Australian Government
Bureau of Meteorology

Tropical Cyclone *Alessia*

20 – 30 November 2013

Linda Paterson and Joe Courtney, Severe Weather Environmental Prediction Services

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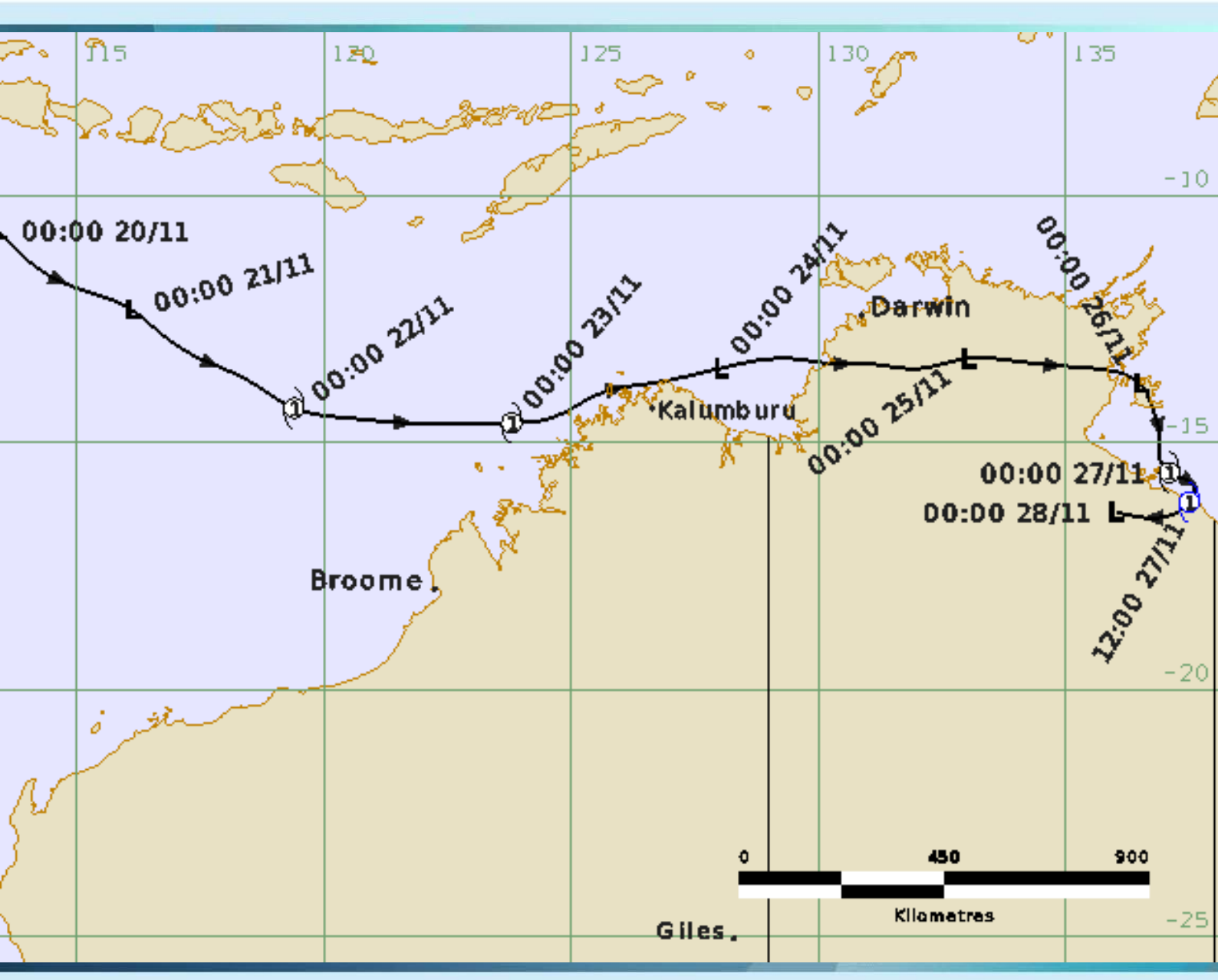

Contact details:

Tropical Cyclone Team Lead
Severe Weather Environmental Prediction Services
Bureau of Meteorology
PO Box 1370, West Perth WA 6872
Email: tcwc@bom.gov.au

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1 Summary

Tropical Cyclone Alessia was a small tropical cyclone that reached category 1 intensity in two stages, the first off the north Kimberley coast and then several days later in the southern Gulf of Carpentaria as shown in Figure 1.

