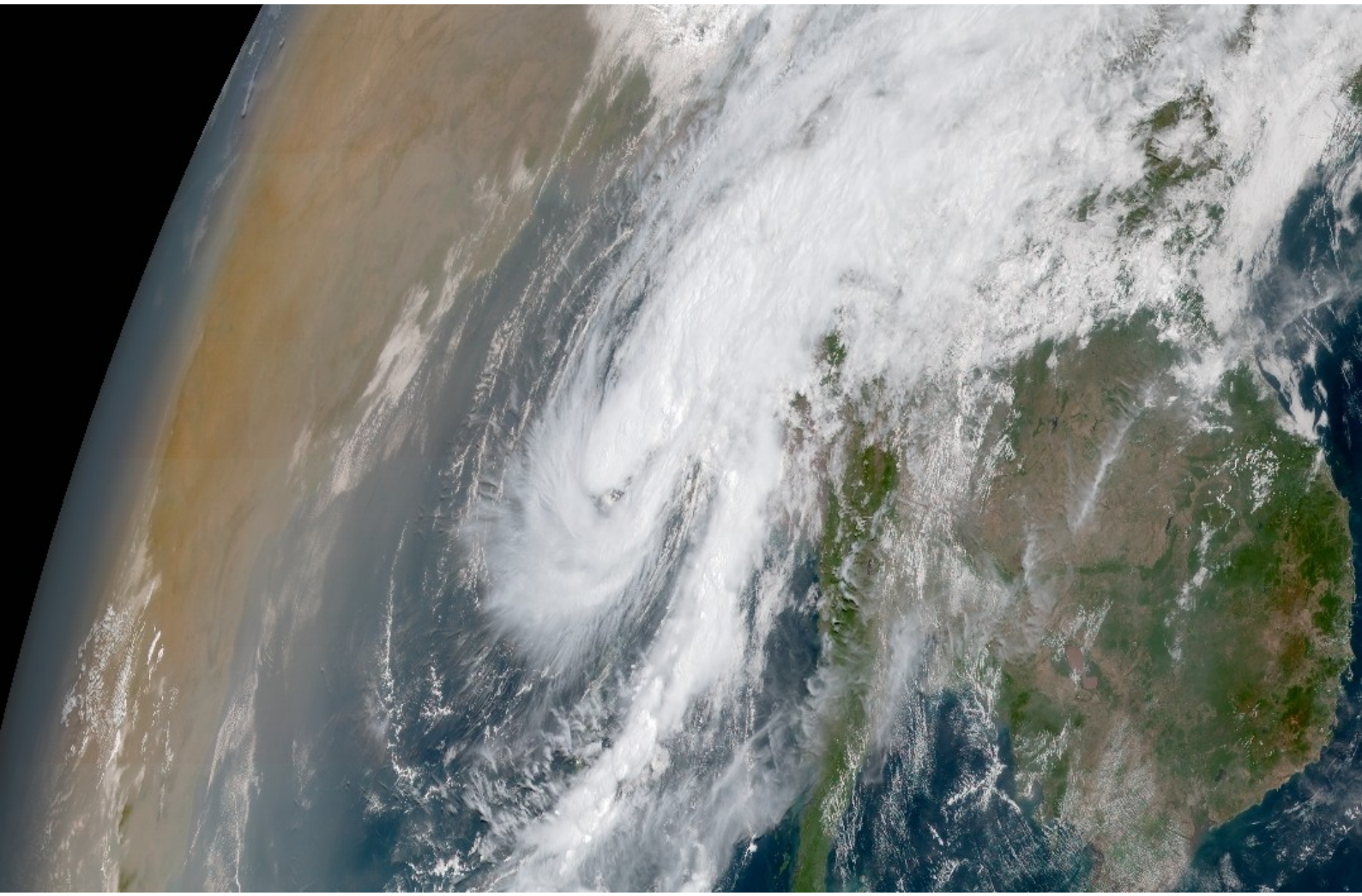
2017

Force Thirteen Cyclone Reports

Cyclone Maarutha (201715)



Cyclone Maarutha was the first cyclone to form in the North Indian Ocean in 2017. Whilst initially expected to reach hurricane strength, it was barely a tropical storm when it made landfall in Myanmar in mid-April.

