

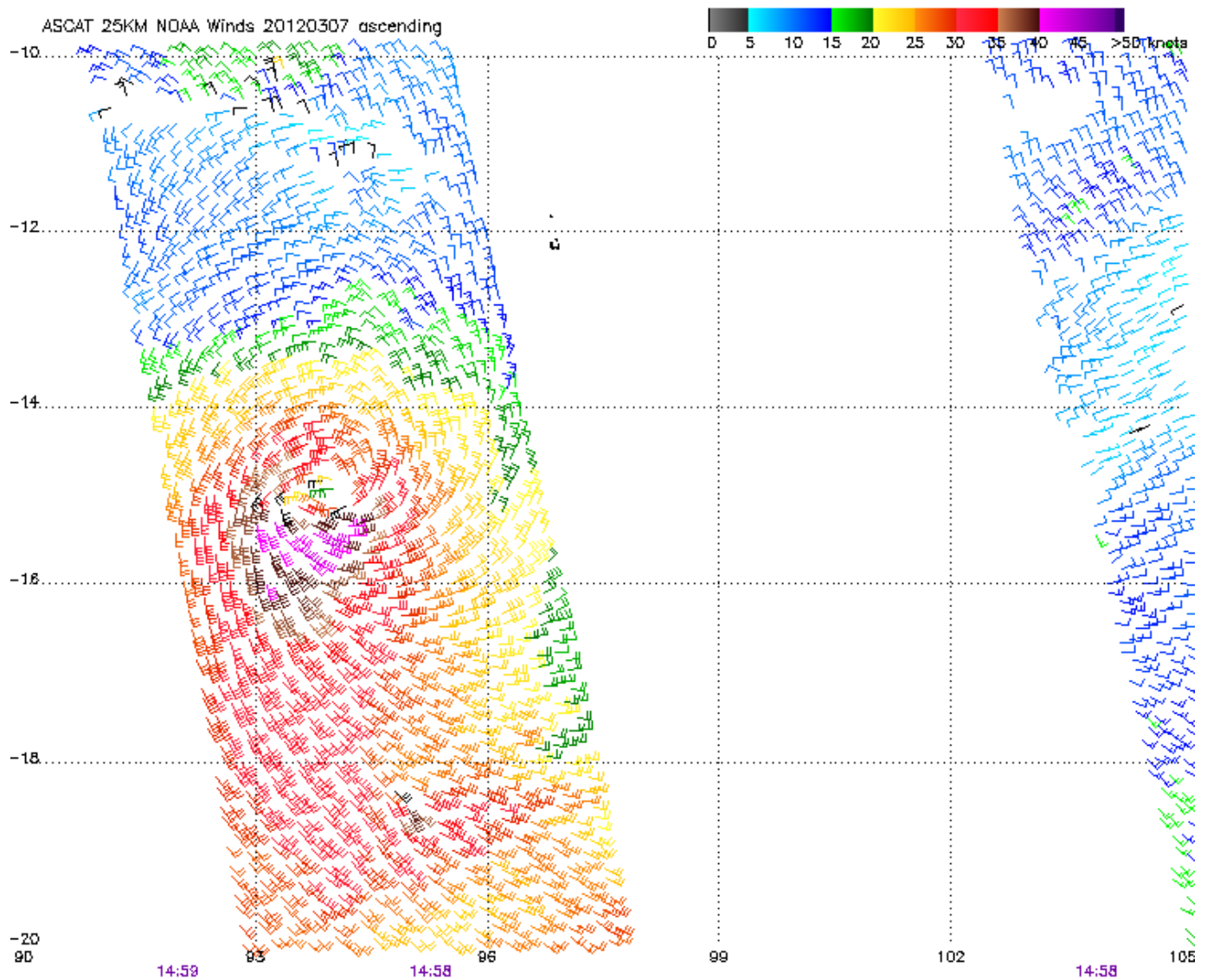


Australian Government
Bureau of Meteorology

Tropical Cyclone *Koji*

5-8 March 2012

Nadine Baillard
Perth Tropical Cyclone Warning Centre
Bureau of Meteorology
11 June 2015