A low became evident in the tropics south of the Indonesian islands early on 20 November. The system moved steadily east southeast and slowly developed. *Alessia* reached cyclone strength at 0000 Universal Time Coordinated (UTC) (0800 AWST = UTC+ 8 hours) 22 November when it was located about 500 kilometres (km) northwest of Broome. *Alessia* tracked to the east passing close to the northern Kimberley coastline near Kalumburu. By this stage the cloud structure began to weaken and Alessia fell below cyclone intensity at 0000 UTC on 24 December in the Joseph Bonaparte Gulf prior to crossing the Northern Territory coast south of Darwin.

The low continued to track east over the Northern Territory emerging into the Gulf of Carpentaria on 26 November. It intensified once more to tropical cyclone intensity on 27 November before crossing the southern Gulf region in a sparsely populated area about 130 km east of Borroloola and 70 km northwest of the Queensland border.

TC *Alessia* was a very small tropical cyclone and had minimal wind impact. Cumulative rainfall totals exceeded 100 mm across parts of the Northern Territory.

TC Alessia was the first November tropical cyclone to affect Western Australia since TC Annika in 2008 and the first November tropical cyclone to affect the Northern Territory since TC Joan in 1975.

1.1 Intensity analysis

A low became evident early on 20 November south of the Indonesian islands. The developing system was affected by moderate to strong northeast vertical wind shear but despite this developed at a standard rate of one Dvorak Data-T (DT) number a day.

Advanced Scatterometer (ASCAT) passes on 22 November 0108 UTC and 0154 UTC 21 November showed a small region of gales near the centre indicating tropical cyclone intensity had been reached earlier than conventional Dvorak analyses suggested. This occurred with a decrease in wind shear an improved cloud pattern signature as shown in the microwave image at 0018 UTC 22 November (refer Figure 2). Initial objective estimates (refer Figure 4) showed Cooperative Institute for Meteorological Satellite Studies (CIMSS) Advanced Dvorak Technique (ADT) around 35 knots (kn) (65 km/h) with Satellite Consensus (SATCON) and CIMSS Advanced Microwave Sounding Unit (AMSU) slightly higher. Objective ADT intensity estimates climbed quickly while SATCON decreased.

Gales were maintained near the centre on 23 November, as shown by scatterometry and reported by Browse Island and Troughton Island. The cyclone brushed the far north Kimberley and the cloud pattern quickly weakened as dry air was entrained into the system from the northern side, weakening below cyclone intensity on 24 November as it moved across Joseph Bonaparte Gulf crossed the Northern Territory coast south of Darwin.

After tracking east over land, the low emerged into the Gulf of Carpentaria on 26 November. Gales commenced in southern quadrants from 1800 UTC 26 November before extending around the centre by 0600 UTC 27 November. Centre Island recorded gales from 2000 UTC 26 November to 0100 UTC 27 November. Figure 3 shows the visible image at 0330 UTC showing strongly curved deep convection near the centre. Alessia then crossed the remote Gulf coast near the Qld border at 1200 UTC and rapidly weakened.

1.2 Structure

Alessia was a very small system with a radius to gales of just 30 nautical miles (56 km) as measured by both scatterometers and also Browse Island and Troughton Island observations. Radius to maximum winds (RMW) was also only 10-15 nm (20-30 km).

1.3 Motion

A mid-level trough was located over Western Australia with the mid-level ridge located north of Australia along 10°S. Alessia was steered in a west northwest regime associated with the trough over Western Australia. On 24 November the trough relaxed and the steering pattern became more westerly, as a result the tropical cyclone began an eastwards movement over the far north of the country. Once in the Gulf of Carpentaria a stronger northwesterly flow north of the circulation helped steer Alessia to the south southeast towards the coast where it became slow moving.

Figure 1. Best track of TC *Alessia* 20-28 November 2013 (times in UTC, AWST = UTC+8, ACST = UTC+9.5).

