

CASE STUDY: Tropical Cyclone Ingrid, 2005

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Tropical Cyclone *Ingrid* made landfall on a remote part of the east coast of Cape York Peninsula as a severe tropical cyclone (see mean sea level analysis and radar image in Figures 1 and 2). *Ingrid* was a small system in size and severe damage was confined to a 40km wide swath close to the coastal crossing near Bombard Point. A storm surge survey measured a surge of 2.8metres (Figure 3). Trees were blown down across Cape York Peninsula as it continued westward after crossing the east coast damage.

As *Ingrid* approached the Queensland Coast (Figure 4) it generated southerly swells, which were directed towards PNG and five lives were lost in the Gulf of Papua on 8 March near Kerema on the Papua New Guinea coast as a boat was capsized by the large swells. A large storm surge on the 9 March caused considerable damage to villages southeast of Port Moresby.

Long period waves (10sec) with Hsig 1m came through a break in the reef near Cairns and were measured on the wave rider buoy near Clifton Beach on the 8 March 2005. This caused inundation there on the high tide, which can be seen in Figure 5.

It was estimated that (AUS) \$2 million worth of damage was caused in Queensland from *Ingrid*, with the Cook Shire Council estimating that damage of up to \$1 million had occurred to shire roads and the Douglas Shire reporting up to \$300,000 of road damage.

Ingrid then tracked across Northern Australia (Figure 6). Communities along the north coast of the Northern Territory were not so lucky. Widespread tree damage and moderate damage to infrastructure was reported along the Arnhem Land coast. Six ships in a local pearling fleet were sunk or damaged. There was evidence suggesting a storm surge of several metres at Drysdale Island. The school at Gawa, on the northern tip of Elcho Island, received substantial damage, and the people of the nearby Nanginyburra community were unable to return home for several months due to the number of fallen trees. Although *Ingrid* had weakened slightly, there was still widespread damage at the Minjilang community on Croker Island, with around 20% of buildings losing some or all of their roofing. The cyclone had weakened further before reaching the Tiwi Islands, so damage to buildings was limited, although vegetation, powerlines and similarly exposed structures did suffer significant damage. Darwin was spared the major wrath of the cyclone with gusty winds and rain only causing minor problems with unstable trees.

In Western Australia, the cyclone seriously damaged the remote resort of "Faraway Bay", northeast of Kalumburu. Vegetation was stripped, and several buildings were destroyed. The accompanying storm tide deposited boats about 100 metres inland and several metres above the usual high tide mark. Luckily the resort was closed for the off-season and the caretakers took shelter in a shipping container secured in concrete to withstand cyclones. At Kalumburu several houses were unroofed but in general structures withstood the cyclone. Floodwaters cut the Great Northern Highway near Kununurra and isolated some properties.

Observations from the Northern Territory and Western Australia

- *Maximum Reported Wind Gust*
207 km/h at McCluer Island, 03:40CST 13 March
174 km/h at Truscott, 03:40WST 16 March
148 km/h at Kalumburu, 01:30WST 16 March
- *Lowest Reported Pressure*
967.4 hPa at Truscott, 04:30WST 16 March
973.6 hPa at Kalumburu, 02:40WST 16 March
974.5 hPa at McCluer Island, 03:20CST 13 March
- *Rainfall*
192 mm at Gove Airport in the 24 hours until 9am on 12 March
438 mm at Truscott in the 24 hours until 9am on 16 March, including 341.2mm in four hours.

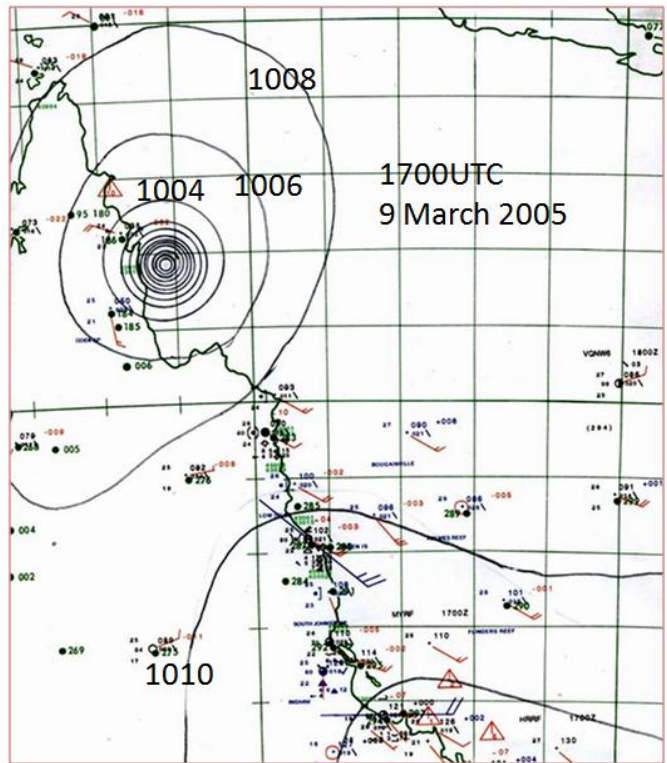


Figure 1 The mean sea level analyses of Tropical Cyclone *Ingrid* just before landfall at 1700UTC 9 March 2005 (3am 10 March AEST).

