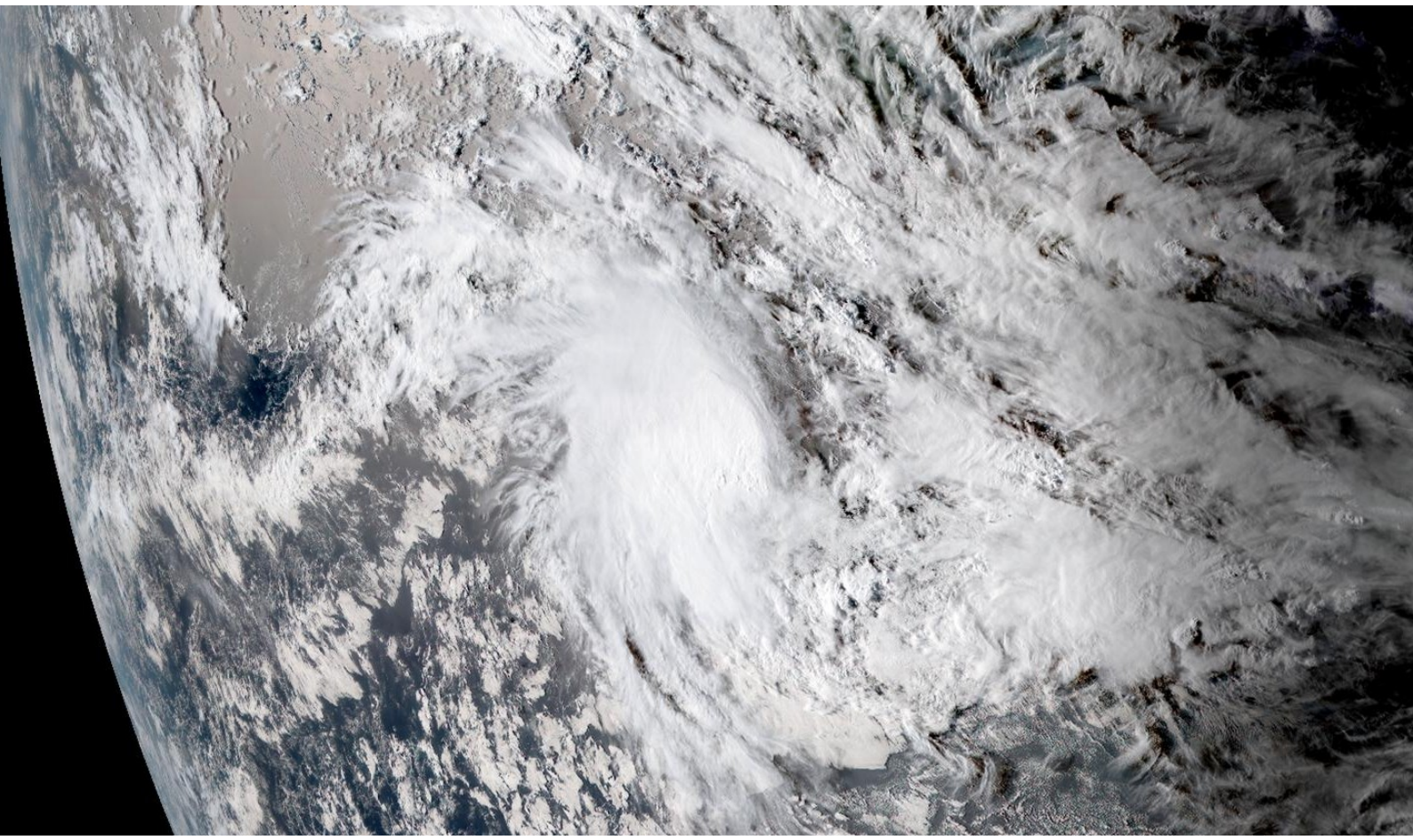
2017

Force Thirteen Cyclone Reports

Cyclone Caleb (201710)



Cyclone Caleb was a short lived weak cyclone in the western Australian region in late March 2017.