Technical Report

Compiled by Nathan Foy at Force Thirteen, May 4, 2017
Direct contact: force-13@hotmail.co.uk

Cover photo: Himawari-8 Image of Cyclone Maarutha on approach to Myanmar on April 15th, 2017.

FORCE THIRTEEN

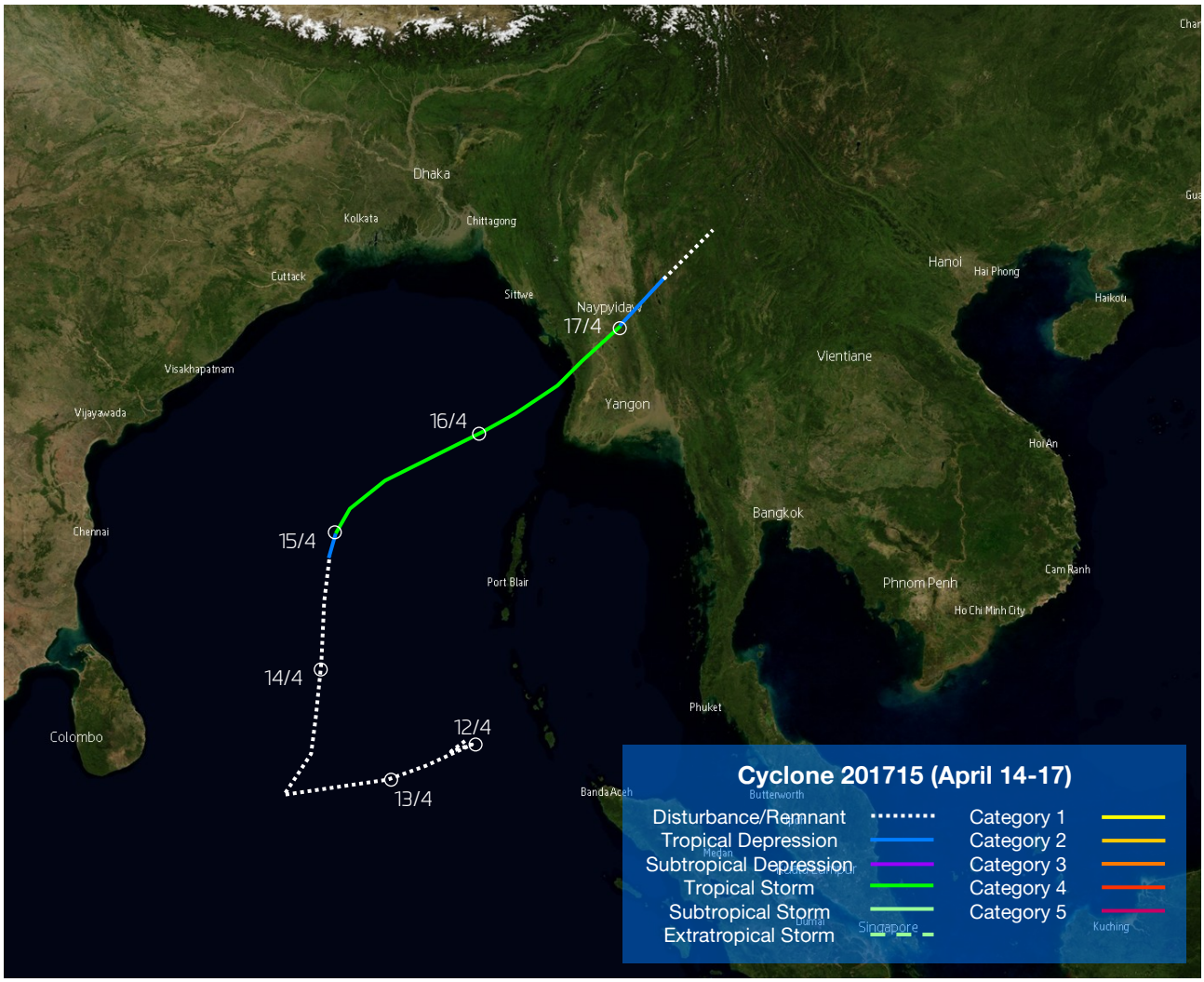
Contents

1.1. Best Track

Below is the best track analysis from Force Thirteen, using Force Thirteen's SATOPS—a tool which uses infrared satellite imagery and cloud temperatures to estimate a storm's wind speed and air pressure. SATOPS does not take precedence over surface observations.

