Australian Government
Bureau of Meteorology

Severe Tropical Cyclone *Ikola*

4-8 April 2015

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1 Summary

Severe Tropical Cyclone *Ikola* formed during an active phase of the Madden-Julian Oscillation (MJO) over the Indian Ocean. The low developed in the La Reunion area of responsibility (AOR) on 4 April and tracked steadily south southeast reaching cyclone strength around 0600 Universal Time Coordinated (UTC) (1400 Australian Western Standard Time (AWST)=UTC+8 hours) 5 April 2015. The cyclone crossed 90^{o}E around 1200 UTC 6 April into the Perth AOR. At this time the cyclone's eye was evident on satellite imagery. *Ikola* reached a 10-minute mean wind peak intensity of 95 knots (kn) (176 kilometres per hour (km/h)) around 0000 UTC 7 April. From time onwards, the cyclone weakened quickly as increased vertical wind shear and cooler sea surface temperatures (SSTs) affected *Ikola*. The system weakened below tropical cyclone strength early on 8 April and dissipated quickly.

2 Meteorological Description

2.1 Intensity analysis

A low became evident in an active monsoon trough on 4 April. The low developed quickly under favourable conditions and reached cyclone strength around 0600 UTC 5 April. *Ikola* crossed into the Perth AOR at 1200 UTC 6 April as an intense cyclone. Applying an eye pattern on enhanced infrared imagery (EIR) subjective Dvorak gave a Dvorak Data T-number (DT) of 5.0. Objective estimates were in agreement however Advanced Dvorak Technique (ADT) estimates reached a plateau briefly as the technique struggled to consistently apply an eye pattern. *Ikola* reached a 10-minute peak intensity of 95 kn (176 km/h) around 0000 UTC 7 April (refer Figure 2). From 1800 UTC 6 April Cooperative Institute for Meteorological Satellite Studies (CIMSS) vertical wind shear analyses (refer Figure 3) showed the shear had increased. Cold convection eroded from the northwest side of the cyclone and by 0600 UTC 7 April the DT had dropped to 4.5. Vertical wind shear continued to increase and *Ikola* weakened rapidly with cold convection confined to the south eastern quadrant. The weakening was further hastened by *Ikola* moving over cooler SSTs south of 20^{o}S from 1800 UTC 7 April. By 0000 UTC 8 April the low level cloud centre was completely exposed (refer Figure 4) with little cold convection remained located some 100 nautical miles (nm) (185 kilometres (km)) to the southeast. An 0212 UTC 8 April Advanced Scatterometer (ASCAT) (refer Figure 5) pass showed below gale force winds around an elongated low level centre indicating the cyclone had weakened into a low.

A comparison of objective and subjective intensity estimates for *Ikola* is shown in Figure 6. Most methods were in agreement during the intensification phase, ADT methods lagged for a period between 1200 and 1800 UTC 6 April as the eye emerged, which is a known weakness. SATCON weakened quickly from 0000 UTC 7 April but ADT methods again lagged as the scene type and raw DT numbers fluctuated. Intensity estimates remained too high at the end of *Ikola's* lifetime and this is most likely due to the sheared nature of the low.

2.2 Structure

Ikola was a small cyclone with gale radii ranging from 70 to 90 nm (130-167 km) in its early stages. As Ikola weakened the gale radii contracted in all quadrants except in the southeast where it expanded out to 90 nm (167 km) and then 110 nm (203 km). Gale radii were larger in the south eastern quadrant during its lifetime due to the cyclone being influenced by northwest shear. Radius to maximum winds (RMW) contracted from around 31 nm (57 km) when *Ikola* formed to around 15 nm (28 km) at the peak of its intensity. Eye diameter contracted from 13 nm (24 km) to 8 nm (15 km) as the cyclone intensified.

2.3 Motion

Initially *Ikola* was steered southwest by a mid-level ridge during 4 April. By 5 April a mid-level trough to the south captured *Ikola* under a north northwest steering influence and the cyclone moved south southeast for the remainder of its lifetime.

3 Impact

Ikola had no impact on mainland Australia.

4 Observations

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

5 Forecast Performance

The accuracy statistics obtained by comparing the forecast positions against the best track positions for *Ikola* are

Forecast Hour	**0**	**06**	**12**	**18**	**24**	**36**	**48**
Absolute error (km)	37	50	62	85	112	149	194
RMS error (km)	47	60	68	90	116	150	194

Figure 7 is a plot of the accuracy figures for *Ikola* compared to the five year mean.