Compiled by Nathan Foy at Force Thirteen, March 31, 2017
Direct contact: force-13@hotmail.co.uk

Cover photo: Himawari image of Cyclone Caleb, captured early on March 23, 2017.

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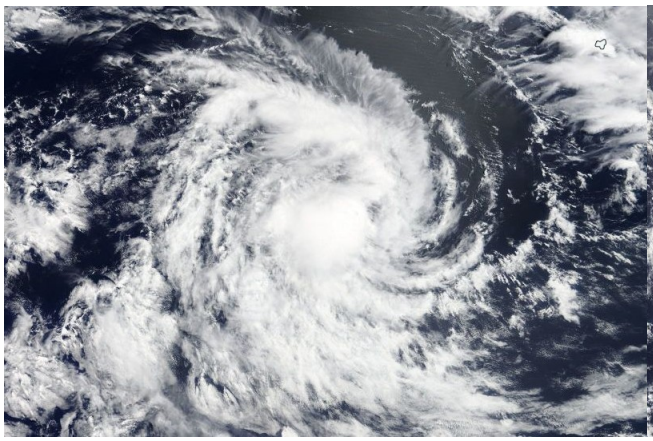
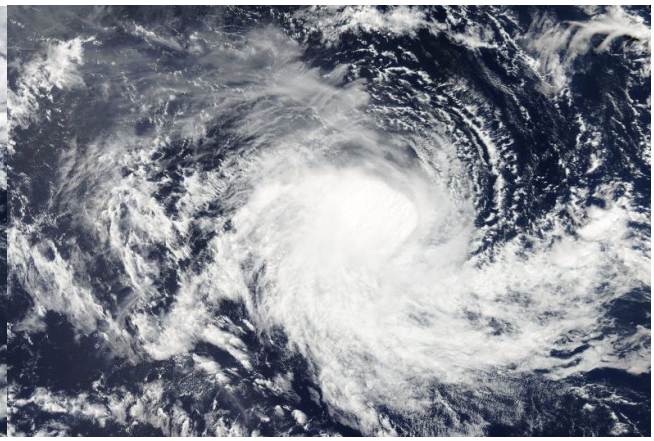
1.1. Synoptic History

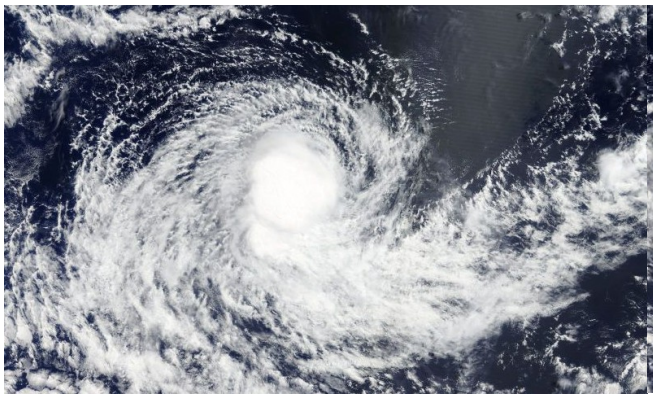
On March 21st, a large area of disturbed weather extended from a point west of the Cocos/Keeling Islands, as far east as the coast of tropical Western Australia. Two areas became distinct—one near the coast of Western Australia, and the other near the Cocos Islands. The latter system began to drift west, before moving more swiftly towards the east and then southeast, developing significantly between March 22 and 23, when it reached tropical storm strength and was named Caleb.
The storm remained fairly small as it moved towards the south, and battled very high amounts of windshear as it gradually curved towards the southwest. Wind shear displaced all convection to the west of the storm, becoming particularly noticeable at times during its time as a tropical storm.
Caleb weakened to a tropical depression on March 25th, and to a remnant low late on the 26th. However, despite this, convection continued to flare up periodically until the 29th, when the system was tracking slowly westwards over open waters. The system lost its rotation on March 31st and dissipated.



