July 2014

Tropical Cyclone Ita

Storm tide and wave monitoring data

On Wednesday, 2 April 2014, the Bureau of Meteorology (BoM) issued a cyclone watch for a developing tropical low in the Coral Sea southwest of the Solomon Islands. Tropical Cyclone (TC) Ita formed on 5 April and continued to move in a south westerly direction rapidly intensifying into a category 5 cyclone. The cyclone weakened to a category 4 in the hours immediately preceding crossing the coast near Cape Flattery at approximately 22:00 on 11 April (Figure 1).

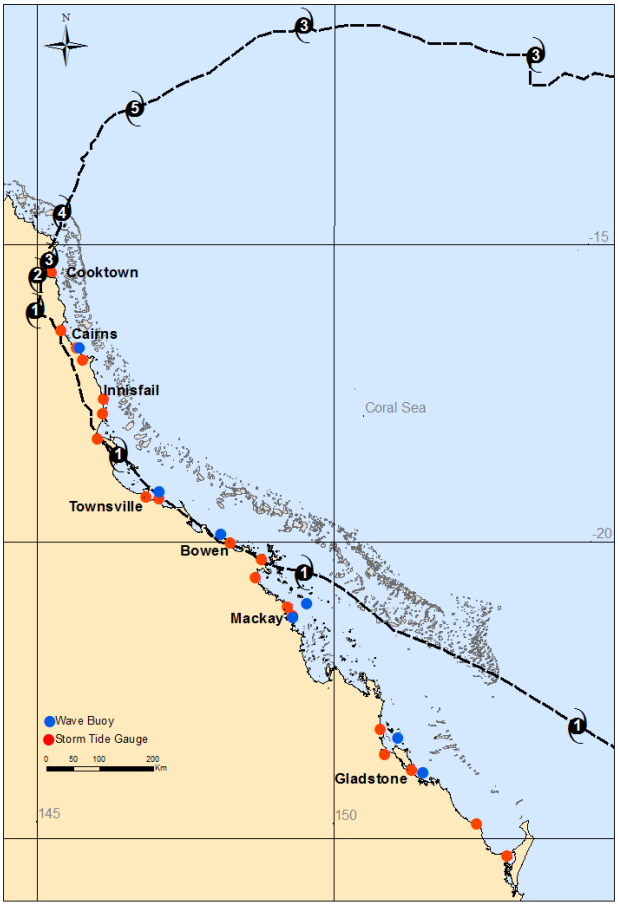

Figure 1. TC Ita track map (Data courtesy of BoM)

DSITIA storm tide monitoring

Data from DSITIA's storm tide and wave monitoring network were made available via the public website and State Disaster Coordination Centre to inform disaster managers about prevailing wave conditions and storm tide levels.

Typically as a cyclone approaches the coast, ocean water levels rise as a result of strong onshore winds and reduced barometric pressure. This rise in water level is known as storm surge and can cause inundation and flooding in coastal areas. The destructive capacity of a storm surge significantly depends on the height of the astronomical tide at the time that the cyclone crosses the coast. The higher the tide, the more likely it is that destructive flooding and erosion will take place.

DSITIA operates a network of 32 storm tide gauges along the Queensland coastline capable of recording real time water levels during extreme events. Table 1 lists the highest recorded storm surges as a result of TC Ita at a number of the North Queensland gauges. The table shows the largest measured maximum storm surges which occurred at Cooktown and Mossman where the cyclone passed with the greatest intensity as well as other monitoring stations along the coastline where the cyclone tracked close by.

Table 1. Recorded storm surge maxima

Site	Date / Time	Peak Surge (m)
Cooktown	12-Apr-2014 / 01:30	1.13
Mossman	12-Apr-2014 / 12:40	1.54
Palm Cove	12-Apr-2014 / 13:40	0.34
Cairns	12-Apr-2014 / 14:30	0.56
Mourilyan	12-Apr-2014 / 23:50	0.30
Clump Point	12-Apr-2014 / 23:50	0.27
Cardwell	13-Apr-2014 / 00:10	0.51
Lucinda	13-Apr-2014 / 00:40	0.43
Townsville	13-Apr-2014 / 07:30	0.68
Cape Ferguson	13-Apr-2014 / 08:50	0.61
Bowen	13-Apr-2014 / 14:20	0.53
Shute Harbour	13-Apr-2014 / 15:20	0.26

The closest storm tide gauge to the coastal crossing point is located at Cooktown. Figure 2 illustrates the height of the recorded storm surge at Cooktown at the time TC Ita crossed the coast.

The storm tide gauge measured a storm surge of 1.13 m as a result of TC Ita. Fortunately, this peak storm surge coincided with the daily low tide, resulting in the total water level remaining well below the Highest Astronomical Tide (HAT) height.