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

Refer to the Australian Tropical Cyclone database for complete listing of parameters. WST is UTC + 8 hours. Please note data between 0600 UTC 4 April and 0600 UTC 6 April 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
2015	4	04	0600	10.2	86.9	40	25	35	1005			
2015	4	04	1200	10.3	86.6	20	25	35	1004			
2015	4	04	1800	10.9	86.3	40	30	40	1002			
2015	4	05	0000	11.6	86.8	30	30	40	1001			
2015	4	05	0600	11.8	87.0	30	33	45	999			
2015	4	05	1200	12.2	87.4	30	35	50	998			31
2015	4	05	1800	12.9	88.2	20	42	60	993			27
2015	4	06	0000	13.4	88.7	20	50	70	987	75/75/75/70	30	26
2015	4	06	0600	14.1	89.4	20	57	80	982	85/65/70/70	40	21
2015	4	06	1200	14.8	90.2	10	80	110	968	70/90/70/70	40	15
2015	4	06	1800	15.8	91.0	10	90	125	959	70/90/70/70	40	15
2015	4	07	0000	16.8	92.1	10	95	135	953	60/70/60/60	30	15
2015	4	07	0600	17.9	93.3	15	90	125	958	60/70/60/60	30	15
2015	4	07	1200	19.0	94.7	15	65	90	976	60/70/60/60	20	15
2015	4	07	1800	20.1	96.1	20	50	70	988	40/90/40/40	30	20
2015	5	08	0000	21.1	97.5	20	35	50	1000	0/110/0/0		110
2015	5	08	0300	21.2	97.9	20	30	45	1004			

FIGURE 1. Best track of *Ikola* 4-8 April 2015 (times in WST, UTC+8).