Note: 1) Times are GMT 2) Times along bottom correspond to measurement at -15S
3) Data buffer is 22 hrs from 20120307 4) Black circles indicate possible contamination
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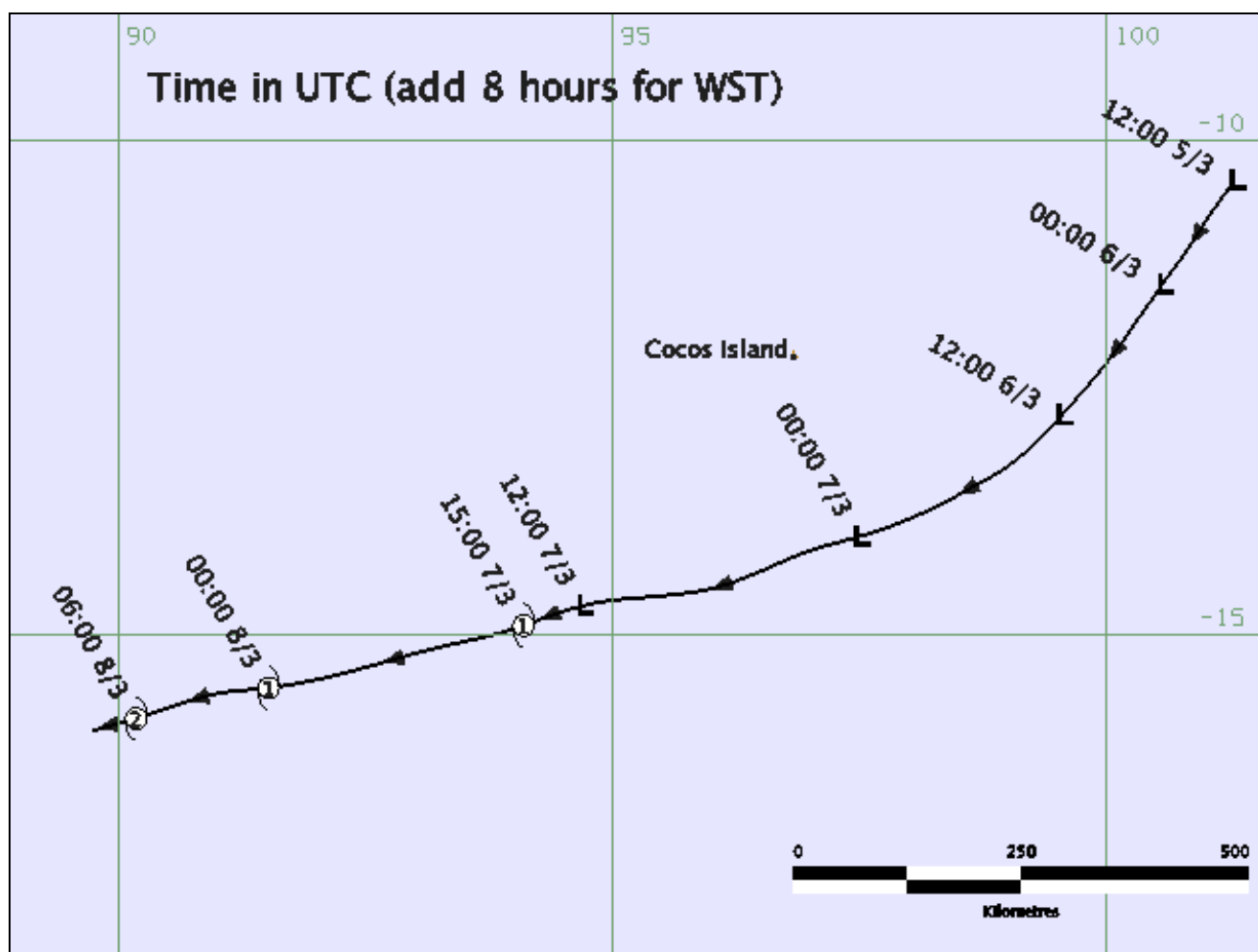
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Summary