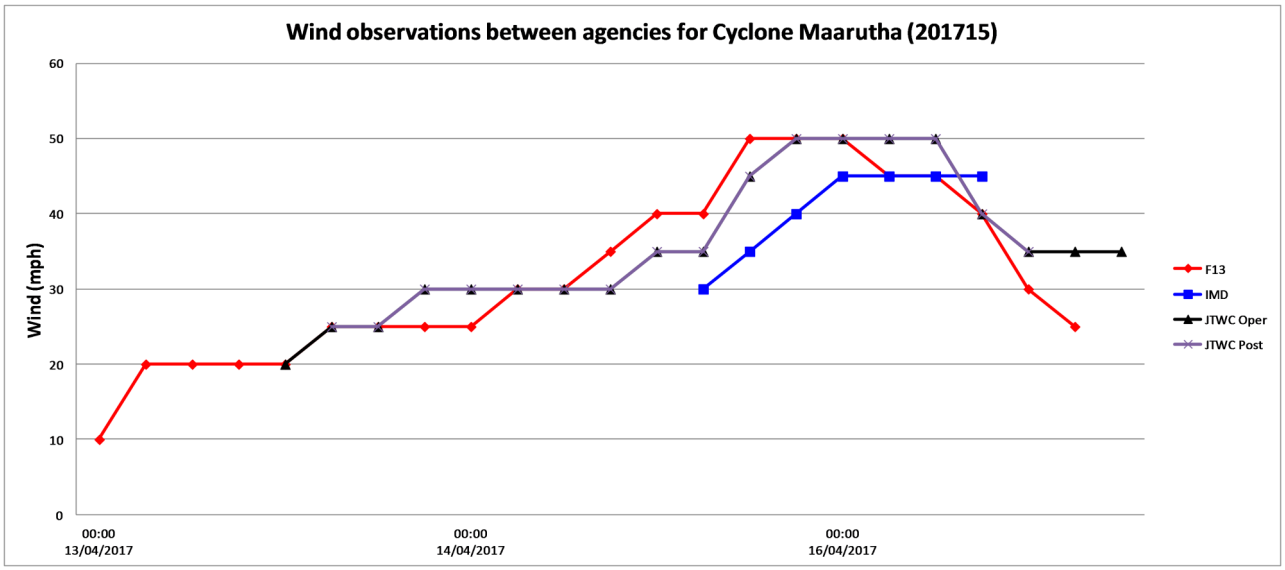
Date (dd/mm/yyyy)	Time	Latitude	Longitude	Wind	Press	Stage
12/04/2017	00:00	8.3	90.7	10	1012	Tropical Disturbance
12/04/2017	06:00	7.9	90.3	20	1011	Tropical Disturbance
12/04/2017	12:00	8.2	90.9	20	1011	Tropical Disturbance
12/04/2017	18:00	7.4	89.2	20	1010	Tropical Disturbance
13/04/2017	00:00	6.7	87.7	20	1010	Tropical Disturbance
13/04/2017	06:00	6.3	85.3	25	1007	Tropical Disturbance
13/04/2017	12:00	7.1	85.7	25	1006	Tropical Disturbance
13/04/2017	18:00	8	85.8	25	1005	Tropical Disturbance
14/04/2017	00:00	8.9	85.8	25	1004	Tropical Disturbance
14/04/2017	06:00	9.9	86.4	30	1004	Tropical Disturbance
14/04/2017	12:00	10.9	87.1	30	1004	Tropical Disturbance
14/04/2017	18:00	11.9	87.7	35	1002	Tropical Depression
15/04/2017	00:00	12.5	88.2	40	1000	Tropical Storm
15/04/2017	06:00	13.3	89.3	40	998	Tropical Storm
15/04/2017	12:00	14.3	90.2	50	994	Tropical Storm
15/04/2017	18:00	15.3	91.3	50	992	Tropical Storm
16/04/2017	00:00	16.1	92	50	993	Tropical Storm
16/04/2017	06:00	16.8	92.6	45	995	Tropical Storm
16/04/2017	12:00	18	93.5	45	996	Tropical Storm
16/04/2017	18:00	19.2	94.2	40	999	Tropical Storm
17/04/2017	00:00	19.9	95.4	30	1004	Tropical Depression
17/04/2017	06:00	21	96.5	25	1007	Remnant Low

