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Coastal erosion in Sicily: geomorphologic impact and mitigation (Italy)

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The coast of Sicily region stretches about 1400 km, bathing three different seas: the North tract, from Messina to Capo San Vito wash to the Tyrrhenian Sea, the oriental side, from Messina to Capo Passero, wash to the Ionian Sea, and finally the southern side wash to the Mediterranean. Of these, 395 km are made up of beaches and 970 km from rocky shores. The coastal morph-type were analyzed in relation to their evolutionary trend (backspace or advancement of the seaside), can be summarized as follows: a low shores of torrent plain (Messina), low shores with salt (Trapani), low shores beaches edged with dunal systems, subject to backspace, where urbanization has reduced or eliminated the internal sand dunes, shores on marine terraces, with beaches at the foot (Agrigento) and high shores non-affected of real phenomena of backspace, but subject to often dangerous events of detachment and collapse of blocks (high rocky shores).
The marine and coastal environment is a complex and articulated, in balance with the Earth's environment, in which live together, but through different dynamics strongly interacting, ecosystems and marine ecosystems typically transition. The increasing density of population concentrated along the shores, the gradual expansion of activities related to the use of marine and coastal resources, are some of the issues that threaten the delicate balance of nature and the sea coast.
The sicilian coastal areas most subject to erosion are those in Ragusa shores areas in south-eastern of Sicily, where the critical areas interesting low coastline and high shores. Following the coast, between Capo Peloro and Milazzo (Messina),where the erosion affects the coast with a low of about 23 km. In the coastal between Capo St. Marco and Capo Feto (Trapani) the critical areas interesting the low coastline and, in part erodible bluffs. One of this case is localized in the town of Mazara del Vallo. In general, the phenomenon erosive affects almost all the sicilian coastal units, in low-coastline and mountainous, with average rates of 29%.
The main methods available today for the protection of coastlines in Sicily, are falling in the first approximation in hard (structural), and soft and soft, based not only on nutrition artificial beaches but also on interventions with low environmental impact as the reduction of losses sediments.
The right approach is not only in stabilizing the various shores, but also in not induce or accelerate the erosion of the adjacent areas. Indeed this impact accompanies almost all the hard interventions achieved in past years.
It is essential to carry out a verification of the effectiveness of the defence of the coast from erosion and structural interventions of nourishment in terms of impact on coastal marine and coastal environment. We started a series of experimental analysis based on the application of new techniques for relief based on remote sensing as the major techniques performed with satellite radar (SAR), measurements morph-altitude high resolution made with the laser system by plane (LIDAR) and precise measurements on the behaviour of works and river mouths with intelligences cameras.
The most dominant climate change involve the precipitation and temperature. Temperature is particularly important in snow-dominated basins and in coastal areas, the latter due to the impact of temperature on sea level. Moreover we must say that (as mentioned in 4th Report IPCC) the shores are projected to be exposed to increasing risks, including coastal erosion, due to climate change and sea level rise. Infrastructure in coastal areas is vulnerable to damage from sea-level rise, flooding, and other storms. This effect will be exacerbated by increasing human-induced pressures on coastal areas.

Keywords: erosion, shores, coastal defend, monitoring.