



Monitoring the changing position of coastlines using Landsat TM imagery: an example from the Pinios river, Greece

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The transport of sediment from the waters of a river and deposition at the mouth of the resulting extension of the land in connection with the sea and hence the change of coastline due to soil erosion and deposition is a topic of major concern for coastal zone management. These deposits take the shape of the Greek letter «Δ, Delta».

Pinios River is one of the longest rivers in Greece, flowing from the Pindus Mountains into the Aegean Sea. In its river estuary it is formed a Delta that has an opening of a 13 Km in the coastline. The delta of Pinios is extremely rich and fertile and is an important ecosystem. Apart from the products of erosion and weathering of rocks from the upstream to the river are also carried many nutrients. The Pinios Delta, due to its highly dynamic nature, provides a very good case to develop remote sensing techniques for monitoring coastline changes.

This paper presents the results of an experiment conducted investigating the extent to which Landsat Thematic Mapper (TM) multispectral imagery can be used to detect changes in the position of the Pinios Delta coast, since the launch of the satellite in 1984. Comparing positions of the Pinios Delta coast from a time series analysis of TM images acquired over the region using region-growing image segmentation and photo interpretation techniques allowed areas of rapid change to be identified. Erosion and deposition rates were also possible to be estimated crudely, pointing out the regions in which transform appeared to be increasing.

The technique presented here has also a potential to enhance conventional field-based surveying for monitoring shoreline changes over long timescales.

KEYWORDS: *coastline mapping, coastal sedimentation; littoral erosion; Landsat TM, remote sensing, geographic information systems, Pineios Delta, Greece*