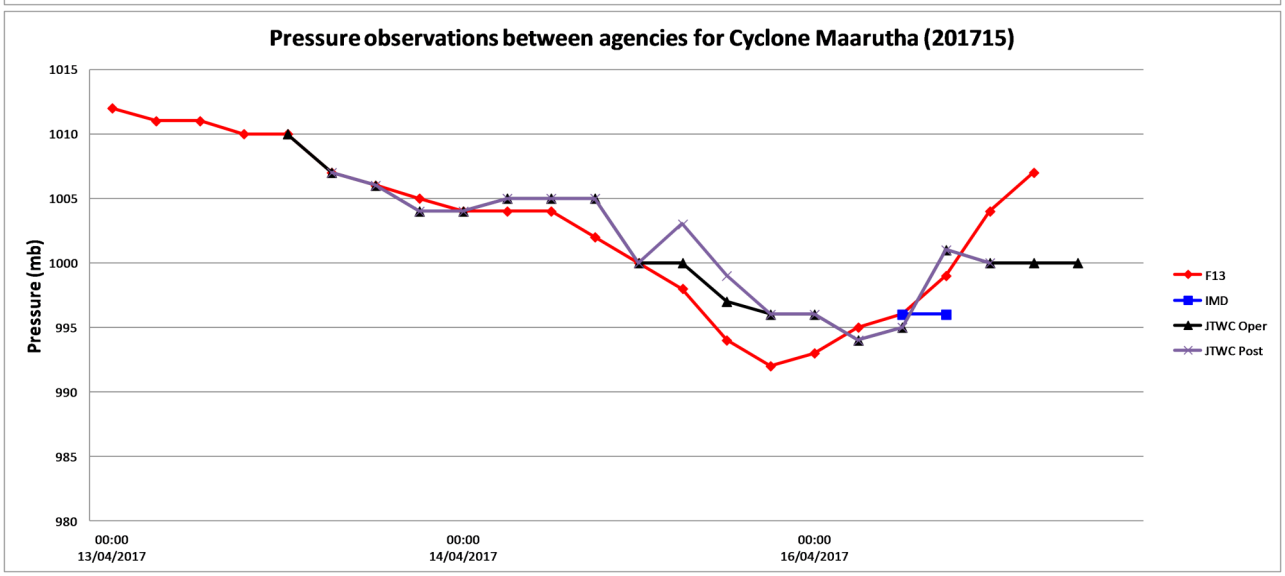
1.2. Track Chart



1.3. Comparison with other agencies

Maarutha was monitored by the Regional Specialized Meteorological Centre, in this instance the Indian Meteorological Department, and by the U.S. Joint Typhoon Warning Center (JTWC). The charts below show comparisons between Force Thirteen's best track and the other agencies' observations.
Data from the IMD is incomplete at the time of publication.