Tropical Cyclone *Koji* was the fourth tropical cyclone to form in the Western Region. A tropical low pressure system formed during an active phase of the Madden-Julian Oscillation (MJO) near 10.4°S 101.3°E on 5 March and tracked towards the southwest, passing more than 200 kilometres (km) to the south of the Cocos Keeling Islands and having no impact on the group of islands. The tropical low reached tropical cyclone intensity late on 7 March and began moving rapidly westwards. Just prior to crossing into La Reunion's area of responsibility (AOR) on 8 March *Koji* reached Category 2 intensity. The tropical cyclone was renamed *Koji-Joni* and continued to track westwards and intensify before weakening below tropical cyclone strength on 13 March in the central Indian Ocean.

Figure 1: Track of Tropical Cyclone *Koji*



Meteorological Description

Intensity analysis

In the initial stages of development, the tropical low remained under moderate east-north-easterly shear. From 0000 UTC (Universal Time Coordinated) (0800 WST =UTC+8 hours) 8 March the shear began to drop. Briefly around 0600UTC on 8 March, a curved band became evident but this band was offset from the low level cloud system centre.

The intensity analysis of *Koji* was significantly affected by scatterometer observations. On 7 March at 0227UTC, an Advanced SCATterometer (ASCAT) pass showed gale force winds reaching 40 knots (kn) (74 km/h) in the southwest quadrant (refer Figure 2). Subsequent Dvorak analysis indicated a Final T-number (FT) of 2.5. Cooperative Institute for Meteorological Satellite Studies (CIMMS) shear was analysed as approximately 15 kn (28 km/h) from the northeast.

By 1500UTC Dvorak analysis continued to give a FT of 2.5 but another ASCAT pass (Figure 3) showed gales extending over three quadrants (excluding the northeast) with winds reaching 45 kn (83 km/h). Due to this ASCAT observation, *Koji* was classified as a Category 1 tropical cyclone at 1500UTC 7 March. CIMMS shear remained about 15 kn (28 km/h) from the northeast. Joint Typhoon Warning Centre (JTWC), CIMMS Advanced Dvorak Technique (ADT), CIMMS Advanced Microwave Sounding Unit (AMSU) and Satellite Consensus (SATCON) analyses (adjusted to 10-minute winds) gave maximum winds between 35 and 40 kn (65 – 74 km/h) (Figure 6). By 1800UTC CIMMS vertical wind shear had dropped to 11 kn (20 km/h) from the northeast.

On 8 March at 0000UTC the wind shear continued to ease (CIMMS analysis showed 8 kn (15 km/h) from the east-northeast). Dvorak gave a Data T-number (DT) of 3.5, a Model Expected T-number (MET) of 2.5, and a FT equal to the adjusted MET of 3.0. At 0348UTC another ASCAT pass confirmed that gales were still present in all quadrants (Figure 4), with winds reaching 45 kn (83 km/h) and the greatest extent of gales in southern quadrants. At 0600UTC Dvorak analysed *Koji* as a Category 2 TC with 50 kn (93 km/h) 10-minute mean winds near the edge of Australia's AOR. Global analyses at 0700UTC (converted to 10-minute mean winds) from CIMSS AMSU (about 59 kn (109 km/h)), SATCON (about 57 kn (105 km/h)) and CIMSS ADT (about 48 kn (89 km/h)) aligned with the intensification into a Category 2 system as suggested by Dvorak. A later ASCAT image at 1618UTC in La Reunion's AOR confirmed 50 kn (93 km/h) mean winds were present (Figure 5).