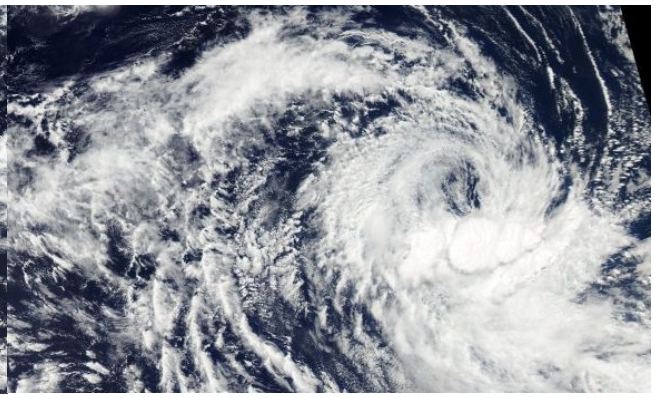
March 24th



March 25th



March 26th



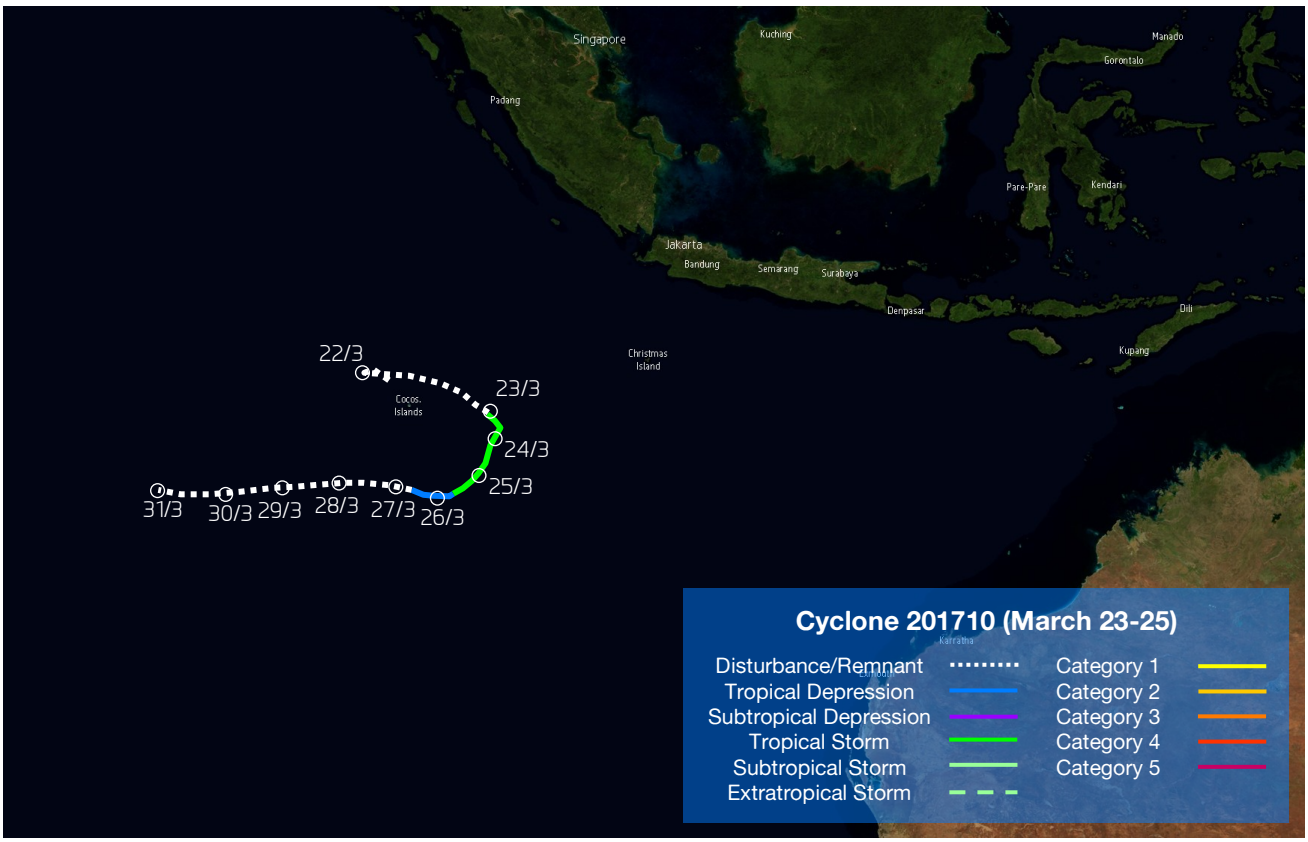
March 28th

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.

