FORCE THIRTEEN

2019 WORLD CYCLONE REPORT

A report on all cyclones that formed in 2019, with detailed season statistics and records that were achieved worldwide this year.

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Cover photo: International Space Station image of Hurricane Dorian on September 1, 2019.

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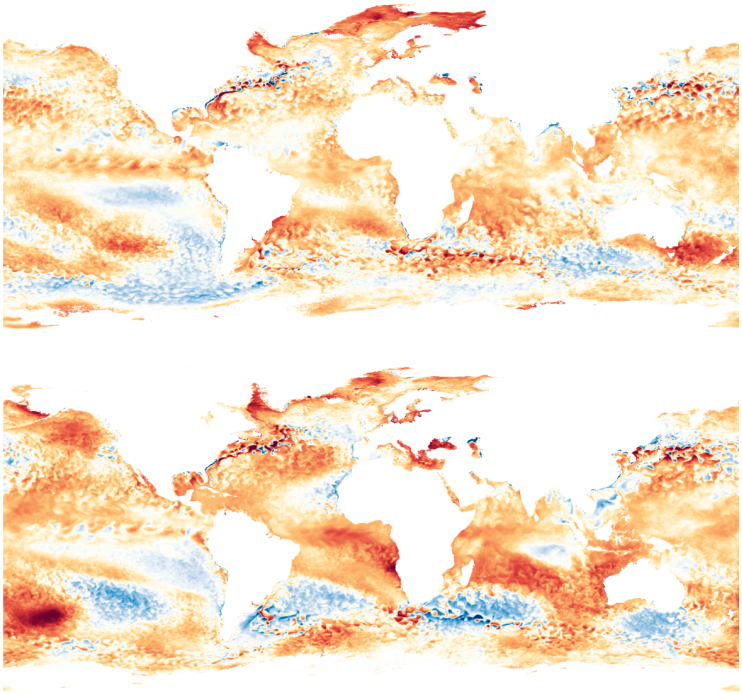
ANNUAL OVERVIEW

Activity in 2019 has been slightly above average. The year began with a mild El Nino event, fizzling out later on to overall neutral conditions. A significant feature of the year was the large amount of late year activity in the Indian Ocean and Western Pacific, due to a substantial Indian Ocean Dipole event.

The North Atlantic saw another year of above average activity, although most of the cyclones were relatively weak with an overall peak wind speed 4mph below the long-term average. The Pacific was near to slightly above average overall. The Southern Hemisphere was well below average overall this year, however there were numerous powerful storms in the Indian Ocean early in the year, with more impressive cyclones in the northern half of the basin later on.



Top image: Sea Surface Temperature anomalies in January 2019, versus the lower image, showing SST anomalies in December 2019. The images best show the regression of the slight El Nino and the IOD event in the Indian Ocean later on.

This year saw 101 tropical cyclones, of which 95 were tropical storms, 54 of hurricane strength, and 33 of major hurricane strength, along with 6 subtropical cyclones.
This compares to 115, 106, 56 and 33 last year, a slight change to what was reported in last year's report due to standard reanalysis.

2019 began with an already active cyclone in the form of Penny near Australia.

January proved to be fairly quiet, with only six tropical cyclones—one of these reaching hurricane strength. February produced another six although much stronger cyclones in the form of Funani (Category 4), Gelena (Category 4), and Wutip (Category 5) in the Western Pacific.
March saw the southern hemisphere reach its azimuth, with the deadliest storm of the year in the form of Cyclone Idai—along with Cyclone Haleh (Category 4), Savannah (Category 3), Trevor (Category 3), Veronica (Category 4), and Joaninha (Category 4), along with a rare South Atlantic tropical cyclone named Iba.
Late April saw another surge in activity with Cyclone Kenneth striking Africa as a Category 4 and Cyclone Fani, a Category 5 off the coast of India.
May was an incredibly quiet month, but still produced the first Atlantic cyclone before the official start of hurricane season—Andrea.
With Hurricane Alvin only forming in late June, the Eastern Pacific had one of its latest starts to a hurricane season.
July began with Hurricane Barbara, which became the earliest Category 5 Pacific hurricane in nine years, along with Hurricane Barry, which struck the Gulf of Mexico coast on July 13th. The month ended with Hurricane Erick, a strong Category 4 storm in the open Pacific.
Early August brought a typhoon landfall to southern Japan, and two other major typhoons.
Several other tropical storms formed that month, including Dorian, which eventually went on to become one of the strongest hurricanes on record as it struck the northern Bahamas.

ANNUAL OVERVIEW

In September, the Eastern Pacific saw Category 4 hurricane Juliette, and a similarly strong Kiko which persisted as a tropical storm for almost a week after peaking. Later, Hurricane Lorena struck the western coast of Mexico and the Baja California peninsula. In the Atlantic, Hurricane Humberto peaked as a Category 3 before passing close to Bermuda, along with Lorenzo late in the month, which became one of the strongest storms in the Eastern Atlantic.
Elsewhere, Typhoon Lingling affected the Korean peninsula, whilst Faxai struck the Tokyo area of Japan early in the month. A subtropical depression also formed in the East China Sea.
One storm was seen in the North Indian Ocean that month—Hikaa briefly reached Category 2 status.

October featured three severe cyclones, beginning with Typhoon Hagibis which reached Category 5 status on two separate occasions before striking eastern Japan. Hagibis and Faxai both became multi-billion dollar disasters in the region.

November continued the rout in the Western Pacific, with Typhoons Halong (Category 5), Fengshen (Category 3), Kalmaegi (Category 1) and Kammuri (Category 4), the latter of which becoming the most destructive typhoon in terms of structures damaged since Typhoon Haiyan in 2013. The northern Indian ocean also continued its impressive activity with Cyclone Bulbul (Category 2), Cyclone Maha (Category 3), and two tropical storms in early December.

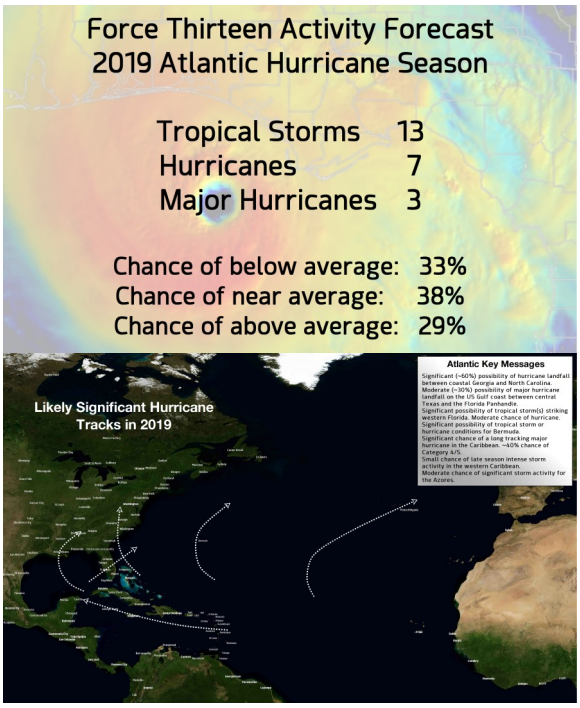
The Atlantic and Eastern Pacific region had a final burst in mid-November, along with a second subtropical cyclone in the Mediterranean—the first one forming in late October.

In December, Cyclone Ambali explosively intensified to reach Category 5 status in the southwest Indian Ocean, along with Belna which made a major landfall in Madagascar. Typhoon Phanfone struck the Philippines over the Christmas period, with Sarai and Calvinia affecting Fiji and Mauritius in the final days of 2019.

PRE-SEASON PREDICTIONS

North Atlantic Ocean

On April 4 2019, Force Thirteen released its projection for the Atlantic Hurricane Season, suggesting near average activity, with a fairly low confidence (typically defined as within 20% of the long-term averages).
The season produced 2 more tropical storms than the projection, along with three other subtropical cyclones. The hurricane and major hurricane predictions saw more success, with the final numbers being 6 and 3, according to Force Thirteen's intensity estimates.

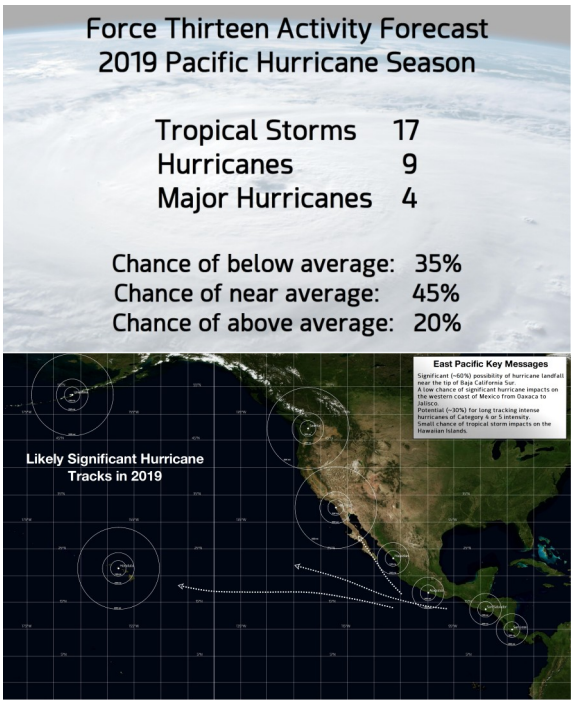


Key Message Verification

- Significant possibility of hurricane landfall between coastal Georgia and North Carolina
Verified (Hurricane Dorian)
- Moderate possibility of major hurricane landfall on the US Gulf coast between central Texas and the Florida panhandle. **Did not verify**
- Significant possibility of tropical storm(s) striking western Florida (moderate chance of hurricane)
Did not verify
- Significant chance of a long tracking major hurricane in the Caribbean.
Did not verify
- Small chance of late season intense storm activity in the western Caribbean.
Did not verify
- Moderate chance of significant storm activity for the Azores
Verified (Hurricane Lorenzo)

East Pacific Ocean

On April 4 2019, Force Thirteen released its projection for the Eastern Pacific Hurricane Season, suggesting near or below average activity with a fair amount of confidence.
Nineteen storms ultimately formed, with only six hurricanes and four major hurricanes.



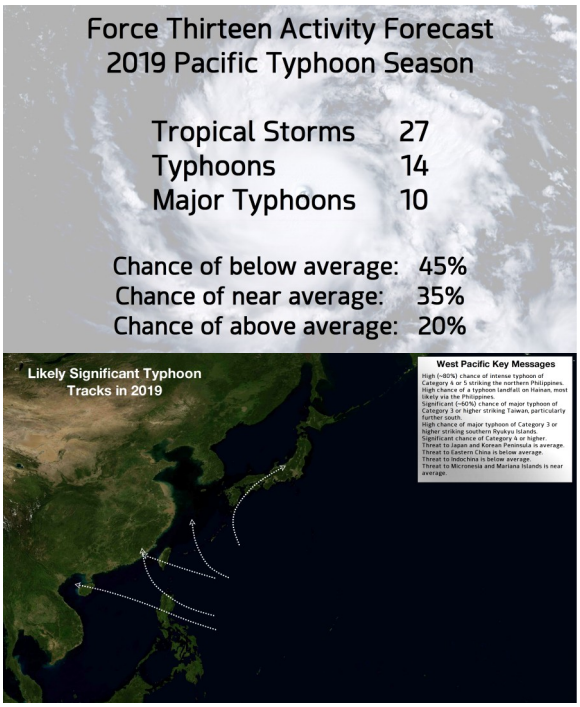
Key Message Verification

- Significant possibility of hurricane landfall near the tip of Baja California Sur.
Verified (Hurricane Lorena)
- A low chance of significant hurricane impacts on the western coast of Mexico from Oaxaca to Jalisco
Potentially verified (Hurricane Lorena)
- Potential for long tracking intense hurricanes of Category 4 or 5 intensity.
Potentially verified (Hurricane Barbara, Erick)
- Small chance of tropical storm impacts on the Hawaiian islands
Did not verify

PRE-SEASON PREDICTIONS

West Pacific Ocean

On April 4 2019, Force Thirteen released its projection for the Pacific typhoon season, suggesting near average activity.
The season produced 27 tropical storms, 17 typhoons and 11 major typhoons.



