

RECONSTRUCTING THE GEOLOGICAL HISTORY OF THE EGYPTIAN NILE: ASWAN - KOM OMBO PHASE

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The Nile is the longest river in the world, stretching north for approximately 4,000 miles from East Africa to the Mediterranean. Over the past several millions of years the Nile gradually has changed its location and size. Reconstructing the geological history of the Nile and identifying the location of abandoned and now buried paleo-channels and deltas, is an essential step in constructing a land use maps. An initial study area between Aswan and Kom Ombo, Egypt was selected for a geologic and geophysical field survey supported with interpretation of Landsat TM, ASTER and radar SIR-C/X-SAR images. Simultaneously, gravity and magnetotelluric data were acquired along two traverses; one following Wadi Abu Subbaira, east of the Nile while the other one across the Wadi Kubania pre-Nile drainage system, to the west. Gravity data were collected using a Scintrex CG-5 gravimeter and a differential GPS whereas the magnetotelluric data were collected using a controlled source audio magnetotelluric stratagem system. Integration of geologic field mapping, geophysical investigations, and interpretation of different types of remote sensing images were used to construct an improved geological and structural map of the study area. The constructed map reveals; 1- This area is strongly controlled by NE-SW, NW-SE and N-S trending basement structures, largely faults; 2- The evolution of these distinct fault sets was largely controlled by the Red Sea tectonics which started ~22 Ma ago. Separation of the Arabian plate from the African plate provided NE-SW extension which subsequently resulted in the development of deep NW-SE grabens (e.g. the Kubania graben) where strain was closely localized because of the presence of older NW-SE trending Precambrian structures; 3- There is a prominent pre-Nile drainage system dominated by W- and NW- drainages emerging from the uplifted Red Sea Hills prior to opening of the Red Sea; 4- Wadi Abu Subbaira-Wadi Kubania exemplify the pre-Nile drainage system between Aswan and Kom Ombo.

Key words: Egyptian Nile, Magnetotelluric, Aswan

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