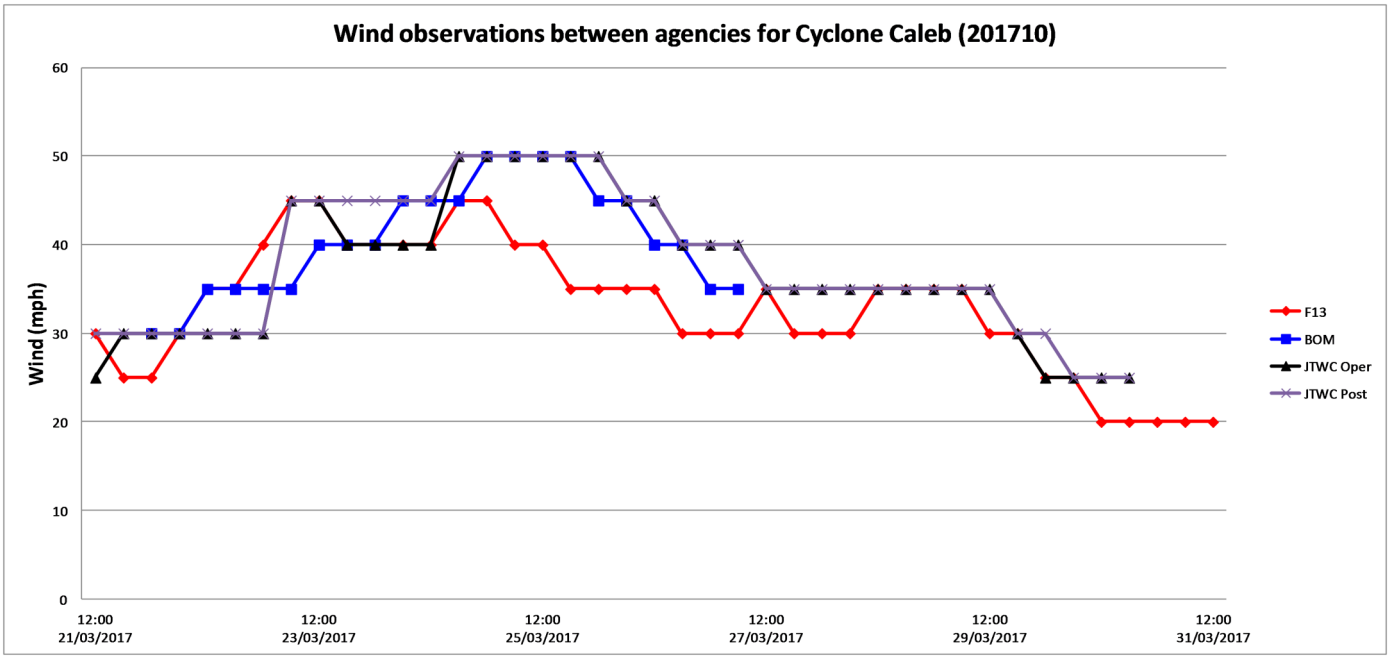
Date (dd/mm/yyyy)	Time	Latitude	Longitude	Wind	Pressure	Stage
21/03/2017	12:00	-10.9	96.6	30	1004	Tropical Disturbance
21/03/2017	18:00	-10.2	95.8	25	1005	Tropical Disturbance
22/03/2017	00:00	-10.3	95.7	25	1005	Tropical Disturbance
22/03/2017	06:00	-10.4	97.2	30	1002	Tropical Disturbance
22/03/2017	12:00	-10.5	97,8	35	999	Tropical Disturbance
22/03/2017	18:00	-11.5	98.4	35	998	Tropical Disturbance
23/03/2017	00:00	-12.1	99.4	40	996	Tropical Disturbance
23/03/2017	06:00	-13.1	100.1	45	995	Tropical Storm
23/03/2017	12:00	-13.4	100.4	45	995	Tropical Storm
23/03/2017	18:00	-13.8	100.9	40	997	Tropical Storm
24/03/2017	00:00	-13.9	100.7	40	998	Tropical Storm
24/03/2017	06:00	-14.4	100.4	40	997	Tropical Storm
24/03/2017	12:00	-14.9	100.3	40	997	Tropical Storm
24/03/2017	18:00	-15.3	100.1	45	996	Tropical Storm
25/03/2017	00:00	-15.6	99.8	45	996	Tropical Storm
25/03/2017	06:00	-15.9	99.5	40	997	Tropical Storm
25/03/2017	12:00	-16.1	99.2	40	998	Tropical Storm
25/03/2017	18:00	-16.3	99	35	1000	Tropical Depression
26/03/2017	00:00	-16.4	98.9	35	999	Tropical Depression
26/03/2017	06:00	-16.4	98.4	35	998	Tropical Depression
26/03/2017	12:00	-16.3	97.8	35	999	Tropical Depression
26/03/2017	18:00	-15.9	97.5	30	1002	Remnant Low
27/03/2017	00:00	-15.7	96.9	30	1005	Remnant Low
27/03/2017	06:00	-15.7	96.2	30	1004	Remnant Low
27/03/2017	12:00	-15.8	95.8	35	1002	Remnant Low
27/03/2017	18:00	-15.8	95.6	30	1004	Remnant Low
28/03/2017	00:00	-15.7	95.3	30	1005	Remnant Low
28/03/2017	06:00	-15.8	95.1	30	1005	Remnant Low
28/03/2017	12:00	-15.8	94.9	35	1003	Remnant Low
28/03/2017	18:00	-15.6	94.7	35	1002	Remnant Low
29/03/2017	00:00	-15.6	94.3	35	1003	Remnant Low
29/03/2017	06:00	-15.8	93.6	35	1004	Remnant Low
29/03/2017	12:00	-16.2	92.8	30	1006	Remnant Low
29/03/2017	18:00	-16.1	92.2	30	1007	Remnant Low
30/03/2017	00:00	-16.1	91.3	25	1007	Remnant Low
30/03/2017	06:00	-16	90.4	25	1008	Remnant Low
30/03/2017	12:00	-16	89.9	20	1010	Remnant Low
30/03/2017	18:00	-15.9	88.9	20	1011	Remnant Low
31/03/2017	00:00	-15.9	87.8	20	1012	Remnant Low
31/03/2017	06:00			20	1013	Remnant Low
31/03/2017	12:00			20	1014	Remnant Low

