



Analysis of Storm Surges in East Trinidad

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ABSTRACT

BACKGROUND

The island of Trinidad, near 10.6°N 61.4°W, has been described as being outside the “hurricane belt” (Arce 2009, McNair 2007). As such it is not ‘frequently’ affected by Tropical Cyclones. From 1851 to 2009, 20 tropical cyclones have passed within a 60 nautical miles of the island, with only four making landfall. Nonetheless, some systems have produced increases in coastal water levels due to storm surges that have been linked to fatalities (Matroo, 2007). This low frequency is due in part to the proximity of Trinidad (about 1110km) to the equator. A precursor to hurricane formation is a minimum distance of about 500km from the equator, Gray (1968, 1979) in Diaz and Markgraf (2000).

Because of the low frequency of passage, there is a lack of awareness of the impacts of coastal flooding and the likely areas of impact. Results of studies of this kind for Trinidad, if previously done, are not publicly available. This gap in knowledge has exposed many persons and livelihoods to the direct impact of coastal flooding with the threat of inundation. Of particular interest is the east coast of the island which fronts the Atlantic ocean with land use categories of recreational, industrial (South – east), Nariva wetland (Ramsar site), fishing villages and residential.

RESEARCH AIMS and METHODOLOGY

The research aims to identify potential storm surge hotspots on the Trinidad coastline and to quantify surge heights and extreme water levels.

The methodology will include analysis of existing historical tide gauge data and anecdotal investigation supplemented by the use of visual evidence from field investigation of post system events and data recovery where possible. This study is initially limited to surge processes along the Cocos and Mayaro Bays, where there is a main artery roadway : the Manzanilla-Mayaro road.

Field investigation and analysis of any events in the near future will also be conducted to identify ephemeral damage at various scales, using where possible; marine wrack lines, tree scars, high water marks or rafted debris, using GPS and detailed photography. Overland flow depth (water depth above ground) measurements and inundation distance (the straight line distance between the coastline and the maximum extent of saltwater intrusion (Fritz et al. 2008) will also be sought.

ANTICIPATED RESULTS

This study will provide a definitive investigation of any evidence that storm surges from tropical systems in the North Atlantic Ocean do affect Trinidad. The proposed method is intended to overcome the current research challenge of little to non-extant data archives. It will also complement government national reports and allow for independent verification, by providing actual measurements for vulnerability and risk assessment analysis as well as providing a key benchmark data set for numerical models.

References

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