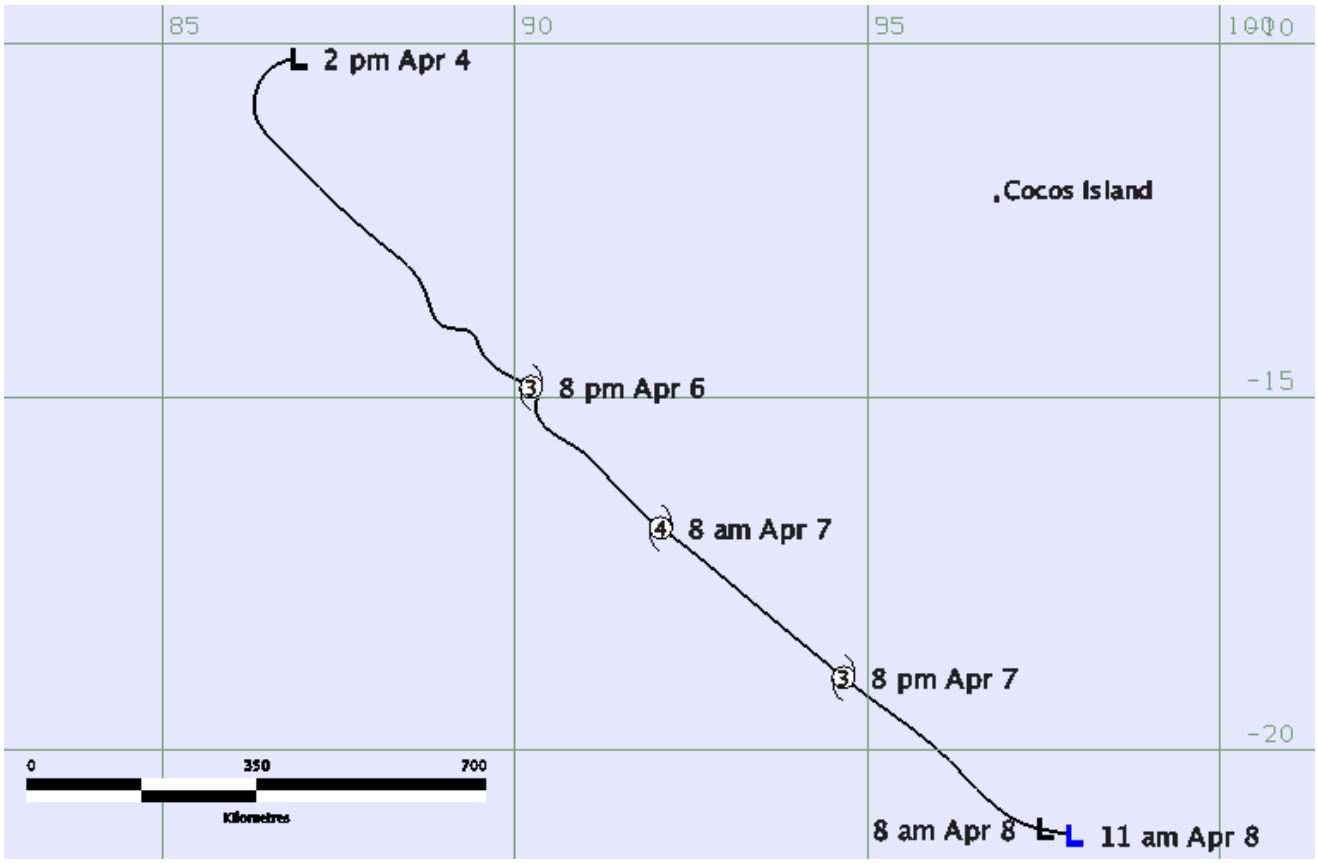

FIGURE 2. AMSR2 microwave image at 2035 UTC 6 April 2015 around peak intensity.

(image courtesy of NOAA NRL: http://www.nrlmry.navy.mil/)

