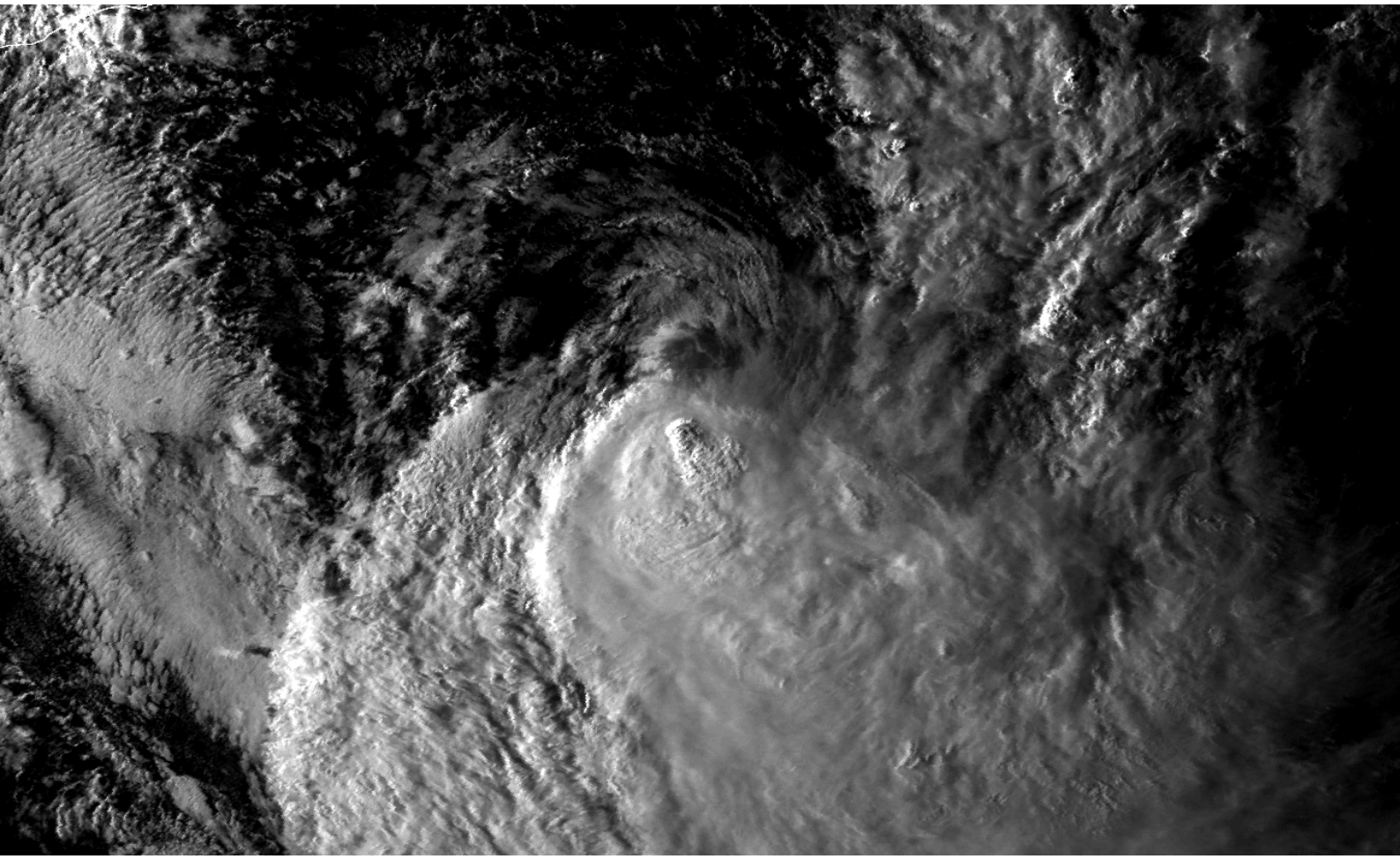
2017

Force Thirteen Cyclone Reports

Cyclone Fernando (201709)



Cyclone Fernando was a weak cyclone which struggled to develop throughout its existence in the South Indian Ocean during mid-March.

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Cover photo: INSAT-3D image of Cyclone Fernando, believed to have been captured on March 14, 2017.