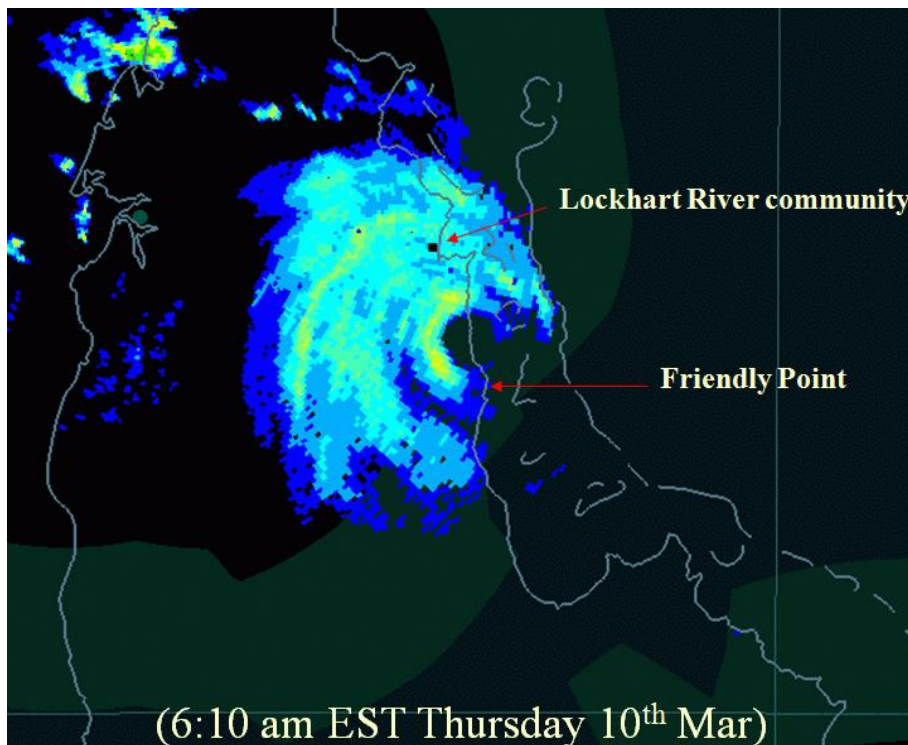


Figure 2 Radar image (from the radar at Weipa) of severe tropical cyclone *Ingrid* at landfall.

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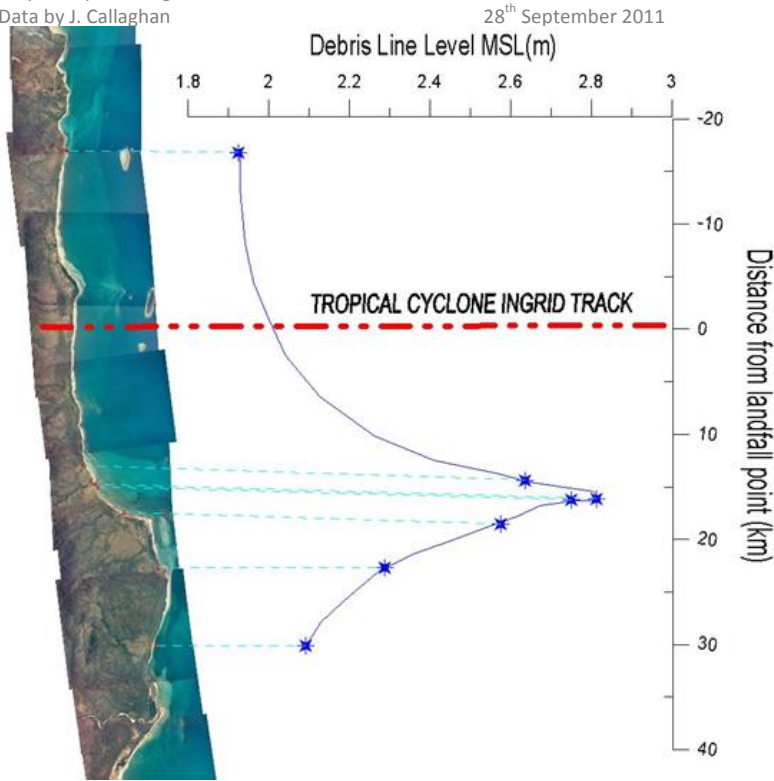


Figure 3 Surveyed level of debris heights generated by the storm surge and waves from severe tropical cyclone *Ingrid* at landfall.

Figure 4 The mean sea level analyses of Tropical Cyclone Ingrid approaching the Far North Coast of Queensland in the left frame at 1100UTC 7 March 2005 (9pm 7 March AEST) and in the right frame at 2300UTC 7 March 2005 (9am 8 March AEST).