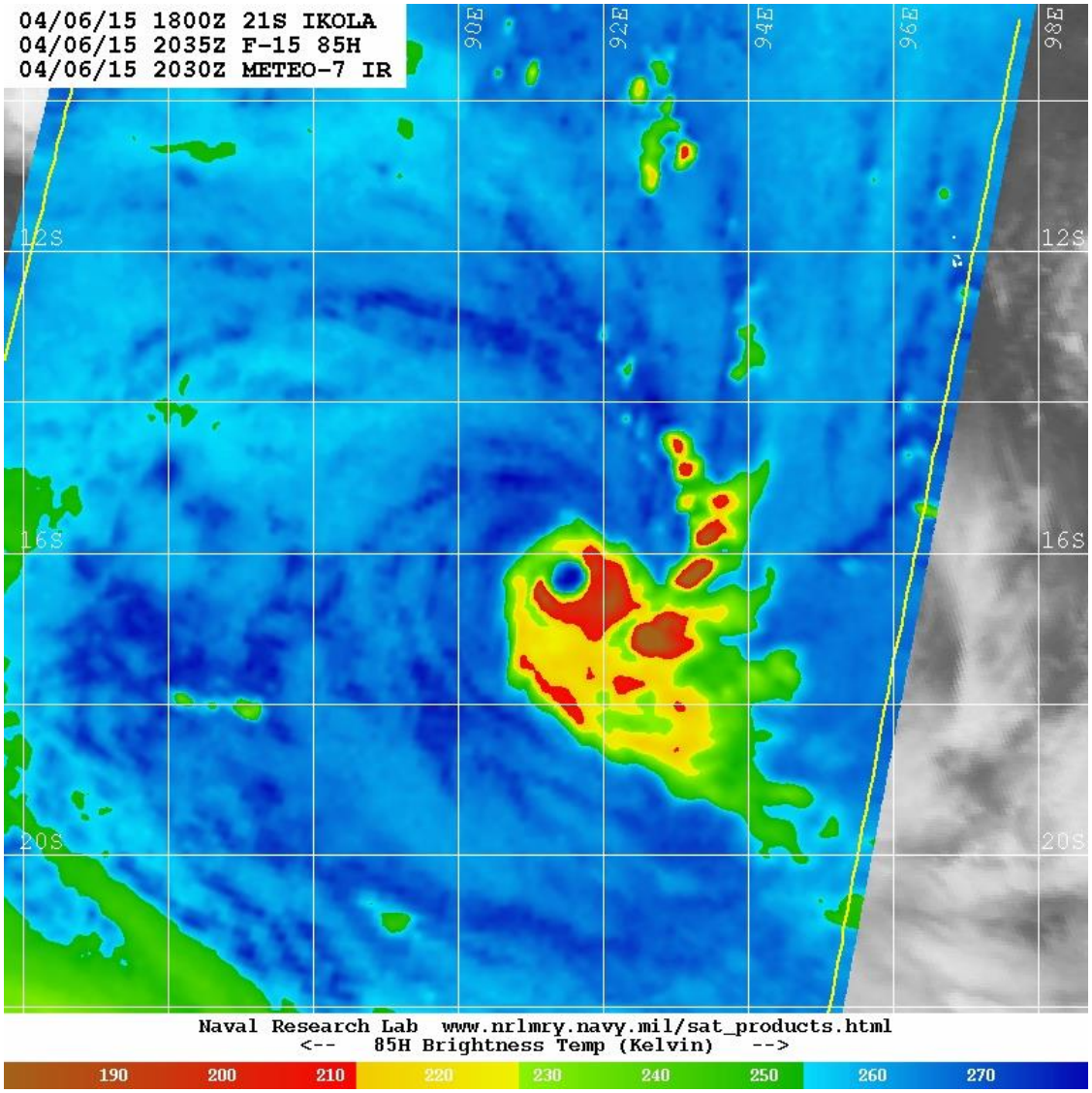

FIGURE 3. Comparison of CIMSS vertical wind shear values and intensity.