FORCE THIRTEEN

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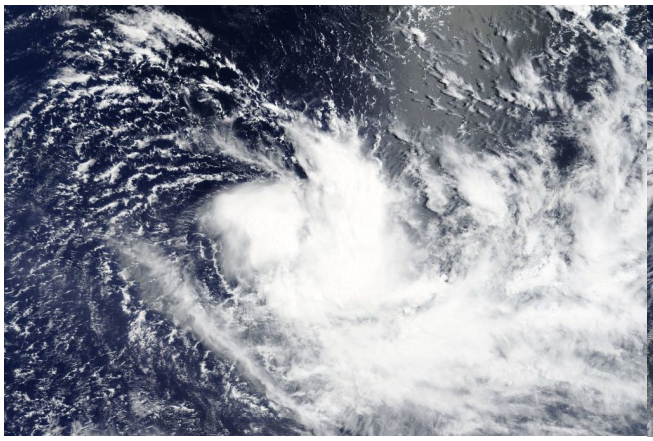
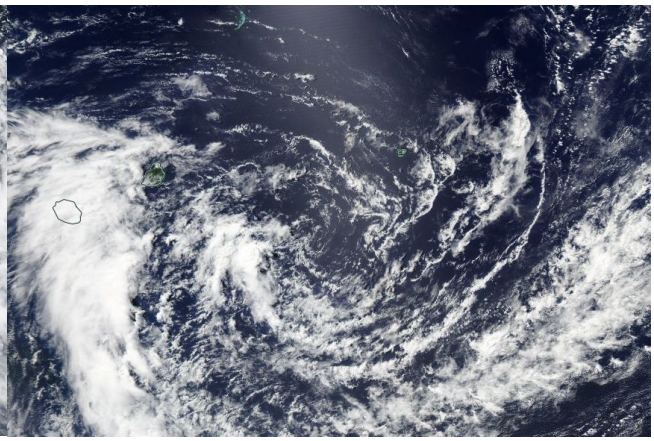
1.1. Synoptic History

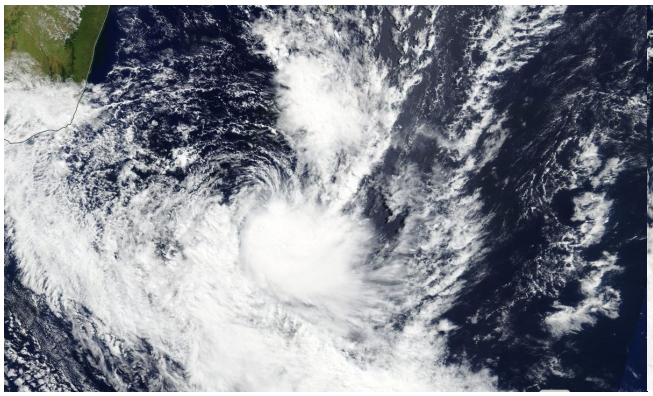
On March 3rd, a new disturbance formed in the eastern Indian Ocean, and progressed generally west-southwestwards over the following days, beginning to look potent on March 5th. The system acquired rotation and by late March 7th took on the appearance of a tropical cyclone, though wind speeds were not of tropical storm strength at this time.
On March 8th, the system displayed some significant bursts of convection, initially to the right of center, and later on directly over the center. In the later hours of the day, an ASCAT pass detected tropical storm force winds. Convection gradually began to wane and become displaced again to the east over the early hours of March 9th, though another huge burst of convection occurred within the storm later in the day. By the early hours of March 10th this again began to wane, and the system began taking a somewhat frontal appearance and lost tropical storm intensity. It is possible that during March 10th that the center of the storm relocated southwest. By the 11th, most of the storm's old convection hadn't moved from its original location, though the center of the storm became increasingly discernible tracking southwest near Rodrigues.
On March 12th, small areas of convection began to flare up on the southern side of the storm, as it passed 150 miles southeast of Mauritius. This continued to develop gradually, peaking late on March 13th as it accelerated southwards away from Réunion. Fernando probably peaked during March 14th, whilst it was undergoing extratropical transition, a phase which had been completed by the next day.
The extratropical remnants of Fernando persisted until March 17th in the southern part of the ocean, where it became indistinguishable.