Key Message Verification

- High chance of intense typhoon of Category 4 or 5 striking the northern Philippines
Verified (Typhoon Kammuri)
- High chance of a typhoon landfall on Hainan, most likely via the Philippines
Did not verify
- Significant chance of major typhoon of Category 3 or higher striking Taiwan, particularly further south.
Did not verify
- High chance of major typhoon of Category 3 or higher striking southern Ryukyu islands
Verified (Typhoon Lekima and Lingling)

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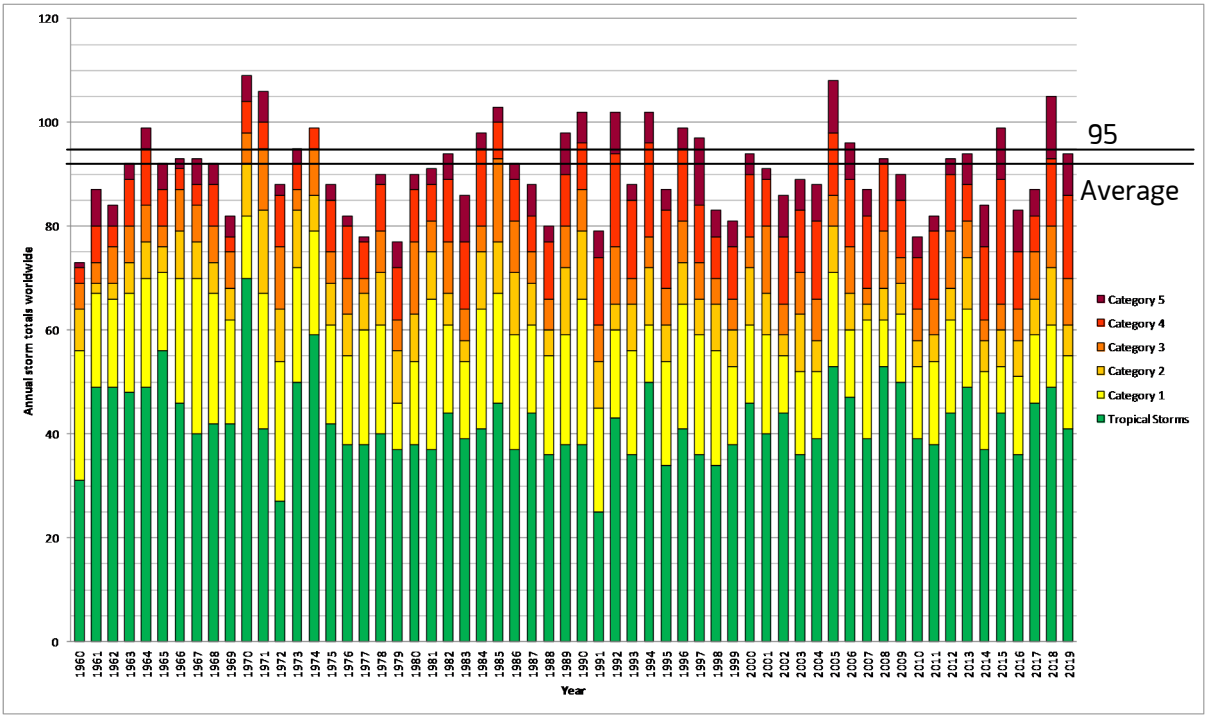
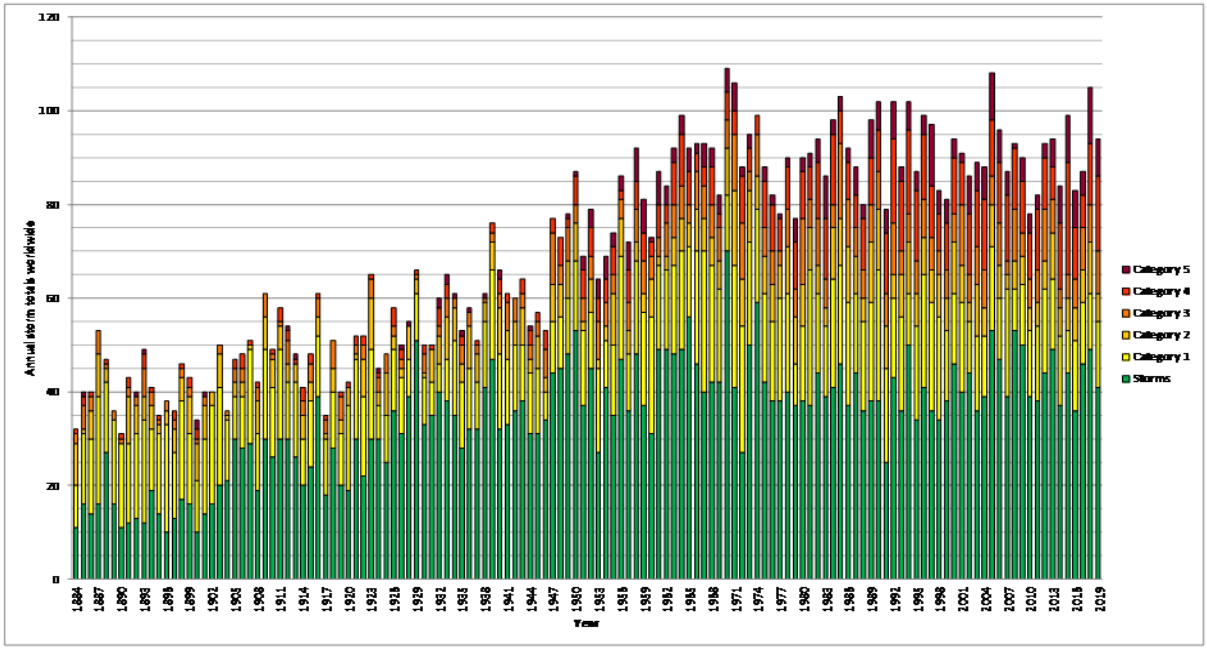
HISTORICAL PERSPECTIVE

With 95 tropical storms (4 subtropical), 2019 ends slightly above average. The 1960-2019 average now stands at 92.1. Due to lack of satellite imagery, years prior to the 1960s are not typically included in the data. However, since the data is readily available, the 1884-2019 chart has also been included below the 1960-2019 chart. The historical numbers are slightly different compared to last year due to ongoing reanalysis.

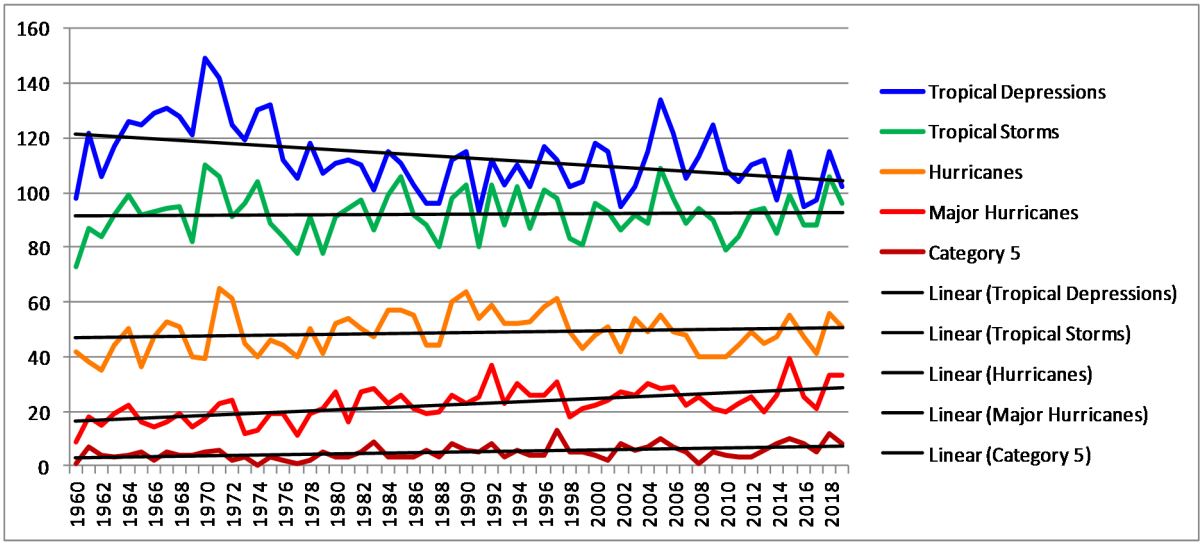




In 1884, only ship and land reports existed resulting in the lower numbers reported. These numbers gradually increased as shipping lanes handled more traffic in storm prone areas and communications were improved. Aircraft first intercepted cyclones in the 1940s, coinciding with a slight increase in numbers, possibly due to the beginning of air patrols after the war. Polar orbiting satellites started operating in the 1960s but often had gaps in their coverage, until geostationary satellites covered the Atlantic and Pacific by the mid 1970s. Since then, numbers have stabilised and have generally been on a slight downward trend overall.

HISTORICAL PERSPECTIVE

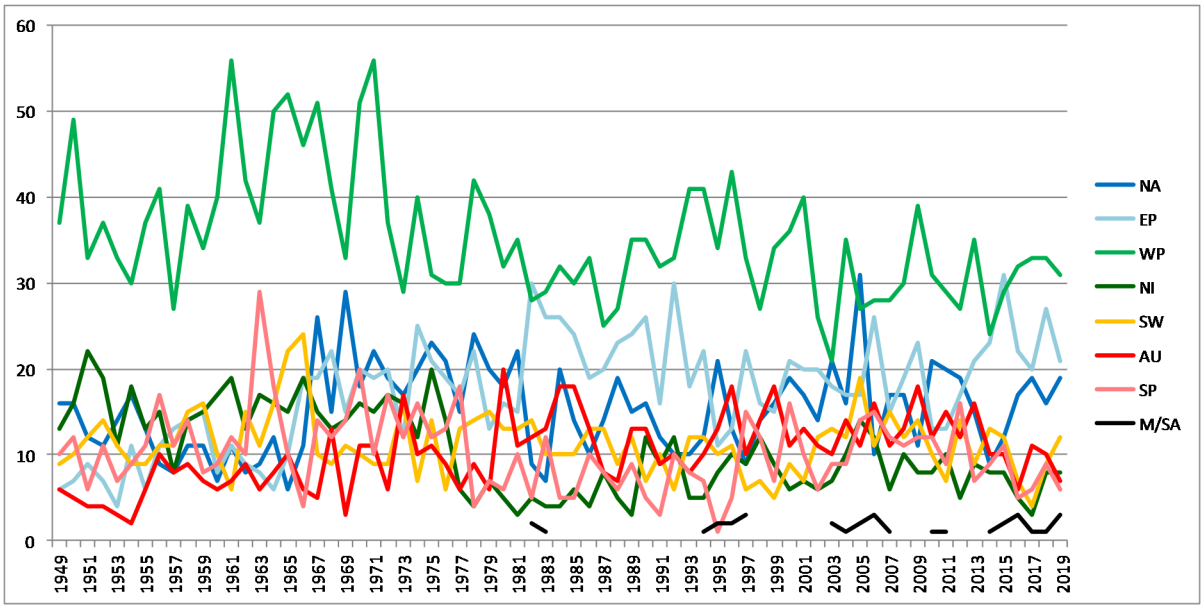
The following chart shows the trend with number of tropical depressions, storms, hurricanes, majors, and Category 5 storms. In the early years of satellite imagery, more tropical depressions were recognised, potentially due to the lack of quality of the images and more stringent criteria in place today. The reverse effect is likely true for the stronger storms, with primitive satellite imagery failing to detect or sufficiently justify a more intense storm. Until the late 1970s, satellite imagery was vastly inferior to reconnaissance planes in estimating a mature storm's intensity.



