



Temporary intervention for coastal risk mitigation with low environmental impact

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As well known, the ionic coast of Basilicata (Southern Italy) is strongly affected by erosion processes inducing severe critical condition for both urban areas and local tourism economic. Topographic/bathymetric information, collected by different sources like multisource platforms, IGMI cartographic data, airborne and satellite imagery, as well as echo-sound, clearly outline such processes staging from the early '50 with an increasing rate observed in the '60-'80 period. These phenomena have different features and effects in both southern and northern parts of the coastal area, between Sinni - Agri deltas and Basento - Bradano deltas respectively, compared to the central littoral area, located between Agri - Cavone - Basento deltas. Such different effects are relevant in terms of maritime vulnerability and shoreline changes sensitivity mainly due to the drastic reduction of sediment supply from river catchments induced by human activities, land use changes, land defence interventions water resources infrastructures and management interesting all the Lucanian river basins.

Further, in the last 15 years, coastal erosion produced critical effects on the Metaponto Lido area, located in the northeast part of the littoral, and characterised by typical fine sandy beaches with a shoreline of about 6 km, gently sloping off shore by 1-2 %, branded by the presence of 2 and 3 orders of natural bars. The urban area has a sea side town village with a longshore promenade water front designed for rehabilitation and requalification of the beach fruition.

The widespread presence of permanent and seasonal structures, built on the longshore sand dune close to the foreshore, amplified the wave actions increasing the local erosion rates.

The severe winter and spring sea storms in 2008 and 2009, emphasized the erosion intensity and trend until to induce structural falls and partial collapse of the promenade, changing the scenario from "ordinary" environmental risk up to civil protection setting due to the increasing coastal inundation risk. Further, during the spring 2009, a simply beach nourishment, of about 50.000 m³, was easily performed with any stabilization structures such as groins or breakwaters, suddenly eroded during the winter season 2009-2010.

In such scenario, the Department of Environmental Engineering and Physics (DIFA) of Basilicata University and the Regional Authority proposed an experimental temporary intervention with a low environmental impact able to mitigate and contrast the coastal risk. The intervention aimed to reduce the spring storm damage, for both town safety and beach erosion, arranging a "no structural" stone barrier all shore long periodically moved out-beach once the storm set down. Such maintenance, performed during the spring season 2010 produced a natural beach nourishment with a sensitive average coastline advancing. The temporary intervention allowed the reduction of fill sand volume for the summer 2010 re-nourishment at 5.000 m³, to be located only in few parts of the interested littoral with extremely positive effect for public finance and local tourism economy. The maintenance activities have been performed even during the spring season 2011 employing the same used materials and obtaining a positive effect on the beach extension too. The temporary character of the intervention, of course, does not avoid the structural works to be further achieved for coastal protection and erosion mitigation.