Australian Government
Bureau of Meteorology

Tropical Cyclone *Wallace*

3 – 12 April 2019

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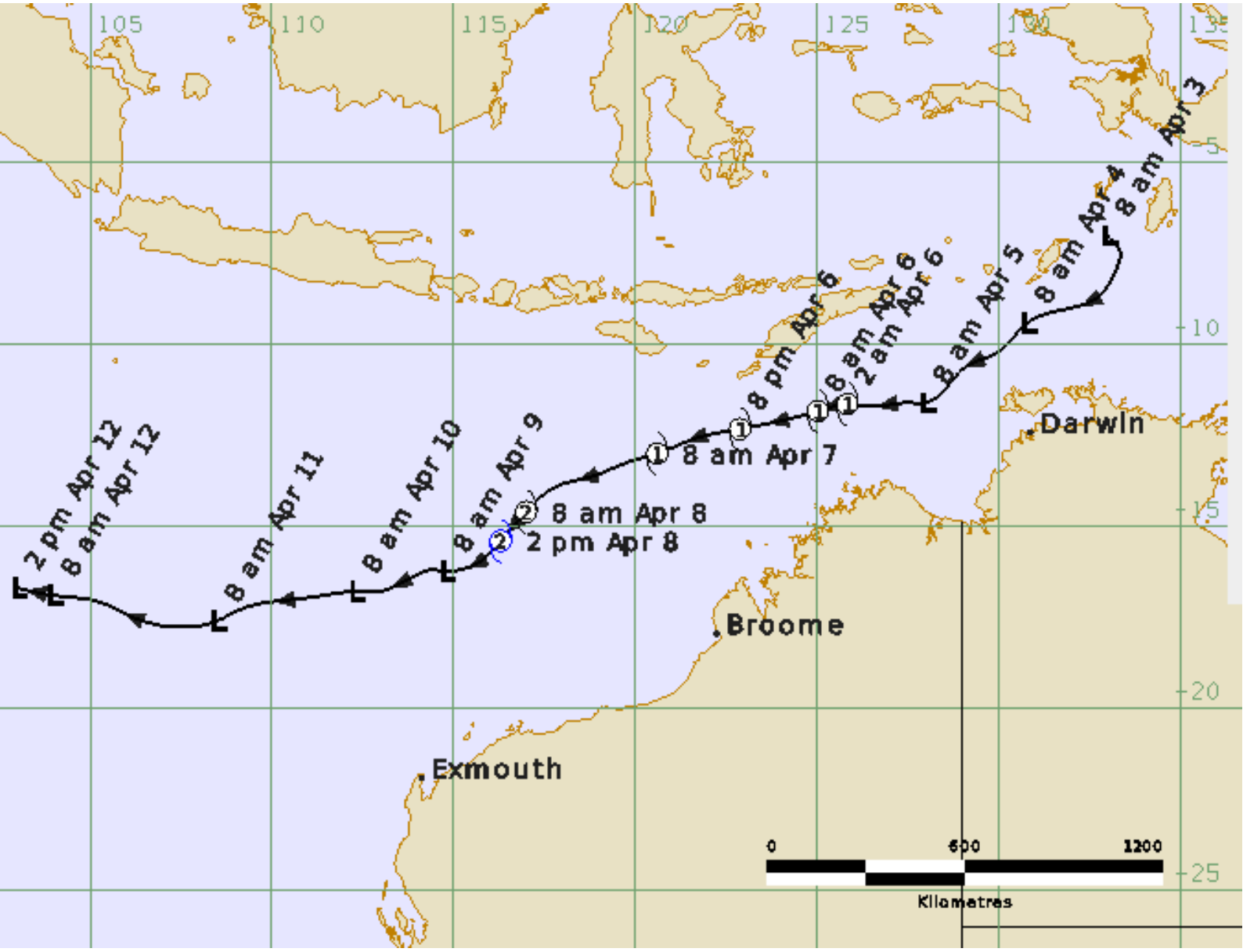

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1 Summary

Tropical Cyclone *Wallace* was a long lived system that developed in the Arafura Sea. The low tracked between Australia and Timor before developing into a tropical cyclone north of the Kimberley, Western Australia on 6 April. *Wallace* continued to move in a west southwest direction to the north of the Australian mainland and reached a peak intensity of 55 knots (kn) (100 kilometres per hour (km/h)) at 0600 Universal Time Coordinated (UTC) 8 April (1400 Australian Western Standard Time (AWST) 8 April) (AWST=UTC+8 hours). *Wallace* weakened below tropical cyclone strength by 0000 UTC 9 April though gales remained south of the centre for another 12 hours (h). A discrete westward moving low persisted until 12 April when it dissipated in the Indian Ocean. *Wallace* did not affect the Australian mainland and there were no recorded impacts.