2. Effects on Land

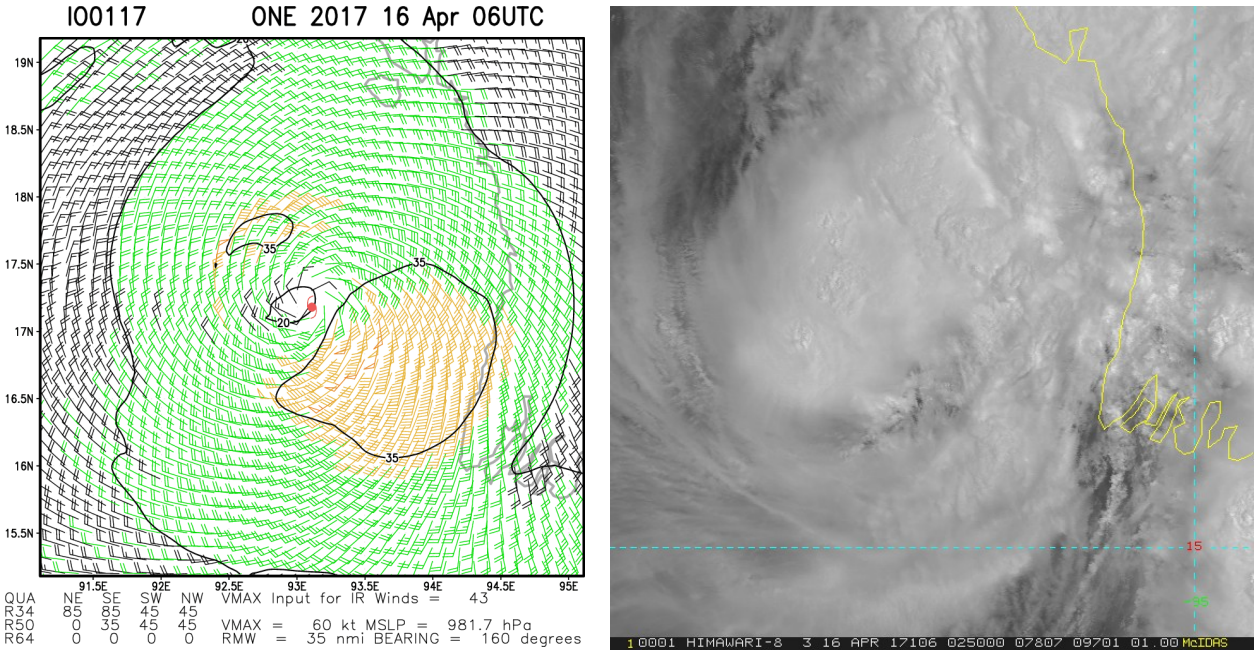
No damage reports are available in Myanmar for Cyclone Maarutha. Any damages that did occur are expected to be low. Below are satellite derived rainfall totals along the track of the storm.

India

Port Blair	30mm
Indira Bazar	110mm
North Sentinel Island	130mm

Myanmar

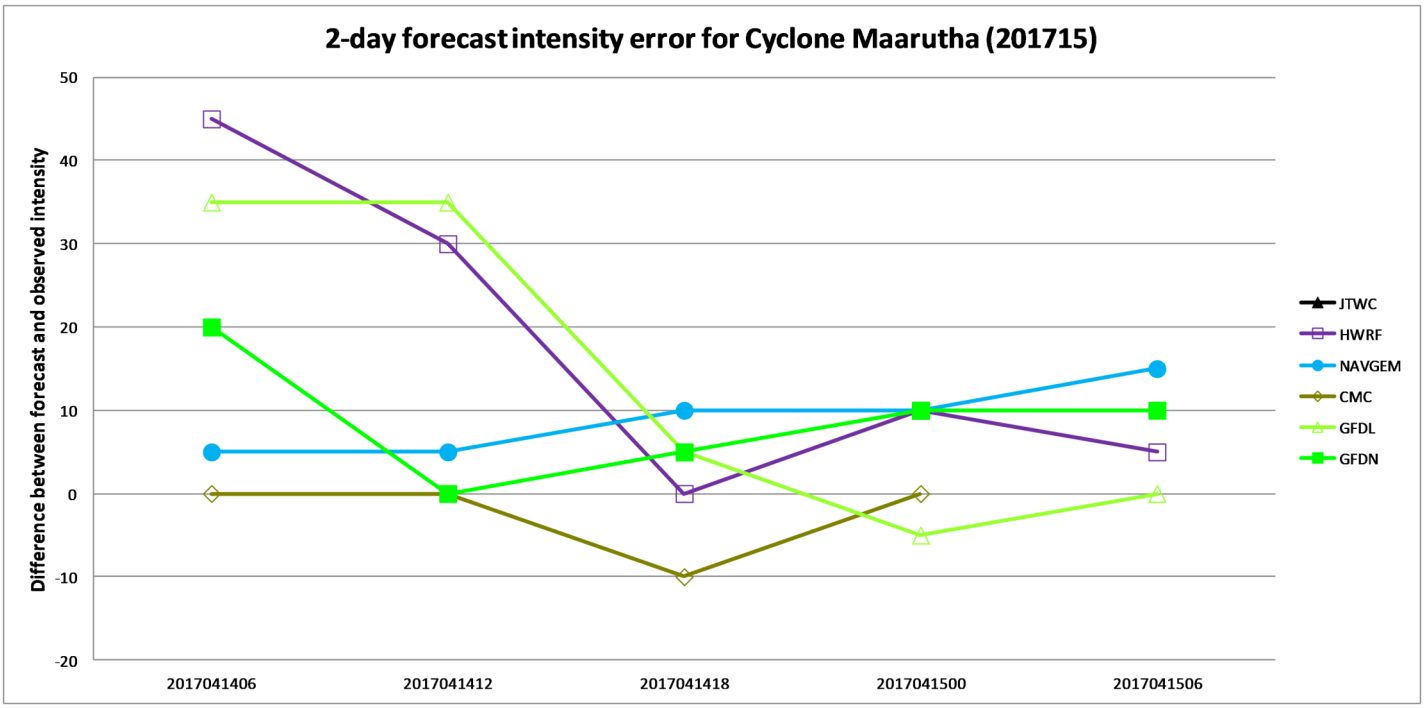
Coco Island	80mm
Labutta	40mm
Myaungmya	30mm
Wakema	20mm
Pathein	20mm
Kangyidaunt	30mm
Kyaunggon	10mm
Ah Thoke	20mm
Kyonpyaw	20mm
Hinthada	40mm
Monyo	50mm
Kyangin	70mm
Zigon	60mm
Pyay	80mm
Phyu	40mm
Taungoo	100mm
Toungup	30mm
Lay Taung Tha Yet Cho	110mm
Kyaukpyu	150mm
Ann	140mm
Thayet	80mm
Naypyitaw	70mm
Taungdwingyi	60mm
Magway	60mm
Yenangyaung	110mm
Lin Zin	120mm
Sin Hpyu Kyun	100mm
Sa Lay	80mm
Kyaukpadaung	70mm
Yamethin	50mm
Pyawbwe	50mm
Meiktila	30mm
Mahlaing	30mm
Kalaw	80mm



