



Australian Government
Bureau of Meteorology

Tropical Low *Gabrielle*
27 February - 06 March 2009

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A. Summary

An Indian Ocean low formed in the monsoon trough in late February and was named *Gabrielle* on 2 March approximately 370 km south southeast of Christmas Island at 1200 UTC (2100 WDT). However, upon reanalysis the system was deemed not to have reached cyclone intensity on account of gales not extending more than half way around the centre at any one time. Gales or near gales were apparent in some sectors from 28 February to 5 March and shipping warnings continued until early on 6 March. There was no known impact from this low.

B. Meteorological Description

Intensity analysis

An active monsoon trough was evident near 10°S during late February assisted by a vigorous monsoon flow to the north. Development was hampered by strong easterly shear. However, strong winds were evident in the area as indicated by scatterometry. The 27/2324 UTC Quikscat, 28/1522 UTC Ascat and 28/2258 UTC Quikscat all show near to gale force winds to the north of the emerging low centre. Indeed the NRL and RSS solutions for 28/2258 UTC Qscat showed winds of at least 50 knots outside the region of deep convection which is highly unusual and seemingly in excess of what could be considered realistic.

During 1 March convection remained separated from an increasingly defined low level centre. The 01/0226 UTC Ascat and 01/1142 UTC Qscat showed persisting marginal gales mostly in the northwest quadrant (these passes only captured the western half of the system). The subsequent 01/1500 UTC Ascat showed 30 knot NW'ly winds in the northeast quadrant outside the deep convection reflecting the acceleration in the track to the east southeast to 15 knots. Convection remained constrained to west of the low level centre as easterly shear persisted.

On 2 March the low level circulation centre had moved sufficiently south to reach a region of less than 20 knots of shear and as a result convection developed close to the centre (see Fig. 2) prompting the naming of the system *Gabrielle* at 1200 UTC (2100 WDT) 2 March during operations. The Dvorak analysis increased to DT=3.0 based on shear pattern- convection less than 1/2 degree from centre and it seemed some intensification was likely based on the expectation of increased convection in

the diurnally more favourable period overnight. However, the 02/1115 UTC Qscat pass shown in Fig. 3 suggests 30-35 knots only in the southwest quadrant and a maximum of 20-25 knots in the northeast semi-circle. The near gales in the northeast quadrant evident earlier had weakened considerably as the system slowed to 8 knots. During the overnight period the convection actually subsided.

Potential factors for the reduction in convection include less favourable oceanic heating although the analysed TC Heat Potential values were not that different from those further to the northwest where the system originated; or owing to an incursion of drier air as a strong mid-latitude ridge developed to the south although this was not immediately apparent on the Total Precipitable Water (TPW) fields at the time.

On 3 March the low level circulation appeared to weaken and although convection occurred both to the north and south of the centre as the shear reduced further, the convection lacked organisation. From this point on the only region of strong winds occurred south of the centre where convection became constrained to, as shown on scatterometry (02/0146 UTC Ascet, 03/1049 UTC Quikscat and 03/1418 UTC Ascet and 03/2320 UTC Quikscat). The low level centre gradually weakened although near gales continued south of the centre as the system accelerated to the west southwest at 20 knots in the following few days.

While winds reached gale-force intensity at times, at no time was it evident that gales occurred more than halfway around the centre, and hence the system is deemed not to have reached cyclone intensity.

Motion

The low was steered to the east southeast under the influence of both the low level monsoonal flow to the north and a pronounced mid latitude trough to the south. On 3 March a mid-level ridge intensified to the southeast and the low recurved to the west southwest.

Structure

Initially the strongest winds were to the west of the centre as the system was under strong easterly shear. Then a band of near gales developed to north northeast of the centre as the system accelerated to the east southeast. As the system slowed and the shear decreased and convection became displaced to the south of the system the strongest winds occurred in southern quadrants aided by a strengthening sub-tropical ridge further south.

C. Impact

There was no known impact from this system. While Christmas Island probably experienced a moderate swell that would have interrupted port activities, there were no shipping movements during this time.

D. Observations

A ship reported 35 knots at 1200 UTC (2100 WDT) 1 March, when it was about 180 nm east northeast of the centre but scatterometry suggested winds at that time

were 25-30 knots. The ship subsequently reported 40 knots but again this appears to be an over-estimate of actual conditions.

E. Forecast Performance

Early notification was given to both Cocos and Christmas Island communities of a possible minor cyclone impact based on model predictions of a low developing north of Cocos Island. However, the system moved between the islands and no advices were required. Shipping warnings and technical bulletins were first issued on the morning of 1 March and Shipping warnings for gales in southern quadrants continued to be issued after *Gabrielle* was downgraded until 7 March.

