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GIS-based coastline segmentation for human impact assessment

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The study presents an example of developed GIS methodology applied to detailed segmentation of a part of the Bulgarian Black Sea coast by natural and technogenous compartments as a part of geospatial database, which have been established in the Bulgarian Oceanographic Data Center. GIS application is illustrated as a case study on a coastal section, located at the North Bulgarian Black Sea coast, between cape Ekrene on the north and cape Galata on the south, with 31 494 m length of the coastline. The research aims to identify natural landforms and human structures in the study area in order to assess the anthropogenic impact on the coastline. Two types of data sources were used for mapping and classifying different coastline segments: data extracted from maps and GPS survey data. Topographical maps in scale 1:5 000, published in 1983 and nautical maps in scale 1:10 000, published in 1994 were scanned, geo-referenced and digitized in GIS environment. The detailed field research in the coastal section between capes of Ekrene and Galata were carried out in May 2007 by means of GPS "Garmin 12". Digital photographs were taken as the most representative illustration of each of identified segments and were included in the Web GIS. Data proceeding, mapping of natural landforms and human structures, and analysis of technogenous impact on the studied coastal area were performed with tools of GIS ArcInfo 9.2. In result, the segmentation of the coastline between two capes was implemented. 117 various segments with total length of 42245 m were identified and mapped along the study area. The collected and produced information for the coastal section between capes of Ekrene and Galata supported by advantages of GIS capacity provides establishment of initial spatial database, which can be easily and incessantly upgraded with other types of investigations and information. The ability to add new data sets (such as aerial, satellite, DGPS etc.) allows to enrich generated coastal database for the Bulgarian Black Sea shoreline.