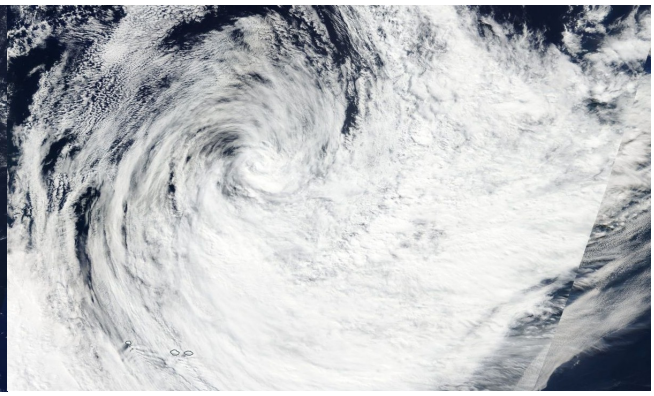
March 8th



March 12th



March 14th



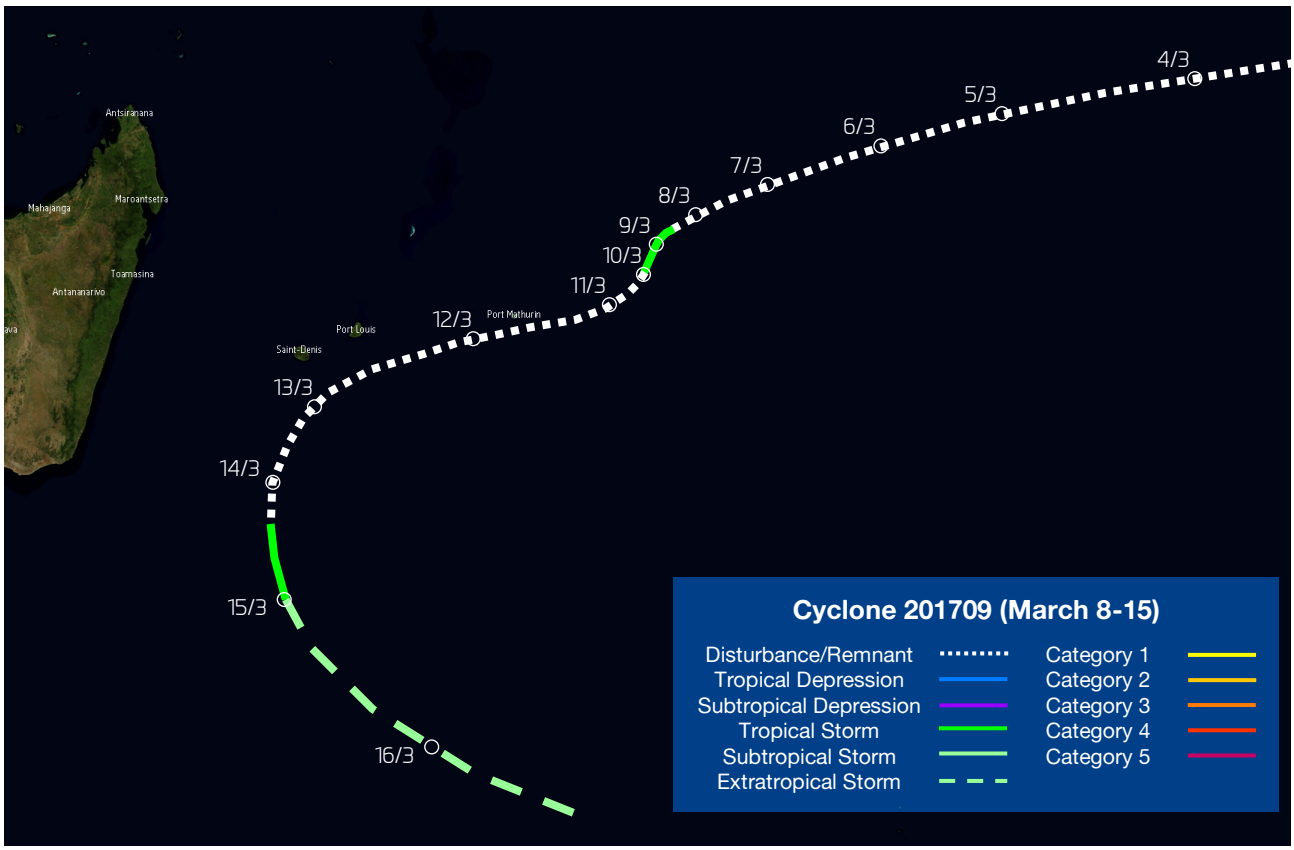
March 16th

1.2. 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.

