

## **A quantitative analysis of transverse river profiles and its applications for morphotectonics: A case studying Shatt Al-Arab River, Southern Iraq**

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*(Received: 13 October 2010 - Accepted: 10 January 2011)*

**Abstract** - The present study discussed the quantitative analysis of Transverse River Profile (TRP) on Shatt Al-Arab channel, by deriving several TRP parameters that can be easily quantifiable and comparable. These parameters are useful to detect the morphotectonic indicators of Shatt Al-Arab basin. Five cross sectional profiles were considered from the previous bathymetrical surveys of Shatt Al-Arab channel starting from Qurna (upstream) at the confluence of Tigris and Euphrates rivers towards Fao (downstream). The results illustrated the main rate of controlling the tectonic activity along the river channel by forming of islands bar at the middle of main river course and increasing in its meanders. The applied analytical technique also efficient in detecting the neotectonic activities for subsurface structures and their effects on deflecting and meanders of the river basin.

**Keywords:** Morphotectonic, Transverse River Profile, Quantitative analysis, Tectonic activity.

### **Introduction**

Shatt Al-Arab is formed by confluence of twin rivers Tigris and Euphrates at Qurna town northern Basra Governorate. It is considered as part of Mesopotamian basin. It extends for 120 km within Iraqi lands and 84 km within Iraqi-Iranian boundaries, before running into the Arabian Gulf (Figure 1). Tectonically, Shatt Al-Arab basin is located at unstable shelf, particularly in the Mesopotamian zone, according to the tectonic division of Buday and Jassim (1987). This part is characterized by a very thick sedimentary cover and the subsurface structures are not reflected to the surface. (Less and Falcon, 1952; Buday and Jassim, 1987). Shatt Al-Arab displays different river patterns such as (straight, meandering, and braided). Particularly, meandering and braided patterns specifically appear at its southern part from its course (Al-Azzawi, 1996; Mulla, 2005; Al-Whaely, 2009). The meandering Phenomena were discussed by many geological studies dealing with the subject of fluvial geomorphology. (Richards, 1982; Morisawa, 1985; Knighton, 1998). These studies discussed the causes and factors that led to its presence meandering. The important causes can be summarized as follows; changing in its erosion state from vertical to lateral, differentiation of river banks in erodibility and changes of the gradient of river valley floor due to the tectonics activity.

This study aims to assess the possibility of quantitative analysis method for isolating tectonic factors from the hydrological factors and determine the factors controlling the meandering and braided pattern in Shatt Al-Arab River.