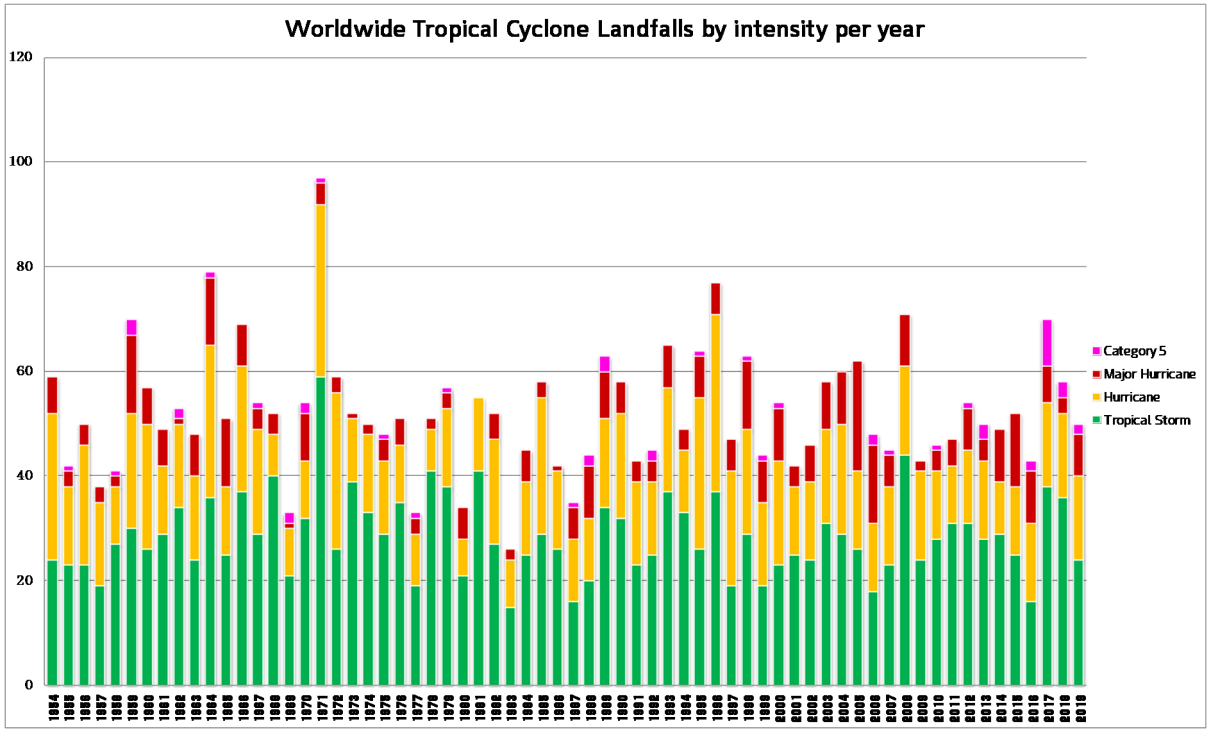
Year	All Cyclones	Tropical Storms	Hurricanes	Major Hurricanes	Category 5
1993	103	88	52	23	3
1994	110	102	52	30	6
1995	102	87	53	26	4
1996	117	101	58	26	4
1997	112	98	61	31	13
1998	102	83	49	18	5
1999	104	81	43	21	5
2000	118	96	48	22	4
2001	115	93	51	24	2
2002	95	86	42	27	8
2003	102	92	54	26	6
2004	115	89	49	30	7
2005	134	109	55	28	10
2006	122	98	49	29	7
2007	105	89	48	22	5
2008	113	94	40	25	1
2009	125	90	40	21	5
2010	108	79	40	20	4
2011	104	84	44	23	3
2012	110	93	49	25	3
2013	112	94	45	20	6
2014	97	85	47	26	8
2015	115	99	55	39	10
2016	95	88	47	25	8
2017	97	88	41	21	5
2018	115	106	56	33	12
2019	107	95	54	33	12
1960-1999 Avg	114	92	49	21	4
1980-2019 Avg	109	93	50	25	6

HISTORICAL PERSPECTIVE

The following chart shows storm numbers by basin per year since 1949. The Western Pacific has seen the most activity each year apart from 1983, 2005 and 2015. The basins shown are the North Atlantic, Eastern Pacific, Western Pacific, North Indian Ocean, South West Indian Ocean, Australian Region, South Pacific, and Mediterranean Sea/South Atlantic.



We have also provided landfall statistics for the preceding 65 years. A landfall is defined as the point in which the center of a cyclone moves over a landmass—this still applies when an eye is present, although some agencies define a landfall as the edge of the eye moving over land. An incidence of the storm's eyewall making landfall is usually defined as a *direct hit*.



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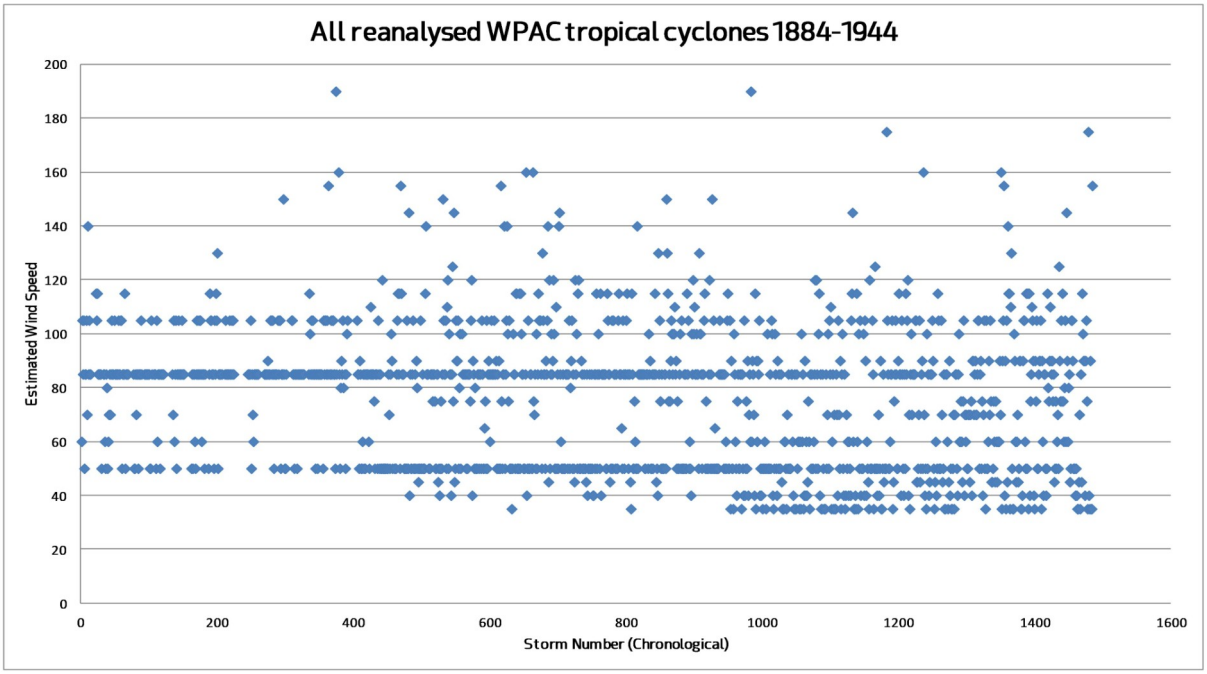
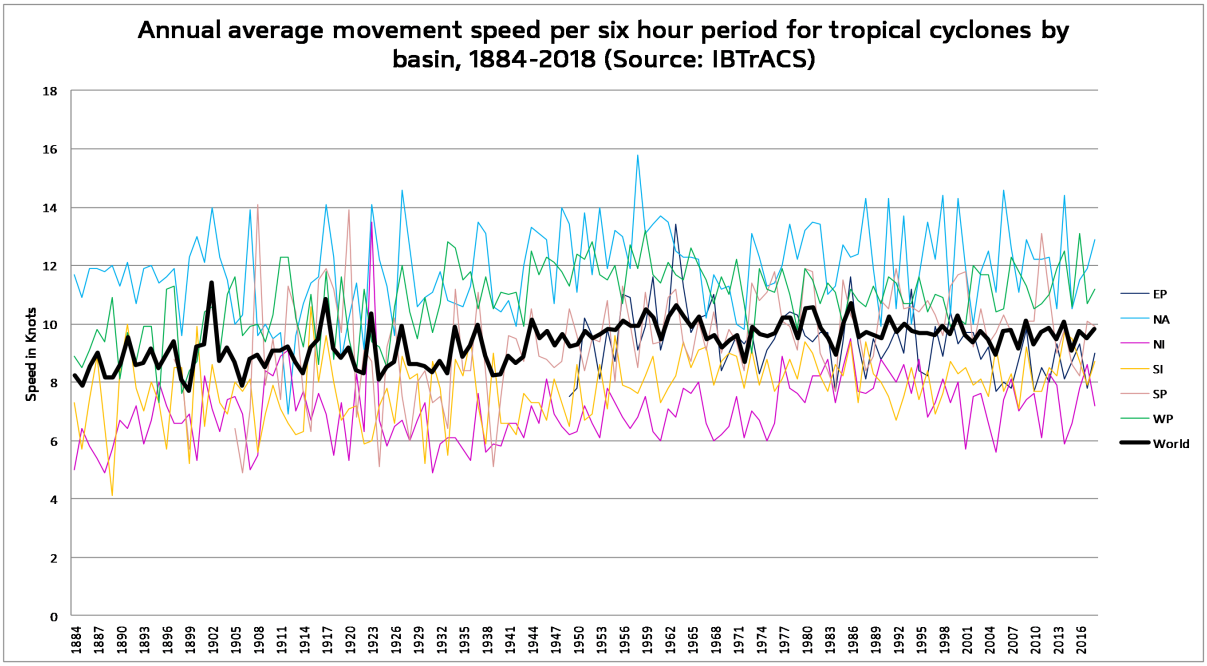
NEW RESEARCH AND DISCOVERIES IN 2019

2019 saw several new implementations and discoveries in terms of data collection, cataloguing, and operational observations.

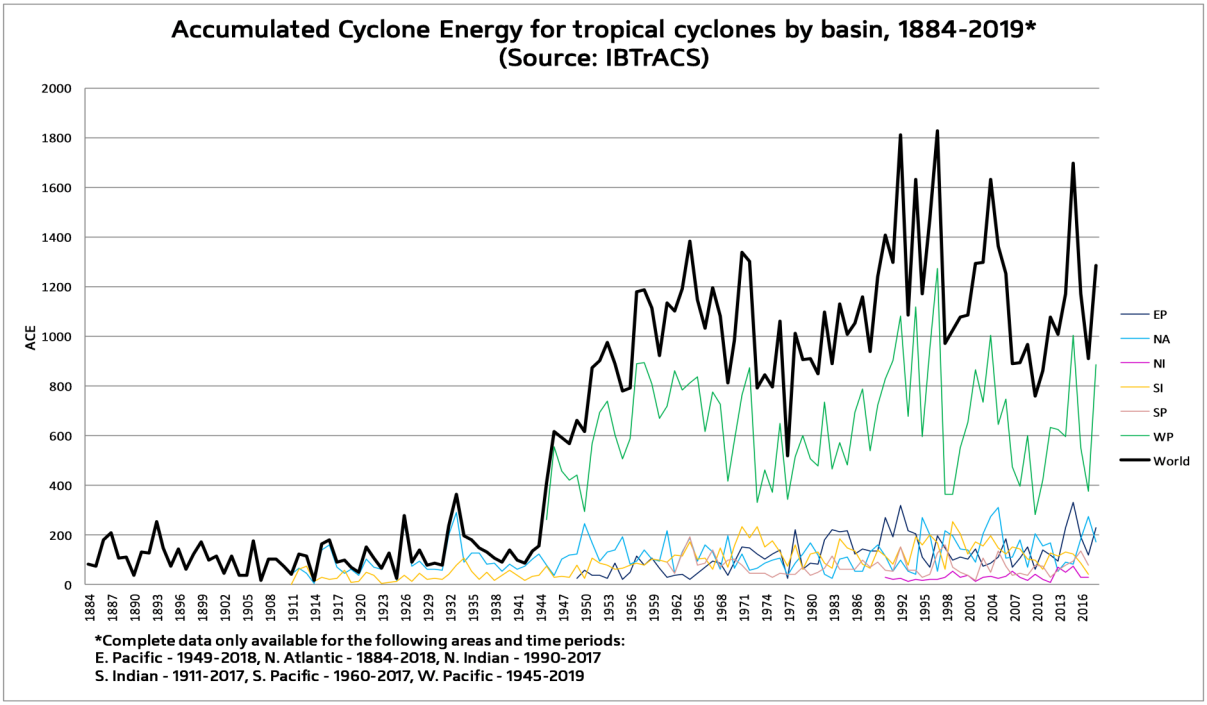
Early in the year, Force Thirteen's reanalysis project into all tropical cyclones in the Western Pacific between 1884 and 1944 concluded after 19 months, cataloguing almost 1,500 cyclones.
The full results of this reanalysis can be found at our sister website—www.cyclonehistory.com



This year, we also published findings in long-term tropical storm movement trends, Accumulated Cyclone Energy (ACE) trends, and began construction of a new best track database.



