

# Abstract

**Akram S Soliman**

## **Combined Effect of Anthropogenic and Natural Sources on Nile Delta Coast Erosion**

The Nile Delta is located on the Egyptian Mediterranean coast and extends for about 240 km from Abu Qir headland at Alexandria on the west to Port Said at the east. Along the Nile delta of Egypt for thousands of years, the Nile River has carried vast quantities of sand derived from equatorial east Africa, displacing the delta coast seaward into the Mediterranean Sea. However, since the late nineteenth century there has been a prolonged period of decrease in discharge on the Nile, essentially caused by a dramatic decrease after the construction of the Aswan High Dam in the 1960s. Shoreline erosion has destroyed coastal roads, recreational facilities and beach resorts at Alexandrai, Rashid and Baltim cities, Egypt. The east of Kitchener drain outlet, east of Baltim city, is under dramatic erosion caused by anthropogenic influence due to cutting off long shore sediments by the detached breakwaters and groins which were used to protect Baltim coastline. More than 103 beach profiles have been surveyed by Costal Research Institute (CoRI) since 2003 to 2013 to monitor coastal surf zone changes. From these extensive surveys, 76 profiles 100 meters spacing have been Selected to cover the coast of the Kitchener drain. Erosion due to continuous multiple protection structures with three different scenarios of protection are studied. These three scenarios are protecting the outfall by two emerged Jetties. Scenario 1 includes 8 detached emerged breakwaters combined with 6 groins while scenario 2 includes 14 eastern emerged groins perpendicular to the shoreline and 4 intermediate groins. Scenario 3 includes submerged breakwater and 10 groins. The three scenarios have modeled numerically by Mike 21 Coupled Model FM program, which is based on 2D Shallow Water Equation. Numerical models have been calibrated and validated by adjusting bed level changes at bed profiles located in the eroded zone. For scenario 1, the analysis of the results shows that bed level change behind detached emerged breakwaters will be 0.05 to .61 m/yr). For scenario 2, groins allow shoreline to be stable with high speeds of water current (exceeds 0.3 m/s). For scenario 3, submerged breakwater protection allows bed level to change (-0.5 to +1m) in structure leeside. Details of the bathymetry maps of the studied areas for the coming eight years are under investigation now and will be presented in the final paper.