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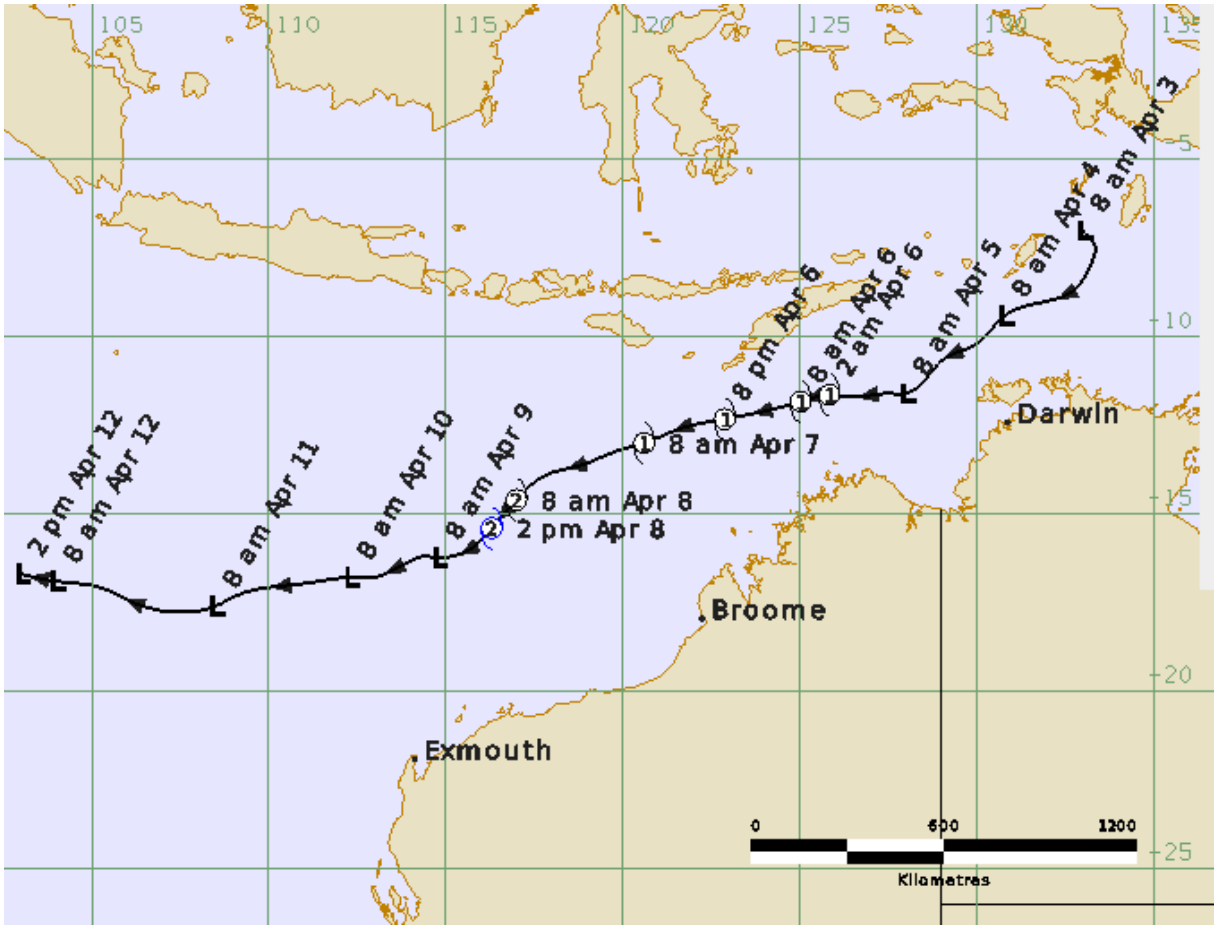
FIGURE 1. Best track of Tropical Cyclone *Wallace* 3-12 April 2019 (times in AWST, UTC+8).



2 Meteorological Description

2.1 Intensity analysis

A low formed in the Arafura Sea on 3 April. An OCEANSAT-2 scatterometer (OSCAT) pass showed a well developed circulation with 20 knot (kn) winds near the centre. A Dvorak Data T (DT) of 1.0 was assigned on 3 April and initially development continued at a standard T-number a day. Development then slowed under moderate to strong vertical wind shear. Satellite imagery showed an exposed low-level centre to the east of deep convection. An OSCAT pass at 0000 UTC 5 April (refer Figure 2) showed a circulation with gales in southern quadrants and an intensity of 35 kn was assigned at this time however satellite imagery continued to show an exposed low level centre with little deep convection nearby. CIMSS shear analyses showed easterly shear of about 40 kn. *Wallace* reached tropical cyclone strength at 1800 UTC 5 April. Dvorak DT values had reached 3.0, both objective Advanced Dvorak Techniques (ADT) outputs had reached 40kn 10-minute mean wind speeds and Satellite Consensus (SATCON) was higher at about 47 kn 10-minute mean wind, refer Figure 3. *Wallace* reached 50 kn at 0600 UTC 6 April but then quickly weakened back to 45 kn by 1200 UTC 6 April. Objective guidance also reached a peak and then decreased at this time.

