surge levels, wave and morphodynamic parameters for a sequence of three short-duration and relatively weak storm events occurred during February 4-12, 2015. Generally, the models' performance is considered as very good and results obtained – quite promising for reliable prediction of both boundary conditions and coastal hazard and gives a good basis for estimation of onshore impact.