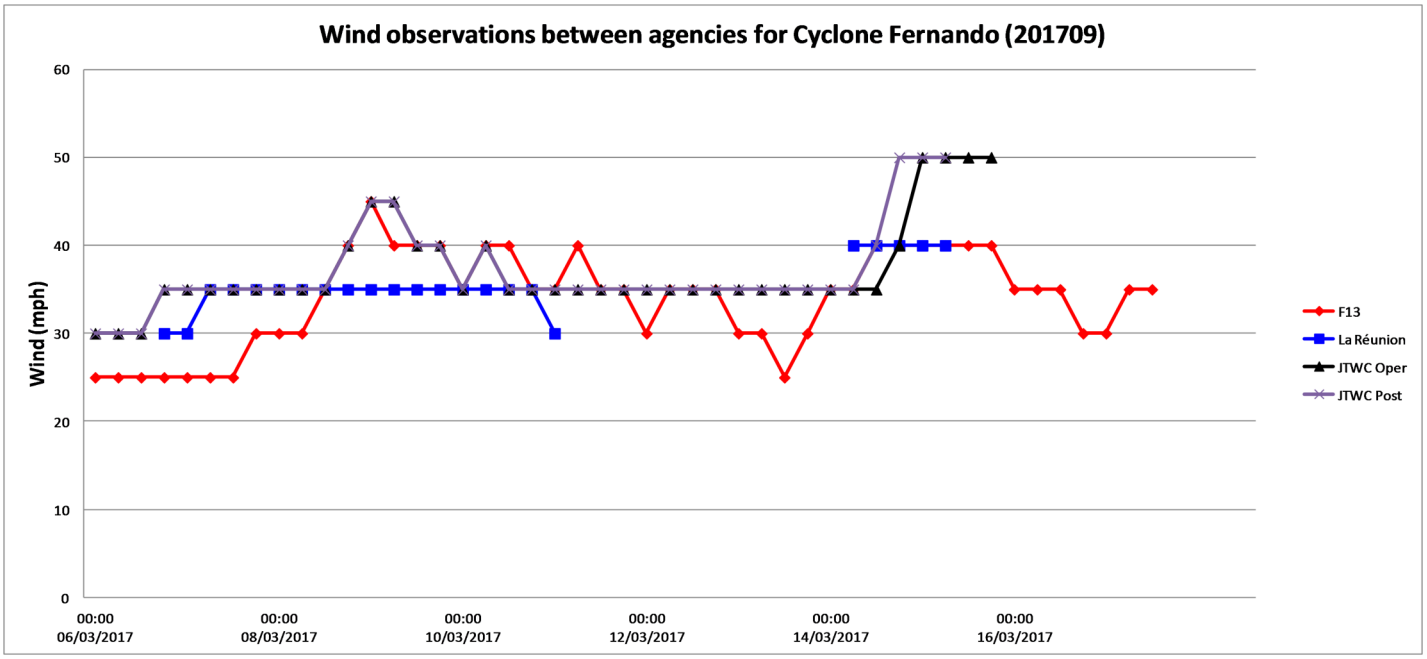
Date (dd/mm/yyyy)	Time	Latitude	Longitude	F13	F13	Stage
06/03/2017	00:00	-13.8	77.9	25	1006	Tropical Disturbance
06/03/2017	06:00	-14.2	77.1	25	1006	Tropical Disturbance
06/03/2017	12:00	-14.6	76.5	25	1005	Tropical Disturbance
06/03/2017	18:00	-15	75.8	25	1005	Tropical Disturbance
07/03/2017	00:00	-15.6	74.8	25	1004	Tropical Disturbance
07/03/2017	06:00	-15.9	73.8	25	1004	Tropical Disturbance
07/03/2017	12:00	-16.1	72.8	25	1004	Tropical Disturbance
07/03/2017	18:00	-16	72.1	30	1003	Tropical Disturbance
08/03/2017	00:00	-15.5	71.5	30	1003	Tropical Disturbance
08/03/2017	06:00	-15.1	71.1	30	1003	Tropical Disturbance
08/03/2017	12:00	-15.1	70.6	35	1002	Tropical Disturbance
08/03/2017	18:00	-15.2	69.9	40	1000	Tropical Storm
09/03/2017	00:00	-15.3	69.7	45	998	Tropical Storm
09/03/2017	06:00	-15.3	69.6	40	998	Tropical Storm
09/03/2017	12:00	-15.3	69.2	40	999	Tropical Storm
09/03/2017	18:00	-15	69.1	40	1000	Tropical Storm
10/03/2017	00:00	-15.2	69	35	1002	Tropical Disturbance
10/03/2017	06:00	-15.6	69.3	40	1003	Tropical Disturbance
10/03/2017	12:00	-16.1	69.6	40	1003	Tropical Disturbance
10/03/2017	18:00	-16.3	70.1	35	1004	Tropical Disturbance
11/03/2017	00:00	-17.8	69.9	35	1004	Tropical Disturbance
11/03/2017	06:00	-19.2	68.6	40	1004	Tropical Disturbance
