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OVERTOPPING WAVES AND HYDRODYNAMIC LOADS ON COASTAL STRUCTURES

For several decades, intensive coastal urbanization has led to an increasing exposure of people and infrastructures to oceanic hazards. Overtopping phenomenon and the mechanical impacts of waves during storms events are the cause of many relevant episodes in term of human and material damages. Climate change, which is leading to a rise in the mean sea water level and possibly an intensification of extreme oceanic events (Slangen et al., 2014), is an important negative factor which further increase the exposure of coastal areas to overtopping waves risk in the next few decades. Consequently, it now seems crucial to improve our understanding of the processes at play during storm periods, and in particular to develop robust methods to quantify and forcast the impact of storm waves on the coast at the local scale, in order to define the best protection strategies. This new knowledge, as well as the associated analysis and forecasting tools, should support the action of public authorities in managing coastal risks.

For this first year of PhD, in addition to a consequent work of subject understanding and definition threw a bibliographical work, two main objectives were followed:

- Over the last decades an important work of research was conducted to increase knowledge on overtopping waves using data exploitation from controlled laboratory experiments. However post overtopping wave impact is still not characterized using quantitative data recorded using real case field measurements. We are now working on the development of a mobile acquisition system to measure overtopping wave loads on a vertical structure in the Bask Coast.
- The second effort resides in modeling the differents processes that lead to overtopping events using a phase resolving depth averaged Boussinesq numerical model BOSZ developed by Volker Roeber. A current work consists in studying the ability of the code in reproducing wave dynamic at the toe of a dike in a very shallow environment and relevant overtopping quantity like the mean overtopping discharge, the maximum discharge and evolution of post overtopping bore characteristics on top of a dike.