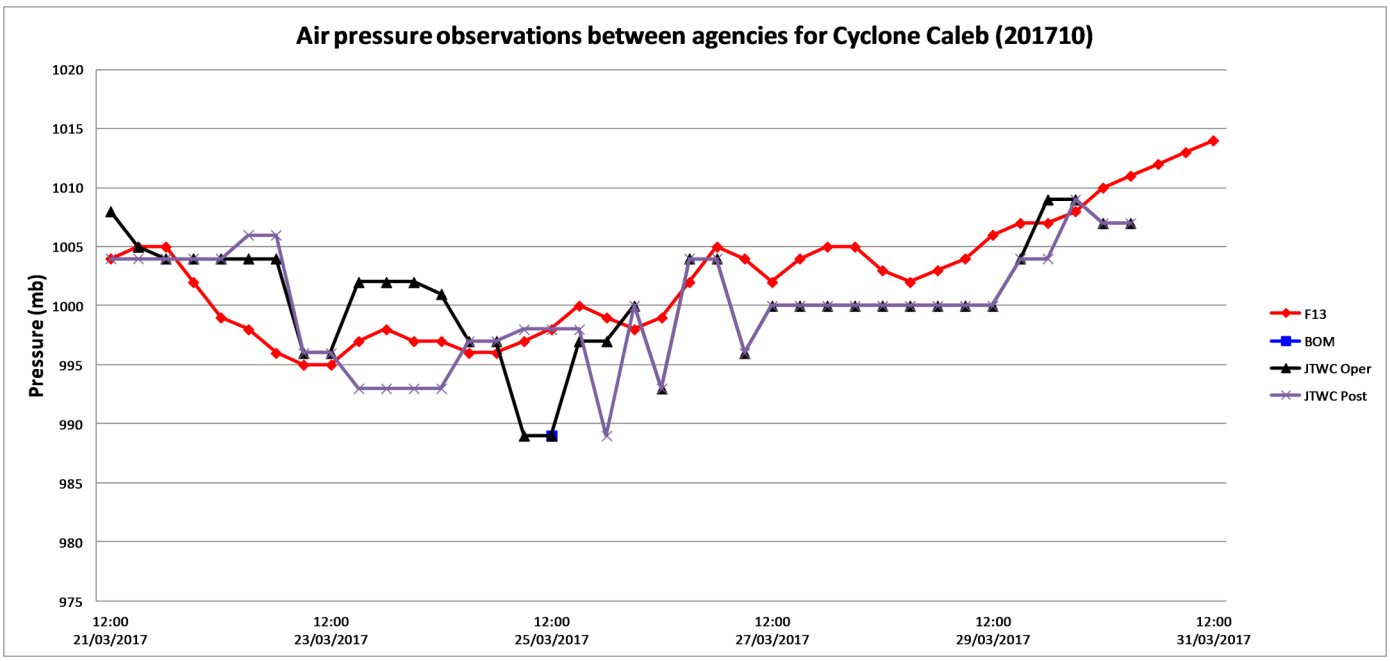
1.3. Track Chart



1.4. Comparison with other agencies

Caleb was monitored by the Regional Specialized Meteorological Centre, in this instance Australia's Bureau of Meteorology (BOM), and by the U.S. Joint Typhoon Warning Center (JTWC). Below shows comparisons between these organisations and the Force Thirteen best track.

