The Bahariya River: A Paleodrainage System in the Western Desert of Egypt

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Based on analysis of Landsat images and Large Format Camera photographs, the region to the east of the Bahariya depression in the central part of the Western Desert of Egypt shows evidence of past fluvial erosional processes. It is believed that the current geomorphology of the region is the result of repeated changes in climate, and the reactivation of ancient, previously established stream networks during moist climatic episodes during the past 200,000 years. Hyper-arid conditions over the last 5000 years have reworked the landscape through deflation and dune formation.

To the east of the Bahariya depression lies a broad plateau of Tertiary age carbonates, that has an overall regional dip to the north. Scarps along the eastern margin of this plateau seperate it from the Nile Valley further east. Lesser scarps abound within the plateau that have varying degrees of erosion on their cliff faces. Numerous sink holes, saline crusts, and sabkha deposits testify to the past fluvial activity in this region. It is inferred that stream erosion of the plateau reached its height during the Messinian dessication of the Mediterranean Sea during the late Miocene.

As these stream systems established themselves, they cut deep valleys into the carbonate rocks of the plateau of the Western Desert of Egypt. A major stream named the "Bahariya River" is deduced to have run through the eastern margin of the plateau, flowing north past the Bahariya topographic high towards the Qattara depression. The northward dip of the terrain supports the hypothesis of northward flowing streams carrying siliceous sediments from the south and depositing them to be reworked southward by wind action. The Ghard Abu-Maharik is, therefor, believed to have its source in the sediments deposited by this river.

Similar geomorphological features in southern Egypt and northern Sudan which were studied using field methods, Landsat images, and Shuttle imaging radar data have established that well-developed late Tertiary age "fossil" streams lie buried under aeolian deposites. Other major defunct drainage systems have been observed in central and western Libya, and in the Great Sand Sea of Western Egypt. The recognition of such ancient streams and their relation to fracture systems and ancient playas have significant implication to the potential of groundwater resources in the Western Desert of Egypt.