Motion

TC *Koji* was steered towards the west-south-west by a mid-level ridge to the south. Initial motion was towards the southwest at an average speed, however shortly before being classified as a tropical cyclone it was steered rapidly in a west-southwest direction.

Structure

Tropical Cyclone *Koji* was affected by wind shear in the early stages of its lifecycle and had the structure of a typical sheared system. The deepest convection was offset to the west of *Koji* which was evident on both infrared and visible satellite and microwave imagery.

For the duration of the event while in the Australian AOR, *Koji* had a maximum extent of gales in the southern quadrants as shown in ASCAT images (Figures 2-5). The ASCAT images captured particularly large gale radii in southern quadrants (reaching up to 140 nautical miles (nm) (260 km) in the southwest quadrant).

At the time when wind shear became lowest, a Special Sensor Microwave Imager/Sounder (SSMIS) microwave image at 2330UTC on 7 March showed the area of deepest convection starting to wrap around *Koji's* northern side. Shortly after, a curved band became evident briefly around 0600UTC on 8 March (but this band was still offset from *Koji's* low level centre).

Impact

TC *Koji* passed more than 200km to the south of the Cocos Keeling Islands (and only had gales in the southwest

quadrant at the time) so impact was negligible.

Observations

There were no surface observations in the vicinity of *Koji*.

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

Refer to the Australian Tropical Cyclone database for the complete listing of parameters. WST is UTC + 8 hours.

Year	Month	Day	Hour (UTC)	Position Latitude S	Position Longitude E	Position Accuracy nm	Max wind 10min knots	Max gust knots	Central Pressure hPa	Rad. of Gales nm	Rad. of storm force winds	Rad. Max. Wind (RMW)
2012	03	05	12	10.4	101.3	60	20	45	1002			
2012	03	05	18	10.9	100.9	55	20	45	1002			
2012	03	06	00	11.5	100.6	50	20	45	999			
2012	03	06	06	12.0	100.2	40	25	45	999			
2012	03	06	12	12.8	99.6	35	30	45	997			
2012	03	06	18	13.5	98.6	45	30	45	998			
2012	03	07	00	14.0	97.5	30	35	50	996	120*		
2012	03	07	06	14.5	96.1	35	40	55	994	110*		
2012	03	07	12	14.7	94.7	20	40	55	994	110*		
2012	03	07	15	14.9	94.1	20	45	65	992	100		35
2012	03	07	18	15.1	93.2	20	45	65	992	70		35
2012	03	08	00	15.5	91.5	20	45	65	991	80		30
2012	03	08	06	15.8	90.2	25	50	70	986	85	30	20
2012	03	08	09	16.0	89.7							

Table 1: Best track summary for Tropical Cyclone *Koji*

Notes: * Although gales were present in one to two quadrants, the system had not yet reached tropical cyclone intensity.

Radius of gales displayed are averages from all quadrants where gales were present.

Figure 2: ASCAT pass at 0227UTC on 7 March showing gales in the southwest quadrant.

(Image courtesy of NOAA US NOAA <http://manati.orbit.nesdis.noaa.gov/datasets/OSCATData.php/>)