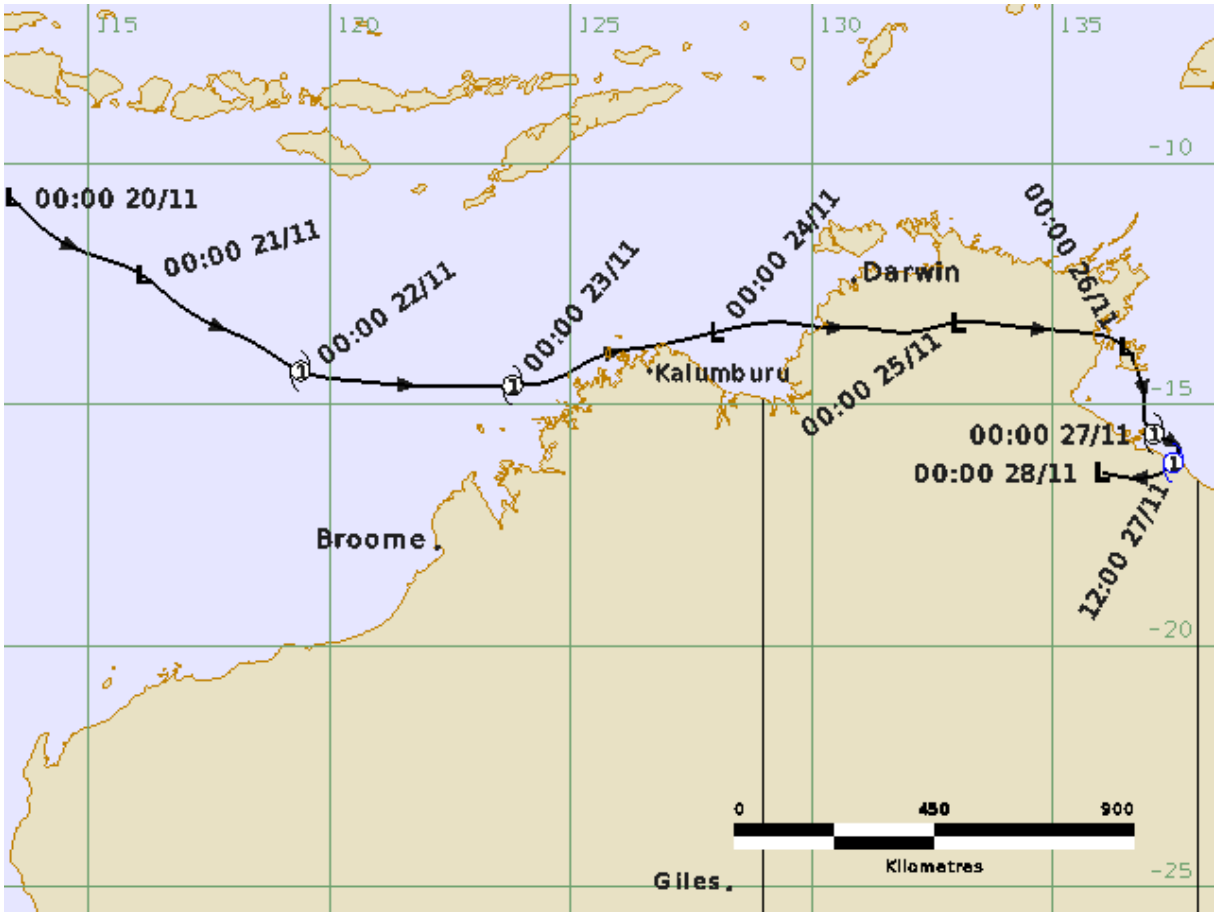


Figure 2. 91 GHz SSMIS microwave image of TC *Alessia* at 0018 UTC 22 November.