Satellite estimated winds and visible satellite image of Cyclone Maarutha near peak intensity.

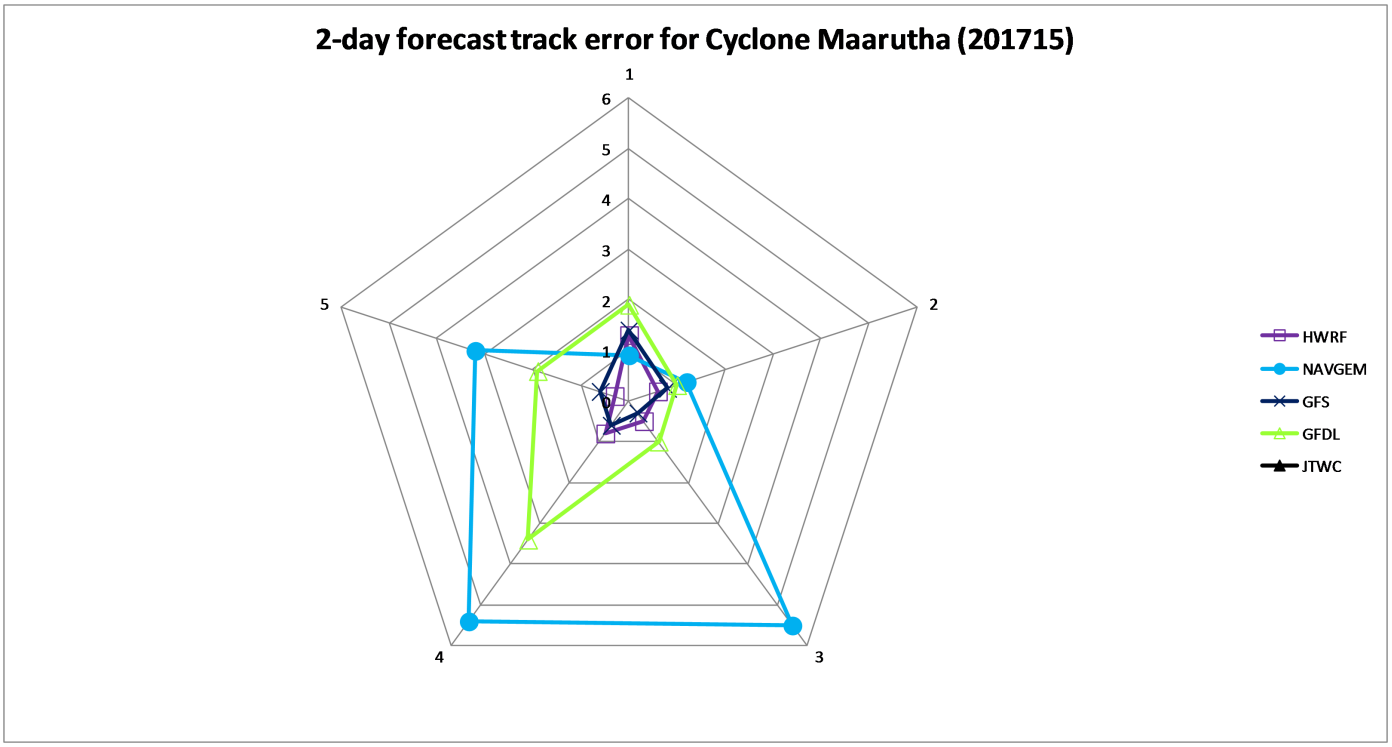
3. Forecasting Critique

The next pages show the track and intensity forecast error from the computer models and the JTWC during Cyclone Maarutha. Since the storm dissipated within five days of the first model runs, five day error data is not available.
The intensity error chart shows how many miles per hour the model predictions were from the observed intensity two and five days later. A value of 0 denotes a perfectly accurate prediction. Negative values correspond to predictions lower than the observation, and positive values show predictions higher than the observation.



3. Forecasting Critique

The track error graphics show how far away from a perfectly accurate positional prediction the computer models and the JTWC predicted two and five days before the fact. Values are expressed in angular degrees, and a value closer to 0 (the center of the graphic) indicates a more accurate prediction.



3. Forecasting Critique

Data from the charts are published below.

2-day forecast intensity error								
Run	JTWC	IMD	HWRF	GFS	NAVGEM	GFDN	CMC	GFDL
2017041406			45		5	20	0	35
2017041412			30		5	0	0	35
2017041418			0		10	5	-10	5
2017041500			10		10	10	0	-5
2017041506			5		15	10		0

Model	**Average**	**Predictions**
JTWC	0	0
IMD	0	0
HWRF	18	5
GFS	0	0
NAVGEM	9	5
GFDN	9	5
CMC	2.5	4
GFDL	16	5

Therefore, the best model for intensity was the CMC

3. Forecasting Critique

Data from the charts are published below.

2-day forecast track error								
Run	JTWC	IMD	HWRF	GFS	NAVGEM	GFDN	CMC	GFDL
2017041406			1.3	1.4	0.9			1.9
2017041412			0.6	0.8	1.2			1
2017041418			0.5	0.3	5.5			1
2017041500			0.8	0.6	5.4			3.4
2017041506			0.3	0.6	3.2			1.9

Model	**Average**	**Predictions**
JTWC	0	0
IMD	0	0
HWRF	0.7	5
GFS	0.74	5
NAVGEM	3.24	5
GFDN	0	0
CMC	0	0
GFDL	1.84	5

Therefore, the best model for track predictions was the HWRF.

4. Cyclone Destruction Potential Scale

The Cyclone Destruction Potential Scale (CDPS) is a new way of measuring cyclone impacts in a more meaningful way. For the past 45 years, storms worldwide have been measured using the Saffir-Simpson Hurricane Wind Scale, split into five categories. However, this scale measures wind alone, and does not correlate well with actual impacts on land, measured by monetary damage.
The CDPS measures other factors, such as storm size and forward speed as well as intensity to create a ten tiered scale that encompasses tropical storms as well as hurricanes.

Stage 1—Small or weak storms that are unlikely to cause a significant impact.
Stage 2—Generally disorganised storms that can cause significant damage.
Stage 3—Further organised systems that are likely to cause significant damage.
Stage 4—Somewhat powerful storms that are likely to cause extensive damage.
Stage 5—Powerful storms that are likely to cause devastating damages.
Stage 6—Very powerful storms that are likely to cause catastrophic damage.
Stage 7—Extremely powerful storms that are likely to cause catastrophic damage.
Stage 8—Super storms that are likely to cause incredible damage.
Stage 9—Super storms that may cause total damage.
Stage 10—Super storms that are likely to cause total damage.

Cyclone Maarutha was the thirteenth storm to be observed by Force Thirteen using the CDPS—a method which was adopted in January 2017.

Maarutha was a mid-range Stage 2 cyclone at peak.

The Cyclone Destruction Potential Scale was created by Devon Williams in 2016. More information can be found at: https://drive.google.com/file/d/0B7pEWk6yHKggSE1STHg2UFJmbHM/view