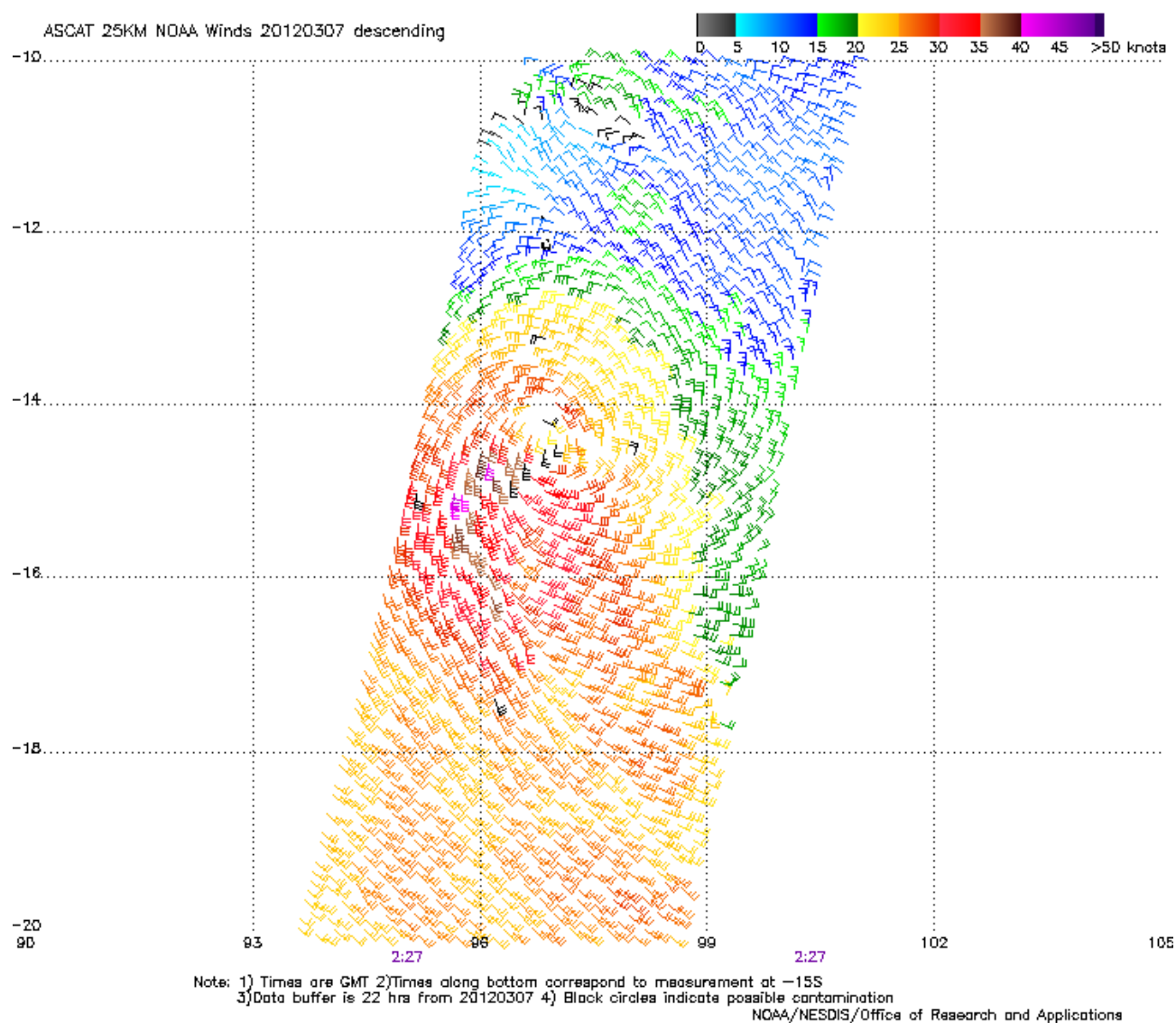


Figure 3: ASCAT pass at 1500UTC on 7 March showing gales extending over three quadrants. This image led to the classification of TC Koji as a category 1 system.

(Image courtesy of NOAA US NOAA <http://manati.orbit.nesdis.noaa.gov/datasets/OSCATData.php/>)