11/03/2017	12:00	-19.8	65.6	35	1004	Tropical Disturbance
11/03/2017	18:00	-19.9	63.8	35	1005	Tropical Disturbance
12/03/2017	00:00	-20.2	62.4	30	1005	Tropical Disturbance
12/03/2017	06:00	-20.7	61.9	35	1005	Tropical Disturbance
12/03/2017	12:00	-21.3	60.2	35	1005	Tropical Disturbance
12/03/2017	18:00	-22.6	59.3	35	1004	Tropical Disturbance
13/03/2017	00:00	-23.2	58.3	30	1004	Tropical Disturbance
13/03/2017	06:00	-23.8	55.8	30	1004	Tropical Disturbance
13/03/2017	12:00	-25.1	55.5	25	1004	Tropical Disturbance
13/03/2017	18:00	-25.6	55.2	30	1003	Tropical Disturbance
14/03/2017	00:00	-26.4	54.7	35	1003	Tropical Depression
14/03/2017	06:00	-28.1	54.5	35	1002	Tropical Depression
14/03/2017	12:00	-28.5	52.8	40	1000	Tropical Storm
14/03/2017	18:00	-29.9	51.9	40	998	Tropical Storm
15/03/2017	00:00	-30.9	51.7	40	997	Extratropical
15/03/2017	06:00	-31.9	51.8	40	997	Extratropical
15/03/2017	12:00	-33.9	51.2	40	996	Extratropical
15/03/2017	18:00	-35.8	50.9	40	996	Extratropical
16/03/2017	00:00	-36.8	51.3	35	998	Extratropical
16/03/2017	06:00	-38	52	35	998	Extratropical
16/03/2017	12:00	-38.5	51.5	35	997	Extratropical
16/03/2017	18:00	-38	52	30	998	Extratropical
17/03/2017	00:00	-37	53	30	999	Extratropical
17/03/2017	06:00	-40	58	35	999	Extratropical
17/03/2017	12:00	-41	60	35	998	Extratropical