By 7 April the shear had decreased to 20 kn from the east and *Wallace* intensified to reach a peak 10-minute mean wind of 55 kn at 0600 UTC 8 April. Figure 4 is a Special Sensor Microwave Imager (SSMI) pass at 0742 UTC 8 April which shows *Wallace* near peak intensity. From 1200 UTC 8 April a combination of moderate to strong shear and entrainment of dry air into the core caused *Wallace* to weaken rapidly. Satellite images showed the deep convection became well separated from the low-level centre. By 0000UTC 9 April an Advanced Scatterometer (ASCAT) pass showed gales were confined to southern quadrants and *Wallace* had weakened below tropical cyclone strength, refer Figure 5. Objective intensity estimates continued to remain strong early on 9 April due to the methods incorrectly positioning the low-level centre closer to the cold convection. The low continued on a westwards movement and dissipated in the Indian Ocean on 12 April.

2.2 Structure

Wallace was a highly asymmetric tropical cyclone that was influenced by strong vertical wind shear over the duration of its existence. Initially the southern gale radii extended up to 60 nautical miles (nm) (111 kilometres (km)), as *Wallace* intensified southern gale radii increased to 80 nm (148 km) while northern radii varied from 40 to 90 nm (75 to 167 km). Convection was located mainly in the western quadrants as the tropical cyclone was affected by strong easterly shear. As Wallace weakened the northern gale radii disappeared and southern radii increased to 100 nm (185 km) with convection mainly in southern quadrants.

The radius to maximum winds (RMW) was 25 nm (46 km) which decreased to 15 nm (28 km) at peak intensity. As *Wallace* weakened the RMW became large at 70 nm (130 km).

2.3 Motion

Wallace was steered in a west to southwest direction by a strong mid-level ridge over northern Australia. A mid-level trough moved over Western Australia during the 8 and 9 April which assisted in weakening *Wallace*. The deeper convection became dissociated with the low-level centre which was then steered in a westerly direction by the low-level easterly steering.