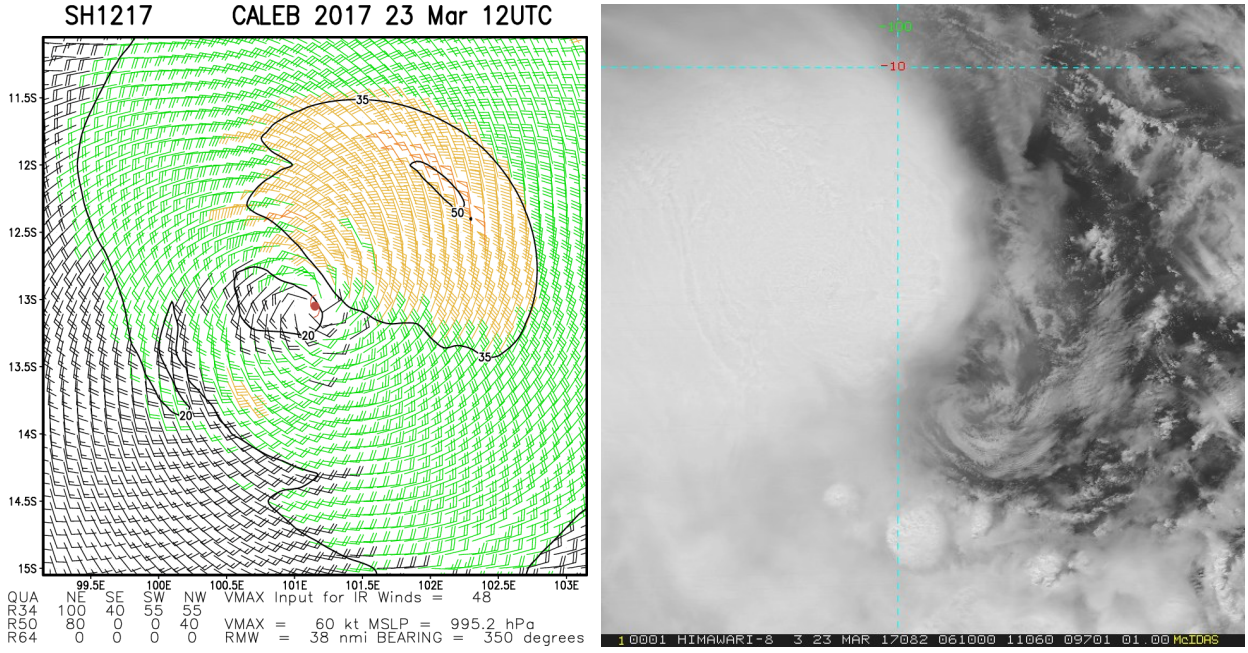




2. Effects on Land

Cyclone Caleb barely affected any land areas. The system leading to the storm formed near the Cocos/ Keeling islands, with satellite derived rainfall totals in the area of up to 100mm. Though, rainfall on the islands themselves are thought to be less. Some rainfall from the storm may have also reached Christmas Island, though rainfall totals remained low.

No other land areas were affected or predicted to be affected by the storm during its existence.