Image courtesy of https://www.fnmoc.navy.mil/tcweb/cgi-bin/tc_home.cgi

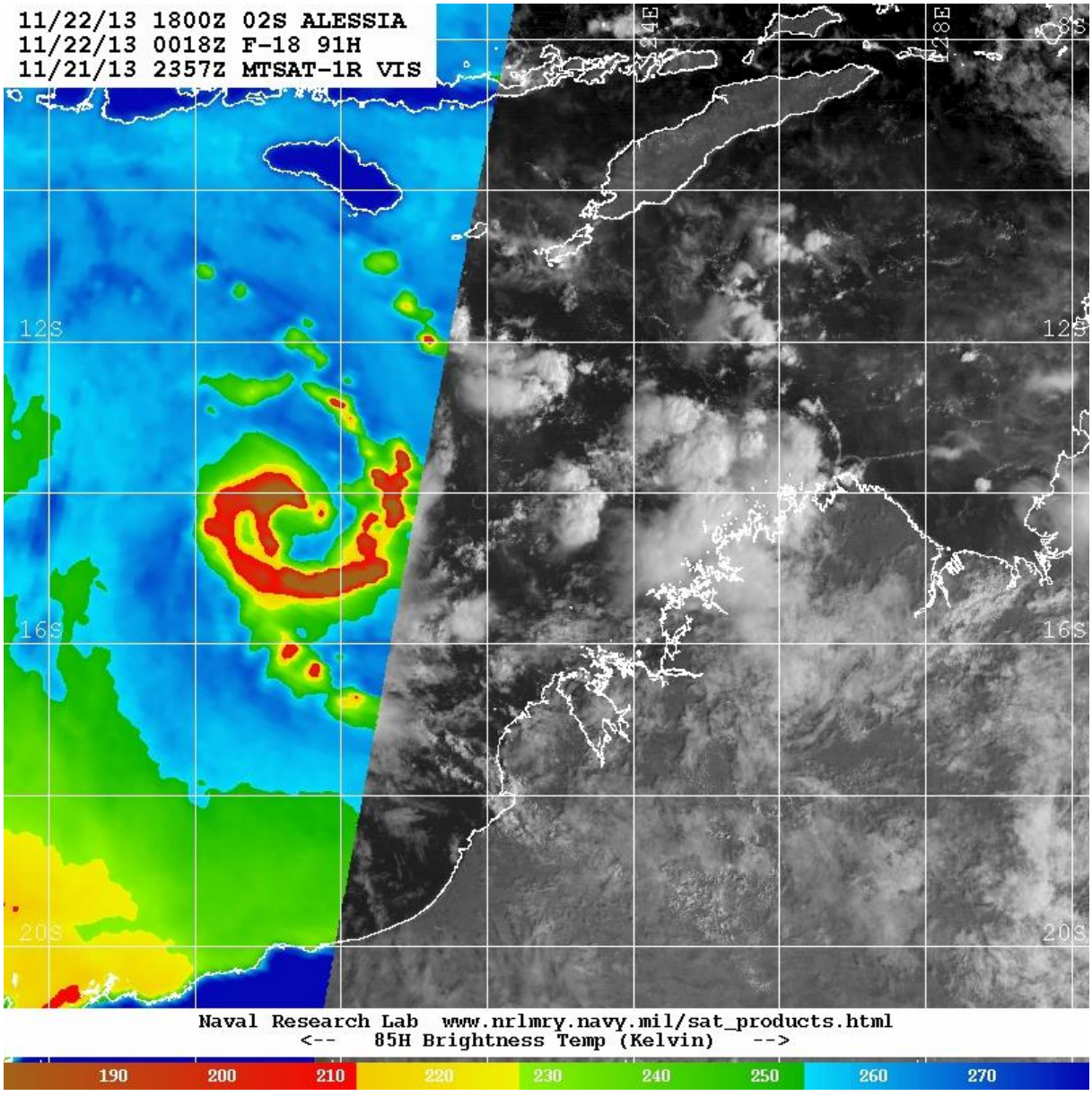


Figure 3. Visible image of TC *Alessia* reintensifying in the Gulf of Carpentaria, 0330 UTC 27 November.

