DEVELOPMENT OF AN INVENTORY OF HELLENIC BEACHES

A. Karditsa [1], S. Poulos [1], A. Velergakis [2], O. Andreadis [2], A. Rigos [2], G. Alexandrakis [3*], S. Petrakis [1] and G. Ghionis [1]
[1] Faculty of Geology and Geoenvironment, National and Kapodistrian University of Athens,
[2] Department of Marine Sciences, University of the Aegean
[3] Foundation for Research and Technology - Hellas - alexandrakis@iacm.forth.gr

Abstract

The present investigation introduces the development of a beach inventory in Greece, which records gather and depict information for beaches. The inventory constitutes a valuable tool for the sustainable use, exploitation and the management of beaches according to the national and EU legislation and directives. The information recorded in the database comprises the spatial characteristics (i.e. shoreline length and orientation, beach width and area), artificial structures and land use (i.e. touristic and residential data) of the broader coastal zone. Along the Hellenic coastline (with the exception of the deltaic shorelines) 7384 beaches have been identified, digitized and statistically analyzed, with a total length of some 2700 km and a total area of ~52 sq. km.

Keywords: Coastal management, Gis, North-Eastern Mediterranean

Introduction

The Hellenic coastline, which accounts more than 16000 km, hosts hundreds of beaches that constitute a great touristic destination and a significant economic asset [1]. On the other hand beaches appear to be very vulnerable systems with 36% of the Hellenic beaches to be currently under erosion [2]. However, until recently, no organized quantitative information existed on their physicogeographical characteristics. Therefore, the development of a database that incorporates all relevant data, in the form of a National Inventory, can be a valuable tool for the sustainable use and exploitation of the coastal zone and the management of beaches according to the national and EU legislation and directives (e.g. Directive 2014/89/EU - Marine Spatial Planning, Directive 2008/56/EU - Marine Strategy).

Methodology

A GIS-based dynamic database of the Hellenic beaches has been constructed, based on the orthorectification and digitization of satellite images available through *Google Earth*. The information recorded in the database comprises the spatial characteristics (i.e. shoreline length and orientation, beach width and area), together with information concerning artificial structures, and land use (i.e. touristic and residential data) of the broader coastal zone (see fig.1). The initial information extracted from satellite imagery is gradually verified and enriched with field measurements and observations. Other beach attributes (e.g. beach sediment type) are also stored in the database, using data from photographic material of the *Google Earth* application and in situ observations.

Results and Discussion

Along the Hellenic coastline (with the exception of the deltaic shorelines) 7384 beaches have been identified and digitized with a total length of some 2700 km and a total area of ~52 km^2. More than 50% (3950) of these are island beaches. A preliminary statistical analysis of their attributes showed that Hellenic beaches are generally limited in size (max beach width) with >67% of all beaches being less than 25 m wide and only 24% having widths between 25 and 50 m. Moreover, <6% of the beaches have widths of 50 - 75 m, ~2% of 75 - 100 m and ~1% >100 m.

With respect to beach material, about 40% of the beaches are sandy, about 28% consist of gravel and about 25% have mixed material (sand and gravel). The remaining 7% relates to beachrocks, artificial beaches and low-lying rocky coasts. Considering the economic product of the beaches, approximately 56% of them have little or no tourist activity and ~22% present limited tourist development. Almost 19% of the beaches are touristicaly developed and an additional 3% are extensively exploited. No direct relationship was found between the degree of tourist development of a beach and the sediment type of the beach zone. On the other hand, more than 70% of the coastal zones with existing coastal residential areas are associated with intensively exploited beaches. These beaches frequently (>75%) incorporate also some kind of artificial structures.
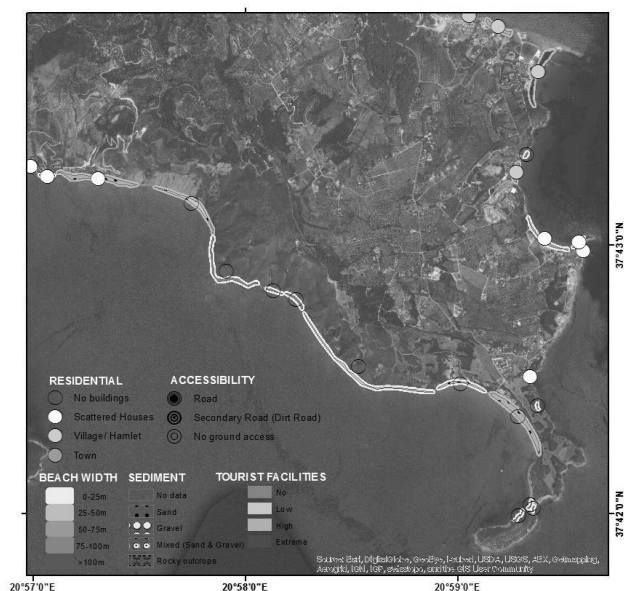

Fig. 1. Visual of the GIS-based inventory of the Hellenic beaches (Laganas Gulf, Zakynthos, scale 1.25 000).

Acknowledgements

References

1 - UNECE (2013) Climate Change Impacts and Adaptation for International Transport Networks. Expert Group Report, Inland Transport Committee. United Nations Economic Commission for Europe ECE/TRANS/238.
2 - Alexandrakis, G., Ghionis, G., Poulos, S.E., and Kampanis N.A., 2013. GREECE, in Coastal erosion and Protection *In* Europe: A Comprehensive Overview, E. Pranzini, A. T. Williams (Eds.), EARTHSCAN Ltd, London, UK, 355-377.