FIGURE 2. OSCAT pass at 0000UTC 5 April

Images courtesy NRL: https://www.nrlmry.navy.mil/TC.html

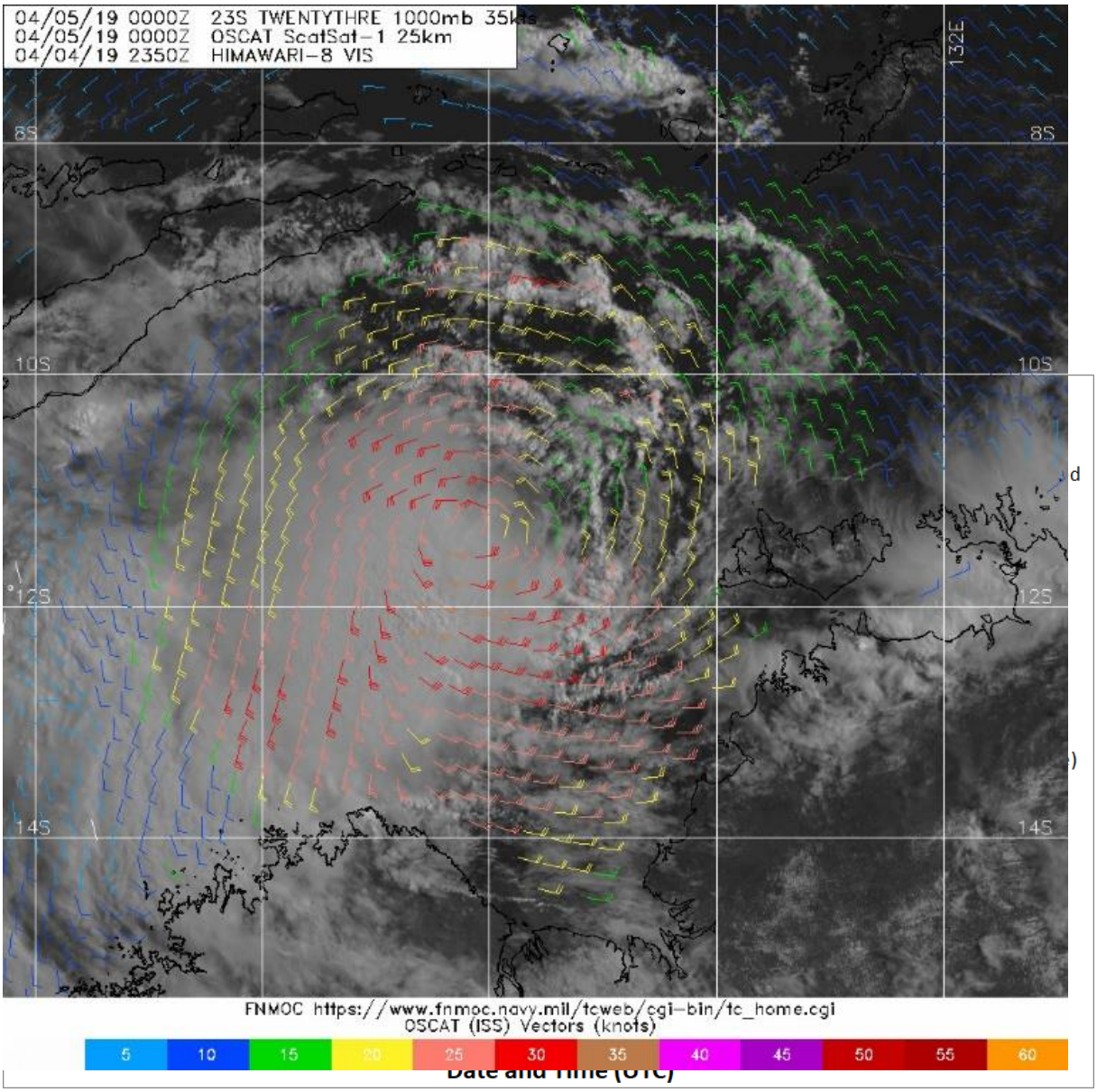


FIGURE 3. Plot of objective and subjective intensity estimates of *Wallace*.

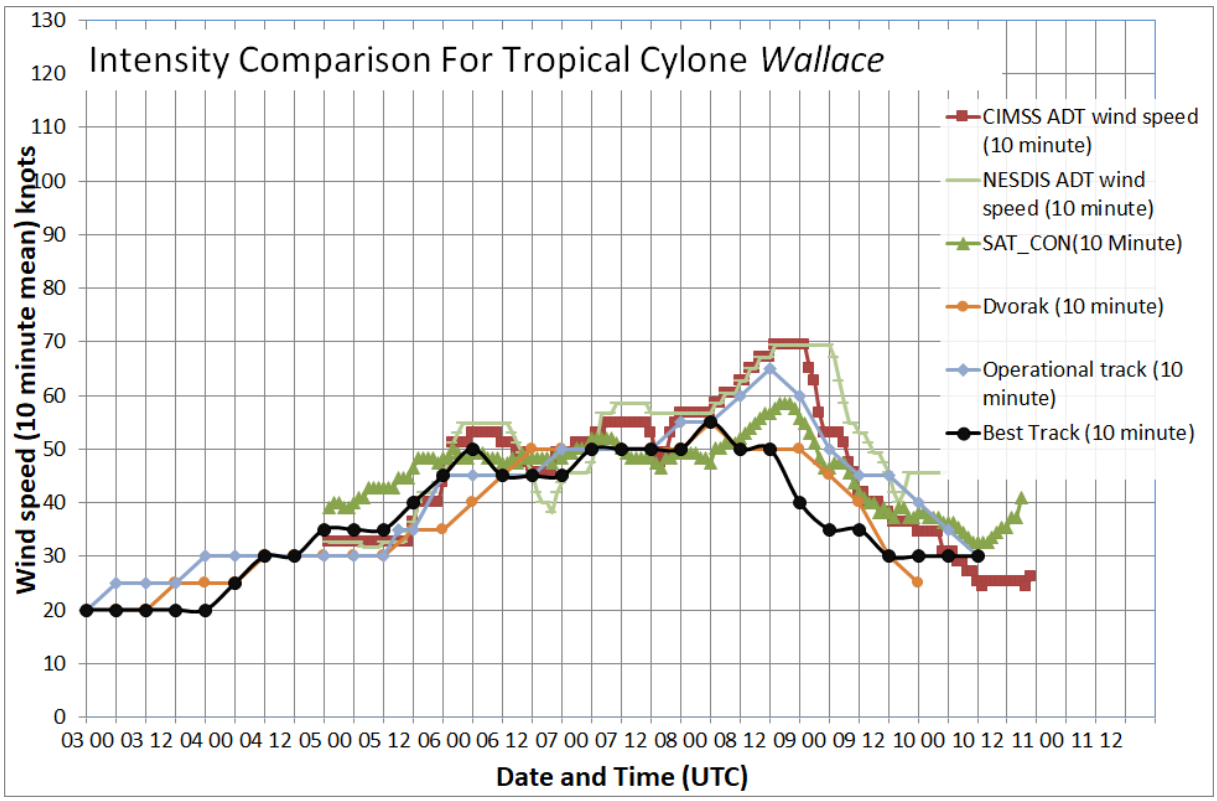


FIGURE 4. SSMI 85GHz microwave pass of *Wallace* at 0742 UTC 8 April during peak intensity.

