



Australian Government
Bureau of Meteorology

Severe Tropical Cyclone *Ilsa*

15 - 24 March 2009

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31 July 2009

A. Summary

Ilsa was a small intense cyclone that moved in a general west southwest direction over open waters north and northwest of Western Australia. *Ilsa* reached category four intensity on 19 March, eventually weakening near 90°E by 24 March. There was no known impact associated with *Ilsa*.

B. Meteorological Description

Intensity analysis

A weak low moved through the Timor Sea region near 10°S on 14 March being hampered by easterly shear. Formation was assisted by broadscale features - the Madden Julian Oscillation (MJO) albeit of very low amplitude, and perhaps more significantly, an Equatorial Rossby wave moving through Australian longitudes.

Initial Dvorak T1.0 intensity was estimated at 0000 UTC 15 March, although convection was not consistently sustained until early on 17 March as the low moved towards 12°S into an area of lower wind shear. Motion of 15 knots contributed to winds being asymmetric, and scatterometry indicated near gales on the southern side on 17 March. At 1800 UTC, the Dvorak DT/CI reached 3.0 as curvature increased. However, scatterometry (Ascat and Quikscat) suggested that gales were confined to the southern side owing to the westerly motion at about 15 knots.

Gales are estimated to wrap more than halfway around near the centre at /0000 UTC 18 March as convection developed about a tight Low Level Circulation Centre (LLCC) prompting the system being upgraded to cyclone intensity. Intensification was then rapid as evidenced by the sustained convection with very cold cloud top temperatures and microwave imagery indicating strong curvature about the LLCC. The increasing curvature continued overnight until a clear eye emerged first by microwave and then on conventional visible imagery from 19/0130 UTC. The visible image at 19/0630 UTC in figure 2 indicates a symmetric well defined eye. Peak intensity is estimated when the Dvorak DT (eye pattern) reached 5.5 later at 19/1200 UTC corresponding to 90 knot sustained winds (category 4 intensity).

From 1500 UTC 19 March the eye weakened on Infra-Red (IR) imagery although convection remained very deep and the intensity was held at CI=5.0 during 20 March. Microwave imagery continued to show an eye for several days, although at no stage did it get sufficiently organised to have a complete 'donut' shape of intense convection see Figure 3.

On 21 March the eye became more elliptical. Despite this, IR imagery showed very cold cloud top temperatures persisting matched by ongoing deep convection in the inner circulation. In *Ilsa*'s favour was ongoing light shear and good outflow particularly on the poleward side. The Dvorak embedded centre pattern maintained a DT of 5.0 although FT based on MET/Pat T of 4.5 supported by AMSU estimates.

During 22 March *Ilsa* moved over waters of less than 27°C and the dry air from the south encircled the system separating *Ilsa* from tropical moisture.

Despite these factors, the inner circulation remained well defined. Thereafter however, the circulation weakened and during 23 March deep convection eased and became separated from the LLCC as southeasterly shear increased. By this stage *Ilsa* was moving over waters of 26°C. While the Dvorak CI was held at 3.5 at 0600 UTC, the intensity is estimated lower at 45 knots based on scatterometry.

The 23/1212 UTC Quikscat image showed gales restricted to the southeastern quadrant, influenced by the 15 knot translation speed, indicating that the system had weakened below cyclone intensity. In the absence of further convection, gales ceased in all quadrants by 0000 UTC 24 March near 90°E.

Motion

Ilsa tracked steadily to the west southwest throughout its lifetime under the influence of a mid-level ridge. It moved initially at about 15 knots then the ridge weakened temporarily on 19 March slowing the system to 5-10 knots during 20 March before redeveloping later on 22 March, increasing the motion to 15 knots on 23 March.

Structure

Ilsa was a small TC having a radius of gales of less than 80 nm. Initially there was asymmetry with gales extending further in southern quadrants owing to storm motion of 15 knots. The radius of maximum winds was generally estimated at about 15 nm.

C. Impact

Ilsa remained over open waters throughout its lifetime and did not impact any islands or communities.