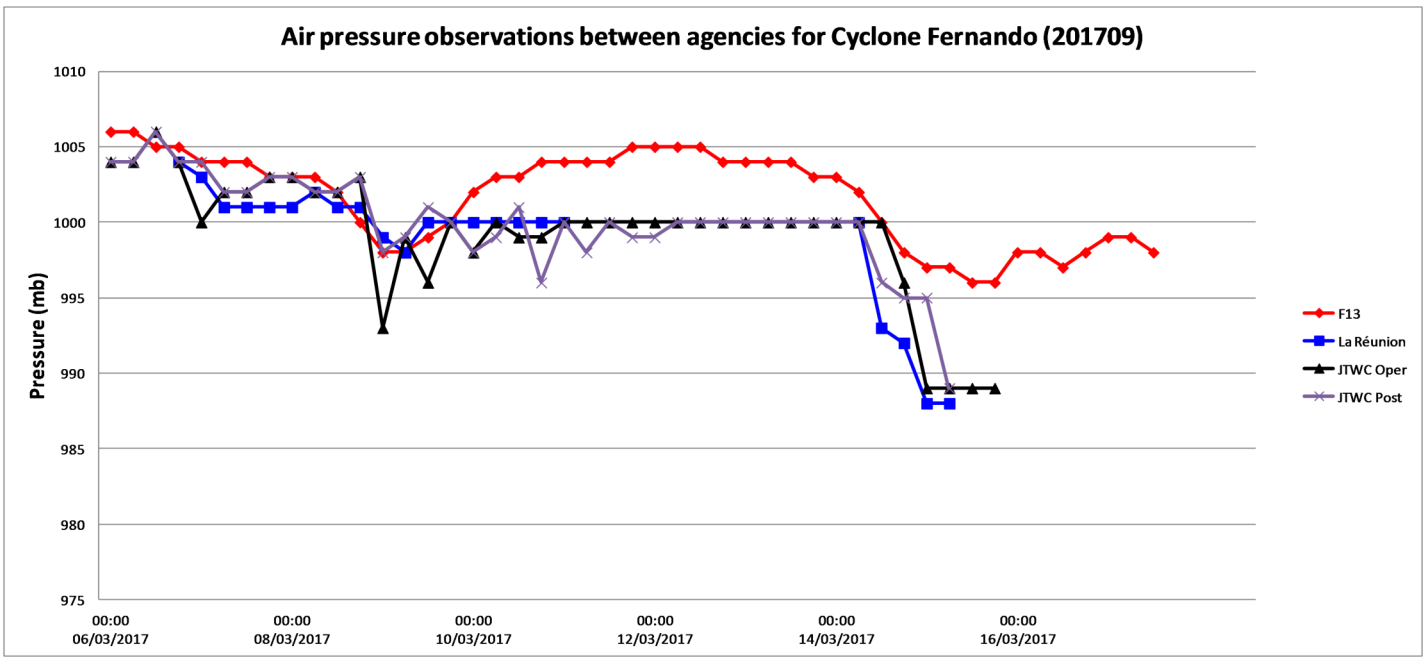
1.3. Track Chart



1.4. Comparison with other agencies

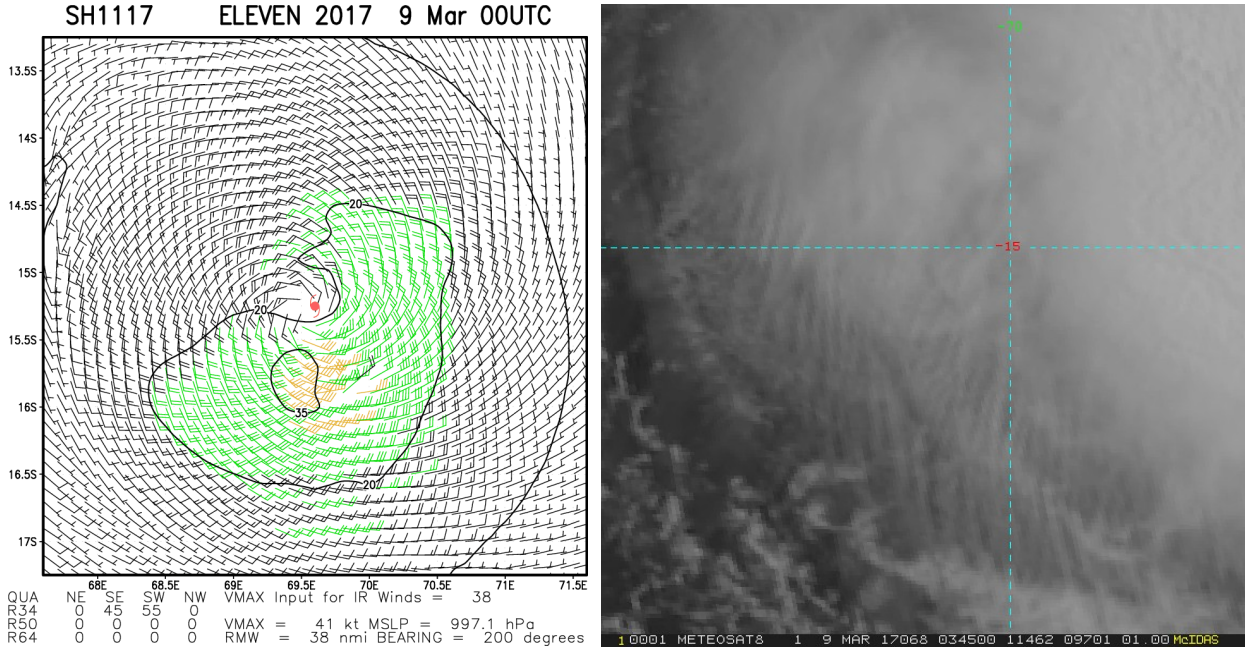
Fernando was monitored by the Regional Specialized Meteorological Centre, in this instance RSMC La Reunion, and by the U.S. Joint Typhoon Warning Center (JTWC). Below shows comparisons between these organisations and the Force Thirteen best track.