NWP forecasts provided good guidance for both track and intensity.

Table 1. Best track summary for *Gabrielle*, November 2008.

Year	Month	Day	Hour (UTC)	Position Latitude S	Position Longitude E	Position Accuracy nm	Max wind 10min knots	Max gust knots	Central Pressure hPa	Rad. of Gales SW quadrant nm	Rad. of Gales NW quadrant nm
2009	2	28	00	9.7	101.2	45	25	45	1002		
2009	2	28	06	10.1	101.1	45	25	45	1002		
2009	2	28	12	10.4	101.2	30	30	45	1002		
2009	2	28	18	10.7	101.2	30	30	45	1000		
2009	3	1	00	10.9	101.2	30	35	45	998		150
2009	3	1	06	11.3	102.3	30	35	45	996		150
2009	3	1	12	12.1	103.7	25	35	45	996	120	150
2009	3	1	18	12.8	104.7	25	35	45	996	120	150
2009	3	2	00	13.6	105.5	25	35	45	996	120	
2009	3	2	06	14.0	106.0	20	35	45	996	120	
2009	3	2	12	13.6	106.7	30	35	45	996	120	
2009	3	2	18	13.5	107.2	45	35	45	996		
2009	3	3	00	13.7	107.8	60	30	45	1000		
2009	3	3	06	14.3	107.8	50	30	45	1000		
2009	3	3	12	14.4	107.2	40	30	45	1000		
2009	3	3	18	14.3	106.4	40	30	45	1000		
2009	3	4	00	14.8	105.7	40	30	45	1002		
2009	3	4	06	16.0	104.9	25	30	45	1002		
2009	3	4	12	16.6	102.8	25	30	45	1002		
2009	3	4	18	16.5	101.6	25	30	45	1002		
2009	3	5	00	17.0	100.3	25	30	45	1002		
2009	3	5	06	18.5	98.7	25	30	45	1002		
2009	3	5	12	19.4	96.6	30	30	45	1002		
2009	3	5	18	20.6	94.6	30	30	45	1002		
2009	3	6	00	21.5	93.1	30	25	40	1004		

Note: Gales were recorded in some quadrants, however at no time did gales extend more than halfway around near the centre and hence *Gabrielle* did not reach cyclone intensity.

Figure 1. Track of Tropical Cyclone *Gabrielle*, 27 February – 6 March 2009 (times in WDT).

