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Beach hazard and susceptibility to inundation and erosion. Case studies in the west coast of Portugal.

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Hydrodynamic forces over the beach sediments are the main driving factors affecting the frequency and magnitude of morphological changes in beach systems. In most of the time, this driving factors act in a foreseeable way and don't represent any danger to the coastal systems nor to its populations. However, hydrodynamic forces are also capable of induce high morphodynamic behavior on the beach profiles and very often in a short period of time which endangers people and property and leads to system retreat. The most common consequences of the occurrence of this type of phenomena over the coastal landforms are costal inundation and erosion. Still, many coastal systems, and specially beach systems, have recovery mechanisms and resilience levels have a very important role in the beach morphodynamic state and exposure to potential damaging events assessments.
The wave dominated Portuguese West coast is an high energetic environment during winter, with 2.5m mean offshore significant wave height. Waves with 5 year recurrence period can reach 9.2m and storms are frequent. Beach systems are frequently associated with rocky coasts. In these cases, the subsystems present are beach-dune, beach-cliff and beach-estuary subsystems exposed to NW Atlantic wave climate.
This research aim is to access beach hazard and susceptibility to inundation and erosion. Three beach systems were selected and monitored applying sequential profiling methodology over a three year period (2004-2007). Sta. Rita, Azul and Foz do Lizandro beaches are representative systems of the coastal stretch between Peniche and Cascais, which is a cliff dominate coast.
Results from the monitoring campaigns are presented, including volume budgets, beach face slope changes, berm occurrence and heights and planimetric coastline dynamics. A hazard and susceptibility assessment schema and zonation are proposed, including the parameterization of local flood (i.e. mean sea, maximum spring tide, and storm surge and run-up levels) and erosion potentials (i.e. volume budget and beach planimetric dynamics).