Australian Government
Bureau of Meteorology

Severe Tropical Cyclone *Alenga*

2-9 December 2011

Linda Paterson
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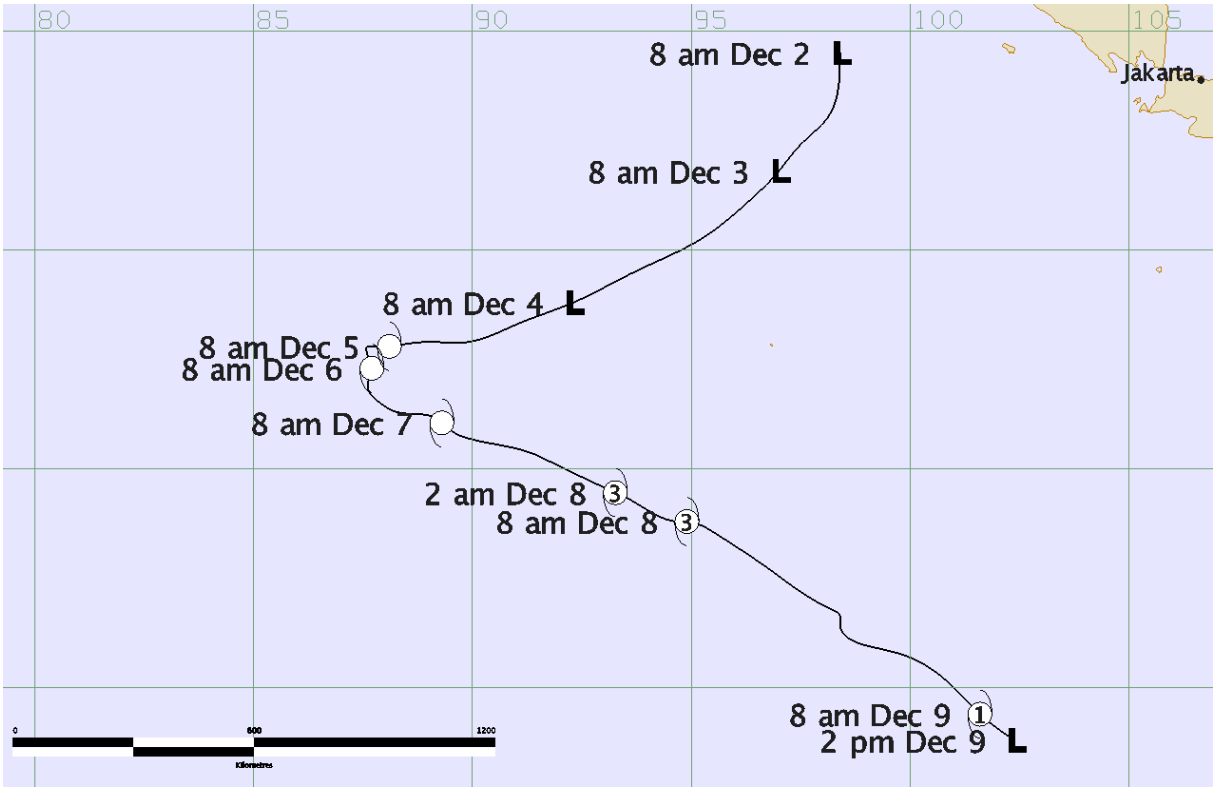
1 Summary

Severe Tropical Cyclone *Alenga* formed during an active phase of the Madden-Julian Oscillation (MJO) to the west of Java. The tropical low initially moved southwest into the La Reunion Tropical Cyclone Warning Centre's area of responsibility (AOR). The southwest movement of the system slowed and early on 6 December *Alenga* began to move to the southeast. *Alenga* crossed 90°E into the Perth Tropical Cyclone Warning Centre's AOR around 0000 Universal Time Constant (UTC) 7 December with an intensity of 45 knots (kn) (10 minute mean wind speed). Conditions were favourable for development and *Alenga* continued to intensify. The tropical cyclone reached a peak intensity of 75 kn at 0600 UTC 8 December. From this point *Alenga* weakened rapidly under the influence of increased wind shear and cooler sea surface temperatures. The tropical cyclone weakened to below cyclone strength by 0600 UTC 9 December. *Alenga* tracked over open water in the Indian Ocean and had no impact on land or island communities.

Figure 1. Best track of STC *Alenga* 2 – 9 December 2011 (times in AWST, UTC+8).