Image courtesy of https://www.fnmoc.navy.mil/tcweb/cgi-bin/tc_home.cgi

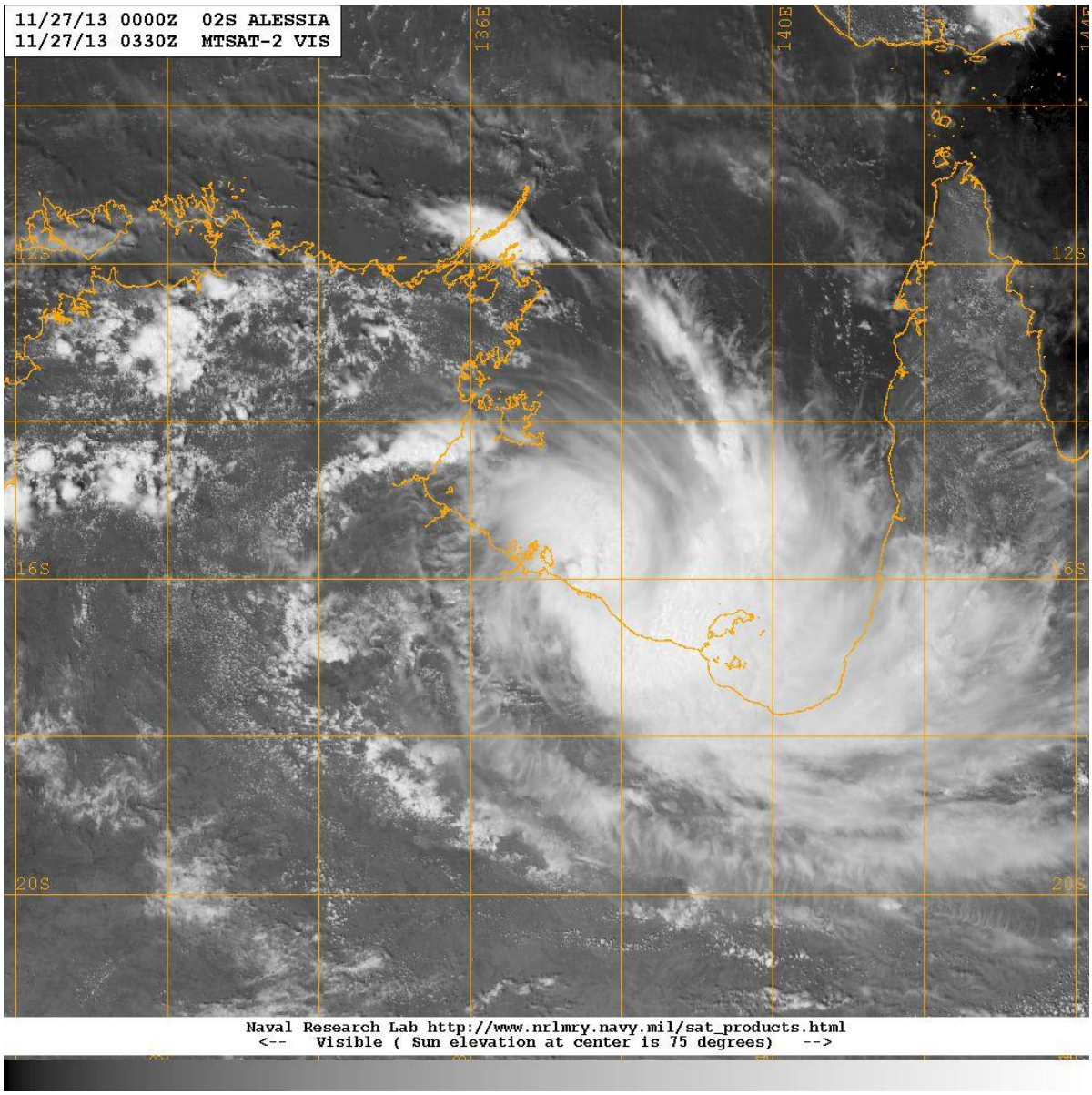
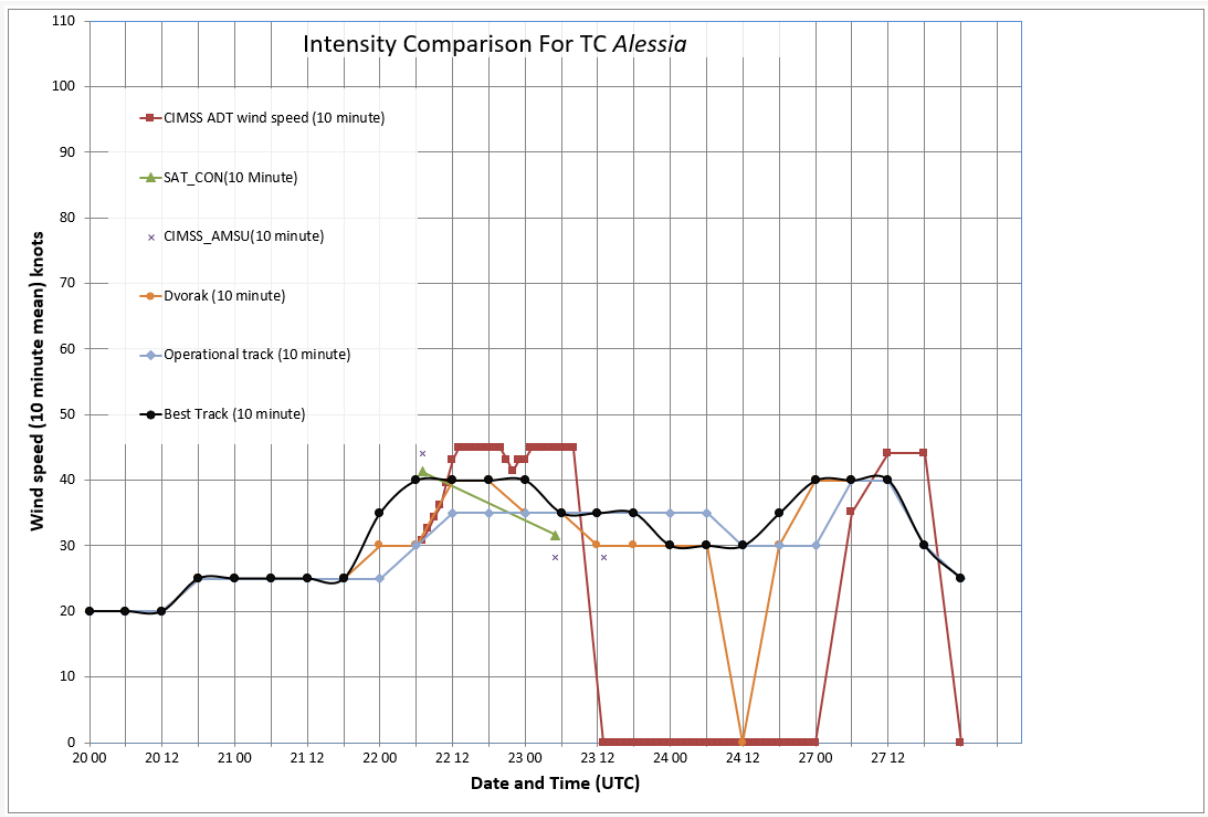


