Research on Coastal Erosion Mitigation

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Coastal zones are subjected to several maritime hazards, capable of causing coastal erosion. These zones are under high anthropogenic pressures, requiring a thoughtful management in order to protect society, economy and natural environment. Thus, research is being developed to contribute for the process of coastal management, considering the generalized coastal erosion and shoreline retreat. Therefore, several works were published in 2017 that contribute for this subject.

A GIS-based tool that aims to provide a quick assessment of coastal erosion risk was developed. The simple processes and small amount of data required by the tool provides an alternative to other methods, which are often more complex and difficult to apply. The tool provides a hierarchy of the erosion risk locations. Then, numerical modelling of the shoreline evolution in these risk areas is important to understand the complexity of the coastal processes and to support coastal zone planning and management.

Research related with different types of interventions is improving the modelling capacity. Short- and long-term coastal morphologic changes in response to artificial beach nourishment operations were investigated, contributing to the ongoing discussion about the effectiveness of nearshore nourishments, especially in context of an energetic environment. Improving the simulation capacity of the cross-shore nourishments evolution towards equilibrium was also investigated, by applying a numerical cross-shore profile evolution model.

Finally, artificial nourishment impacts based on laboratory works were also performed, at Oporto University laboratories. Two physical models were developed, with and without artificial nourishments, being compared the performance considering the longitudinal sediment transport rates. Longitudinal rocky revetments and submerged detached breakwaters performance was also discussed based on numerical tests, considering the cross-shore behavior and the impacts on the shoreline.