1.1 Intensity analysis

A low became evident in an active monsoon trough to the west of Java on 4 December. The low initially moved to the southwest into the La Reunion Tropical Cyclone Warning Centre's AOR. The system reached cyclone strength at 0000 UTC 5 December. On 6 December *Alenga* began to move to the southwest and crossed into the Perth AOR at 1200 UTC 7 December. At this time enhanced infrared imagery (EIR) showed a tight temperature gradient on the eastern side and *Alenga* appeared to be under the influence of south-easterly shear. Dvorak analyses indicated a Dvorak Data T number (DT) of 3.0. By 0600 UTC the cloud features had reorganised into a curved band pattern. This pattern continued through until around 1600 UTC when an eye began to emerge. DT's reached a peak of 4.5 between 0000 - 0600 UTC 8 December (refer Figure 2). From 0330 UTC 8 December the eye pattern quickly disappeared as *Alenga* came under the influence of increased wind shear from the west northwest. Microwave imagery also showed *Alenga* had lost its symmetric structure by around 1200 UTC 8 December. By 0000 UTC 9 December deep, cold convection persisted only in the southeast quadrant. By 0600 UTC 9 December no convection remained and the low level cloud centre was completely exposed with *Alenga* estimated to be below cyclone strength.

All available intensity estimates are shown in figure 3. Cooperative Institute for Meteorological Satellite Studies (CIMSS) Advanced Dvorak Technique (ADT) climbed steadily through the period that an eye was emerging but peaked too high. National Environmental Satellite Data Information Services (NESDIS) ADT struggled with the pattern until an eye emerged and then intensity estimates were reasonable. They weakened too quickly after the eye disappeared. Satellite Consensus (SATCON) and Advanced Microwave Sounding Unit (AMSU) estimates appeared reasonable throughout and the subjective intensity estimates were biased towards these and subjective Dvorak.

1.2 Structure

Alenga was a small system with gale radii ranging from 60 nautical mile (nm) up to 90 nm in the northern quadrants initially and then the southeast quadrant by 8 December. The radius to maximum wind (RMW) ranged from around 15 – 20 nm initially down to 10 nm at peak intensity. The system was symmetric from 7 – 8 December. On 8 December wind shear increased from the west northwest and convection became biased to the southeast quadrant.

1.3 Motion

Initially *Alenga* was steered to the southwest by a mid-level ridge located to the southeast of the system. During 5 December *Alenga* slowed as a mid-level trough

amplified in the central Indian Ocean. *Alenga* then turned to the southeast as it came under the northwesterly steering influence of the trough. *Alenga* continued moving to the southeast until it weakened below cyclone strength and dissipated.

2 Impact

Alenga had no impact on mainland Australia.

3 Observations

There were no observations recorded during the lifetime of *Alenga.*

4 Forecast Performance

The accuracy statistics obtained by comparing the forecast positions against the best track positions for Severe Tropical Cyclone *Alenga* are

Forecast Hour	**0**	**06**	**12**	**18**	**24**	**36**	**48**	**72**
Absolute error (km)	40	84	115	166	232	356	396	518
RMS error (km)	59	103	154	205	260	378	417	518

Figure 4 is a plot of the accuracy figures for *Alenga* compared to the five year mean.

TABLE 1. Best track summary for Severe Tropical Cyclone *Alenga*

Refer to the Australian Tropical Cyclone database for complete listing of parameters. WST is UTC + 8 hours. Please note data between 0000 UTC 2 December and 1800 UTC 6 December from La Reunion RSMC.

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)	Rad. of storm (NE/SE/ SW/NW)	RMW n mi
2011	12	02	0000	5.5	98.4	45	15	20	1006			
2011	12	02	0600	7.0	98.1	45	15	20	1006			
2011	12	02	1200	7.4	97.7	45	15	20	1006			
2011	12	02	1800	7.7	97.4	45	20	30	1005			
2011	12	03	0000	8.2	97.0	45	20	30	1004			
2011	12	03	0600	8.9	96.3	45	20	30	1004			
2011	12	03	1200	9.7	95.3	45	20	30	1004			
2011	12	03	1800	10.5	93.7	45	20	30	1004			
2011	12	04	0000	11.2	92.3	45	25	35	1002			
2011	12	04	0600	11.7	91.0	45	27	40	1001			
2011	12	04	1200	12.1	89.9	45	27	40	1001			
2011	12	04	1800	12.1	88.9	45	33	45	999			
2011	12	05	0000	12.2	88.1	30	40	55	997	65/65/75/ 65		46
2011	12	05	0600	12.2	87.7	30	42	60	996	65/75/75/ 65		39
2011	12	05	1200	12.2	87.6	30	42	60	995	65/75/75/ 75		37

