

Cyclone *Hamish* in Hervey Bay: A *Katrina*-like Scenario

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Summary

Severe Tropical Cyclone *Hamish* (Category 5) was the most significant storm to threaten the Queensland coast since Larry in 2006. It was a particularly long-lived storm, taking seven days to travel down almost the entire length of the Queensland coast. Thankfully it remained sufficiently far offshore that its direct impacts on the coast were very minor. However, at one stage of its life, the Bureau of Meteorology was forecasting a potential landfall in the vicinity of Hervey Bay. This presentation explores the possible insurance-related outcome of that scenario through a combination of wind and storm surge modelling and draws comparisons with Hurricane *Katrina*'s 2005 impacts on New Orleans and the Mississippi coast in the USA.

Characteristics of *Hamish*

Subject to final post-analysis by the Bureau of Meteorology, *Hamish*'s estimated minimum central pressure of 925 hPa on Sunday 8th March when well offshore Mackay places it in the "top ten" most intense storms in the Queensland climate record. In comparison, the peak intensity of *Larry* was 935 hPa about 12 hours before landfall and only 960 hPa at landfall. The peak measured wind gust was 220 kph at Flinders Reef and *Hamish* passed reasonably close to a number of other reef-based weather stations that recorded close to 200 kph. It was also well monitored by the network of coastal radars and satellite surveillance throughout its life. A number of computer models were used to assist in the forecast process. Although these models were reasonably consistent in their predictions, there were some periods when a westward turn was indicated as being likely. One of these was when the storm was nearing Hervey Bay.

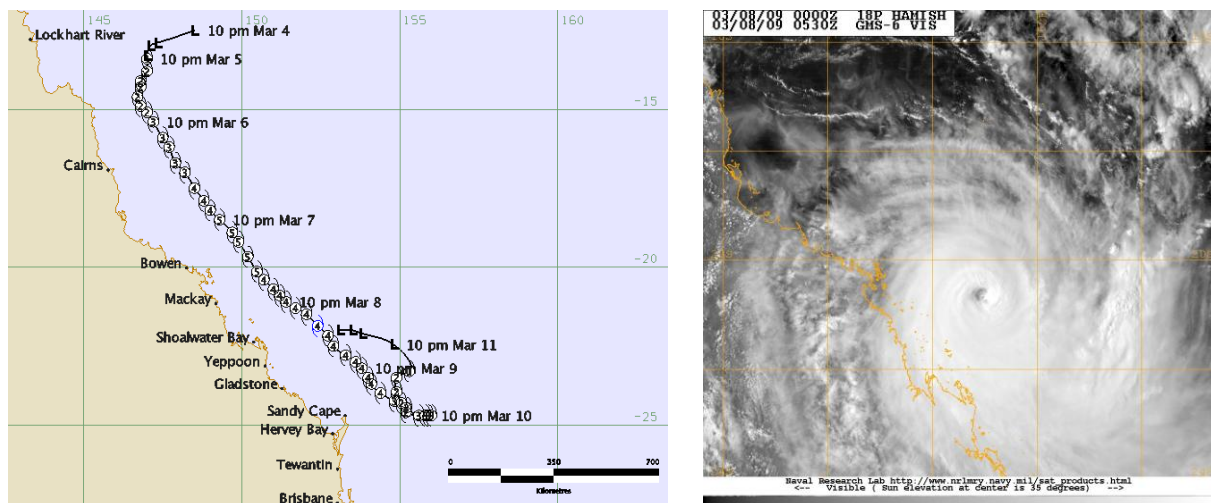


Figure 1: Left: Bureau of Meteorology storm track for *Hamish*; Right : Satellite image of *Hamish* offshore Mackay when at estimated Category 5 intensity (US Naval Research Laboratory image).

Hamish had many characteristics similar to Hurricane *Katrina*. For example, their lifetimes were of similar length, their paths reasonably well predicted and at various times their size and intensity were similar. They also underwent "eyewall replacement cycles", which in the case of *Katrina* was a critical factor in maximising the massive 10m storm surge that decimated the Mississippi coast and, of course, flooded New Orleans. The path of *Katrina*, being perpendicular to the US coast, was more capable of generating a large storm surge, whereas *Hamish*, after it straightened near Cooktown, was mostly parallel to the coast and far offshore.

The Hervey Bay Scenario

The official Bureau of Meteorology forecast issued at 8am on Sunday 8th March (Figure 2) placed *Hamish* near Lady Elliot Island at Category 4 intensity by 7am on 10th March, headed for Hervey Bay and very well aligned with the high tide on the evening of 10th March. As it is well understood that Hervey Bay has one of the highest levels of risk from storm surge along the Queensland coast, this created special concern within Emergency

Management Queensland, which quickly considered options for evacuation of some low lying parts of the City of Hervey Bay (population 55,000).