NEW RESEARCH AND DISCOVERIES IN 2019



Finally, in February operational testing began on Force Thirteen's new satellite intensity estimating tool—SATIED (SATellite Interpolation of Eyewall Dynamics)
This tool works by taking six cloudtop temperature readings around the center of the storm, and the temperature of the eye. These parameters along with an eye structure score produces the final wind speed estimation of a storm through SATIED's algorithm. Operational testing was completed in October.

THE 2019 DATASHEET

Since 2014, we have compiled datasheets showing all the storms of the year based on several criteria. This provides easy access to particular records about storms that occurred this year. The columns, reading from left to right, show: The storm name, basin of formation, date of formation (year, month, day), date of dissipation (year, month, day), Peak intensity in miles per hour, lowest central pressure in millibars, and Saffir-Simpson Hurricane Wind Scale Category.

Year	MF	DF	MD	DD		Name	Wind mph	Press mb	SSHS
2019	11	2	11	10	W. Pacific	Halong	190	890	5
2019	8	25	9	7	N. Atlantic	Dorian	190	908	5
2019	10	5	10	13	W. Pacific	Hagibis	185	892	5
2019	2	19	2	28	W. Pacific	Wutip	175	916	5
2019	10	24	11	1	N. Indian	Kyarr	165	912	5
2019	4	26	5	4	N. Indian	Fani	160	920	5
2019	12	5	12	8	S. Indian	Ambali	160	924	5
2019	6	30	7	8	E. Pacific	Barbara	160	925	5
2019	9	23	10	2	N. Atlantic	Lorenzo	155	934	4
2019	3	19	3	28	Australia	Veronica	155	935	4
2019	8	4	8	12	W. Pacific	Lekima	155	913	4
2019	10	19	10	26	W. Pacific	Bualoi	150	933	4
2019	7	27	8	5	E. Pacific	Erick	150	943	4
2019	4	23	4	26	S. Indian	Kenneth	145	936	4
2019	2	5	2	14	S. Indian	Gelena	140	929	4
2019	9	2	9	8	W. Pacific	Lingling	140	930	4
2019	11	26	12	5	W. Pacific	Kammuri	140	942	4
2019	9	12	9	25	E. Pacific	Kiko	140	945	4
2019	3	8	3	17	S. Indian	Idai	140	946	4
2019	3	22	3	31	S. Indian	Joaninha	140	956	4
2019	2	5	2	9	S. Indian	Funani	130	935	4
2019	9	2	9	10	W. Pacific	Faxai	130	942	4
2019	9	1	9	7	E. Pacific	Juliette	130	950	4
2019	3	2	3	7	S. Indian	Haleh	130	952	4
2019	11	11	11	18	W. Pacific	Fengshen	125	948	3
2019	9	12	9	20	N. Atlantic	Humberto	125	949	3
2019	10	30	11	7	N. Indian	Maha	125	954	3
2019	3	17	3	25	Australia	Trevor	120	959	3
2019	3	14	3	21	Australia	Savannah	115	945	3
2019	6	10	6	17	N. Indian	Vayu	115	948	3
2019	8	5	8	17	W. Pacific	Krosa	115	948	3
2019	12	21	12	29	W. Pacific	Phanfone	115	955	3
2019	12	5	12	11	S. Indian	Belna	115	963	3
2019	2	25	3	1	S. Pacific	Pola	110	966	2
2019	9	27	10	4	W. Pacific	Mitag	105	961	2
2019	8	2	8	8	W. Pacific	Francisco	105	968	2
2019	10	17	10	22	W. Pacific	Neoguri	105	968	2
2019	9	17	9	22	E. Pacific	Lorena	105	971	2
2019	11	5	11	12	N. Indian	Bulbul	105	975	2
2019	9	22	9	25	N. Indian	Hikaa	100	972	2
2019	12	29	1	2	S. Indian	Calvinia	90	970	1
2019	11	13	11	20	W. Pacific	Kalmaegi	90	970	1
2019	9	17	9	25	N. Atlantic	Jerry	90	974	1

THE 2019 DATASHEET

2019	2	12	2	22	S. Pacific	Oma	85	970	1
2019	4	23	4	29	S. Indian	Lorna	85	980	1
2019	1	23	1	31	Australia	Riley	80	964	1
2019	12	26	1	1	S. Pacific	Sarai	80	975	1
2019	10	25	10	28	N. Atlantic	Pablo	80	977	1
2019	11	24	11	27	S. Pacific	Rita	80	980	1
2019	7	28	8	7	E. Pacific	Flossie	80	990	1
2019	11	5	11	11	W. Pacific	Nakri	75	981	1
2019	11	19	11	22	W. Pacific	Fung-wong	75	987	1
2019	7	11	7	16	N. Atlantic	Barry	75	991	1
2019	5	25	5	29	E. Pacific	Alvin	75	992	1
2019	9	19	9	23	W. Pacific	Tapah	70	971	TS
2019	4	5	4	12	Australia	Wallace	70	983	TS
2019	8	21	8	25	E. Pacific	Ivo	70	990	TS
2019	8	21	8	25	W. Pacific	Bailu	65	982	TS
2019	11	19	11	25	N. Atlantic	Sebastien	65	993	TS
2019	9	17	9	22	E. Pacific	Mario	65	994	TS
2019	9	3	9	10	N. Atlantic	Gabrielle	65	995	TS
2019	5	11	5	15	Australia	Ann	65	997	TS
2019	1	2	1	8	S. Pacific	Mona	60	974	TS
2019	10	29	10	31	W. Pacific	Matmo	60	993	TS
2019	12	3	12	4	N. Indian	07A	60	996	TS
2019	10	18	10	18	N. Atlantic	Nestor	60	999	SS
2019	7	16	7	21	W. Pacific	Danas	50	979	TS
2019	7	30	8	3	W. Pacific	Wipha	50	990	TS
2019	1	19	1	22	S. Indian	Desmond	50	994	TS
2019	9	28	10	1	E. Pacific	Narda	50	997	TS
2019	11	11	11	12	Mediterranean	02M	50	997	SS
2019	9	3	9	5	N. Atlantic	Fernand	50	998	TS
2019	10	11	10	14	N. Atlantic	Melissa	50	998	TS
2019	10	25	10	26	N. Atlantic	Olga	50	999	TS
2019	11	15	11	17	E. Pacific	Raymond	50	1000	TS
2019	7	6	7	8	E. Pacific	Cosme	50	1001	TS
2019	5	9	5	11	Australia	Lili	50	1002	TS
2019	10	12	10	14	E. Pacific	Ema	50	1003	TS
2019					S. Atlantic	Iba	50	1006	TS
2019	10	30	11	1	N. Atlantic	Rebekah	45	987	SS
2019	12	2	12	7	N. Indian	Pawan	45	996	TS
2019	9	4	9	7	E. Pacific	Akoni	45	1003	TS
2019	9	22	9	27	N. Atlantic	Karen	45	1003	TS
2019	7	3	7	3	W. Pacific	Mun	40	992	TS
2019	8	27	8	30	W. Pacific	Podul	40	995	TS
2019	2	9	2	11	S. Pacific	Neil	40	996	TS
2019	7	25	7	27	W. Pacific	Nari	40	997	TS
2019	9	15	9	16	W. Pacific	Peipah	40	999	TS
2019	6	29	6	30	W. Pacific	04W	40	1000	TS
2019	1	22	1	25	S. Indian	Eketsang	40	1002	TS
2019	10	20	10	21	E. Pacific	Priscilla	40	1004	TS
2019	7	22	7	25	E. Pacific	Dalila	40	1005	TS

THE 2019 DATASHEET

2019	8	11	8	13	E. Pacific	Henriette	40	1005	TS
2019	8	26	8	29	N. Atlantic	Erin	40	1005	TS
2019	8	3	8	5	E. Pacific	Gil	40	1006	TS
2019	10	17	10	19	E. Pacific	Octave	40	1006	TS
2019	5	21	5	21	N. Atlantic	Andrea	40	1006	SS
2019	8	21	8	23	N. Atlantic	Chantal	40	1006	TS
2019	9	17	9	19	N. Atlantic	Imelda	40	1006	TS
2019	9	2	9	3	W. Pacific	Kajiki	35	995	TD
2019	9	7	9	8	W. Pacific	96W	35	1000	SD
2019	10	24	10	26	Mediterranean	01M	35	1004	SD
2019	10	16	10	16	E. Pacific	17E	35	1005	DB
2019	7	12	7	14	E. Pacific	04E	35	1006	TD
2019	11	16	11	18	E. Pacific	21E	35	1006	TD
2019	10	15	10	15	N. Atlantic	15	35	1006	TD
2019	3	15	3	18	W. Pacific	03W	30	1001	TD
2019	1	19	1	22	W. Pacific	01W	25	1003	TD

These intensity values are based upon existing information and our own analysis and is correct to our best estimations as of January 6, 2020. However, Cyclones Calvinia and Sarai survived into 2020, and only the peak intensity attained in 2019 is shown in the table. Many storms have their intensities measured by satellites alone, unless they make landfall or is intercepted by a reconnaissance plane. Thus, most typhoons and southern hemisphere cyclones at peak intensity are merely estimates and may be higher or lower.

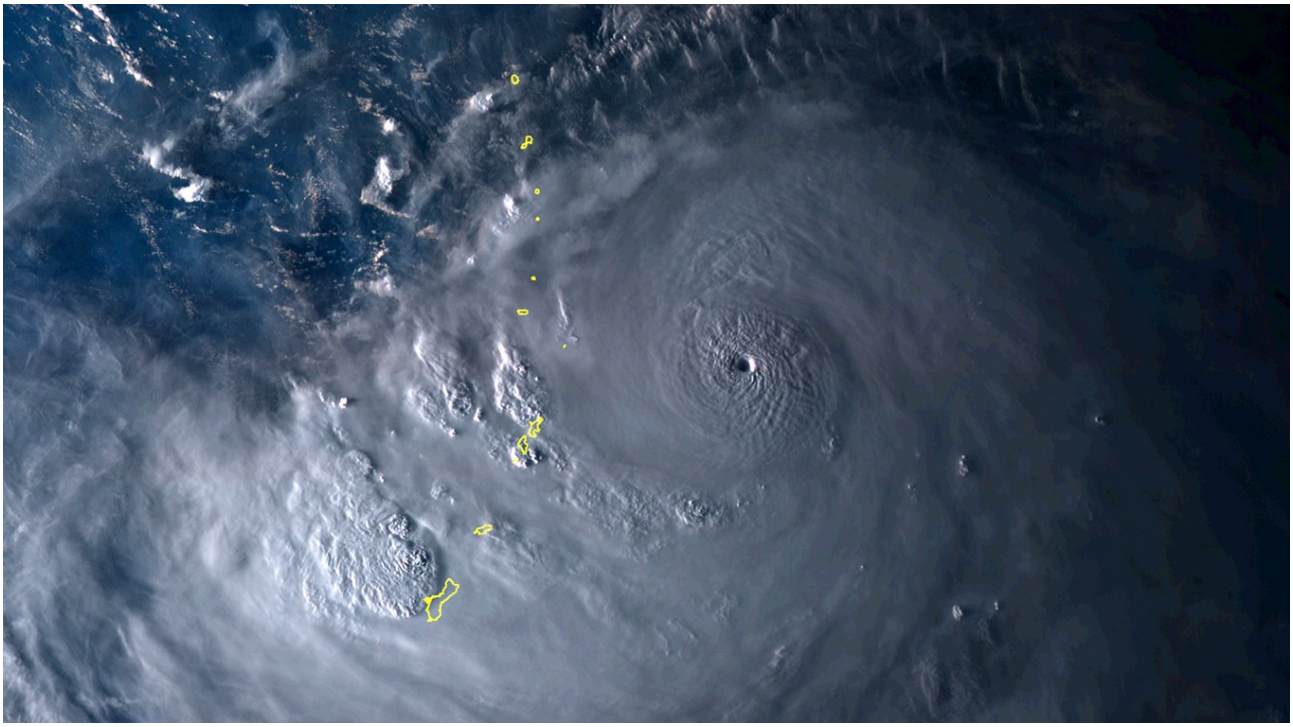


Image: Force Thirteen enhanced image of Typhoon Hagibis at on October 7, captured by the Himawari-8 satellite.