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)	Rad. of storm (NE/SE/ SW/NW)	RMW n mi
2011	12	05	1800	12.4	87.6	30	45	65	994	75		41
2011	12	06	0000	12.7	87.7	30	40	55	995	65		35
2011	12	06	0600	13.1	87.6	45	37	50	996	55		37
2011	12	06	1200	13.5	87.9	45	35	50	997			33
2011	12	06	1800	13.7	88.3	45	35	50	997			24
2011	12	07	0000	13.9	89.3	20	45	65	993	60		15
2011	12	07	0600	14.3	89.9	20	55	75	986	60	20	15
2011	12	07	1200	14.7	91.6	20	60	85	985	60	20	15
2011	12	07	1800	15.5	93.3	20	65	90	981	75/60/60/ 75	40	20
2011	12	08	0000	16.2	94.9	20	70	100	975	90/60/60/ 90	40	15
2011	12	08	0600	17.3	96.8	15	75	105	972	90/60/60/ 90	40	10
2011	12	08	1200	18.5	98.4	20	70	100	973	60/90/60/ 60	30	10
2011	12	08	1800	19.2	99.7	30	60	85	980	60/90/60/ 60	20	20
2011	12	09	0000	20.6	101.6	25	50	55	988	30/60/30/ 30	20	25
2011	12	09	0600	21.2	102.4	20	30	45	995			
2011	12	09	1200	21.5	102.7	20	30	45	997			

Figure 2. SSMIS microwave image at 2247 UTC 7 December 2011 approaching peak intensity.(image courtesy of NOAA NRL: http://www.nrlmry.navy.mil/)