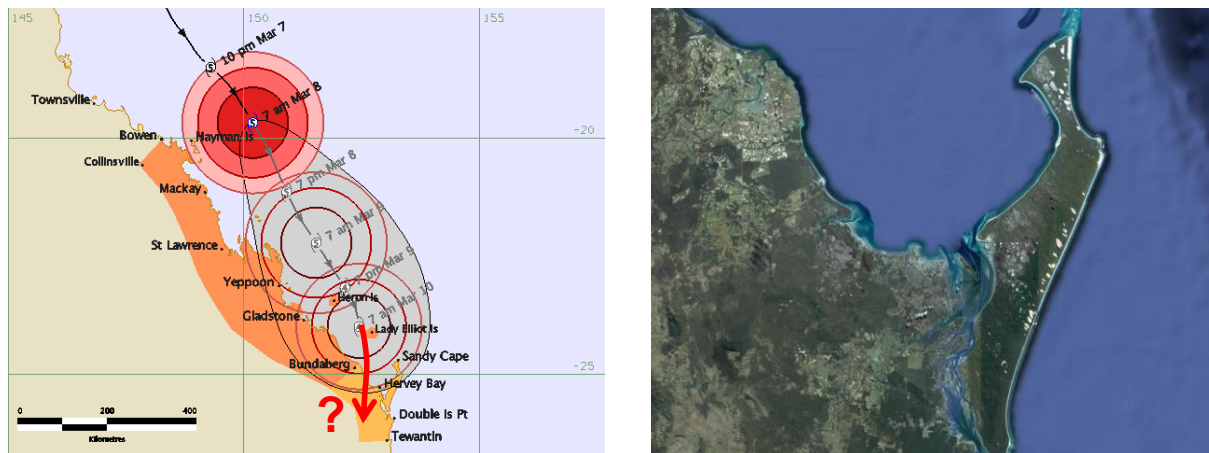


Figure 2: Left: Bureau of Meteorology forecast track 8am 08/03/2009 and the landfall scenario considered; Right : Google Earth image of the Hervey Bay region bounded by Fraser Island.

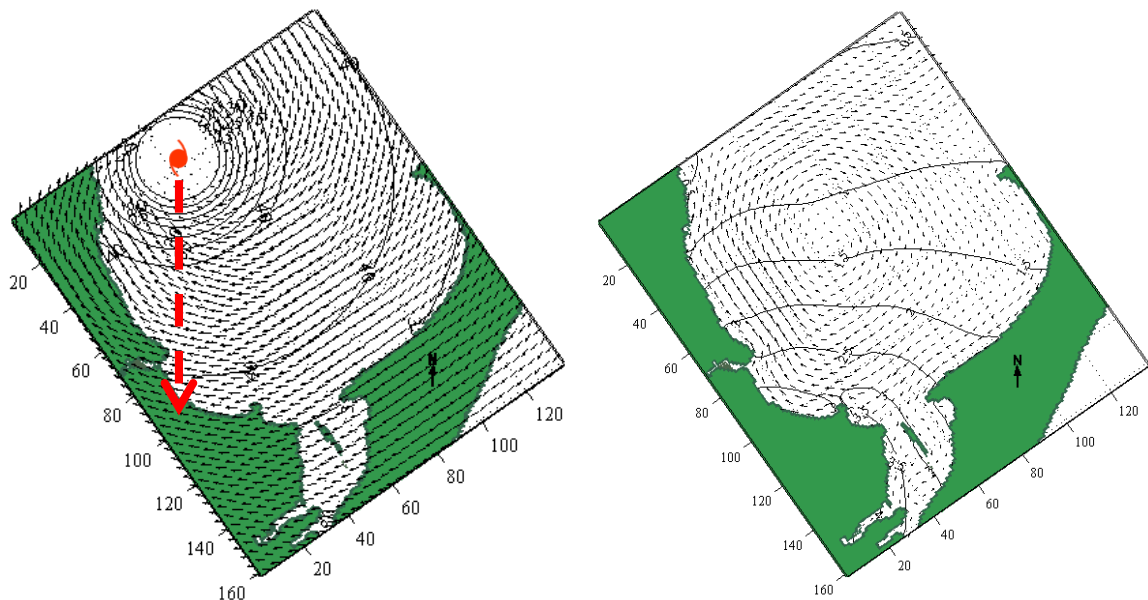


Figure 3: Left: Mean wind speed pattern approaching landfall; Right: Water velocity and storm surge contours.

Outcomes

The predicted total storm tide from this scenario reaches to almost the 6m AHD contour along the Hervey Bay shore and up to 7m AHD further within the Great Sandy Strait waterway, potentially inundating many hundreds of properties. Also, estimated peak wind gusts reach 220 km/hr at Hervey Bay (similar to Cyclone Tracy) and the provincial cities of Maryborough (pop 30,000) and Bundaberg (pop 50,000) both experience wind gusts in excess of 200 km/hr. The estimated wind and storm surge insurance loss impacts from this *Hamish* scenario will be discussed during the presentation and comparisons made with a representative Hurricane *Katrina*.

Acknowledgements

This study was conducted as a part of the Willis Research Network, the world's largest partnership between academia and the insurance industry. The work will be incorporated into the Willis MIRAM insurance loss model to provide higher resolution storm surge loss estimation for the Fraser Coast region. The use of the MMUSURGE model and assistance from Lou Mason at the Australian Maritime College in supplying regional model bathymetry is gratefully acknowledged. Also, Tony Wedd and Ann Farrell from the Brisbane Regional Office of the Bureau of Meteorology provided the preliminary *Hamish* track information.