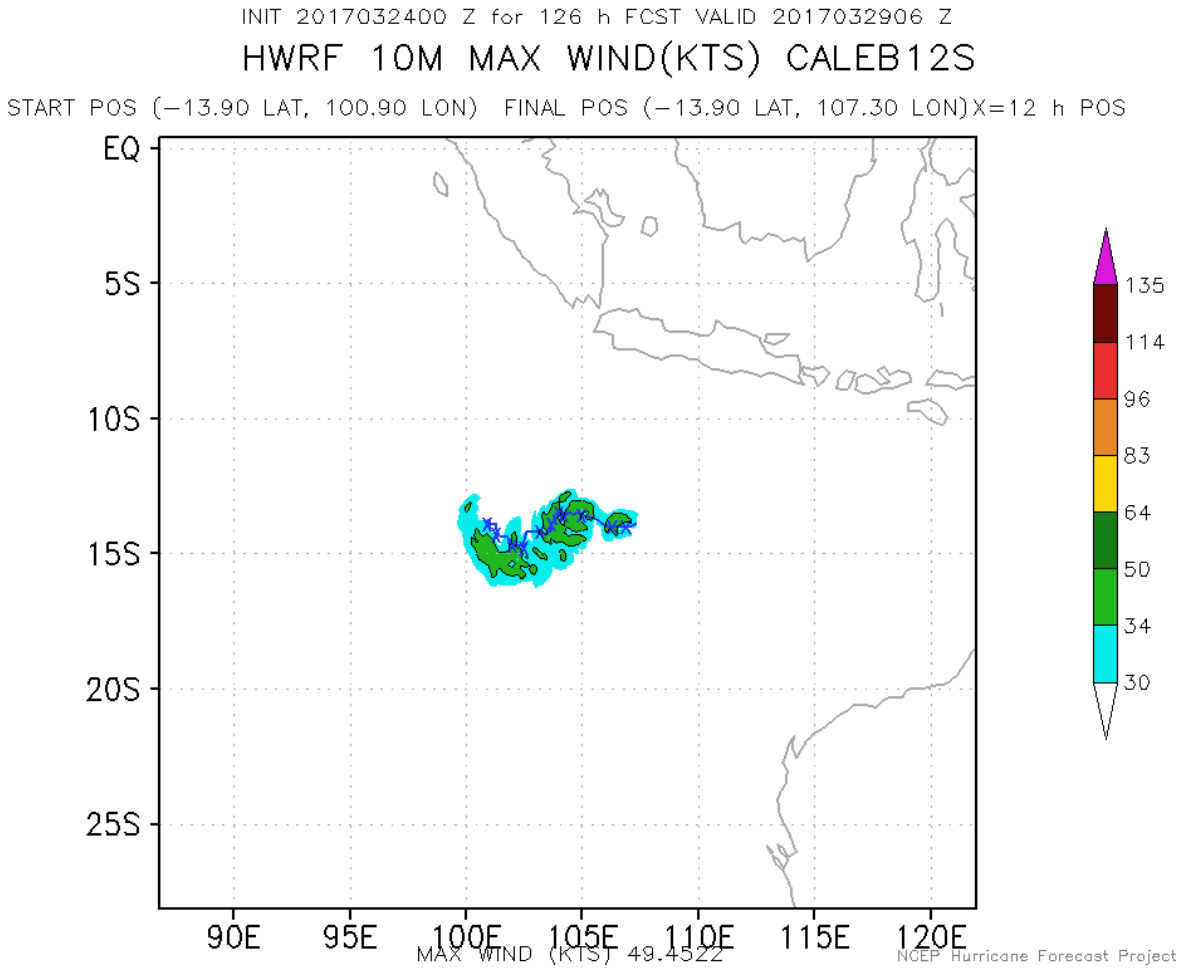


Satellite estimated winds and visible satellite image of Cyclone Caleb near peak intensity.

3. Forecasting Critique

Model forecasts were pretty clear in predicting slow movement throughout the life of Caleb, this of course verified. This also brought about some intriguing forecasts, particularly from the HWRF and GFS which at times both predicted the storm to move slowly towards the east, possibly as far as 110 degrees east. However, model performance was overall decent from the GFS, and satisfactory from the NAVGEM and HWRF.

Early on during the storm's life, models generally predicted an intensity too high, though good agreement established