Images courtesy NRL: https://www.nrlmry.navy.mil/TC.html

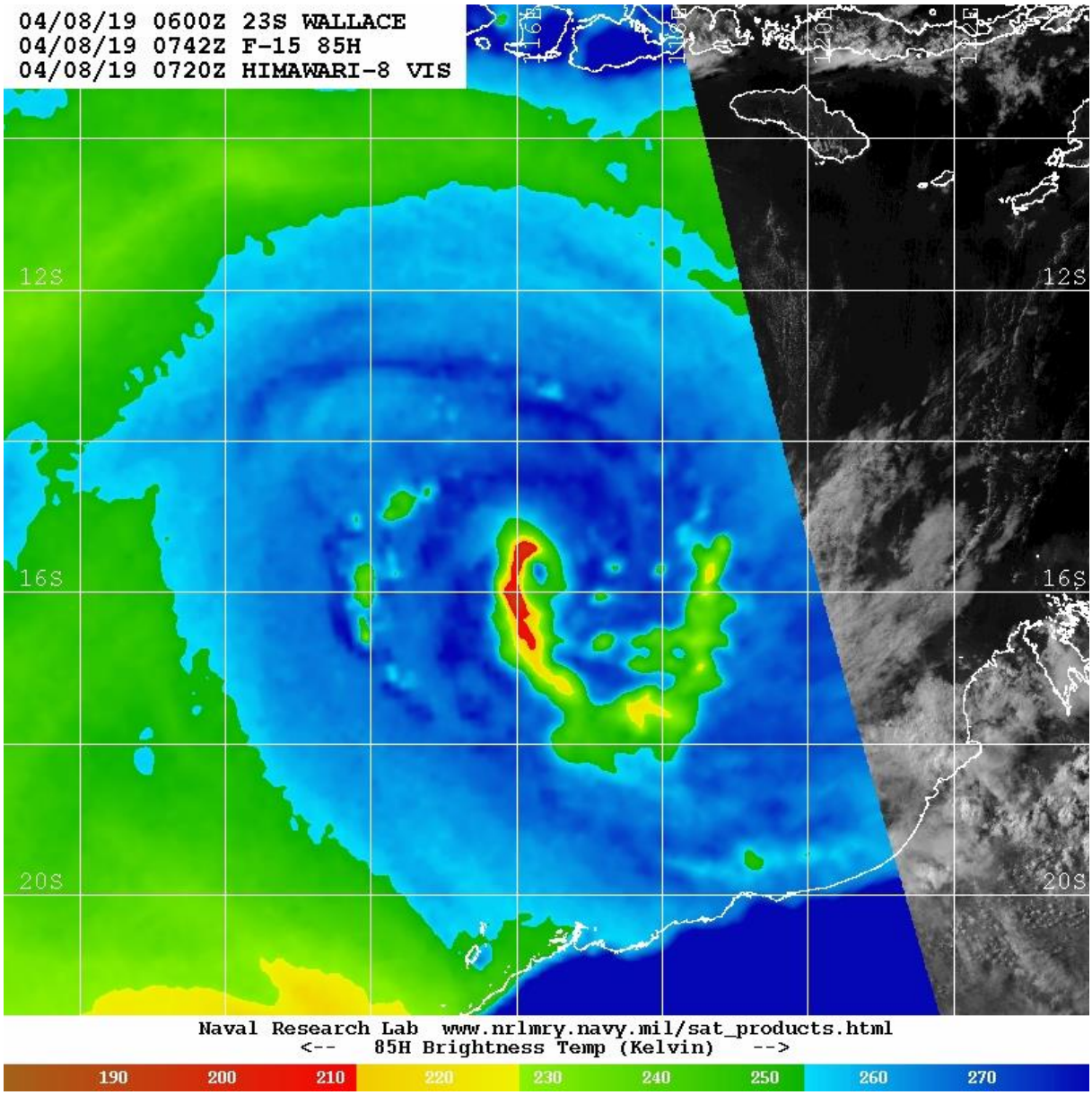
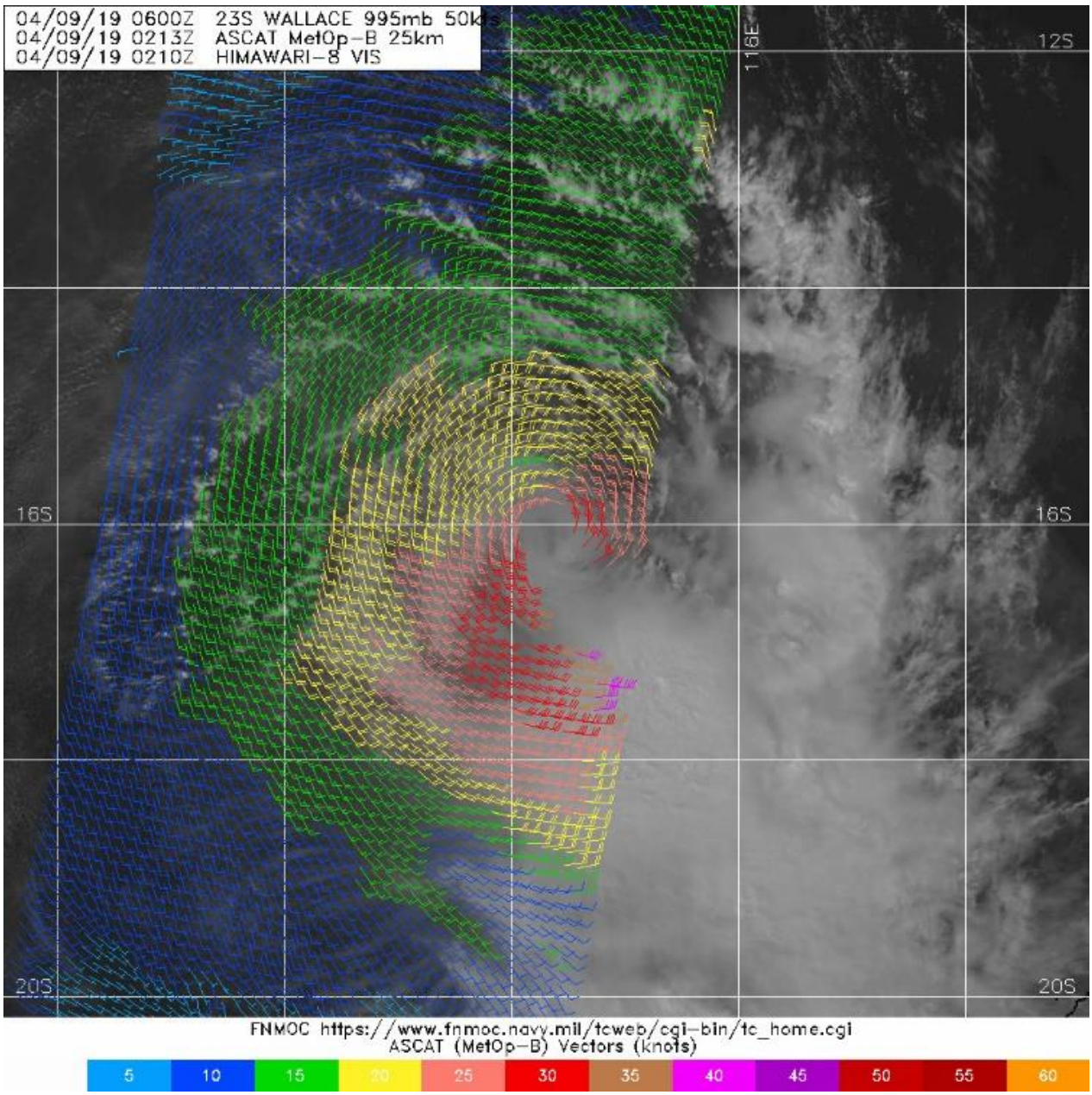