D. Observations

Nil.

E. Forecast Performance

Shipping warnings commenced at 0649 UTC 17 March and continued until 0202 UTC 24 March when the system was downgraded at 19.3°S 90.1°E. Technical Bulletins were issued from 1308 UTC 17 March until 0017 UTC 24 March. Information Bulletins were issued from 1106 WDT 18 March to 0957 WDT 19 March.

Accuracy statistics are given in Table 2. The forecast position error was significantly better than usual. For example, the 24-hour position error was just 77 km, well below the five-year average of 123 km.

Table 1. Best track summary for *Ilsa*, March 2009.

Refer to the Australian Tropical Cyclone database for complete listing of parameters.

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 nm	Rad. of storm force winds	Radius Max. Wind (RMW)
2009	3	15	00	10.0	128.7	30	20	45	1006			
2009	3	15	06	10.2	127.9	30	20	45	1006			
2009	3	15	12	10.4	126.8	40	20	45	1006			
2009	3	15	18	10.6	125.7	30	25	45	1004			
2009	3	16	00	10.8	124.6	30	25	45	1004			
2009	3	16	06	11.2	123.3	30	25	45	1004			
2009	3	16	12	12.0	122.4	30	25	45	1004			
2009	3	16	18	12.2	121.4	30	25	45	1004			
2009	3	17	00	12.4	119.8	30	25	45	1004			
2009	3	17	06	12.8	118.1	25	30	45	1002			
2009	3	17	12	13.0	116.4	25	30	45	1002			
2009	3	17	18	13.1	114.7	15	35	50	1000			
2009	3	18	00	13.5	113.4	10	40	55	996	60		
2009	3	18	06	13.6	111.7	15	45	65	994	67.5		
2009	3	18	12	13.8	110.9	20	50	70	990	82.5	15	
2009	3	18	18	14.5	109.7	25	60	85	984	80	25	
2009	3	19	00	15.2	108.7	25	70	100	976	80	30	20
2009	3	19	06	16.0	107.6	15	80	110	968	85	35	25
2009	3	19	12	16.3	106.9	15	90	125	958	80	35	25
2009	3	19	18	16.2	105.9	15	90	125	958	82.5	35	25
2009	3	20	00	16.2	105.2	15	80	110	966	87.5	35	25
2009	3	20	06	16.1	104.4	15	80	110	966	75	35	25
2009	3	20	12	16.0	103.9	15	80	110	966	75	35	25
2009	3	20	18	15.9	103.1	15	80	110	966	67.5	35	25
2009	3	21	00	15.9	102.4	15	80	110	966	62.5	35	25
2009	3	21	06	16.1	101.6	15	80	110	966	60	35	25
2009	3	21	12	16.2	101.1	15	80	110	966	60	35	25
2009	3	21	18	16.2	100.2	15	80	110	968	60	35	25
2009	3	22	00	16.4	99.5	15	75	105	972	72.5	35	25
2009	3	22	06	16.6	98.8	15	70	100	976	70	35	25
2009	3	22	12	16.8	97.9	20	65	90	980	70	30	20
2009	3	22	18	17.1	96.7	20	60	85	986	70	25	
2009	3	23	00	17.3	95.6	20	50	70	992	57.5	20	
2009	3	23	06	17.5	94.3	20	45	65	996	50		
2009	3	23	12	18.2	92.9	20	40	55	998			
2009	3	23	18	18.7	91.4	20	35	45	1000			
2009	3	24	00	19.2	90.1	20	30	45	1002			
2009	3	24	06	19.6	89.0	15	25	40	1002			

Table 2. Verification statistics: Track and Intensity.

Parameter	0 hr	12 hr	24 hr	48 hr	72 hr
Count	21	19	20	14	12
Distance (km)	20	51	77	92	103
Mean Wind (knots)	1.6	8.0	11.6	16.4	11.2

Figure 1. Track of Severe Tropical Cyclone *Ilsa*, 14-24 March 2009. Times in WDT (subtract 9 hours to convert to UTC).