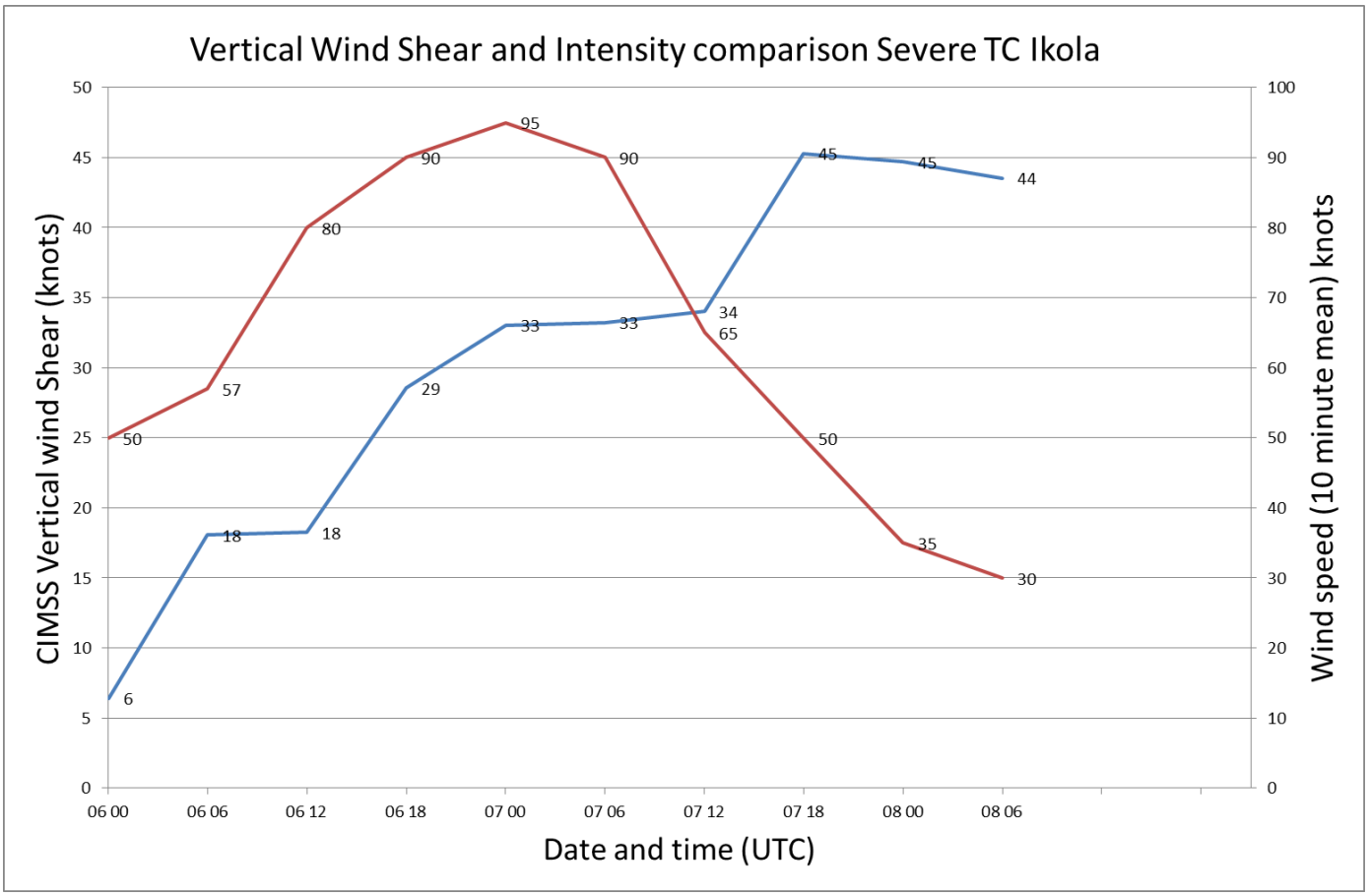

FIGURE 4. 37 GHz Windsat microwave image 2323 UTC 7 April 2015.

(image courtesy of NOAA