FIGURE 5. ASCAT pass at 0213 UTC 9 April showing gales confined to southern quadrants.

Image courtesy NRL: https://www.nrlmry.navy.mil/TC.html



3 Impact

There were no impacts recorded to mainland Australia.

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4 Observations

There were no recorded observations of significance.

5 Forecast Performance

Official tropical cyclone forecasts were issued from 4 to 6 April. A tropical cyclone watch was first issued on 4 April from Cockatoo island to Kalumburu in Western Australia. The watch and warning zones were extended south to Derby but all Advices ceased on 6 April when it became apparent that *Wallace* was not going to cause gales on the Western Australian coast.

The accuracy figures for Tropical Cyclone *Wallace* in Figure 6a and b were calculated using official forecast tracks issued from 1200 UTC 4 April to 0000 UTC 10 April. These show that the forecast position performed better than the five-year average at all time steps to 120 hours.

	00	06	12	18	24	36	48	72	96	120	144
Absolute position error (km)	34	44	55	66	70	77	85	96	141	344	591
Absolute mean wind error (kn)	5	6	7	9	9	10	12	16	14	11	7
Sample Size	23	23	23	23	23	23	23	20	16	12	7

FIGURE 6 a. Position accuracy figures for Tropical Cyclone *Wallace.*

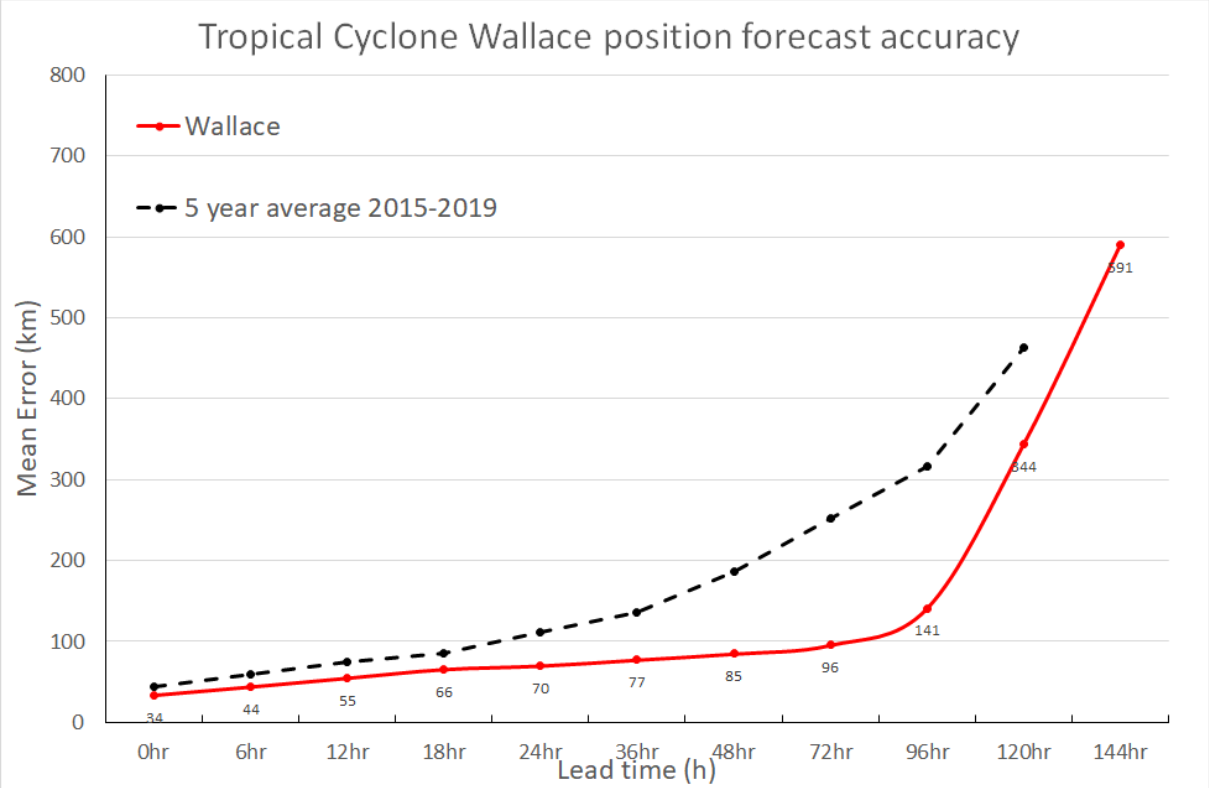

FIGURE 6b. Intensity accuracy figures for Tropical Cyclone *Wallace.*

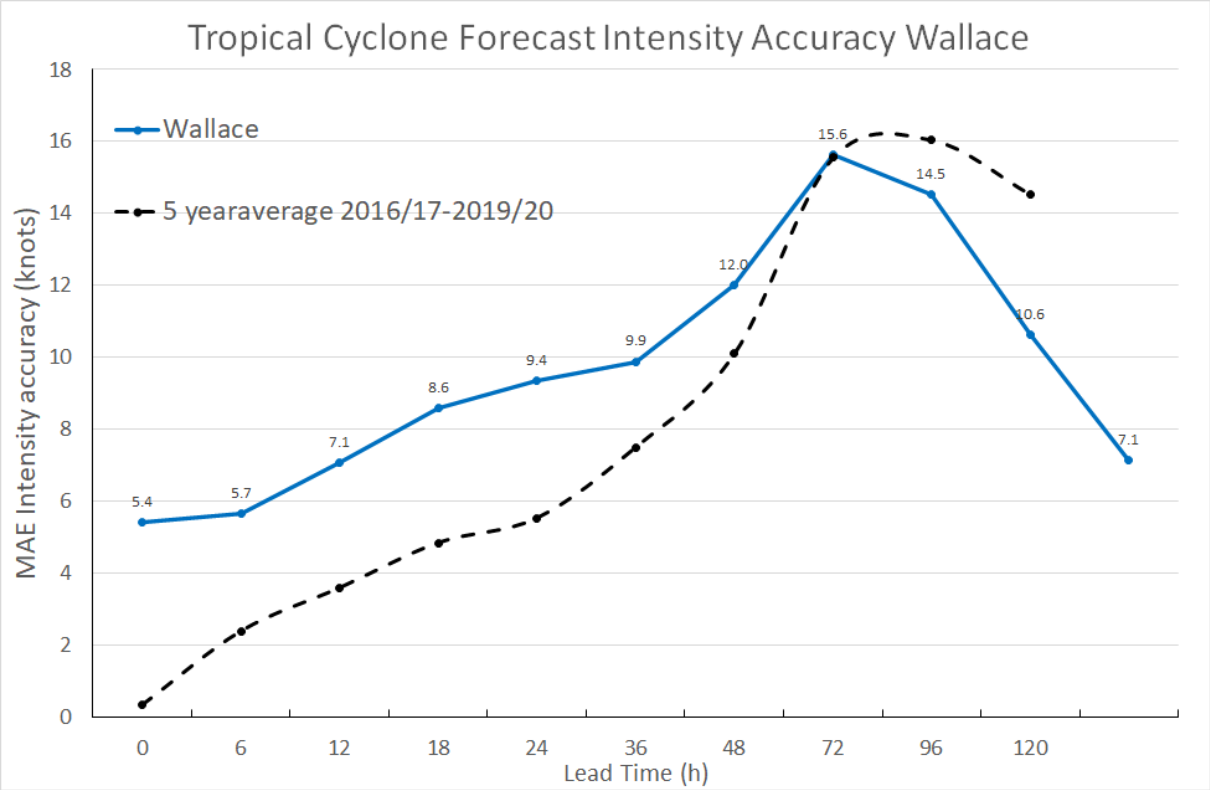

TABLE 1. Best track summary for Tropical Cyclone *Wallace* 3-12 April 2019.

Refer to the Australian Tropical Cyclone database for complete listing of parameters and track. Note: UTC is AWST - 8 hours.

Year	Month	Day	Hour UTC	Pos. Lat. S	Pos. Long. E	Pos. Acc. nm	Max Wind 10min kn	Max gust kn	Cent. Press. hPa	Rad. of gales (NE/SE/ SW/NW)	Rad. of storm (NE/SE/ SW/NW)	RMW n mi
2019	4	3	00	7.0	133.0	20	20	45	1005			
2019	4	3	06	7.5	133.3	20	20	45	1005			
2019	4	3	12	8.0	133.2	20	20	45	1005			
2019	4	3	18	8.6	132.8	20	20	45	1005			