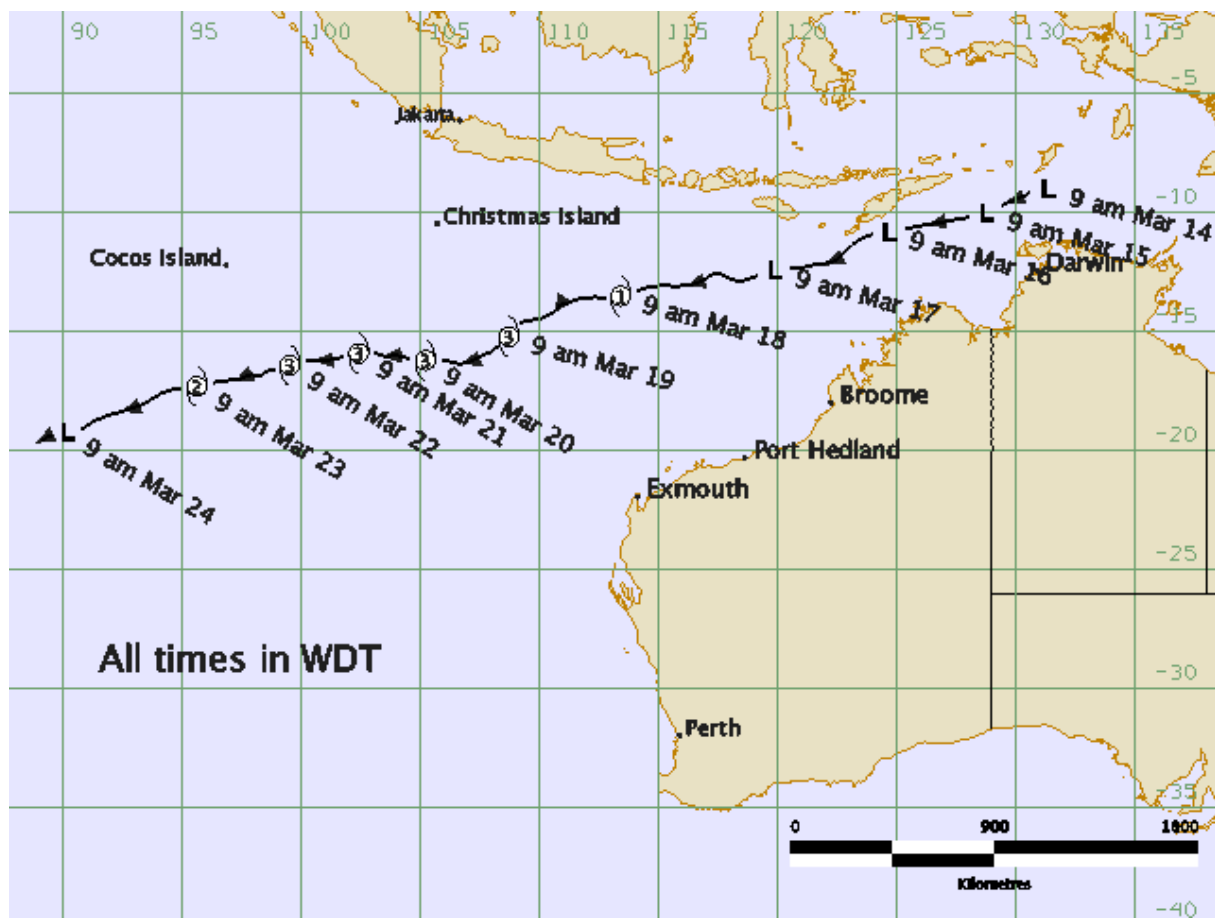


Figure 2. Visible image at 0630 UTC 19 March showing a well defined symmetric eye. (image courtesy of US NRL: <http://www.nrlmry.navy.mil/>)

