Relational spatial databases for the study of erosion rates and the accommodation space in the coast of Andalusia.

Antonio Prieto Campos (1), Pilar Díaz Cuevas (2), José Ojeda Zújar (3), and Juan Pedro Pérez Alcántara (4)

(1) Department of Physical Geography, University of Seville, Seville, Spain (pcampos@us.es), (2) Department of Physical Geography, University of Seville, Seville, Spain (pilard@us.es), (3) Department of Physical Geography, University of Seville, Seville, Spain (zujar@us.es), (4) Department of Physical Geography, University of Seville, Seville, Spain (jpperezalcantara@us.es)

During last decades, several members of the Research Group RMN-177 "Ordenación del Litoral y Tecnologías de la Información Territorial" of University of Seville have been developing different strategies for the production, management and dissemination of coastal data, including shoreline data model, shoreline mapping and erosion rates for the Andalusian coast (South Spain).

The integration of thematic information on shoreline segments used for erosion rate calculations, and their incorporation into a PostgreSQL-PostGIS relational spatial database, has allowed the generation of several indicators at a detailed scale (1: 2500), such as presence of dunes, erosion, width of the beach, and vulnerability among others. The objective of this work is to present the results of an updated shoreline data model that allows the analysis of the "accommodation space" in Andalusian beaches and their relationship with the erosion rates.

In this work the "accommodation space" is understood as the availability of free space (absence of anthropic constructions) with sedimentary substrate that allows the retreat of the coast, and thus its natural adaptation to the increase of erosive processes. This information, integrated to each shoreline segment (topologically independent parts of the coastline), is essential for understanding the future evolution of Andalusian beaches and its resilience. The results obtained for the 2013 coastline analysis showed that a high percentage of Andalusian beaches have reduced their accommodation space, disappearing in some sectors of this coast (especially in the tourist sectors in the Mediterranean Coast). As it was expected, the beaches with the greatest available accommodation space are associated with the presence of sand dune formations, more frequent in the Atlantic façade. The integration of this variable and the erosion rates calculated in the medium / long term will make possible the extraction of beach vulnerability indicators in a context of future erosive processes.

The integration of all data and results of this work into a relational spatial database (PostgreSQL / PostGIS) has not only been essential throughout the methodological process, but also constitutes an essential element for the processes of data dissemination by means of generation of Open Geospatial Consortium (OGC) interoperable services and a web-based viewer developed with the open source "Leaflet" library.