Figure 4. Comparison of objective and subjective intensity estimates during Tropical Cyclone *Alessia*.



2 Impact

TC Alessia had minimal impact on mainland Australia. Wind squalls brought down some trees and a power line in Darwin. The TC brought the first significant rainfall of the wet season with weekly totals exceeding 100 mm across large parts of the Top End of the Northern Territory.

3 Observations

3.1 Wind

Gale force winds were recorded at Browse Island Automatic Weather Station (AWS) between 2130 and 2330 UTC 22 November. A maximum ten-minute mean wind of 36 kn (67 km/h) was recorded.

Gale force winds were recorded at Troughton Island AWS between 1539 and 1707 UTC 23 November. A maximum 10-minute mean wind of 37 kn (68 km/h) was recorded with a peak gust of 47 kn (87 km/h).

Gales were recorded at Centre Island (Gulf of Carpentaria) between 2000 UTC 26 November to 0100 UTC 27 November. The peak wind gust was 57 kn (105 km/h).

3.2 Pressure

Browse Island recorded a minimum pressure of 1003 Hectopascal (hPa).

Troughton Island recorded a minimum pressure of 1001.1 hPa.

Centre Island recorded a minimum pressure of 999.6 hPa at 2015 UTC 26 November. 0545 CST.

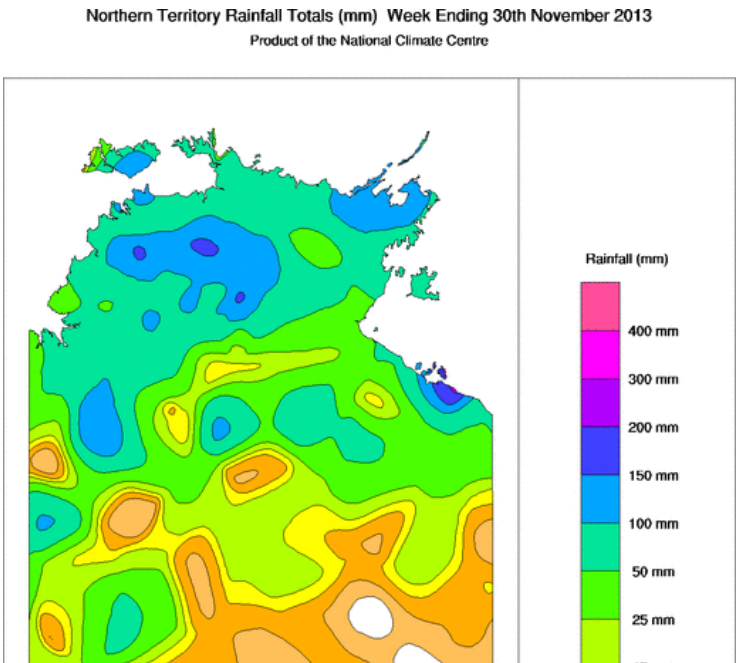
3.3 Rainfall

Daily rainfall totals to 9am CST 27 November:

163 mm at Centre Is; 138 mm at McArthur River Mine.

Weekly rainfall totals also exceeded 100 mm across other parts of the Northern Territory as per Figure 5.

Figure 5. Accuracy statistics for Tropical Cyclone *Alessia.*



4 Forecast Performance

Tropical Cyclone advices for the north Kimberley coast were first issued on the afternoon of 21 November. This area extended to Northern Territory including Darwin on 22 November for a category one impact. Advices were cancelled once the weakened cyclone crossed the coast south of Darwin. Tropical Cyclone warnings were initiated for the Gulf of Carpentaria coast on the morning of 27 November until once again the system weakened over land overnight that night.

The accuracy statistics obtained by comparing the forecast positions against the best track positions for TC *Alessia* are shown in the table below. Figure 6 is a plot of the accuracy figures for TC *Alessia* compared to the five-year mean.

	00	06	12	18	24	36	48	72	96	120
Position Absolute error (km)	34	62	90	116	136	146	147	179	201	328
Intensity Absolute error (kn)	2.9	4.7	5.6	6.6	6.9	7.3	8.5	9.3	8.1	7.1
Sample Size	17	17	17	17	17	17	17	15	13	12