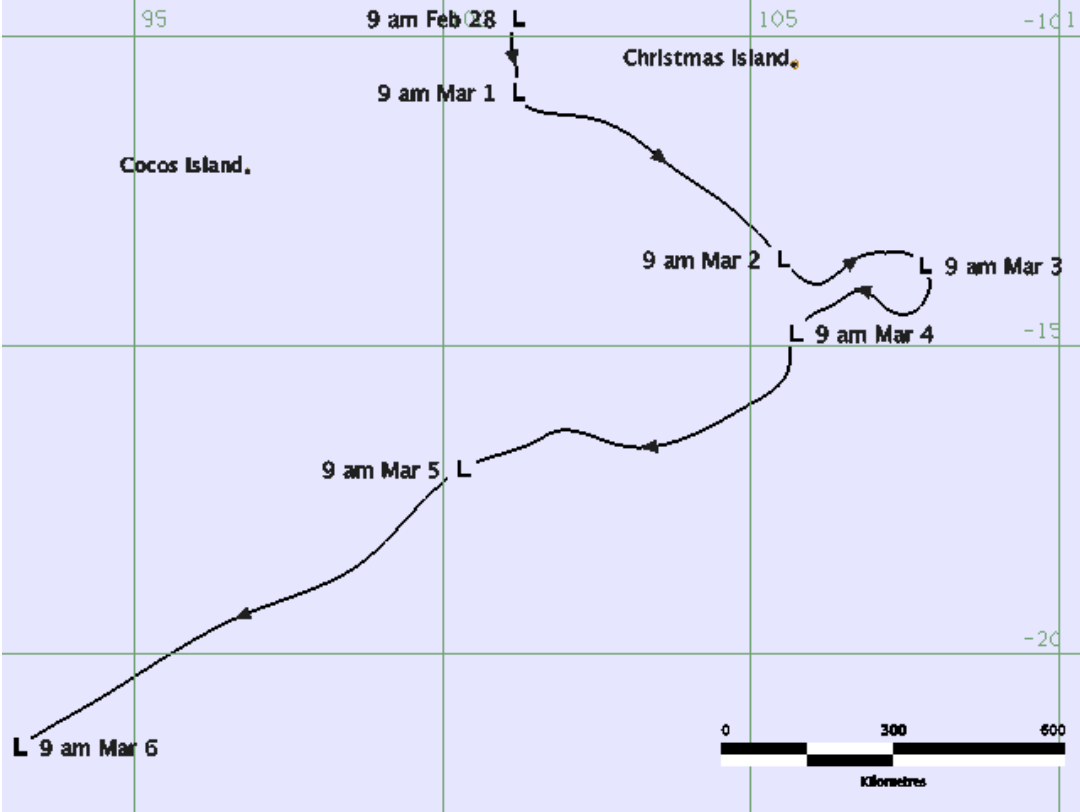


Figure 2. Visible image at 0930 UTC 2 March 2009.

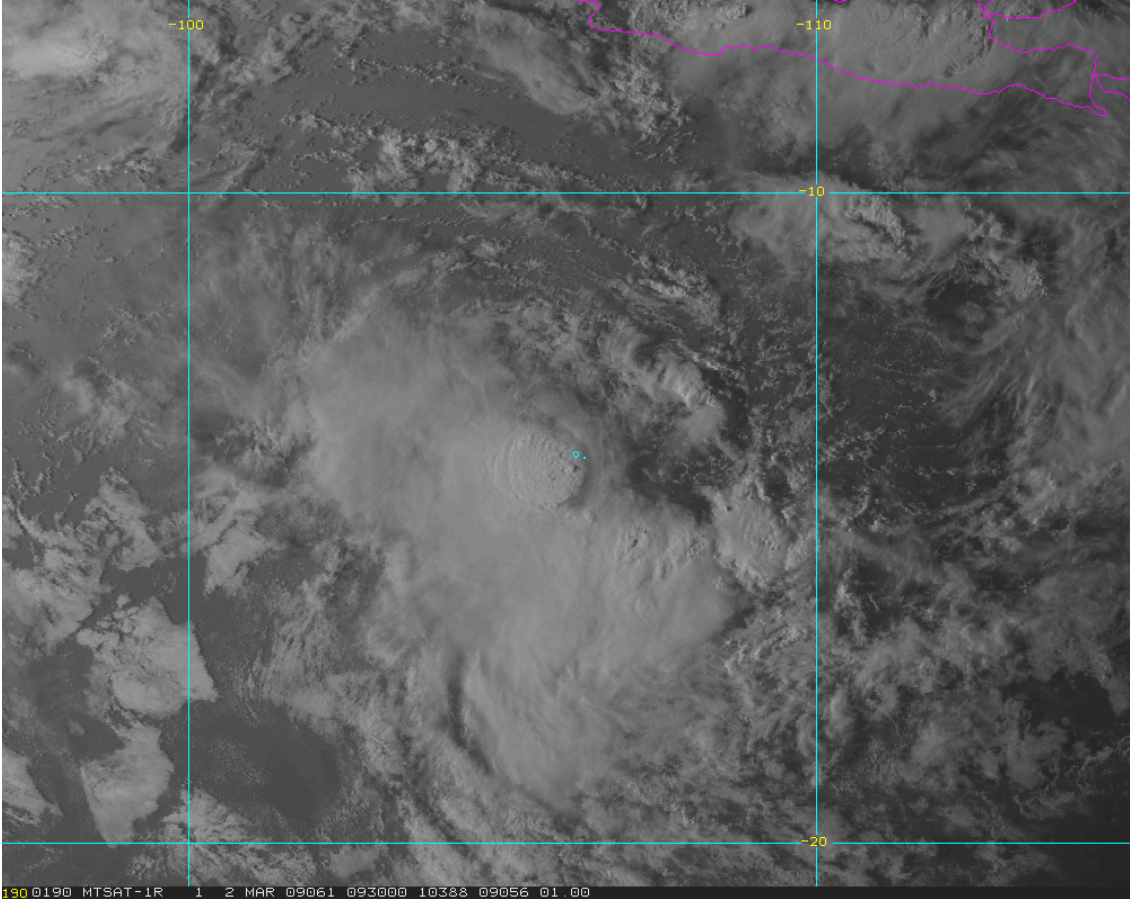


Figure 3. Quikscat image at 1115 UTC 2 March 2009.
(image courtesy of NESDIS: <http://manati.orbit.nesdis.noaa.gov/quikscat/>)

