Geophysical Research Abstracts
Vol. 14, EGU2012-43, 2012
EGU General Assembly 2012

Investigating the Hydrodynamics of a Breached Barrier Beach

M. O'Shea and Dr. J. Murphy
Hydraulics and Maritime Research Centre, University College Cork, Ireland

Identifying key drivers of extreme erosion can be relatively straight forward. Severe flooding, large storms and even human interaction have all been responsible for drastically altering the coastline over short time periods. However when events such as barrier breaching occur with no obvious contributory factors, a deeper understanding of the underlying coastal processes is required. Ideally conclusions on morphological drivers should be drawn from field data collection and remote sensing over a long period of time, i.e. decades.

Unfortunately when the barrier beach at Rossbeigh, County Kerry, Ireland, started to erode rapidly in the early 2000's there was no such data collection conducted. By 2008 approximately 1.5million m3 of sand had been eroded and during the winter period of that year the dune breached, resulting in the formation of a barrier island and a new tidal inlet. The initial breach length was 500m but it continued to expand to 750m and then stabilised.

A research project has been ongoing at the Hydraulics and Maritime Research Centre of University College Cork since the breaching event. Assessing the threat breaching presents to local infrastructure, housing and industry is part of this research brief. Topographical surveys, sediment sampling, satellite imagery analysis and numerical modelling have previously been conducted to gain an insight into the morphodynamics of Rossbeigh. An initial analysis of the breaching suggested that erosion had slowed and regeneration of the dune was occurring; however further monitoring indicated that as the breach was stabilising other areas of the barrier beach were experiencing increased erosion. As a result of this a field monitoring campaign consisting of wave and tidal data collection was undertaken in the summer of 2011 to gain a clearer understanding of the hydrodynamic processes influencing the erosion patterns. Wave gauges were deployed along the beach at low water and also 4km offshore. Tidal currents were also measured in the breach area, alongshore of Rossbeigh beach and in the vicinity of the newly formed island. The findings provide a new insight into the active processes. The magnitude of tidal currents, directionality of incident waves at high tide and presence of low frequency infragravity waves along Rossbeigh are significant findings that influence the morphology. As a result of this work existing numerical and predictive models require updating to accurately model the morphology of the barrier beach and identify future threats to the local coastline.