

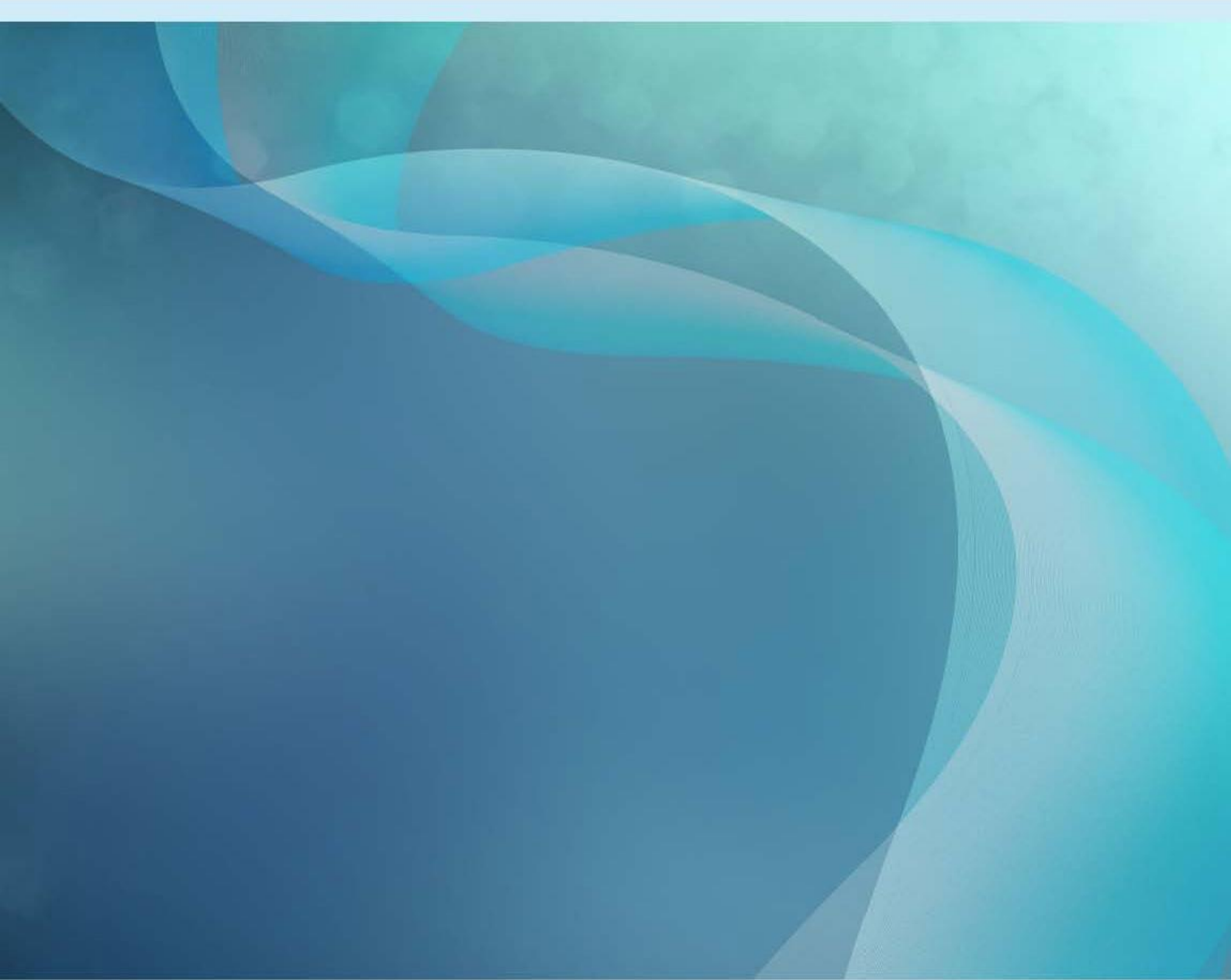


Australian Government
Bureau of Meteorology

Severe Tropical Cyclone *Jack*

16 – 22 April 2014

March 2016



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1 Summary

A tropical low formed approximately 180 kilometres to the northeast of the Cocos Islands on 16 April. The tropical low drifted to the west southwest and slowly developed in an area of low vertical wind shear reaching cyclone strength at 1800 Universal Time Coordinated (UTC) 18 April (0200 Australian Western Standard Time (AWST) 19 April = UTC+8 hours). The tropical low was named Tropical Cyclone *Jack*. From 19 April, *Jack* was steered to the south while the cyclone rapidly intensified to a peak 10-minute mean intensity of 75 knots (kn) at 0000 UTC 20 April. Later on 20 April, *Jack* turned to the southeast as it came under the influence of a mid-level trough located to the southwest of the system. *Jack* initially weakened quickly under the influence of increased wind shear and in the final stages cooler sea surface temperatures (SSTs) contributed to the systems demise.