shortly after the storm's naming and these predictions were reasonably accurate, particularly from the HWRF and GFDL.

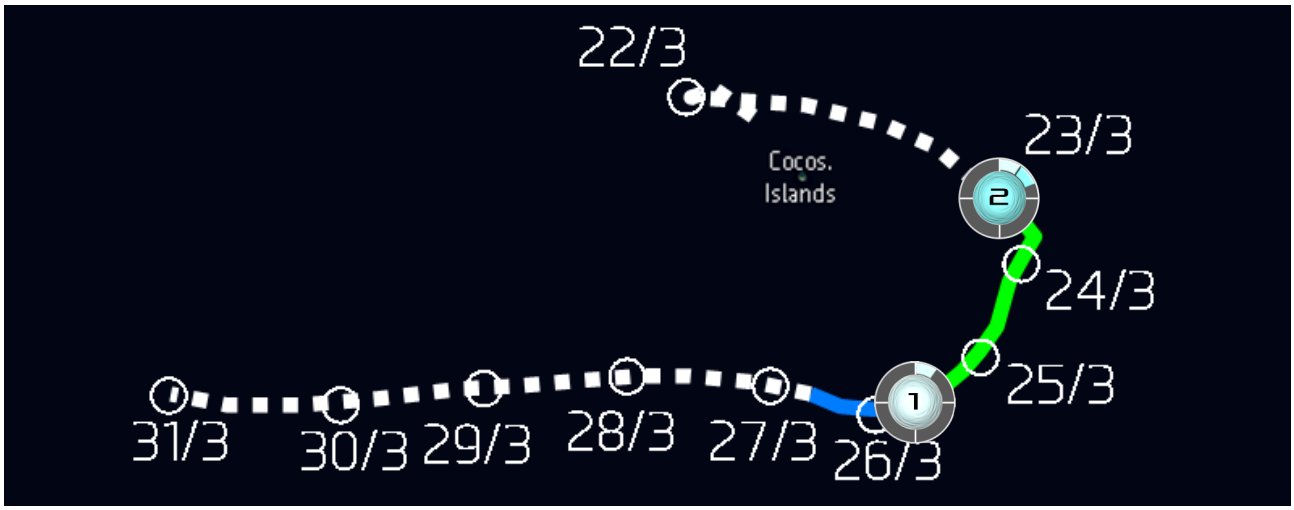


A model run from the HWRF, showing Caleb moving eastwards on the forecast. This model run was initialised at 00:00 UTC on March 24th.

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

Caleb 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 Caleb

Force Thirteen issued one update on Cyclone Caleb, when it was first named by the Bureau of Meteorology. Since it never affected land, no more updates were created.
Our coverage on Caleb received a 100% approval rating.

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