

## **The Geomorphic System and the Effects of Human Interference at Gold Coast Beach in Tainan, Taiwan**

Tsung-Yi Lin

National Taiwan Normal University, Department of Geography, Taipei, Taiwan (aeolin@ntnu.edu.tw)

The Gold Coast beach in Tainan, Taiwan, located between Anping harbor and Ur-Jen river mouth, is the subject of this study, which characterizes the beach's geomorphic system through the analysis of information such as sediment grain size, mineral composition, and periodic measurements of morphological changes of the beach. Based upon such characterizations, further analysis is conducted on the effects that human activities of the last 15 years have upon the geomorphic changes within the Gold Coast beach.

The study shows that the median grain size of the Gold Coast beach's sediment is medium sand. The mineral composition includes mainly slate fragments and quartz grains, with small amounts of feldspar, sandstone and shell fragments. Based on a comprehensive study of the longshore distribution of beach sediment size and mineral composition of southwestern coast of Taiwan, as well as, the long-term, monitored data of waves, tides, and currents in this region, we conclude that the main process responsible for the sand accumulation at Gold Coast beach is the prevailing longshore sand transport from south to north. The southern breakwater of Anping harbor plays a role in intercepting the longshore transport sand and helps form the beach. Since the Ur-Jen river flows through a mudstone region, the suspended sediment plume during the flood season does not provide much sediment source to the sandy beach.

A monthly beach profile survey project conducted between the years 1999 to 2000 revealed that the beach elevation and width had experienced an obvious seasonal change. The beach widened during the winter, but narrowed in the summer due to typhoon wave erosion. When the subaerial beach was eroded, a submerged longshore bar that was oriented almost parallel to the shoreline had formed at a distance about 400-600 meter away. With this observation, we can conclude that beach morphology is also influenced by various seasonal wave actions that affect onshore and offshore sand transport.

An astonishing morphologic change at Gold Coast was observed as a 1500-meter reach of sandy beach at the southern end, near the Ur-Jen river mouth, disappeared in just a few years after the year 2005. The beach was not recovered the way it used to be in the winter season. The main reason for this geomorphic change could be the construction of a series of detached breakwaters on the coastal reach that is at the south side of Ur-Jen river mouth. Salients formed behind the detached breakwaters, which could have interrupted the south-to-north longshore sand transport. The Gold Coast became a sand-starved beach recently in the past 10 years, despite efforts of the government to construct more groins in this erosion area.

**Keywords:** beach system, beach sediment, beach morphology, geomorphic processes, geomorphic change