1.1 Intensity analysis

A tropical low became evident near 11°S 98°E around 0600 UTC 16 April. The low was steered in a west southwest direction as it intensified, attaining a Dvorak Data-T number (DT) 1.0 classification at around 0000 UTC 17 April. *Jack* reached cyclone strength at 1800 UTC 18 April. The tropical cyclone was located in a favourable environment of low vertical wind shear and warm SSTs and it intensified rapidly. An eye pattern emerged on enhanced infrared imagery (EIR) at 1800 UTC 19 April and the microwave 1820 UTC Advanced Microwave Scanning Radiometer 2 (AMSR2) image showed cold convection wrapping completely around the centre (refer Figure 2). *Jack* reached a peak 10-minute mean wind of 75 kn (refer Figure 3) between 1800 UTC and 0000 UTC 20 April before the eye pattern disappeared at 2300 UTC 19 April. During 20 April a mid-level trough approached from the southwest, the vertical wind shear slowly strengthened and *Jack* began to gradually weaken. The tropical cyclone decreased below cyclone strength at 0600 UTC 22 April as high vertical wind shear and cooler SSTs affected the circulation.

The intensity of *Jack* was estimated using a combination of objective and subjective intensity techniques (refer Figure 3). Objective intensity estimates from Advanced Dvorak Technique (ADT) and Satellite Consensus (SATCON) were in good agreement through *Jack's* development. Subjective Dvorak estimates reached a peak of 80 kn while ADT peaked at 75 kn. SATCON reached a peak intensity of about 70 kn and reflected a weakening trend from 0000 UTC 20 April. All methods were in agreement around 1800 UTC 21 April.

1.2 Structure

Jack was a small tropical cyclone with an initial gale radius of 60 nautical miles (nm). This increased to 90 nm in the southern quadrants as *Jack* moved south and began to weaken. Radius to maximum winds (RMW) was initially 15 nm, this contracted to

around 10 nm during *Jack's* most intense period. The RMW expanded to 30 nm as *Jack* weakened.

1.3 Motion

Initially the tropical low was located to the northwest of the mid-level ridge and the tropical cyclone was steered to the west southwest. On 19 April, a trough to the south of *Jack* split the ridge and the tropical cyclone turned to the south. The trough continued to amplify in the central Indian Ocean and on 20 April *Jack* was steered to the southeast ahead of it. *Jack* continued on southeast movement until it weakened below cyclone strength on 22 April.

2 Impact

Jack had no impact on the Cocos Keeling Islands or mainland Australia.

3 Observations

No observations were recorded during *Jack's* lifetime.

4 Forecast Performance

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

Forecast Hour	0	06	12	18	24	36	48	72
Absolute error (km)	44	73	89	102	115	138	151	176
RMS error (km)	54	86	104	123	137	167	173	180

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

TABLE 1. Best track summary for *Jack*

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

Year	Month	Day	Hour UTC	Pos. Lat S	Pos. Long. E	Pos. Acc. n mi	Max Wind 10 min kn	Max gust kn	Cent. Pres. hPa	Rad. of gales (NE/SE/SW/NW)	Rad. of storm (NE/SE/SW/NW)	RM W n mi
2014	04	16	0600	11.0	98.0	45	25	45	1004			
2014	04	16	1200	10.9	97.1	45	25	45	1004			
2014	04	16	1800	10.9	96.1	45	25	45	1004			
2014	04	17	0000	10.9	95.1	45	25	45	1004			
2014	04	17	0600	11.5	94.6	45	30	45	1001			
2014	04	17	1200	11.4	93.8	45	30	45	1001			
2014	04	17	1800	11.6	93.5	45	30	45	1001			
2014	04	18	0000	11.7	93.3	45	30	45	1000			
2014	04	18	0600	11.8	92.7	20	30	45	1001			
2014	04	18	1200	12.2	91.6	20	30	45	1002			
2014	04	18	1800	12.5	91.3	20	35	50	998	60		15
2014	04	19	0000	13.0	91.1	20	45	65	992	60		15
2014	04	19	0600	13.4	90.9	20	50	70	989	60	30	15
2014	04	19	1200	13.9	90.6	20	60	85	982	60	30	10
2014	04	19	1800	14.3	90.6	10	65	90	978	60	30	15
2014	04	20	0000	14.6	90.7	15	75	105	967	70	40	10