2. Effects on Land

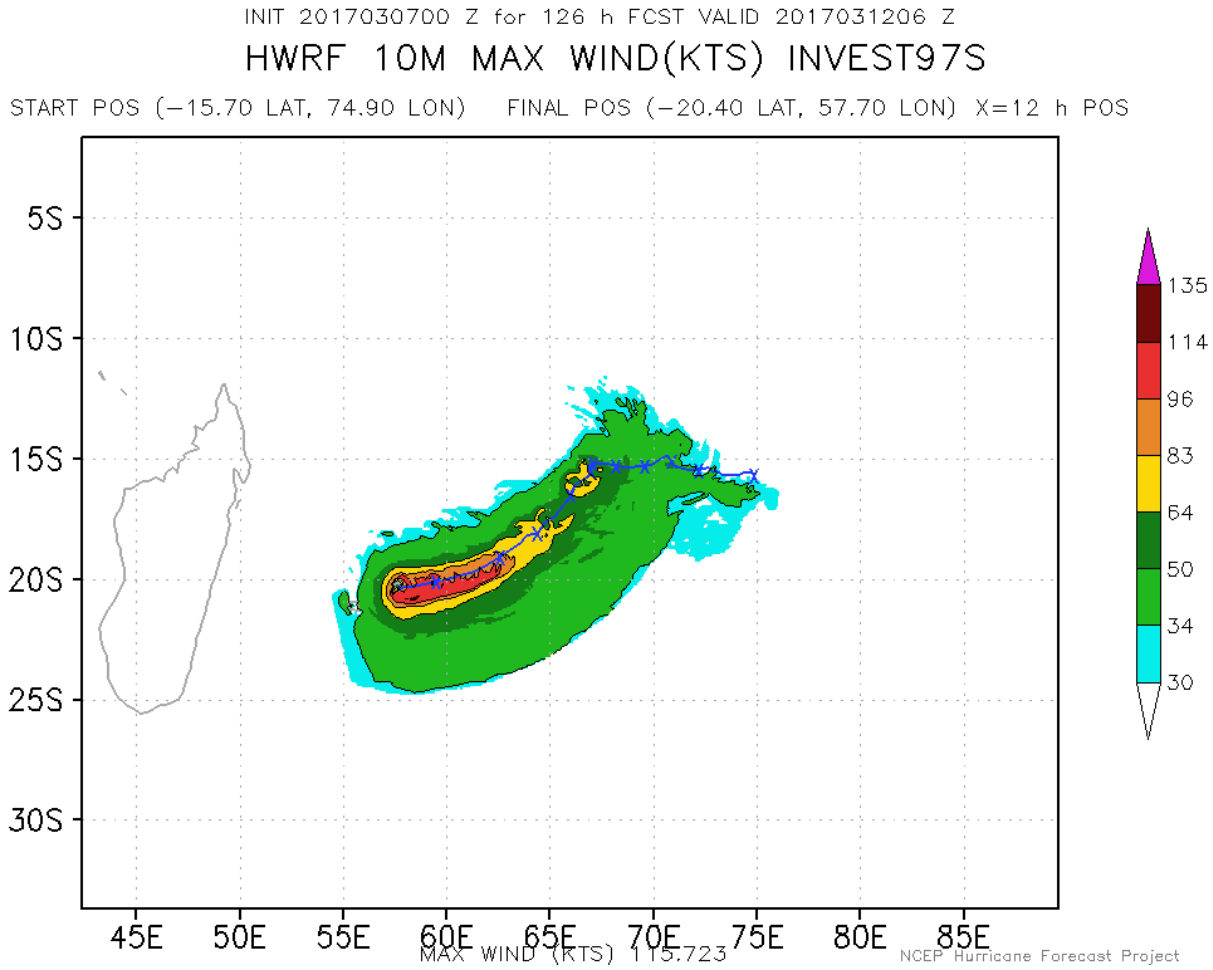
Cyclone Fernando barely affected land, delivering around 20mm of rainfall to Rodrigues and less than 10mm to Réunion island. Fernando was forecasted to impact the Mascarene islands more than it ultimately did, owing primarily to the storm's failure to live up to its intensity forecasts.