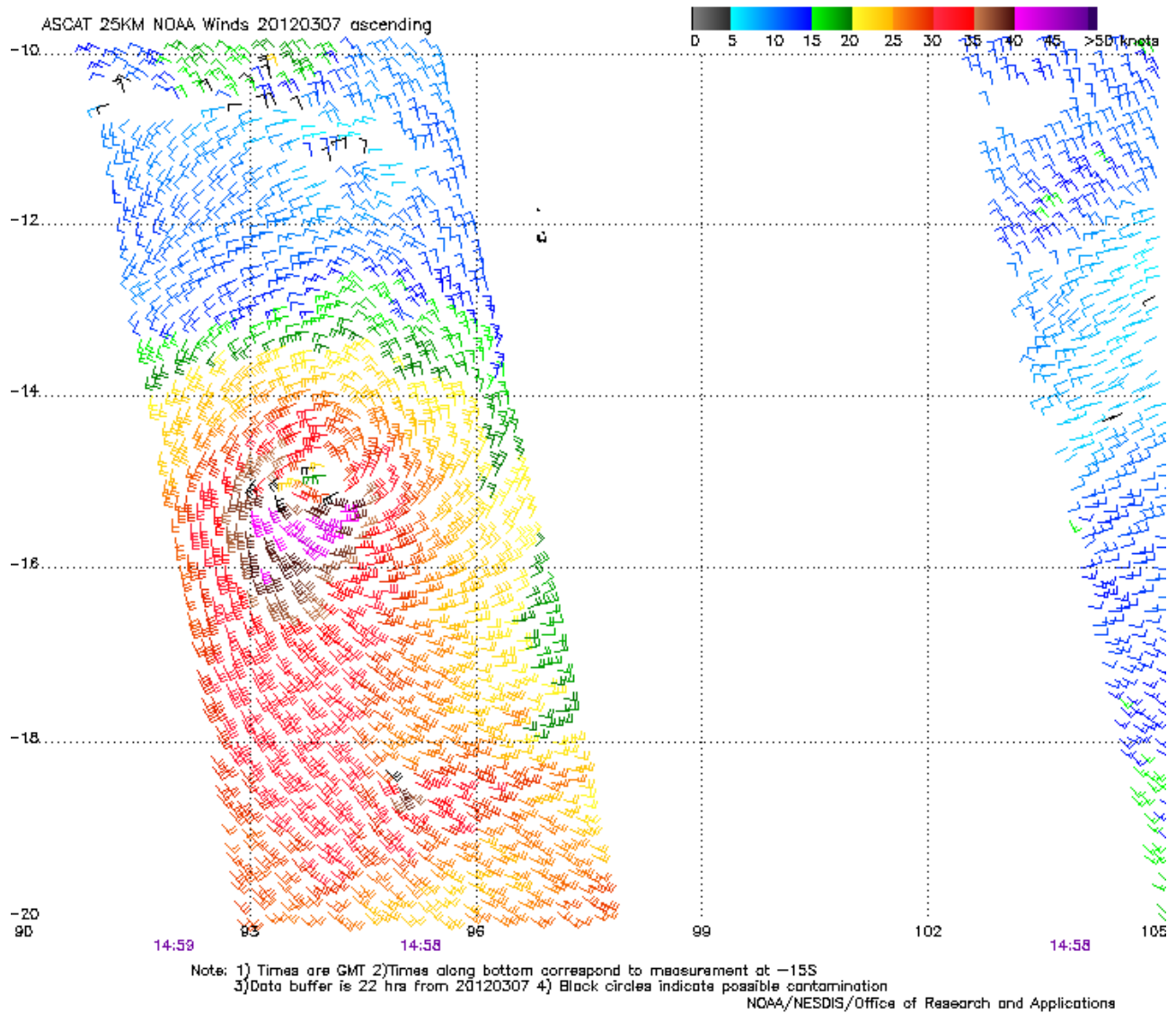