Year	Month	Day	Hour UTC	Pos. Lat S	Pos. Long. E	Pos. Acc. n mi	Max Wind 10 min kn	Max gust kn	Cent. Pres. s. hPa	Rad. of gales (NE/SE/SW/NW)	Rad. of storm (NE/SE/SW/NW)	RM W n mi
2014	04	20	0600	14.7	90.7	20	75	105	966	70	40	10
2014	04	20	1200	14.8	91.0	15	70	100	971	70	40	15
2014	04	20	1800	15.3	91.4	20	65	90	977	70	40	10
2014	04	21	0000	15.5	92.1	20	65	90	979	60/90/90/60	30	15
2014	04	21	0600	16.1	92.7	20	60	85	983	60	30	15
2014	04	21	1200	16.5	93.3	15	60	85	982	60	30	25
2014	04	21	1800	16.5	93.5	15	55	75	984	30/60/30/30	30	30
2014	04	22	0000	17.1	94.5	30	40	55	997	30/60/60/30		30
2014	04	22	0600	17.9	95.3	15	30	45	1002			

Figure 1. Best track of *Jack* 16 – 22 April 2014 (times in AWST, UTC+8).

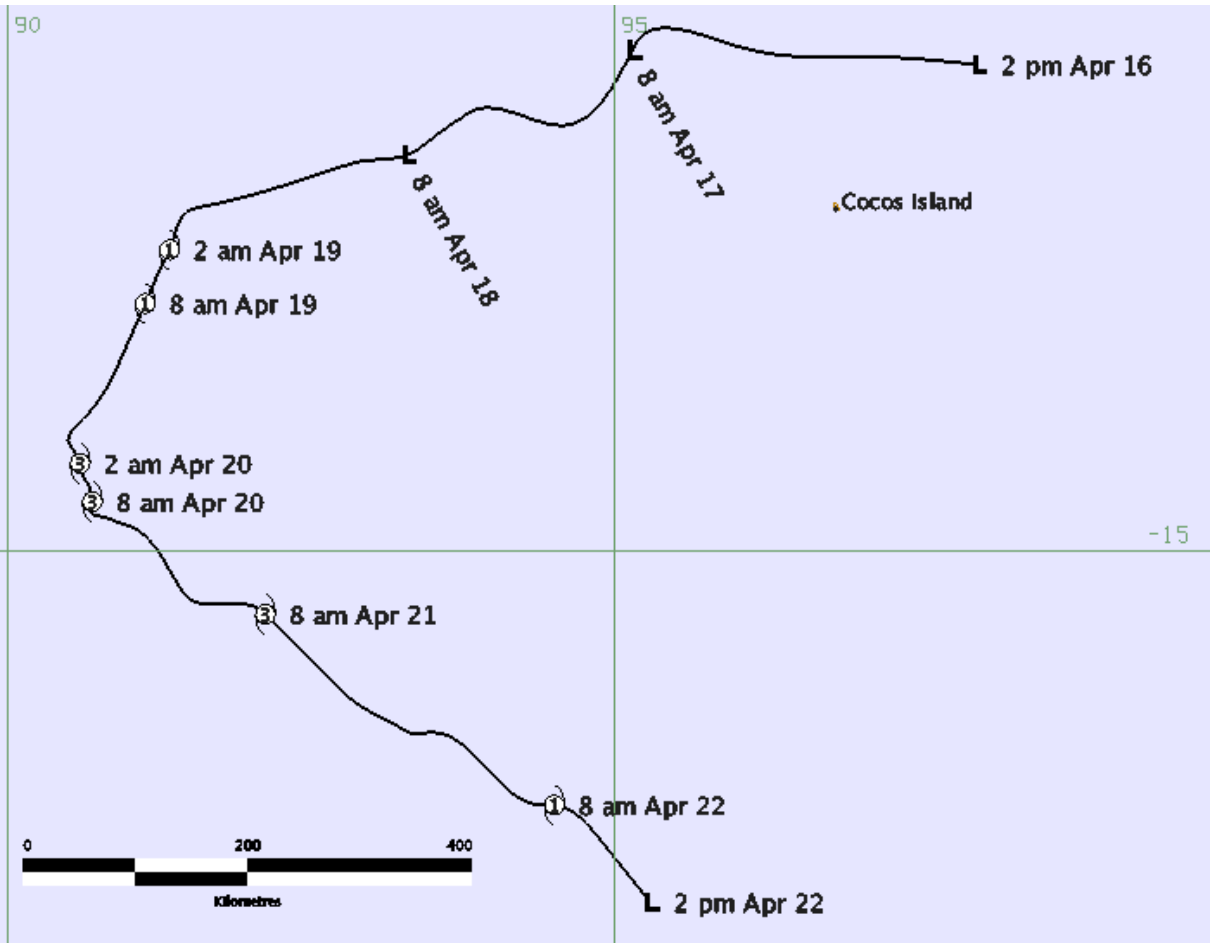


Figure 2. 89 GHz AMSR2 1820 UTC 19 April image of *Jack* near peak intensity.

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

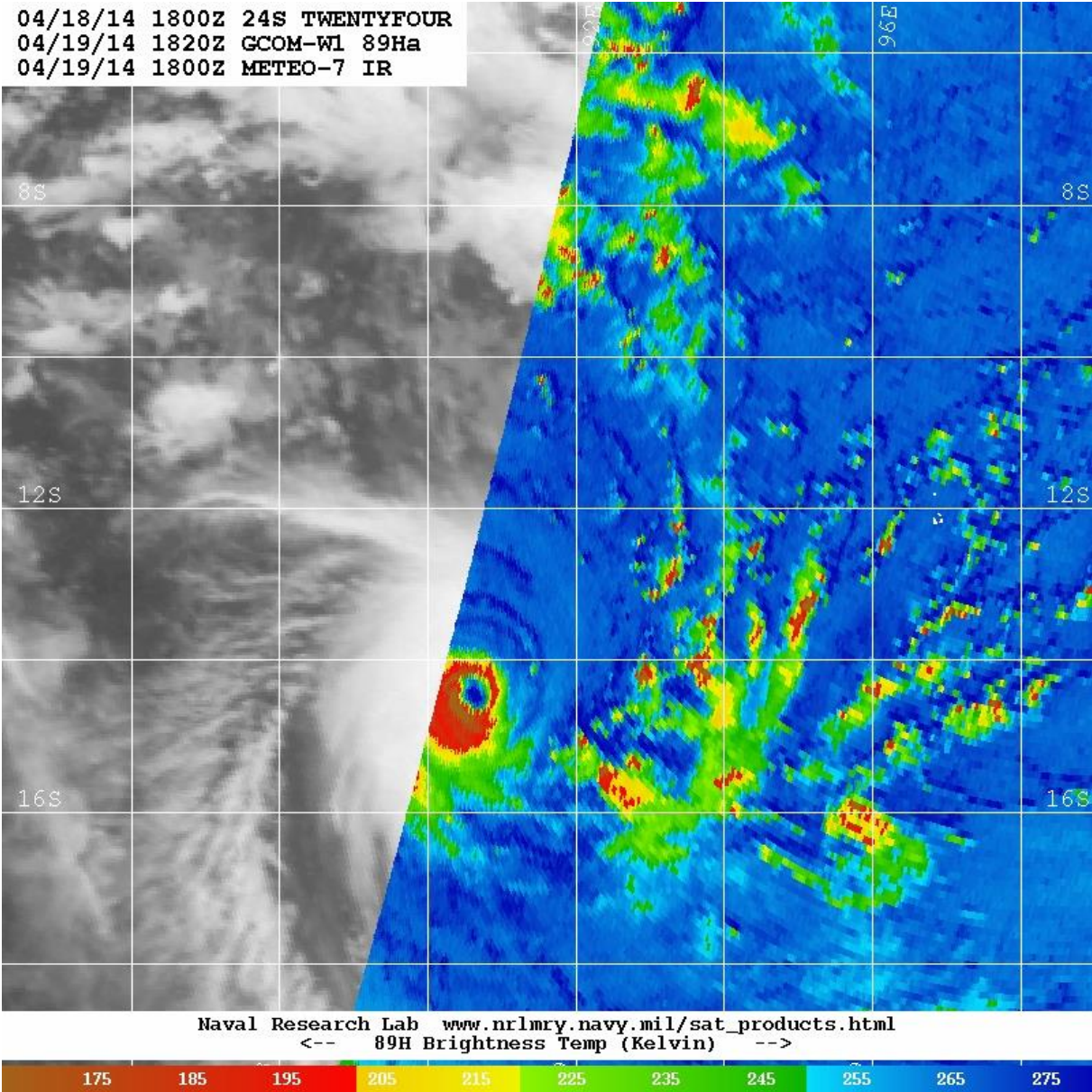


Figure 3. Comparison of objective and subjective intensity estimates during *Jack*.

