

Case Study 3: Romanian Coastline.

The Romanian coast has a length of 244 kilometres and is located in the North Western part of the Black Sea. In what regards its genesis, geomorphology and also uses, the Romanian coast can be divided in two units (fig. 1). The Northern unit consists of low lying sandy beaches in front of the Danube Delta, belonging to the Danube Delta Biosphere Reserve (UNESCO MAB and RAMSAR nature sanctuary). Beaches are made of Danube-born alluvia redistributed by waves and currents. The South littoral unit stretches from Cape Midia (Northern border of Mamaia Bay) to the state border with Bulgaria in the South. This unit consists of soft-rock cliffs separated by sandy barrier beaches. The two units are separated by the protection jetties of Midia Harbour. These jetties, that stretch 5 kilometres seawards, represent an impermeable boundary in the general alongshore southwards sediment drift.



Figure 1: Romanian coastline

Three case study sites are selected for this project:

- 1) Portita – Edighiol barrier beach on the barrier beach separating the Razelm – Sinoe Lagoon System from the Black Sea, in the North littoral unit. This barrier beach contains the former Portita Inlet (closed four decades ago when Razelm Lagoon was transformed into a freshwater lake) and other two active inlets from Sinoe Lagoon. The barrier beach is affected by erosion, with active overwash phenomena. It is part of the Danube Delta Biosphere Reserve. The coastal erosion will most probably contribute to the breaching of the barrier beach, with the subsequent change in salinity of the Razelm Lagoon and all the changes in the ecosystem.

- 2) Mamaia barrier beach – unites Midia Cape and harbour to the city of Constanta and contains the most developed coastal mass tourism resort in Romania. The barrier beach separates the Siutghiol Lake from the sea, and is located in the South littoral unit. It is affected by erosion and has been subject in time to a series of coastal protection measures that involved the building of hard defense works (detached breakwaters, groynes, jetties) and artificial nourishment. The Mamaia frontage is at high risk of short term erosion, particularly from extreme storms from the north and east. The southern end of the bay is most vulnerable. Significant storms from certain directions could result in mass sediment transport offshore, with long term negative effects. These storms risk to affect the existing infrastructure. Risk of loss of lives in case of extreme storms exists as well in the low lying areas. Moreover, should erosion of the barrier lead to a breach, there is a risk of saltwater intrusion, that could endanger the drinking water supply source for the city of Constanta, which consists of several groundwater abstraction wellfields, located around the Siutghiol lake. Thus the whole population in the area of Constanta city would be directly affected.

- 3) Eforie North – Eforie South barrier beach – mass tourism site in the Southern Unit of the Romanian littoral. Northern and southern boundaries are Eforie North and Eforie South towns (and coastal mass tourism resorts) – consisting of soft rock cliffs with small artificial beaches protected by hard defense works. Eforie beach has been suffering from accelerated coastal erosion due to the development of the harbor of Constanta (the biggest in the Black Sea) that contributed to the drastic change in current and waves directions – as well as in the dynamics of coastal sediments. Erosion here affects houses and touristic objectives, as well as the coastal infrastructure. The hypersaline lake of Tekirghiol (site of high ecological value) is at risk of losing its characteristics because of the breaching possibility along the Tekirghiol barrier beach.

Impact of climate change on the selected case study sites regards mainly the effects of an increased number of extreme storms. Changes in temperature may also affect the existing coastal ecosystems, but these hardly affect the beach stability. Sea level rise is another important signal considered when developing the masterplan for the protection against erosion. All these issues were considered in the Masterplan, but since its development none of the foreseen „hard defence” works has been completed yet.

References

HALCROW and GeoEcoMar Report “Coastal Dynamics and Sedimentology Studies”, September 2011, Master Plan for Reduction of Coastal Erosion on the Black Sea Coast