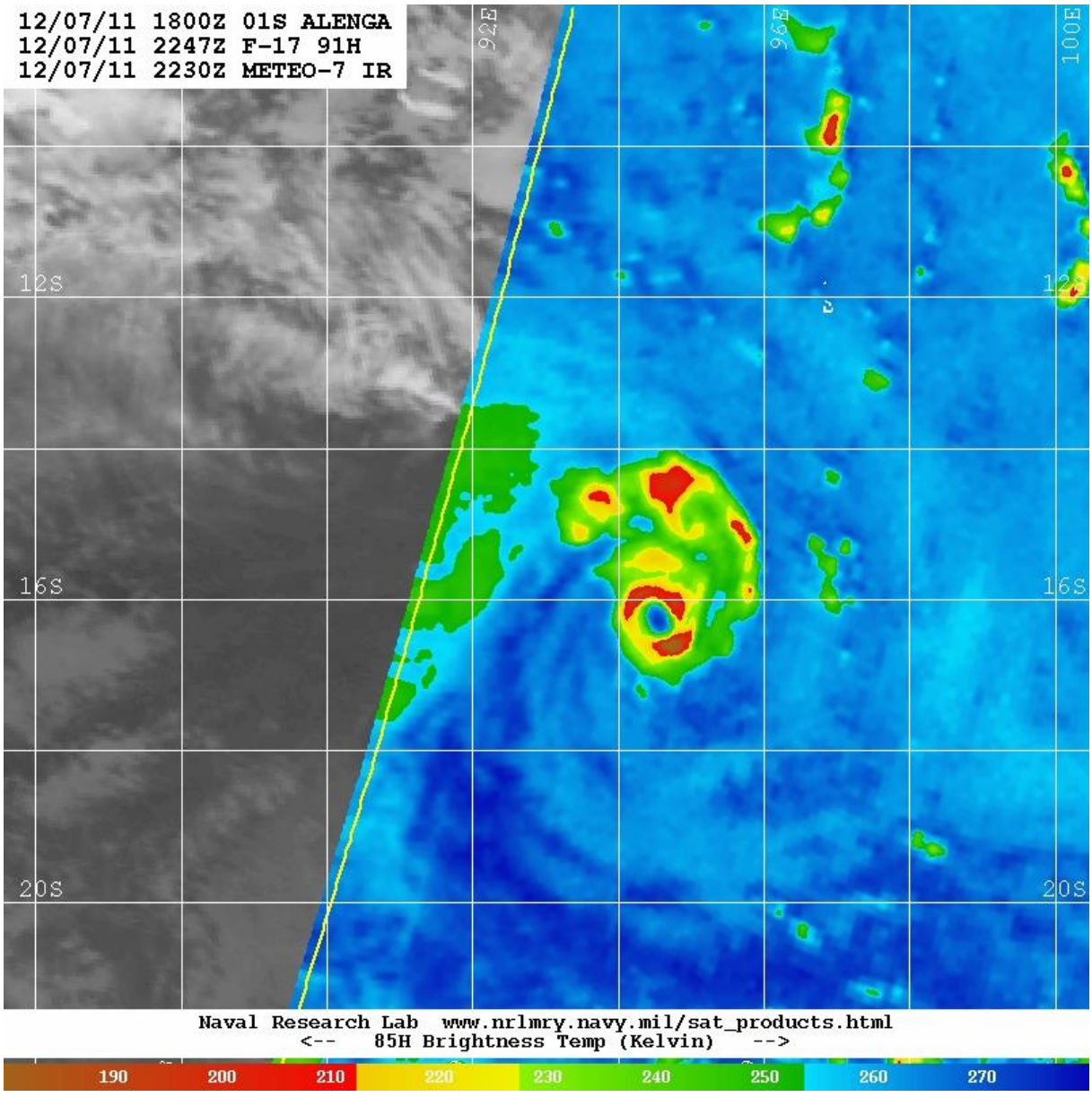


Figure 3. Comparison of objective and subjective intensity analysis techniques.

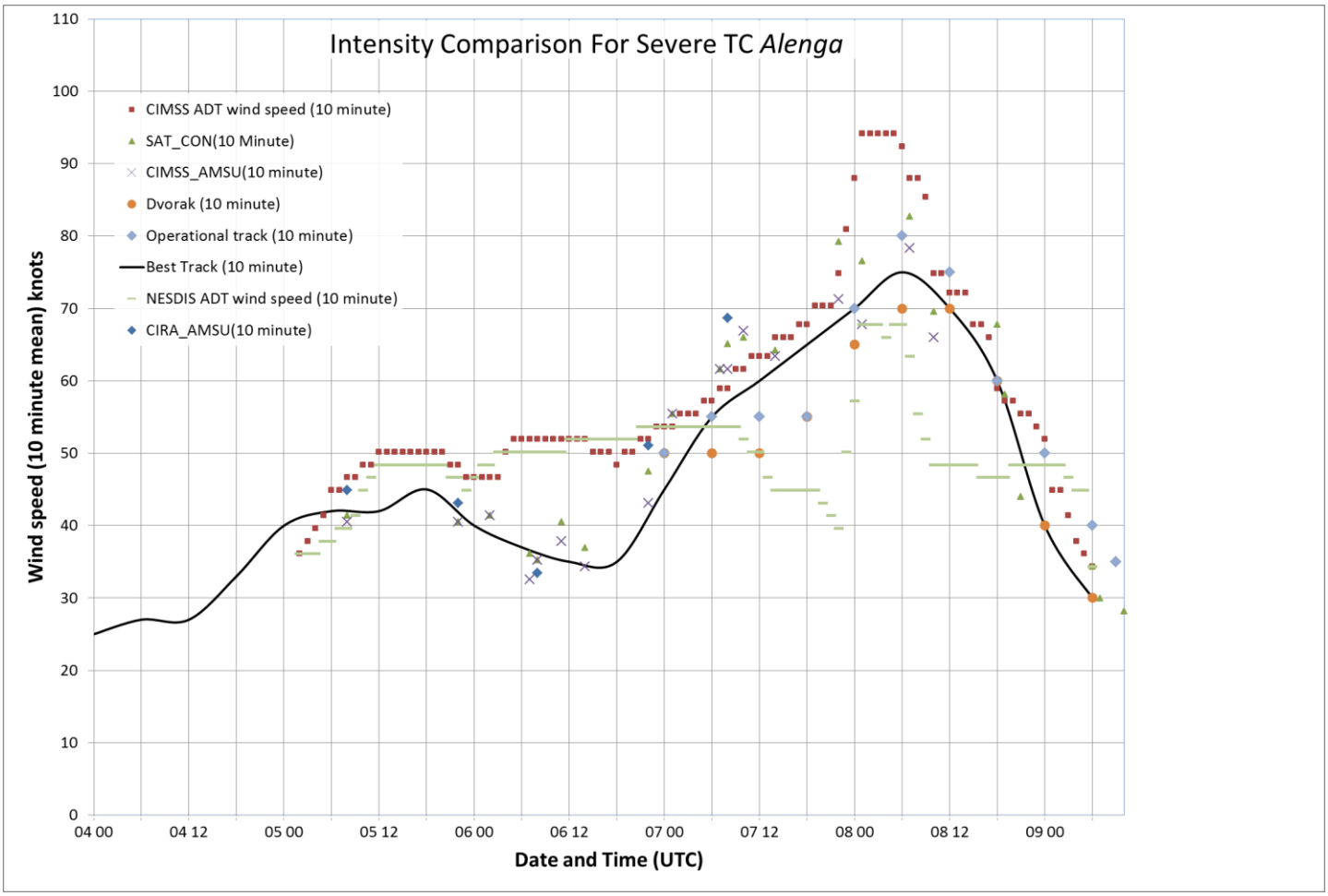


Figure 4. Accuracy figures for *Alenga*