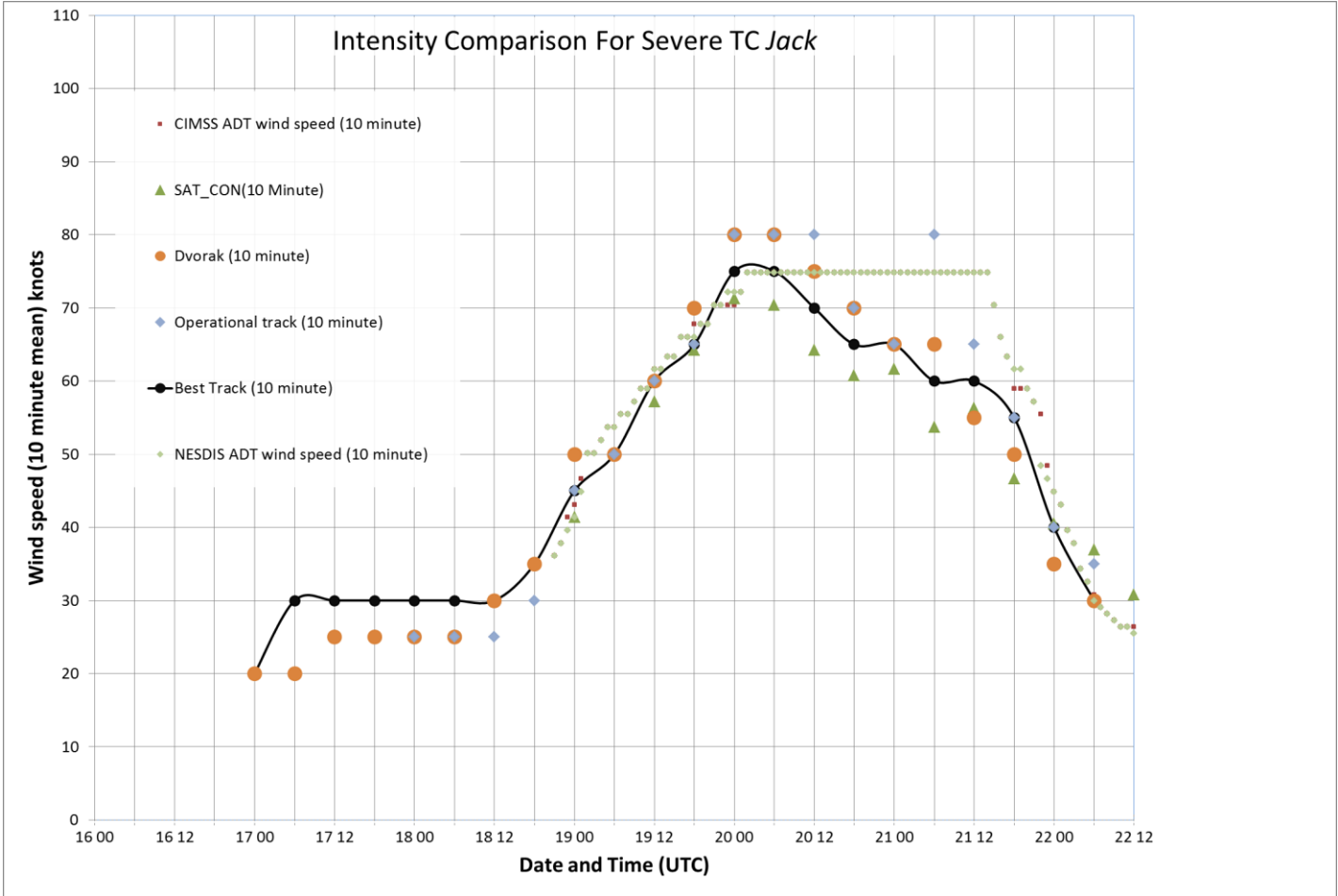


Figure 4. Accuracy statistics for *Jack*