2019	4	4	00	9.4	130.8	20	20	45	1004			
2019	4	4	06	10.2	130.0	20	25	45	1004			
2019	4	4	12	10.6	129.1	20	30	45	1001			
2019	4	4	18	11.2	128.5	20	30	45	1001			
2019	4	5	00	11.6	128.0	20	35	50	998	0/30/60/0		25
2019	4	5	06	11.6	127.5	20	35	50	998	0/30/60/30		25
2019	4	5	12	11.7	126.6	10	35	50	998	0/0/65/0		25
2019	4	5	18	11.6	125.8	10	40	55	998	0/80/70/90		25
2019	4	6	00	11.8	125.0	20	45	65	997	50/80/70/90		25
2019	4	6	06	12.1	124.0	20	50	70	995	70/70/80/70	35	20
2019	4	6	12	12.3	122.9	20	45	65	995	40/70/90/70		20
2019	4	6	18	12.5	121.8	20	45	65	995	40/70/90/70		20

Year	Month	Day	Hour UTC	Pos. Lat. S	Pos. Long. E	Pos. Acc. nm	Max Wind 10min kn	Max gust kn	Cent. Press. hPa	Rad. of gales (NE/SE/ SW/NW)	Rad. of storm (NE/SE/ SW/NW)	RMW n mi
2019	4	7	00	13.0	120.6	20	45	65	995	40/70/90/70		20
2019	4	7	06	13.3	119.7	20	50	70	990	30/60/90/70	35	15
2019	4	7	12	13.6	118.8	10	50	70	990	30/60/90/70	35	15
2019	4	7	18	13.9	117.8	10	50	70	990	30/60/90/70	35	15
2019	4	8	00	14.6	117.0	20	50	70	989	30/60/100/90	35	15
2019	4	8	06	15.4	116.3	15	55	75	987	30/60/100/90	35	15
2019	4	8	12	16.0	115.7	15	50	70	986	30/60/100/90	35	15
2019	4	8	18	16.2	115.2	15	50	70	989	30/100/100/90	35	20
2019	4	9	00	16.2	114.8	20	40	55	995	0/100/70/0		70
2019	4	9	06	16.2	114.4	10	35	50	995	0/100/0/0		70
2019	4	9	12	16.3	114.0	10	35	50	996	0/0/120/0		70
2019	4	9	18	16.8	112.9	10	30	45	1000			
2019	4	10	00	16.8	112.3	10	30	45	1001			
2019	4	10	06	16.9	111.4	10	30	45	1001			
2019	4	10	12	17.0	110.7	10	30	45	1001			
2019	4	10	18	17.3	109.1	10	30	45	1002			
2019	4	11	00	17.6	108.5	10	30	45	1002			
2019	4	11	06	17.8	107.4	10	30	45	1002			
2019	4	11	12	17.5	106.2	20	30	45	1002			
2019	4	11	18	17.1	105.3	20	30	45	1002			

Year	Month	Day	Hour UTC	Pos. Lat. S	Pos. Long. E	Pos. Acc. nm	Max Wind 10min kn	Max gust kn	Cent. Press. hPa	Rad. of gales (NE/SE/ SW/NW)	Rad. of storm (NE/SE/ SW/NW)	RMW n mi
2019	4	12	00	16.9	104.0	15	30	45	1002			
2019	4	12	06	16.7	103	10	30	45	1002			