



PROCEEDINGS PAPER

Exploration of Wadi Zerka Ma'in rotational fault and its drainage pattern, Eastern of Dead Sea, by means of remote sensing, GIS and 3D geological modeling

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Paper Abstract

The Wadi Zerka Ma'in catchment area is located in the North East of the Dead Sea. It contains a confined river of about 23 km length. The region is characterized by a recent sharp base level drop and a strong orographic control on climatic parameters such as temperature and precipitation. It is controlled by three regional structural systems as follow: 1) the anticline - syncline system (late Cretaceous - end of Miocene) which is a part of Syrian fold arc system; 2) NW - SE faults system which were generated simultaneously and parallel to the Red Sea spreading; 3) NWW - SSE faults system which are perpendicular to the Dead Sea and younger than the Red Sea fault system; 4) NNW - SSE faults system (middle Miocene - until now) which were generated simultaneously and parallel to the active Dead Sea transform fault. The structural setting of the study area was evaluated by means of a three-dimensional (3D) geological model, a digital elevation model (DEM) with resolutions 15 meters and stream profile analysis. DEM generation was performed using ASTER data. We found that the Wadi is located at the junction of two main fault systems. The major feature is a trans-tensional fault displacement which changes from 0 to 200 m. We showed that the catchment area is a result of a rotational fault while the river changes its flow direction according to the different fault system directions. The lower portion of the basin is affected by the major base level drops and display contributing rivers in exceptional non-equilibrium. Thus this catchment allows observing the rapid adaptation of the drainage system to both climatic and tectonic forcing.

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