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

3. Forecasting Critique

Early model runs predicted that the system would become fairly strong, particularly in the case of the HWRF, which at times predicted a Category 3 cyclone landfall on Mauritius. The best early performers were the GFS and NAVGEM. After the cyclones period of slow movement when it gained tropical storm intensity, model consensus tightened and predicted a less severe cyclone, though most predictions were still too aggressive.
On March 10th, the NAVGEM model arguably came closest to predicting the storm's final track and intensity, but ultimately no model came particularly close in predicting the storm's low intensity.

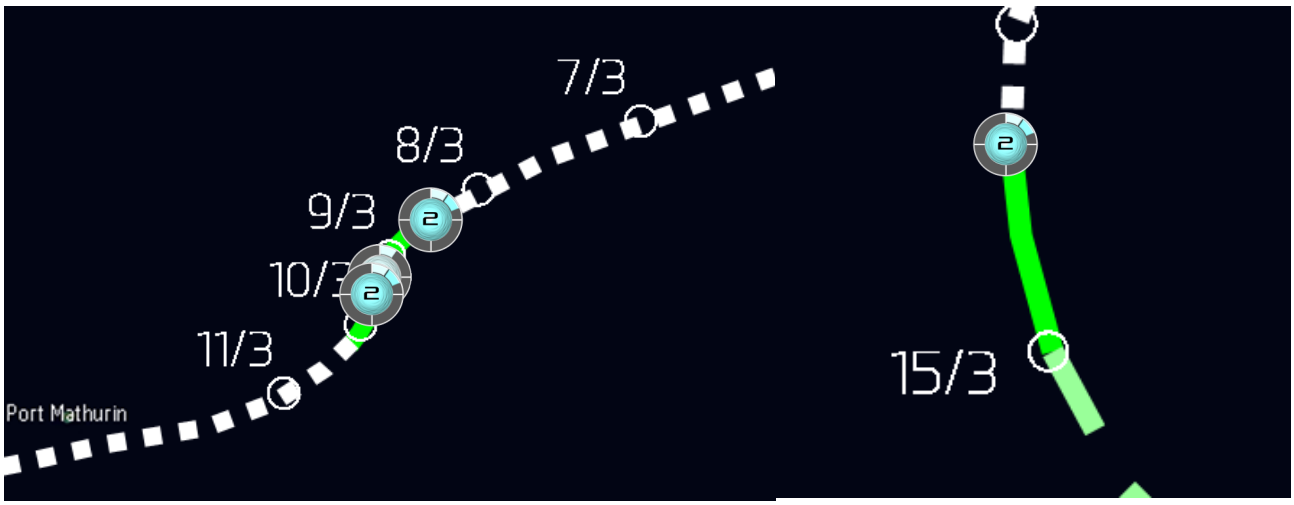


An early model run from the HWRF, showing Fernando with winds of over 115mph over Mauritius. This model run was initialised at 00:00 UTC on March 7th.

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

Fernando was a 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

5. Force Thirteen's Coverage on Fernando

Because Fernando never threatened any land areas as a tropical storm, Force Thirteen did not issue any updates on the storm.

Comments, suggestions and inquiries should be directed to force-13@hotmail.co.uk, or any of Force Thirteen's online platforms.