Figure 6. Accuracy statistics for Tropical Cyclone *Alessia.*

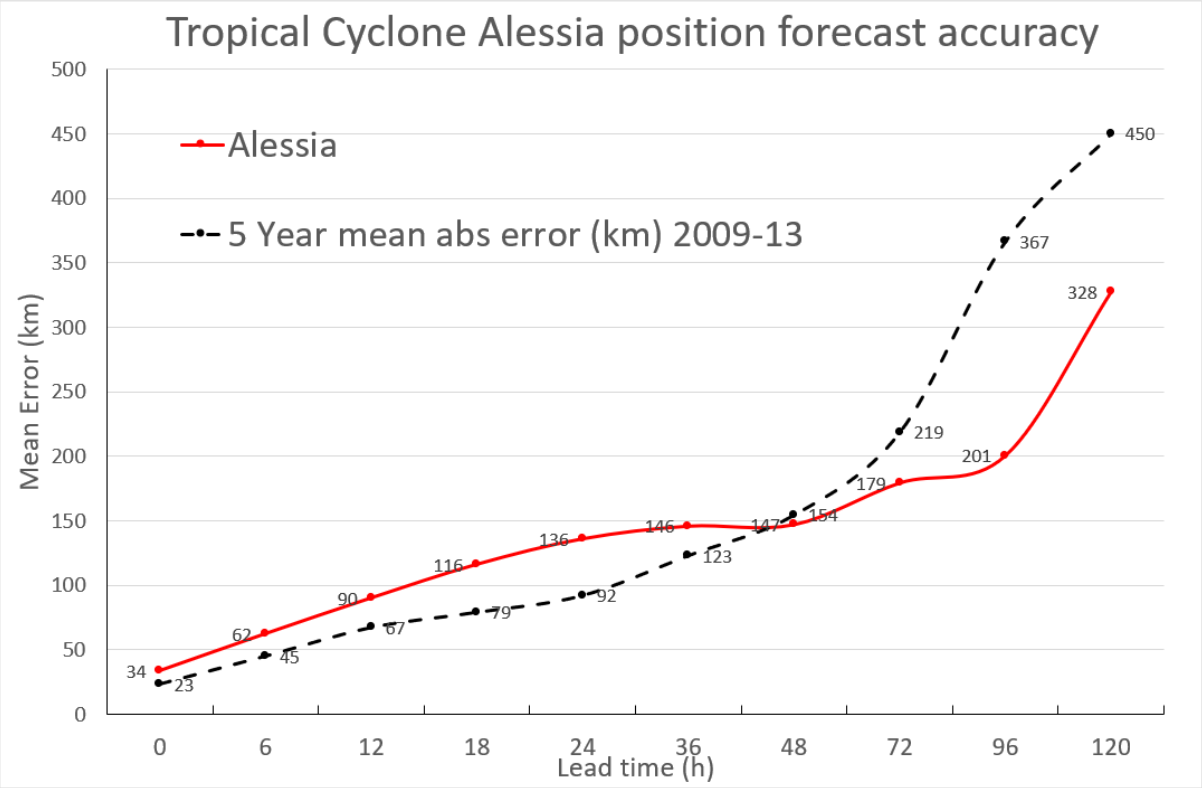


TABLE 1. Best track summary for Tropical Cyclone *Alessia*

Refer to the Australian Tropical Cyclone database for complete listing of parameters and data: http://www.bom.gov.au/cyclone/tropical-cyclone-knowledge-centre/databases/

Year	Month	Day	Hour UTC	Pos. Lat S	Pos. Long. E	Pos. Acc. n mi	Max Wind 10 min kn	Max gust kn	Cent. Press. hPa	Rad. of gales (NE/SE/ SW/NW)	RMW n mi
2013	11	21	0000	12.3	116.1	20	25	45	1001		
2013	11	21	0600	12.7	116.6	20	25	45	1001		
2013	11	21	1200	13.3	117.5	20	25	45	1002		
2013	11	21	1800	13.7	118.4	20	25	45	1002		
2013	11	22	0000	14.3	119.4	20	35	50	996	20/-/20/20	15
2013	11	22	0600	14.5	120.5	20	40	55	994	30/20/20/30	15
2013	11	22	1200	14.6	121.7	15	40	55	994	30/20/20/30	15
2013	11	22	1800	14.6	122.8	15	40	55	994	30/20/20/30	15
2013	11	23	0000	14.6	123.8	15	40	55	996	30/20/20/30	15
2013	11	23	0600	14.5	124.6	15	35	50	994	30/20/20/30	15
2013	11	23	1200	14.0	125.6	25	35	50	994	30/20/20/30	15
2013	11	23	1800	13.8	126.6	20	40	50	996	30/20/20/30	15
2013	11	24	0000	13.5	128.0	20	30	45	998		
2013	11	24	0600	13.3	129.5	20	30	45	997		
2013	11	24	1200	13.4	131.0	15	30	45	1000		

Year	Month	Day	Hour UTC	Pos. Lat S	Pos. Long. E	Pos. Acc. n mi	Max Wind 10 min kn	Max gust kn	Cent. Press. hPa	Rad. of gales (NE/SE/ SW/NW)	RMW n mi
2013	11	26	1200	14.8	136.9	20	25	45	1000		
2013	11	26	1800	15.3	136.9	20	35	50	998	-/30/30/-	10
2013	11	27	0000	15.6	137.1	20	40	55	995	30/30/30/20	10
2013	11	27	0600	15.9	137.6	15	40	55	993	30/30/20/30	10
2013	11	27	1200	16.2	137.5	25	40	55	993	30/20/15/30	10
2013	11	27	1800	16.5	137.0	30	30	45	1000		
2013	11	28	0000	16.4	136.0	30	25	35	1002		