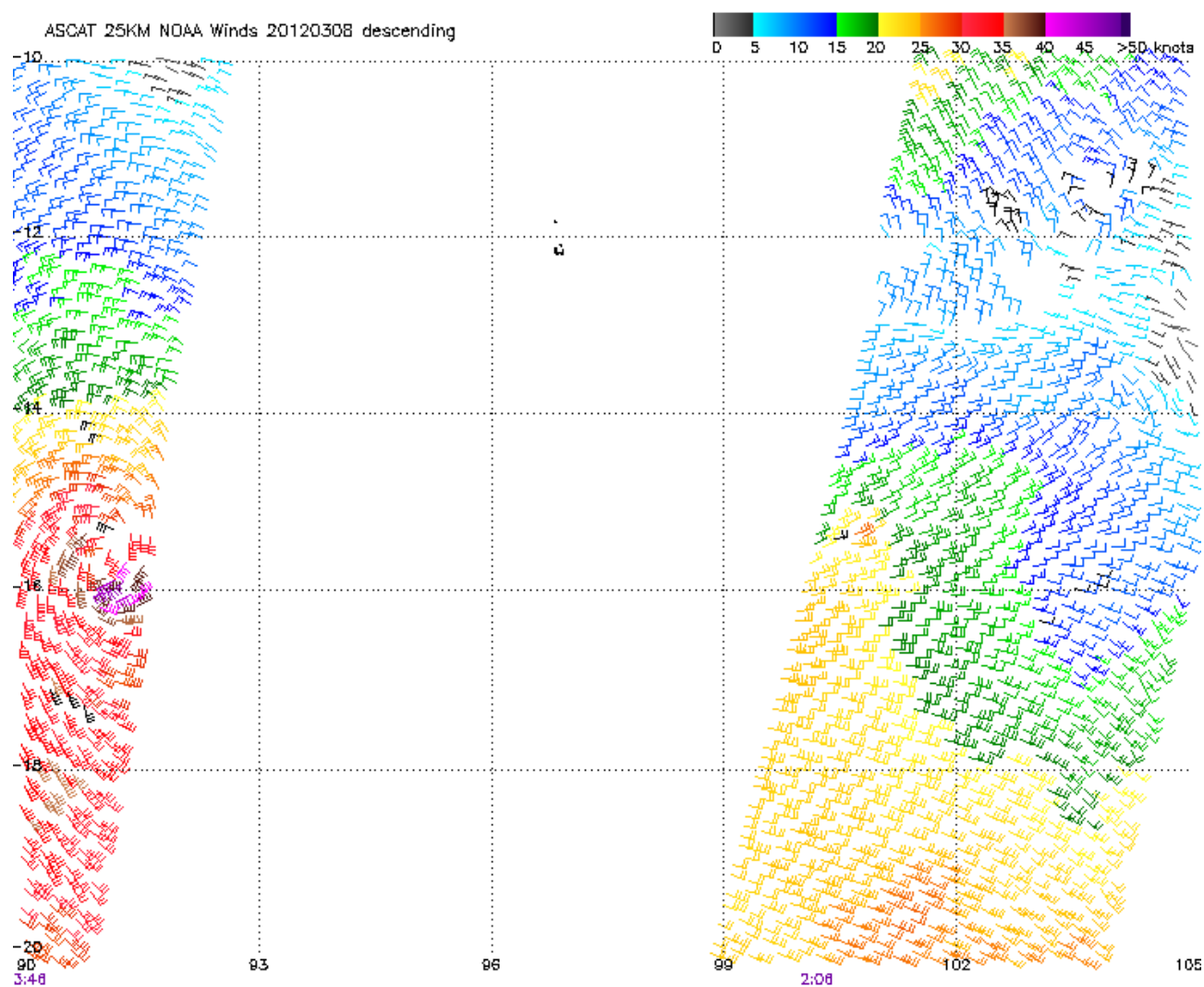