STORMS LISTED BY AMOUNT OF LANDFALLS

		Formed		Dissipated		
Basin	Name	M	D	M	D	Landfalls
N. Atlantic	Dorian	8	25	9	7	5
Australia	Trevor	3	17	3	25	3
W. Pacific	Phanfone	12	21	12	29	3
Australia	Veronica	3	19	3	28	2
E. Pacific	Lorena	9	17	9	22	2
E. Pacific	Narda	9	28	10	1	2
N. Atlantic	Karen	9	22	9	27	2
S. Indian	Idai	3	8	3	17	2
W. Pacific	Bailu	8	21	8	25	2
W. Pacific	Francisco	8	2	8	8	2
W. Pacific	Kammuri	11	26	12	5	2
W. Pacific	Krosa	8	5	8	17	2
W. Pacific	Lekima	8	4	8	12	2
W. Pacific	Podul	8	27	8	30	2
W. Pacific	Wipha	7	30	8	3	2
Australia	Ann	5	11	5	15	1
E. Pacific	Priscilla	10	20	10	21	1
N. Atlantic	15	10	15	10	15	1
N. Atlantic	Barry	7	11	7	16	1
N. Atlantic	Fernand	9	3	9	5	1
N. Atlantic	Imelda	9	17	9	19	1
N. Atlantic	Lorenzo	9	23	10	2	1
N. Atlantic	Nestor	10	18	10	18	1
N. Atlantic	Olga	10	25	10	26	1
N. Indian	Bulbul	11	5	11	12	1
N. Indian	Fani	4	26	5	4	1
N. Indian	Hikaa	9	22	9	25	1
N. Indian	Maha	10	30	11	7	1
N. Indian	Pawan	12	2	12	7	1
S. Indian	Belna	12	5	12	11	1
S. Indian	Kenneth	4	23	4	26	1

STORMS LISTED BY AMOUNT OF LANDFALLS

		Formed		Dissipated		
Basin	Name	M	D	M	D	Landfalls
S. Pacific	Mona	1	2	1	8	1
W. Pacific	Danas	7	16	7	21	1
W. Pacific	Faxai	9	2	9	10	1
W. Pacific	Hagibis	10	5	10	13	1
W. Pacific	Kajiki	9	2	9	3	1
W. Pacific	Kalmaegi	11	13	11	20	1
W. Pacific	Lingling	9	2	9	8	1
W. Pacific	Matmo	10	29	10	31	1
W. Pacific	Mitag	9	27	10	4	1
W. Pacific	Mun	7	3	7	3	1
W. Pacific	Nakri	11	5	11	11	1
W. Pacific	Nari	7	25	7	27	1

Image: Force Thirteen enhanced image of Hurricane Dorian before striking the northern Bahamas, captured by the International Space Station

STORMS LISTED BY COUNTRIES AFFECTED

		Formed		Dissipated		
Basin	Name	M	D	M	D	Countries
N. Atlantic	Dorian	8	25	9	7	9
S. Indian	Idai	3	8	3	17	5
W. Pacific	Mitag	9	27	10	4	4
N. Indian	Bulbul	11	5	11	12	3
S. Indian	Belna	12	5	12	11	3
W. Pacific	Danas	7	16	7	21	3
W. Pacific	Lingling	9	2	9	8	3
W. Pacific	Podul	8	27	8	30	3
Australia	Lili	5	9	5	11	2
Australia	Trevor	3	17	3	25	2
N. Atlantic	Gabrielle	9	3	9	10	2
N. Atlantic	Karen	9	22	9	27	2
S. Indian	Kenneth	4	23	4	26	2
W. Pacific	Bailu	8	21	8	25	2
W. Pacific	Francisco	8	2	8	8	2
W. Pacific	Hagibis	10	5	10	13	2
W. Pacific	Lekima	8	4	8	12	2
W. Pacific	Mun	7	3	7	3	2
W. Pacific	Tapah	9	19	9	23	2
W. Pacific	Wipha	7	30	8	3	2
Australia	Ann	5	11	5	15	1
Australia	Savannah	3	14	3	21	1
Australia	Veronica	3	19	3	28	1
E. Pacific	Lorena	9	17	9	22	1
E. Pacific	Narda	9	28	10	1	1
E. Pacific	Priscilla	10	20	10	21	1
N. Atlantic	15	10	15	10	15	1
N. Atlantic	Barry	7	11	7	16	1
N. Atlantic	Fernand	9	3	9	5	1
N. Atlantic	Imelda	9	17	9	19	1
N. Atlantic	Lorenzo	9	23	10	2	1

STORMS LISTED BY COUNTRIES AFFECTED

		Formed		Dissipated		
Basin	Name	M	D	M	D	Countries
N. Atlantic	Nestor	10	18	10	18	1
N. Atlantic	Olga	10	25	10	26	1
N. Indian	Fani	4	26	5	4	1
N. Indian	Hikaa	9	22	9	25	1
N. Indian	Kyarr	10	24	11	1	1
N. Indian	Maha	10	30	11	7	1
N. Indian	Pawan	12	2	12	7	1
N. Indian	Vayu	6	10	6	17	1
S. Indian	Calvinia	12	29	1	2	1
S. Indian	Gelena	2	5	2	14	1
S. Indian	Joaninha	3	22	3	31	1
S. Pacific	Mona	1	2	1	8	1
S. Pacific	Oma	2	12	2	22	1
S. Pacific	Pola	2	25	3	1	1
S. Pacific	Rita	11	24	11	27	1
S. Pacific	Sarai	12	26	1	1	1
W. Pacific	Bualoi	10	19	10	26	1
W. Pacific	Faxai	9	2	9	10	1
W. Pacific	Fengshen	11	11	11	18	1
W. Pacific	Fung-wong	11	19	11	22	1
W. Pacific	Kajiki	9	2	9	3	1
W. Pacific	Kalmaegi	11	13	11	20	1
W. Pacific	Kammuri	11	26	12	5	1
W. Pacific	Krosa	8	5	8	17	1
W. Pacific	Matmo	10	29	10	31	1
W. Pacific	Nakri	11	5	11	11	1
W. Pacific	Nari	7	25	7	27	1
W. Pacific	Phanfone	12	21	12	29	1

STORMS LISTED BY DEATH TOLL

		Formed		Dissipated		
Basin	Name	M	D	M	D	Fatalities
S. Indian	Idai	3	8	3	17	1298
W. Pacific	Lekima	8	4	8	12	108
W. Pacific	Hagibis	10	5	10	13	102
N. Atlantic	Dorian	8	25	9	7	75
N. Indian	Bulbul	11	5	11	12	72
W. Pacific	Phanfone	12	21	12	29	63
S. Indian	Kenneth	4	23	4	26	52
N. Indian	Vayu	6	10	6	17	39
W. Pacific	Wipha	7	30	8	3	27
N. Indian	07A	12	3	12	4	25
W. Pacific	Mitag	9	27	10	4	24
N. Atlantic	Lorenzo	9	23	10	2	21
W. Pacific	Nakri	11	5	11	11	19
W. Pacific	Kajiki	9	2	9	3	15
W. Pacific	Podul	8	27	8	30	15
N. Indian	Fani	4	26	5	4	12
S. Indian	Belna	12	5	12	11	12
W. Pacific	01W	1	19	1	22	10
N. Indian	Pawan	12	2	12	7	8
W. Pacific	Lingling	9	2	9	8	8
E. Pacific	Narda	9	28	10	1	6
W. Pacific	Danas	7	16	7	21	6
N. Atlantic	Imelda	9	17	9	19	5
E. Pacific	17E	10	16	10	16	4
W. Pacific	Kammuri	11	26	12	5	4
N. Atlantic	Nestor	10	18	10	18	3
W. Pacific	Bailu	8	21	8	25	3
W. Pacific	Faxai	9	2	9	10	3
W. Pacific	Krosa	8	5	8	17	3
W. Pacific	Tapah	9	19	9	23	3
N. Atlantic	Humberto	9	12	9	20	2
N. Indian	Maha	10	30	11	7	2

STORMS LISTED BY DEATH TOLL

		Formed		Dissipated		
Basin	Name	M	D	M	D	Fatalities
S. Pacific	Sarai	12	26	1	1	2
W. Pacific	Mun	7	3	7	3	2
E. Pacific	Lorena	9	17	9	22	1
N. Atlantic	Barry	7	11	7	16	1
N. Atlantic	Fernand	9	3	9	5	1
S. Indian	Eketsang	1	22	1	25	1
W. Pacific	Francisco	8	2	8	8	1

STORMS LISTED BY INJURED PERSONS

		Formed		Dissipated		
Basin	Name	M	D	M	D	Injured
S. Indian	Belna	12	5	12	11	2693
S. Indian	Idai	3	8	3	17	2420
W. Pacific	Phanfone	12	21	12	29	369
W. Pacific	Hagibis	10	5	10	13	346
W. Pacific	Kammuri	11	26	12	5	318
S. Indian	Kenneth	4	23	4	26	200
W. Pacific	Faxai	9	2	9	10	147
W. Pacific	Krosa	8	5	8	17	55
W. Pacific	Lekima	8	4	8	12	31
W. Pacific	Lingling	9	2	9	8	13
W. Pacific	Mitag	9	27	10	4	12
N. Indian	Pawan	12	2	12	7	11
W. Pacific	Bailu	8	21	8	25	9
N. Atlantic	Nestor	10	18	10	18	5
W. Pacific	Francisco	8	2	8	8	5
N. Atlantic	Imelda	9	17	9	19	3
W. Pacific	Mun	7	3	7	3	3

STORMS LISTED BY MONETARY DAMAGES

		Formed		Dissipated		
Basin	Name	M	D	M	D	Damages $m
W. Pacific	Hagibis	10	5	10	13	9600
N. Atlantic	Dorian	8	25	9	7	8375
W. Pacific	Lekima	8	4	8	12	7369.407
W. Pacific	Faxai	9	2	9	10	6800.71
N. Indian	Bulbul	11	5	11	12	4277
N. Indian	Vayu	6	10	6	17	3381
S. Indian	Idai	3	8	3	17	1200
N. Atlantic	Imelda	9	17	9	19	1000
N. Atlantic	Barry	7	11	7	16	500
N. Atlantic	Lorenzo	9	23	10	2	362
N. Atlantic	Fernand	9	3	9	5	213
W. Pacific	Lingling	9	2	9	8	190.676
W. Pacific	Mitag	9	27	10	4	151.781
N. Atlantic	Nestor	10	18	10	18	120
W. Pacific	Kammuri	11	26	12	5	116.186
S. Pacific	Oma	2	12	2	22	51
Australia	Veronica	3	19	3	28	46
W. Pacific	Wipha	7	30	8	3	44.31
W. Pacific	Nakri	11	5	11	11	35.6
W. Pacific	Bailu	8	21	8	25	26.704
W. Pacific	Phanfone	12	21	12	29	67*
W. Pacific	Krosa	8	5	8	17	21
E. Pacific	Narda	9	28	10	1	17
W. Pacific	Kajiki	9	2	9	3	12.9
W. Pacific	Kalmaegi	11	13	11	20	12.4
S. Indian	Joaninha	3	22	3	31	10.5
W. Pacific	Tapah	9	19	9	23	7.9
W. Pacific	Danas	7	16	7	21	6.422
W. Pacific	01W	1	19	1	22	6.04
W. Pacific	Wutip	2	19	2	28	3.5
W. Pacific	Podul	8	27	8	30	2.433
S. Indian	Gelena	2	5	2	14	1

STORMS LISTED BY MONETARY DAMAGES

		Formed		Dissipated		
Basin	Name	M	D	M	D	Damages $m
E. Pacific	Lorena	9	17	9	22	0.91
Australia	Trevor	3	17	3	25	0.7
W. Pacific	Mun	7	3	7	3	0.24
N. Indian	Pawan	12	2	12	7	0.14
W. Pacific	03W	3	15	3	18	0.023

