Geophysical Research Abstracts,
Vol. 10, EGU2008-A-00050, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-00050
EGU General Assembly 2008

Detection of meander migration and river course change using Remote Sensing, GIS, and field data in the Üzümcü River Basin

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Üzümcü is a tributary of Susurluk River in the northwest Turkey. The river has a basin area of 521.5 km^2. The objective of this study is to determine the migration of river bed and meanders resulting from temporal rainfall variations in the Uzumcu river basin. The research area lies between coordinates of 570000 E – 576000 E and 4376000 N – 4381000 N (European Datum 1950 – UTM Zone 35N) in the western Turkey.

In order to determine the meander migration of the river in the area, topographic maps of various dates (1958 – 1973 – 1998), Landsat ETM+ satellite image of the year 2006 and data based on field observations with GPS have been used. ArcGIS Desktop v.9x software has been used to process the data. In this respect, the topographic maps of different dates have been scanned and transferred into computer-environment. Then those maps have been superposed using coordination data. Landsat ETM+ satellite image of the year 2006 has also been geometrically corrected and georeferenced by using the topography at the scale of 1:25,000. Characteristics of the research area and river have been digitized in point, polyline and polygon formats, and using screen digitization. Through overlaying the digitized data, changes on the river bed have been tried to be determined. Transecting vertical cross-sections from the areas where the river bed and meanders migration occurs, analyzes regarding the material length have been performed and by means of GPS, these points have been transferred on the base maps that had been prepared before.

The results of the study indicate that the river course has migrated several times during 1958 – 2006. It has been determined that displacements occurred in meanders and appeared in the flood plain due to rapid changes of the volume of water in the river. As for the river bed migration, it has been understood that the immediate escalation of the stream flow was influential.

Key words: Üzümcü River, meander migration, river bed, deposition, sediment.