Figure 4: ASCAT pass at 0348UTC on 8 March showing maximum gales in the southwest quadrant.

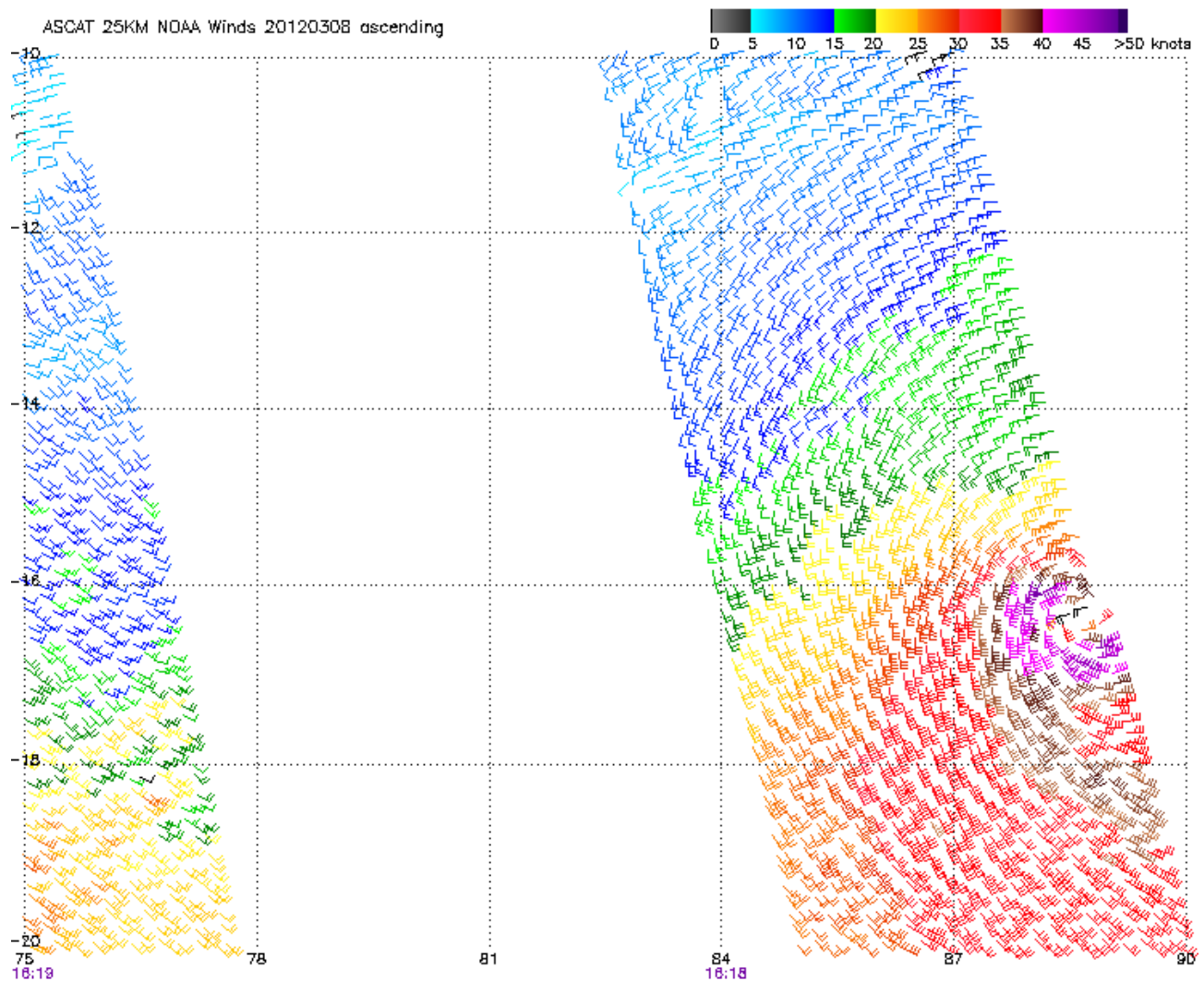
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Figure 5: ASCAT pass at 1619UTC on 8 March in La Reunion's AOR with 50kn winds present.

(Image courtesy of NOAA US NOAA <http://manati.orbit.nesdis.noaa.gov/datasets/OSCATData.php/>)



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Figure 6: Comparison of global intensity analysis techniques (adjusted to 10 minute).