STORMS LISTED BY BUILDINGS DAMAGED

		Formed		Dissipated		
Basin	Name	M	D	M	D	Damaged
N. Indian	Vayu	6	10	6	17	591134
W. Pacific	Kammuri	11	26	12	5	463608
W. Pacific	Phanfone	12	21	12	29	470321*
S. Indian	Idai	3	8	3	17	164123
W. Pacific	Hagibis	10	5	10	13	93250
W. Pacific	Faxai	9	2	9	10	40000
N. Atlantic	Dorian	8	25	9	7	12447
N. Indian	07A	12	3	12	4	10000
E. Pacific	Narda	9	28	10	1	904
S. Indian	Belna	12	5	12	11	727
W. Pacific	Lingling	9	2	9	8	475
N. Atlantic	Fernand	9	3	9	5	400
W. Pacific	Wutip	2	19	2	28	160
S. Indian	Joaninha	3	22	3	31	100
W. Pacific	Nakri	11	5	11	11	75
N. Atlantic	Humberto	9	12	9	20	29
N. Indian	Pawan	12	2	12	7	26
W. Pacific	03W	3	15	3	18	15
N. Indian	Maha	10	30	11	7	4
W. Pacific	Francisco	8	2	8	8	4
N. Atlantic	Barry	7	11	7	16	2

STORMS LISTED BY BUILDINGS DESTROYED

		Formed		Dissipated		
Basin	Name	M	D	M	D	Destroyed
S. Indian	Idai	3	8	3	17	120065
W. Pacific	Phanfone	12	21	12	29	60506*
W. Pacific	Kammuri	11	26	12	5	68433
N. Indian	Vayu	6	10	6	17	18243
S. Indian	Kenneth	4	23	4	26	2504
N. Indian	07A	12	3	12	4	1770
W. Pacific	Lekima	8	4	8	12	1691
W. Pacific	Nakri	11	5	11	11	59
N. Atlantic	Karen	9	22	9	27	7
W. Pacific	03W	3	15	3	18	4
W. Pacific	Faxai	9	2	9	10	2
W. Pacific	Francisco	8	2	8	8	2
N. Indian	Pawan	12	2	12	7	1

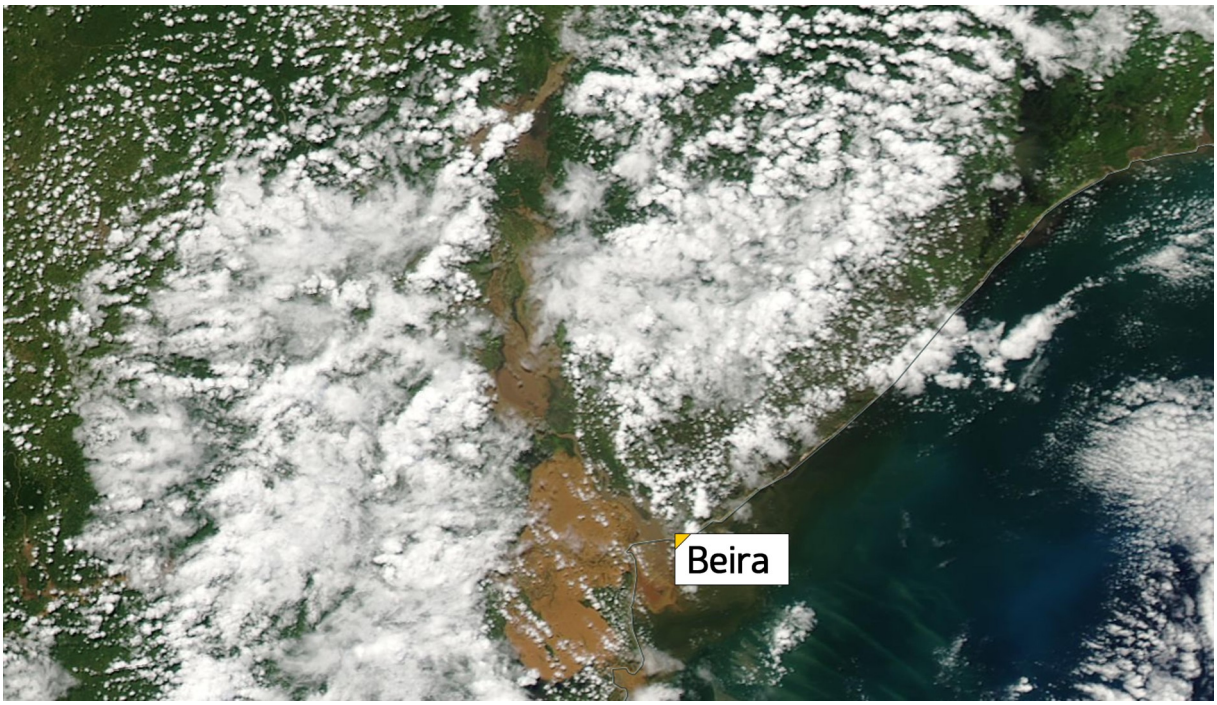


Image: Satellite image of coastal regions of Mozambique which were worst affected by Cyclone Idai in March 2019.

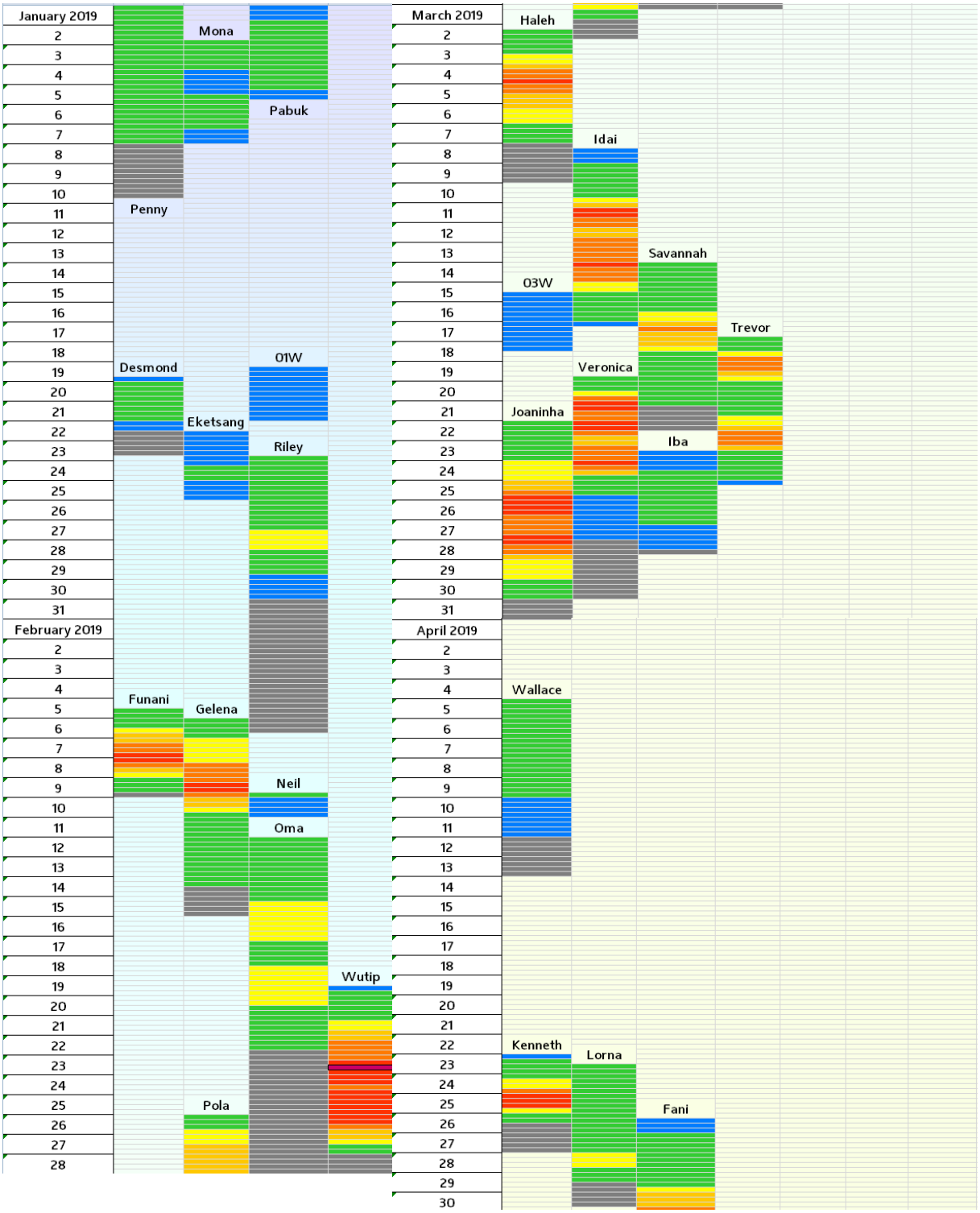
STORMS LISTED BY EVACUEES

		Formed		Dissipated		
Basin	Name	M	D	M	D	Evacuees
N. Indian	Bulbul	11	5	11	12	2400000
N. Indian	Vayu	6	10	6	17	2100000
N. Atlantic	Dorian	8	25	9	7	1884631
W. Pacific	Kammuri	11	26	12	5	457567
W. Pacific	Hagibis	10	5	10	13	445000
W. Pacific	Faxai	9	2	9	10	390000
N. Indian	Pawan	12	2	12	7	310000
W. Pacific	Phanfone	12	21	12		145553
W. Pacific	Francisco	8	2	8	8	31480
S. Indian	Kenneth	4	23	4	26	30000
W. Pacific	01W	1	19	1	22	21006
S. Indian	Belna	12	5	12	11	15000
N. Atlantic	Barry	7	11	7	16	10000
S. Pacific	Sarai	12	26	1	1	2000
W. Pacific	03W	3	15	3	18	1138
N. Atlantic	Imelda	9	17	9	19	1050
W. Pacific	Nakri	11	5	11	11	977
E. Pacific	Lorena	9	17	9	22	787
E. Pacific	17E	10	16	10	16	400
S. Indian	Calvinia	12	29	1	2	298
N. Atlantic	Lorenzo	9	23	10	2	53

2019 STORM TIMELINE

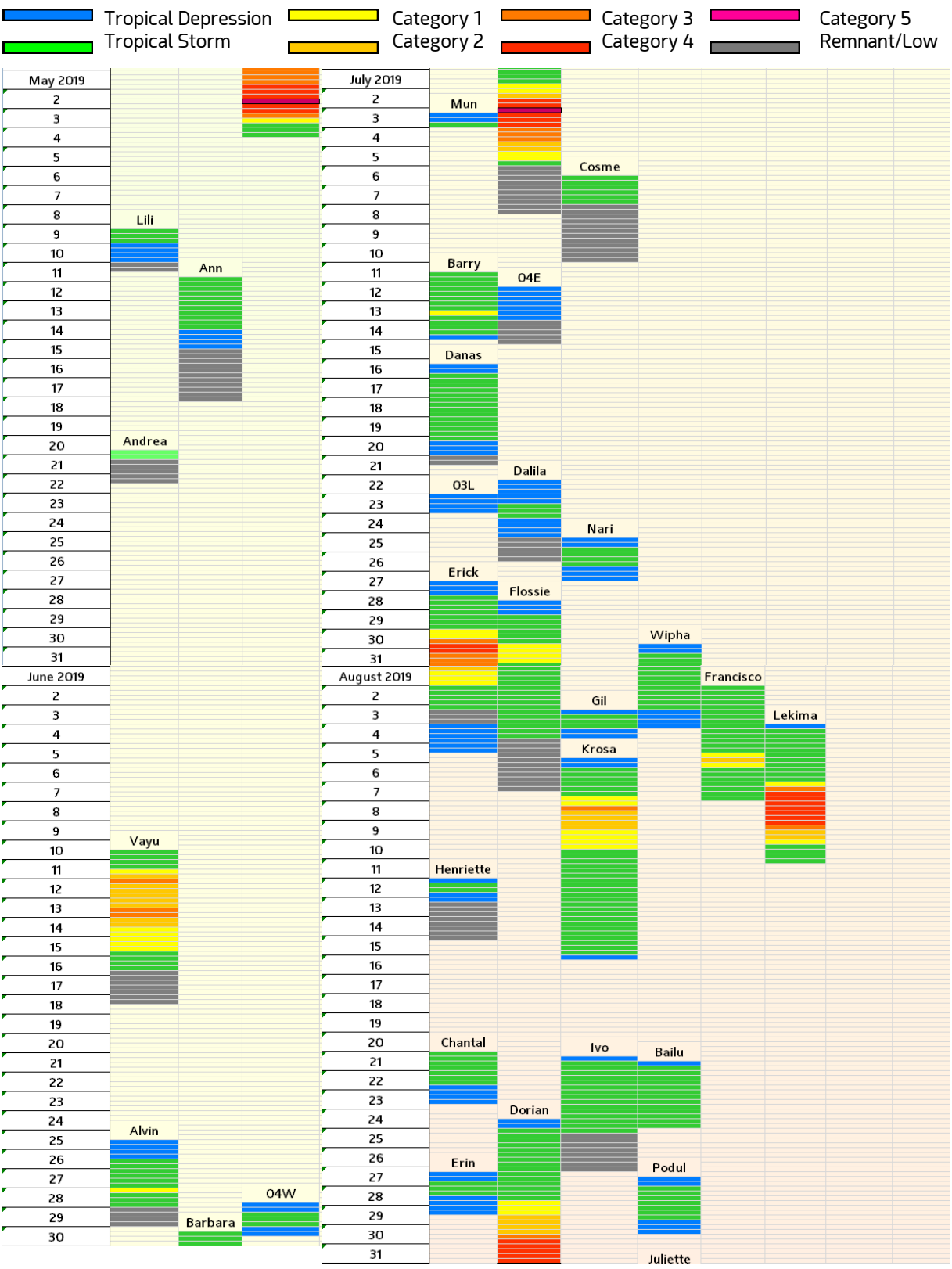
Below shows the progression at six-hourly intervals of worldwide tropical cyclone activity in 2019. All intensity categories are in correspondence with the Saffir-Simpson Hurricane Wind Scale.