NRL: http://www.nrlmry.navy.mil/)

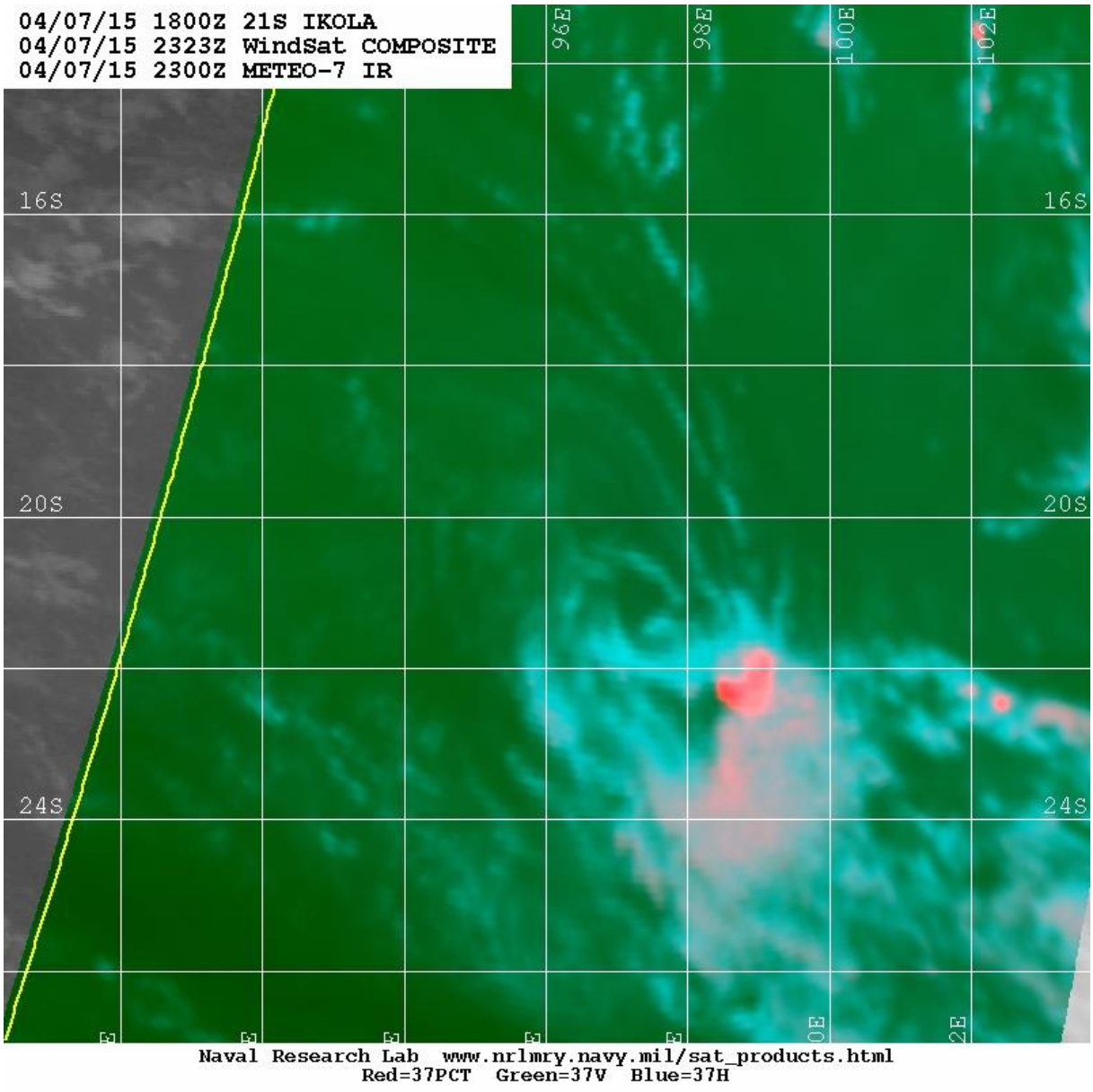

FIGURE 5. ASCAT Metop A pass at 0212 UTC 8 April 2015.