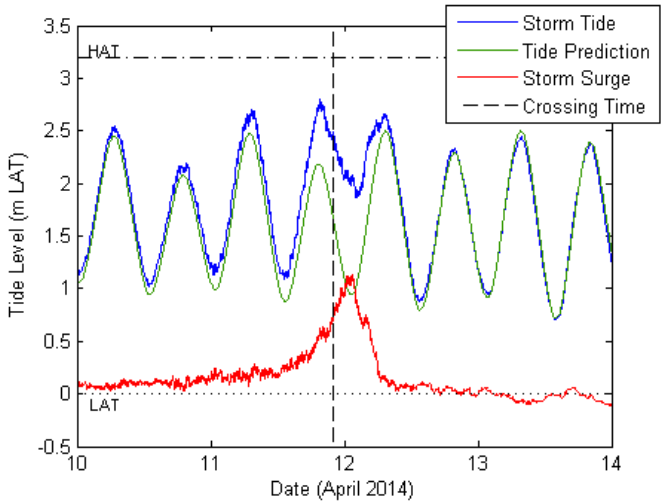

Figure 2. Cooktown storm tide gauge

The Mossman storm tide gauge also recorded water level heights well above the predicted tidal height. Figure 3 depicts the measured water level at the time the cyclone crossed coast.

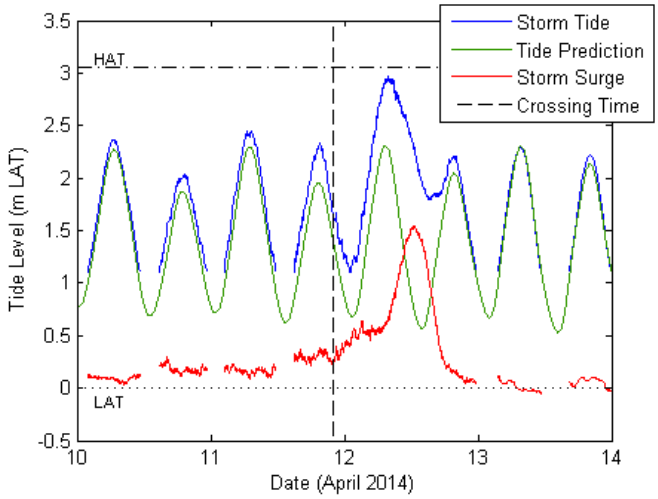

Figure 3. Mossman storm tide gauge

The Mossman storm tide gauge is located within the mouth of the Mossman River and therefore the high water level measured by the gauge can be largely attributed to high river flow as a result of intense rainfall in the Mossman River catchment.

DSITIA wave monitoring network

DSITIA operates a network of 14 wave monitoring stations along the Queensland coastline measuring wave heights, periods, direction and water temperature. Figure 4 illustrates the significant wave height data captured during TC Ita at five sites along the North Queensland coast.

Figure 4 shows that as the cyclone tracked south along the coastline the recorded wave heights peaked at different times at each monitoring location.

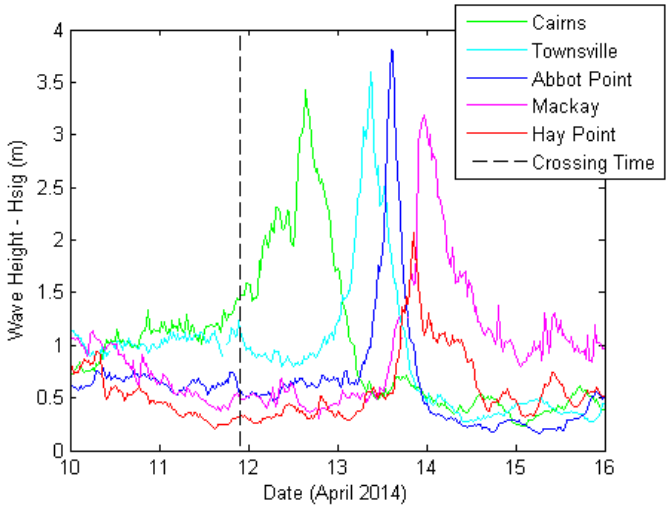

Figure 4. Recorded significant wave heights

The closest wave rider buoy to the coastal crossing point is located just off the coast at Cairns. As a result of TC Ita, a maximum wave height of 5.62 m was recorded. This is the largest wave ever recorded at the Cairns monitoring site since records began in 1975. Figure 5 shows the wave activity recorded at the Cairns site over TC Ita's full period of influence.

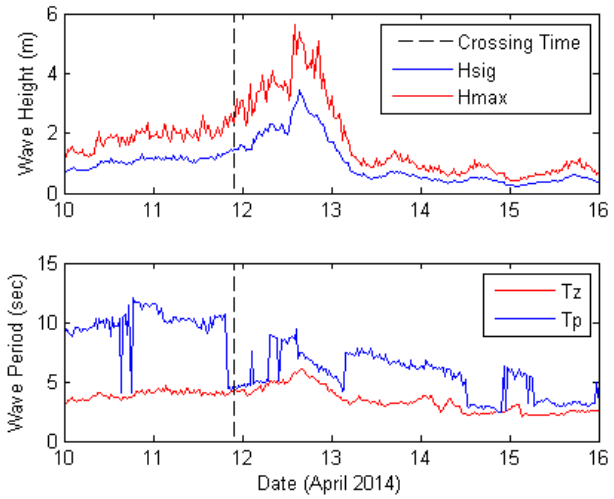

Figure 5. Cairns wave rider buoy data

Figure 5 depicts the gradual recorded increase in wave height leading up to the time when the system passed by Cairns along with a clear decrease in wave height. This sudden decrease in wave height can be attributed to the rapid change in wind direction as the system continued to move south past the monitoring site.

Further information

Additional information about DSITIA's storm tide and wave monitoring networks can be found on the Queensland Government webpages:

www.qld.gov.au/tides and www.qld.gov.au/waves