Tropical Depression
Tropical Storm
Category 1
Category 2
Category 3
Category 4
Category 5
Remnant/Low



FORCE THIRTEEN

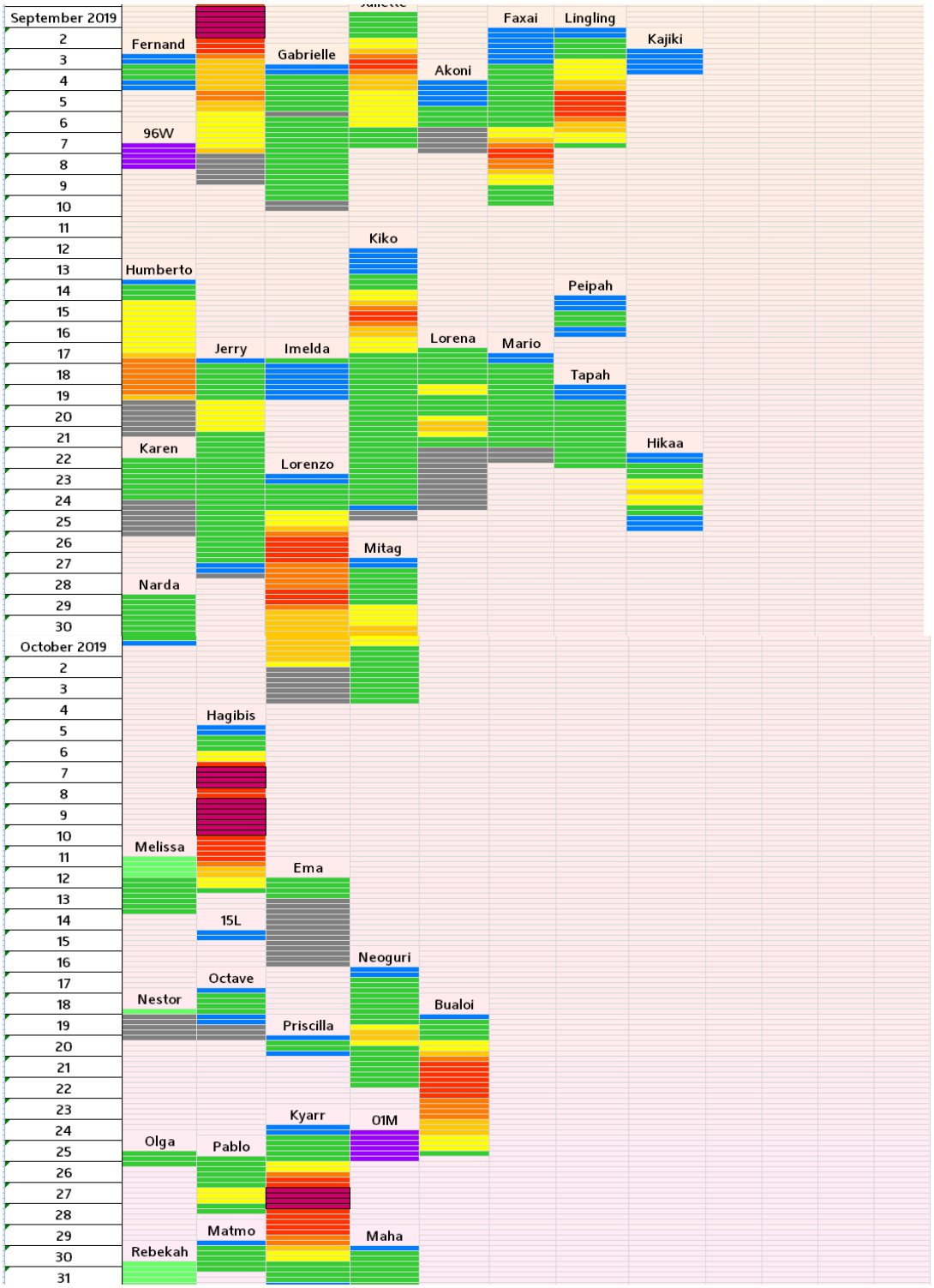
2019 STORM TIMELINE



FORCE THIRTEEN

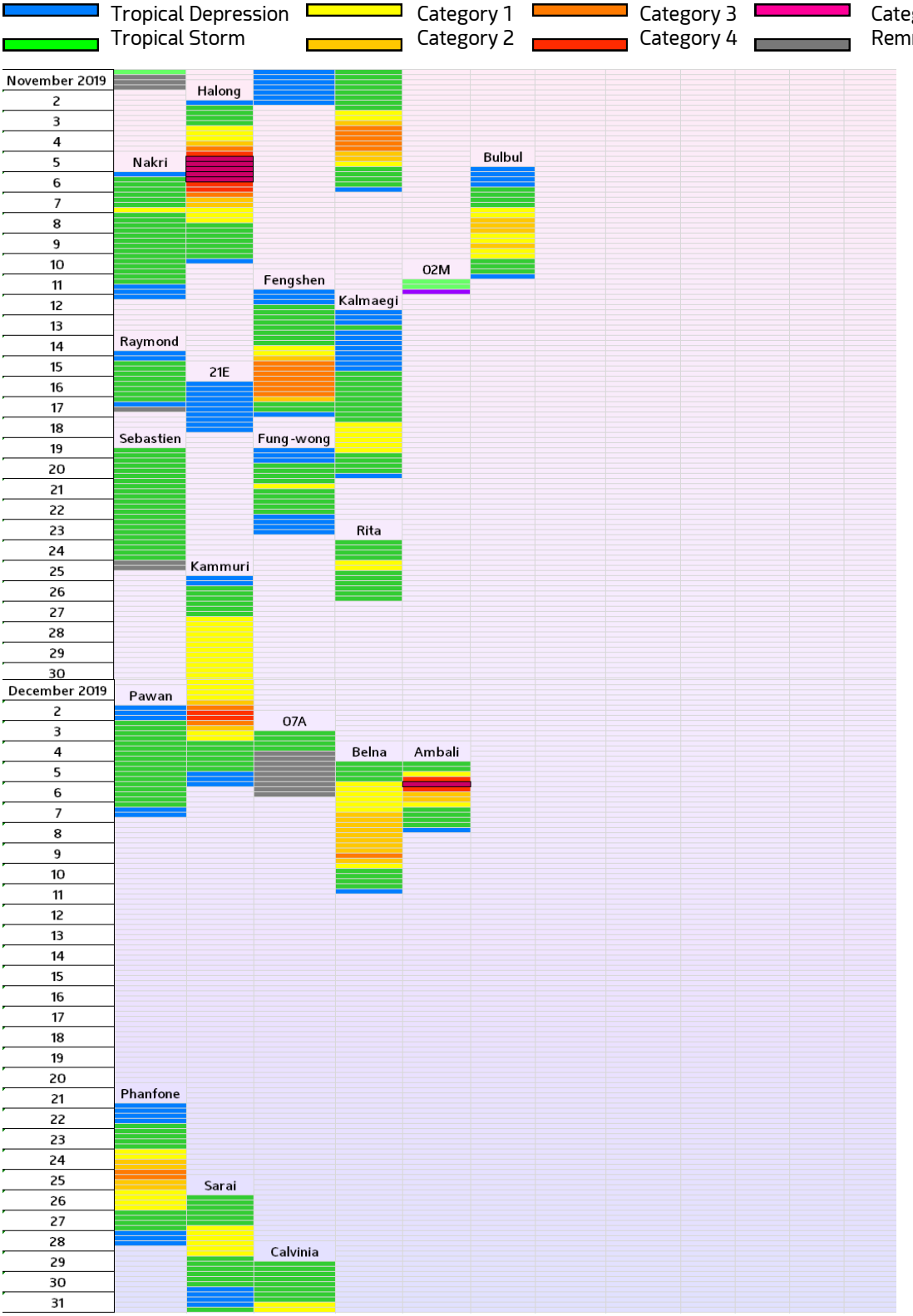
2019 STORM TIMELINE

Tropical Depression
Tropical Storm
Category 1
Category 2
Category 3
Category 4
Category 5
Remnant/Low



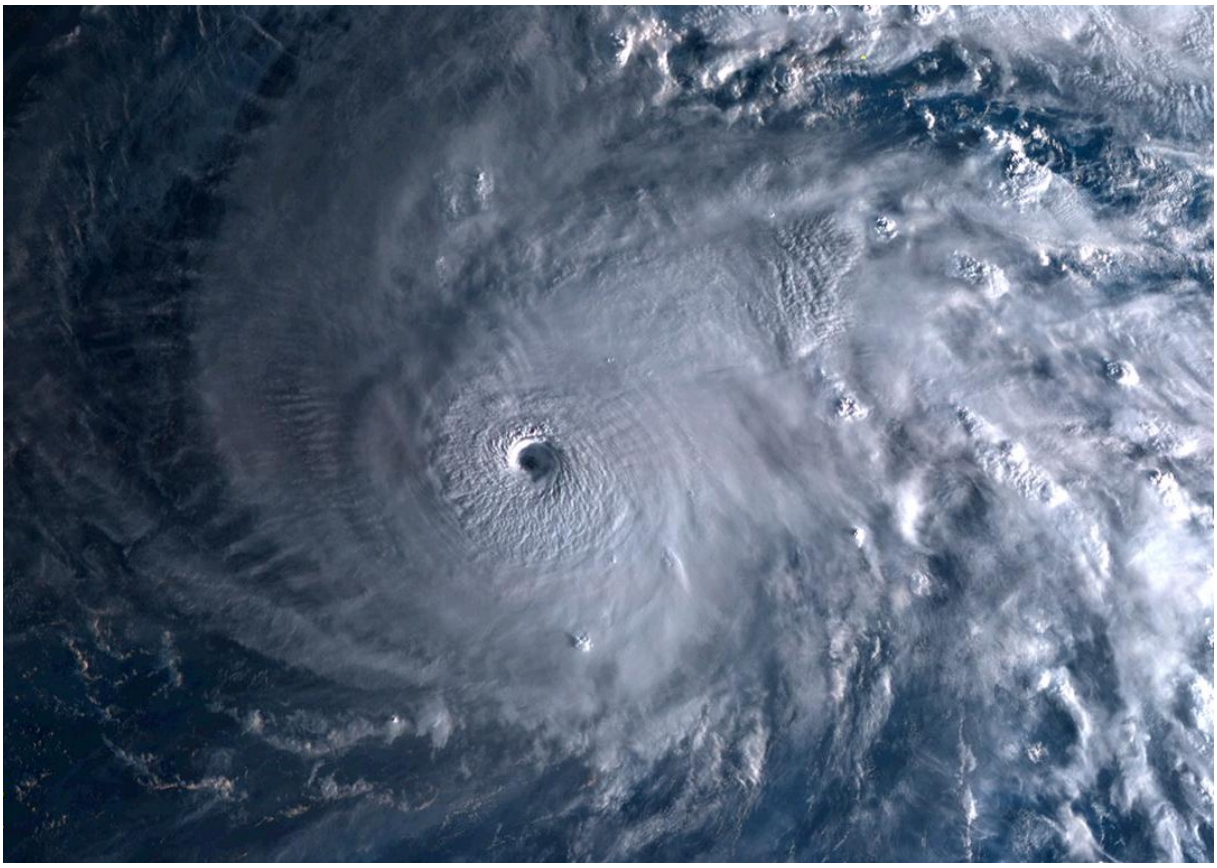
FORCE THIRTEEN

2019 STORM TIMELINE



FORCE THIRTEEN

2019 RECORDS



The next page will show all the records set in 2019 for intensity and longevity. In the records section of this report, all storms that set their record in 2019 will be counted as part of this year's records, even if they formed or dissipated in a different calendar year. If a storm's record encompasses multiple years (as could be seen in longevity records, for instance), the record will be counted towards both years.