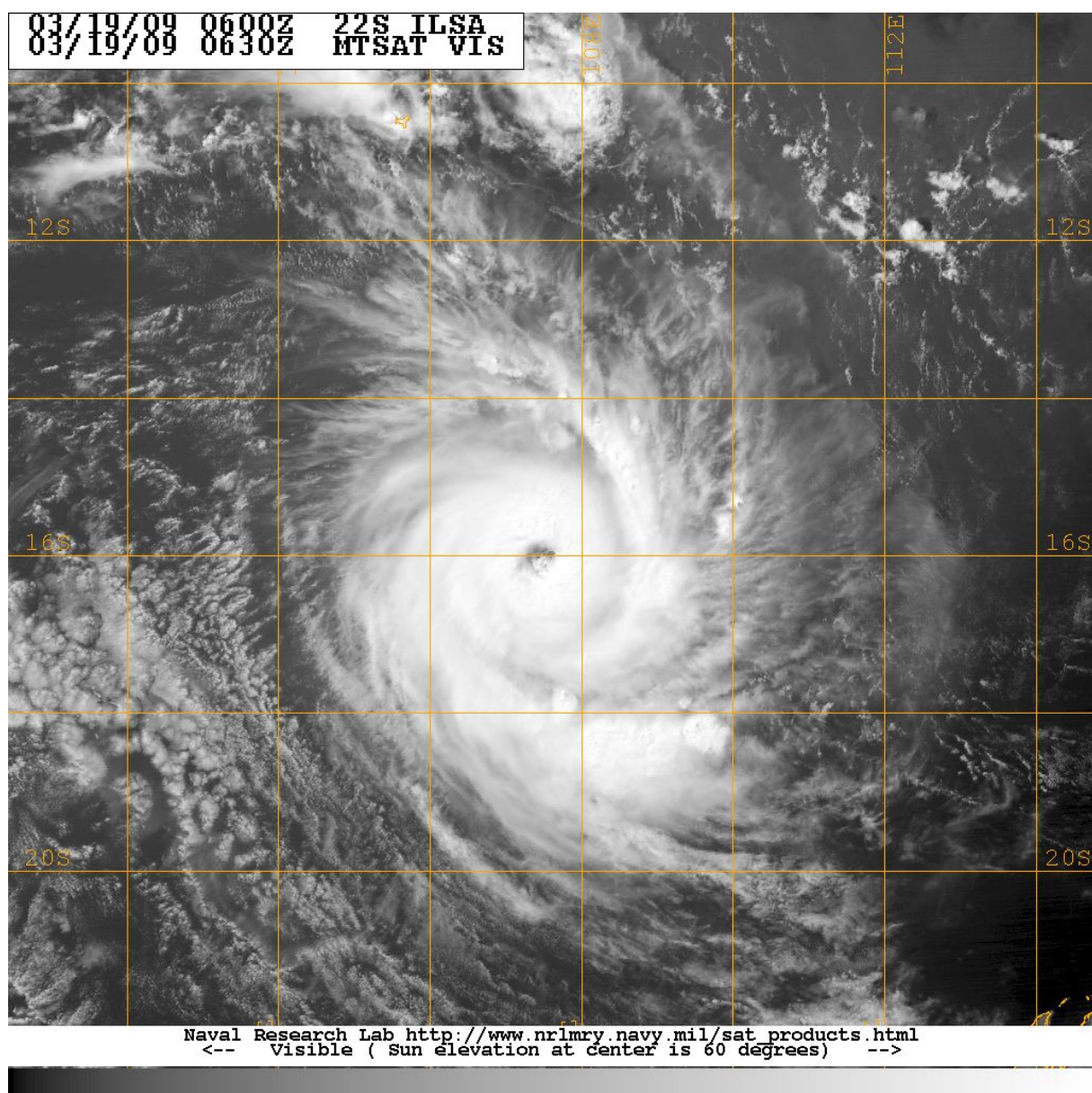


Figure 3. Microwave (TRMM 85GHz) image at 1739 UTC 19 March.

(image courtesy of US NRL: <http://www.nrlmry.navy.mil/>)

