

REMOTE SENSING INVESTIGATING OF COASTLINE AND LAND USE CHANGES IN KIZILIRMAK DELTA

Cem Gazioglu¹ *, Edip Muftuoglu², Volkan Demir¹ and Zeki Yasar Yasar¹

¹ Istanbul University, Institute of Marine Sciences and Management, Department of Marine Sciences and Management, Berkarda Remote Sensing and GIS Lab., 34116 Vefa Istanbul Turkey - cemga@istanbul.edu.tr

² Istanbul University, Institute of Marine Sciences and Management, Department of Physical Oceanography and Marine Biology, 34116 Vefa Istanbul Turkey

Abstract

Deltas are very important systems due to their unique features which is very vulnerable. Remote sensing has been widely used in various applications for ocean and coastal investigation. In this study focused on applying remote sensing technology to monitor the rapid varying of coastline and land-use changes of Kızılırmak Delta. Which are very difficult to be measured timely and quantitatively. LANDSAT TM, LANDSAT ETM+ and ASTER data were used to in this study to obtain the information about coastline and land-use change.

Keywords : Black Sea, Remote Sensing, Gis.

Kızılırmak Delta is the biggest deltas along the southern margin of Black Sea. It is approximately 21,700 ha area. The Kızılırmak Delta was formed by sediments deposited by the Kızılırmak River which is the longest river in Turkey and drains an area of 78 646 km², 1355 km length, 5.9 (km³/y)3 water input to the Black Sea. Average annual sediment load and water inputs of the Anatolia rivers are estimated at 24 million t/y (ca 20 of the total sediment carried into Black Sea) and 40 km³/y. The delta as a whole is 56,000 ha in extent and wetland area is 16.110 ha. Shallow lakes found on delta area. Large parts of the site are flooded during winter and spring. The average annual rainfall is 719 mm. It contains dunes, beaches, seasonal marshes, wooded areas and shallow lakes (the depth of the lakes is on average 1.5 m. max. 3 m. in spring). All the lakes are fresh (except Balık Lake which is brackish as a result of its connection to the sea).

importance in particular sciences which is essential to understanding their interconnectedness. The repetitive acquisition and synoptic capabilities of remote sensing technologies can be exploited to provide timely spatial data for coastal GIS, enabling detection and monitoring of coastal zone of deltas. GIS for coastal zone is used to store information with a geographic parameters to investigate interactions among different parts of systems, which is described by collected data and information, and to manage complex and delicate environmental structures of coastal zone. A standard GIS is a computer based decision support system for the manipulation and analysis of spatial information in which there is an automated link between data and their geographic position. A standard GIS also consists of hardware and software for entering, storing, transforming, measuring, combining, retrieving, displaying and performing mathematical operations on thematic data that have been registered to a definite coordinate system [1].

In this study, satellite data (LANDSAT TM ,1980; LANDSAT TM ,1987; LANDSAT ETM, 1999 and ASTER, 2004) and DTM (ASTER data) (Figure 1) data was used for coastline and landuse change.

Reference

Gazioglu, C., Yücel, Z.Y., Burak, S., Doğan, E., and Müftüoğlu, E. "Geomorphological Features of Kızılırmak Delta" MEDCOAST 2005.

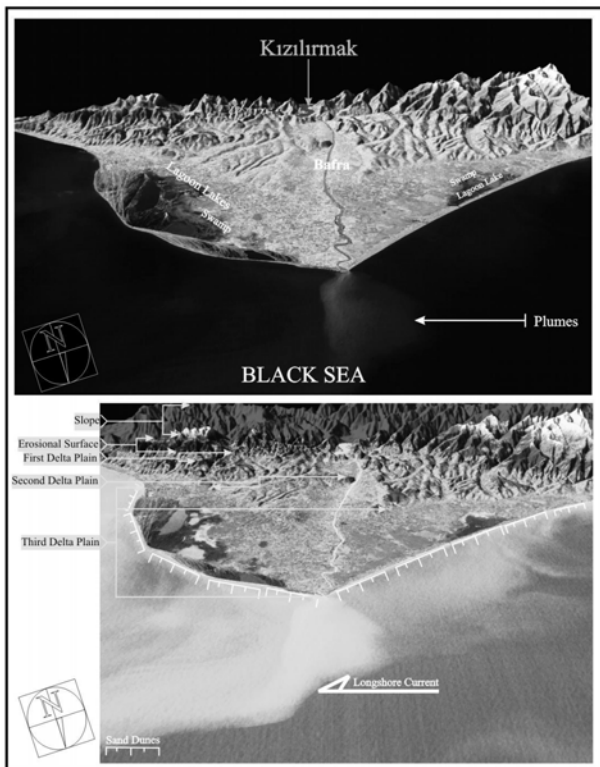


Fig. 1. Perspective view of KIZILIRMAK Delta (Aster, 2004).

The statement that remote sensing application on Deltaic areas and wetlands has a complex character. Delta and Wetland are complex systems themselves due to the fact that physical, chemical, biological, hydrological and geological processes interact there. Moreover, there are strong connections between delta and its surroundings, which link delta and wetland and adjoined areas to unique systems. The spatial distribution and linkages among land and water of environmental parameters is of key