(image courtesy of NOAA NRL:http://manati.star.nesdis.noaa.gov/datasets/ASCATData.php)

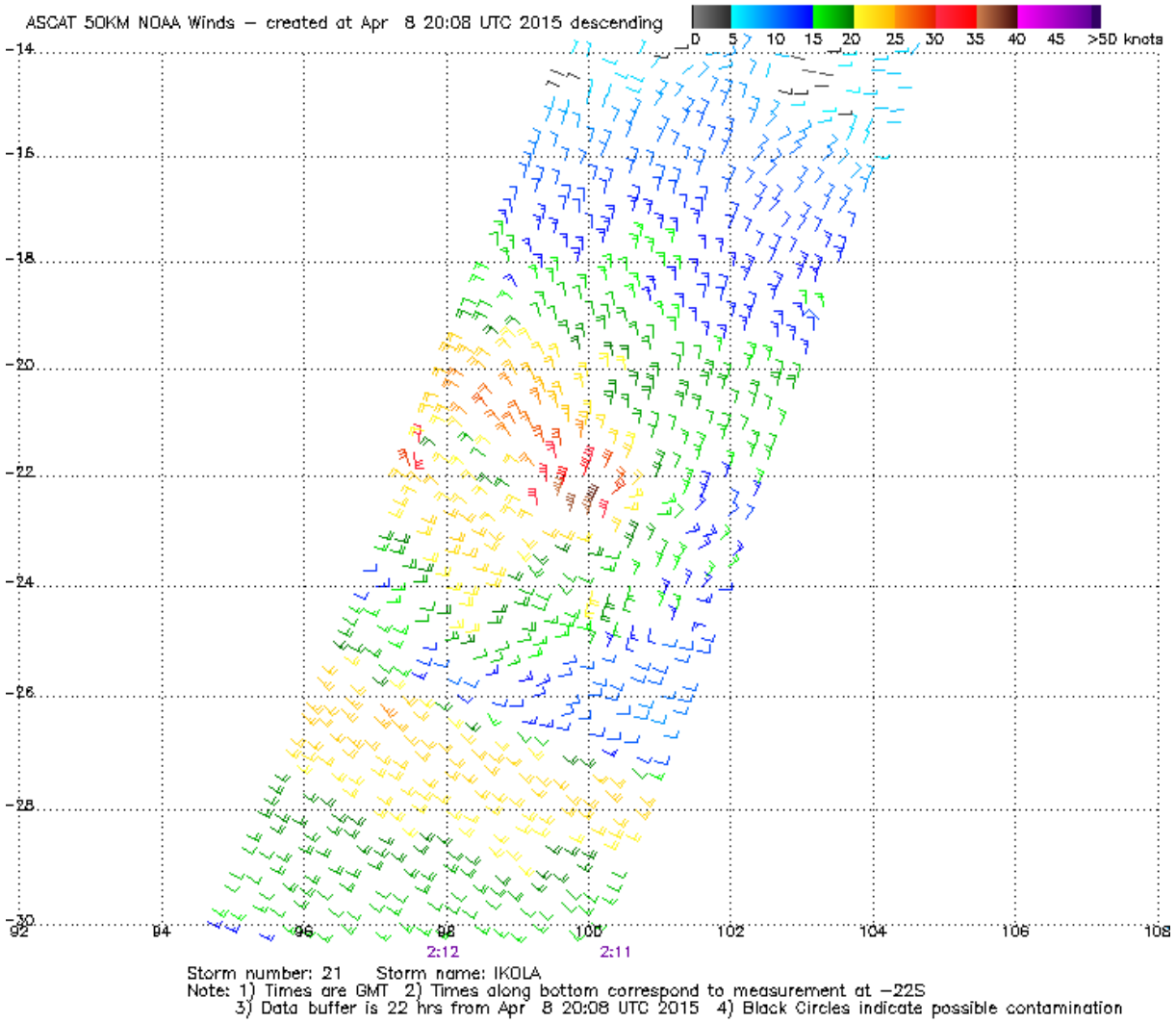

FIGURE 6 Comparison of objective and subjective intensity estimates for *Ikola*

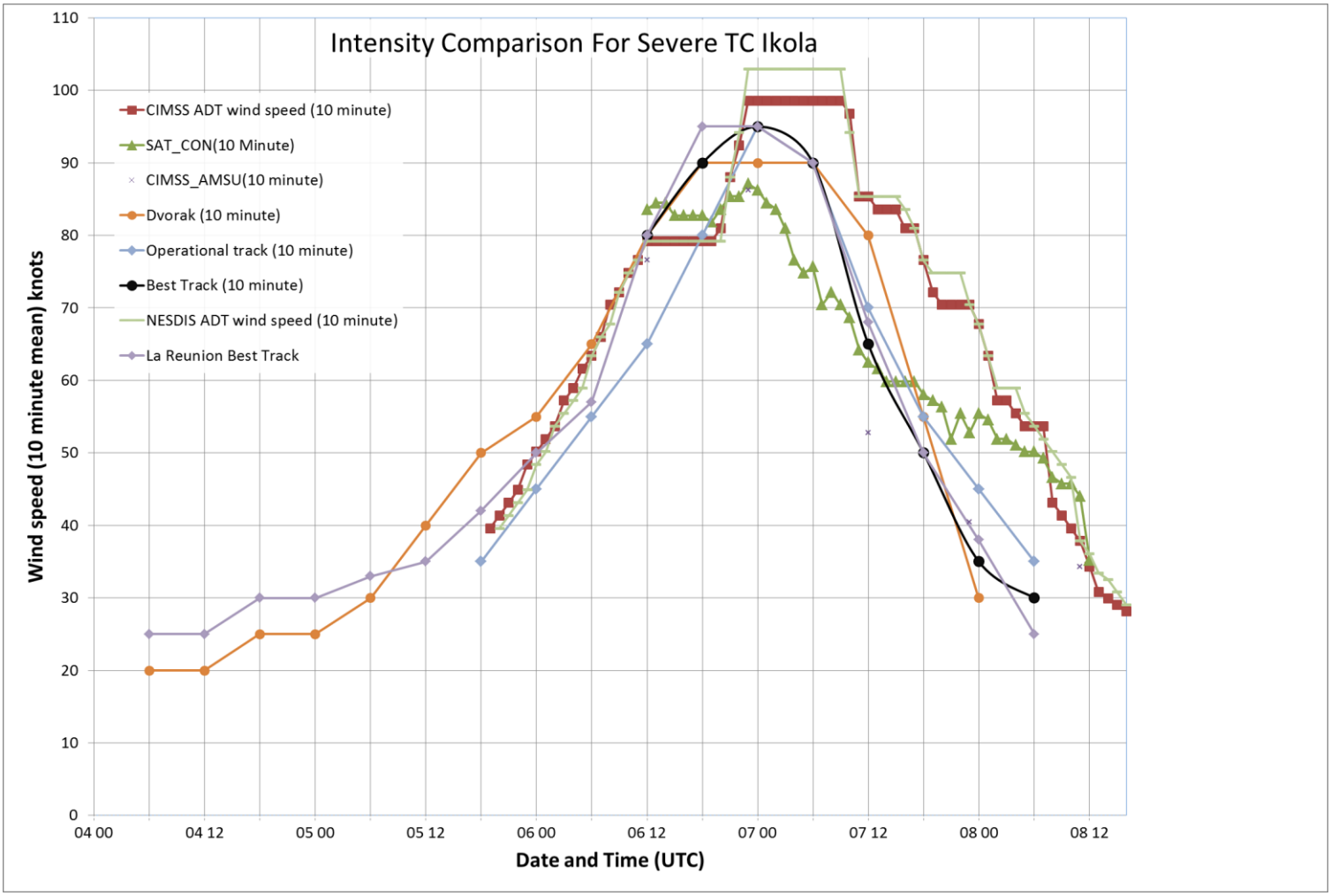

FIGURE 7. Accuracy statistics for STC *Ikola*