Image: Himawari-8 satellite image of Typhoon Halong near its peak intensity on November 5, 2019

INTENSITY AND LONGEVITY RECORDS

Most intense central pressures

World

1. Typhoon Halong	890mb
2. Typhoon Hagibis	892mb
3. Hurricane Dorian	908mb

Atlantic

1. Hurricane Dorian	908mb
2. Hurricane Lorenzo	934mb
3. Hurricane Humberto	949mb

Eastern Pacific (includes Central)

1. Hurricane Barbara	925mb
2. Hurricane Erick	943mb
3. Hurricane Kiko	945mb

Western Pacific

1. Typhoon Halong	890mb
2. Typhoon Hagibis	892mb
3. Typhoon Lekima	913mb

North Indian Ocean

1. Cyclone Kyarr	912mb
2. Cyclone Fani	920mb
3. Cyclone Vayu	948mb

South Indian Ocean

1. Cyclone Ambali	924mb
2. Cyclone Gelena	929mb
3. Cyclone Veronica	935mb

South Pacific Ocean

1. Cyclone Trevor	959mb
2. Cyclone Pola	966mb
3. Cyclone Oma	970mb

Strongest Wind Speeds

World

1. Typhoon Halong	190mph
=. Hurricane Dorian	190mph
3. Typhoon Hagibis	185mph

Atlantic

1. Hurricane Dorian	190mph
2. Hurricane Lorenzo	155mph
3. Hurricane Humberto	125mph

Eastern Pacific (includes Central)

1. Hurricane Barbara	160mph
2. Hurricane Erick	150mph
3. Hurricane Kiko	140mph

Western Pacific

1. Typhoon Halong	185mph
2. Typhoon Hagibis	180mph
3. Typhoon Wutip	175mph

North Indian Ocean

1. Cyclone Kyarr	165mph
2. Cyclone Fani	160mph
3. Cyclone Maha	125mph

South Indian Ocean

1. Cyclone Ambali	160mph
2. Cyclone Veronica	155mph
3. Cyclone Kenneth	145mph

South Pacific Ocean

1. Cyclone Trevor	120mph
2. Cyclone Pola	110mph
3. Cyclone Oma	85mph

Most intense Category 4 storms

World

1. Cyclone Gelena	929mb
2. Cyclone Lingling	930mb
3. Typhoon Bualoi	933mb

Strongest 24 hour average wind

World

1. Typhoon Halong	175mph
=. Hurricane Dorian	175mph
3. Typhoon Hagibis	170mph

Most intense Category 3 storms

World

1. Cyclone Savannah	945mb
2. Typhoon Fengshen	948mb
=. Cyclone Vayu	948mb
=. Typhoon Krosa	948mb

Most Intense 24 hour average air pressure

World

1. Typhoon Hagibis	904mb
2. Typhoon Halong	905mb
3. Hurricane Dorian	915mb

INTENSITY AND LONGEVITY RECORDS

Longest duration as a tropical storm or stronger

World

1. Hurricane Dorian	336 hours
2. Hurricane Kiko	264 hours
3. Cyclone Oma	252 hours

Atlantic

1. Hurricane Dorian	336 hours
2. Hurricane Jerry	228 hours
3. Hurricane Lorenzo	210 hours

Eastern Pacific (includes Central)

1. Hurricane Kiko	264 hours
2. Hurricane Juliette	156 hours
=. Hurricane Flossie	156 hours

Western Pacific

1. Typhoon Krosa	234 hours
2. Typhoon Kammuri	222 hours
3. Typhoon Halong	198 hours

North Indian Ocean

1. Cyclone Fani	180 hours
=. Cyclone Maha	180 hours
3. Cyclone Kyarr	168 hours

South Indian Ocean

1. Cyclone Joaninha	216 hours
2. Cyclone Gelena	204 hours
3. Cyclone Idai	192 hours

South Pacific Ocean

1. Cyclone Oma	256 hours
2. Cyclone Trevor	174 hours
3. Cyclone Penny	168 hours

Longest duration as a Category 5 storm

World

1. Typhoon Hagibis	42 hours
2. Hurricane Dorian	36 hours
3. Typhoon Halong	30 hours

Atlantic

1. Hurricane Dorian	36 hours

Eastern Pacific (includes Central)

1. Hurricane Barbara	6 hours

Western Pacific

1. Typhoon Hagibis	42 hours
2. Typhoon Halong	30 hours
3. Typhoon Hagibis	24 hours

North Indian Ocean

1. Cyclone Kyarr	24 hours
2. Cyclone Fani	6 hours

South Indian Ocean

1. Cyclone Ambali	6 hours

South Pacific Ocean

None

Longest duration at sub-900mb

World

1. Typhoon Halong	6 hours
=. Typhoon Hagibis	6 hours

Longest duration at Category 4 or stronger

World

1. Typhoon Hagibis	114 hours
2. Hurricane Dorian	84 hours
3. Cyclone Kyarr	66 hours

Longest duration at sub-920mb

World

1. Typhoon Hagibis	54 hours
2. Typhoon Halong	30 hours
3. Cyclone Kyarr	24 hours

Longest duration at Category 1 or stronger

World

1. Hurricane Dorian	246 hours
2. Hurricane Lorenzo	180 hours
3. Typhoon Hagibis	156 hours

Longest duration at Category 4 without strengthening

World

1. Typhoon Lekima	42 hours
=. Typhoon Bualoi	42 hours
3. Multiple storms	30 hours

Longest duration at Category 3 without strengthening

World

1. Typhoon Fengshen	42 hours
=. Hurricane Humberto	42 hours
3. Cyclone Maha	30 hours

Longest duration at Category 2 without strengthening

World

1. Cyclone Pola	36 hours
2. Cyclone Bulbul	18 hours
3. Multiple storms	12 hours

Longest duration at Category 1 without strengthening

World

1. Cyclone Oma	48 hours
2. Multiple storms	36 hours

INTENSITY AND LONGEVITY RECORDS

Longest duration at Tropical Storm w/o strengthening

World

1. Tropical Storm Penny	168 hours
2. Tropical Storm Sebastien	132 hours
3. Tropical Storm Wallace	120 hours

Shortest Cyclone Duration

World

1. Subtropical Storm Nestor	6 hours
2. Subtropical Storm Andrea	12 hours
=. Tropical Depression 15L	12 hours

Longest Cyclone Duration

World

1. Hurricane Dorian	348 hours
2. Hurricane Kiko	300 hours
3. Multiple storms	252 hours

Average minimum central pressure by basin

1. South Indian	957mb	5. South Pacific	977mb
2. Australian Region	969mb	6. North Atlantic	987mb
3. Western Pacific	967mb	7. North Indian	959mb
4. Eastern Pacific	989mb		

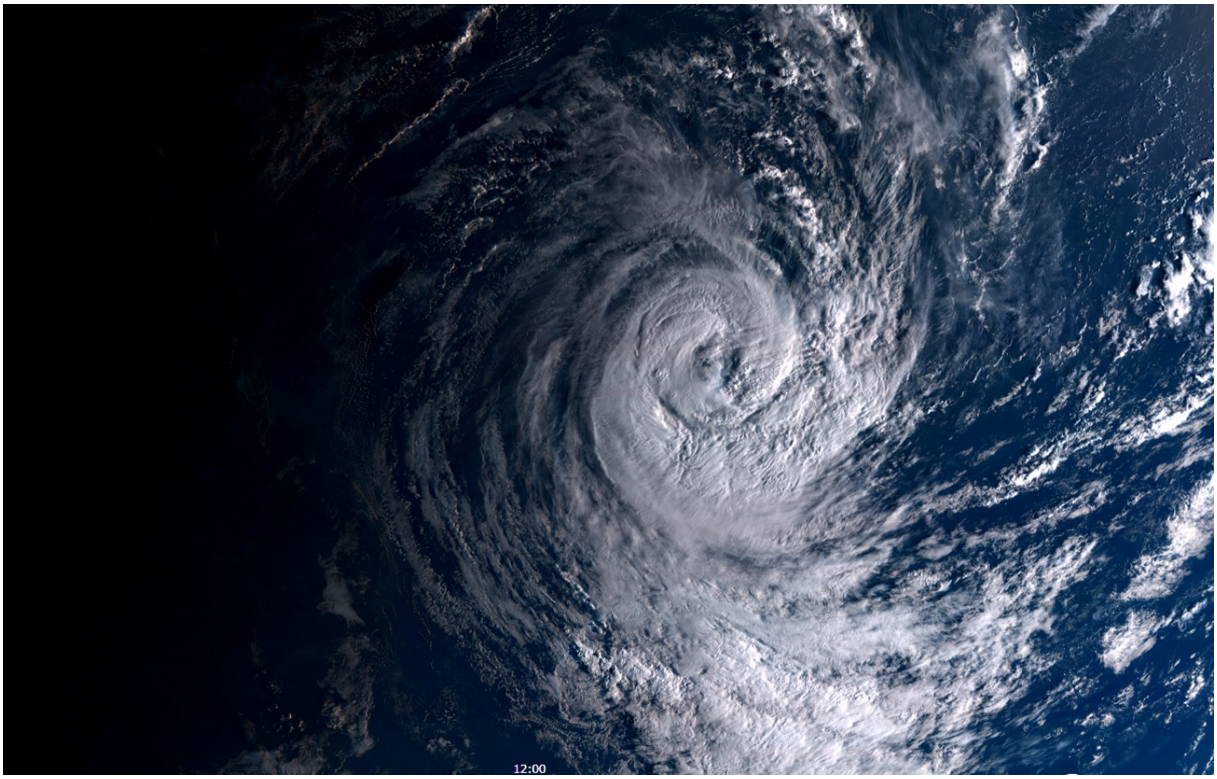


Image: Himawari-8 satellite image of Cyclone Oma on February 19, 2019. Oma was the third longest lasting cyclone of the year, and the longest in the southern hemisphere.

ACTIVITY RECORDS

Most tropical storms or stronger active simultaneously **World** 1. Six, on August 4 2. Five, on August 3-4, 4-5, 6, September 17-21, 22-24	Most Tropical Storms or stronger active in a 30-day period **World** 1. Twenty, from August 21-September 20 =. Twenty, from August 24-September 23 =. Twenty, from August 31-September 30
Most hurricanes active simultaneously **World** 1. Three, from September 2-7 =. Three, on November 7	
Most Category 3 storms active simultaneously **World** 1. Two, on February 8, March 22, August 8, September 5, and November 4	Most Category 4 storms active simultaneously **World** None
Most consecutive days with a tropical storm active **World** 1. Fifty-six, from October 17-December 11 2. Thirty-two, from September 13-October 14 3. Thirty-one, from February 5-March 7	Most consecutive days with two tropical storms active **World** 1. Nineteen, from September 14-October 2 2. Fifteen, from July 28-August 11 3. Fourteen, from March 14-27
Most consecutive days with a hurricane active **World** 1. Twenty, from March 10-29 2. Thirteen, from August 28-September 9	Most consecutive days with two hurricanes active **World** 1. Six, from September 2-7 2. Four, from March 21-24
Most consecutive days with a major hurricane active **World** 1. Twelve, from March 17-28 2. Ten, from August 30-September 8	Most consecutive days with two major hurricanes active **World** 1. Two, from February 22-23

LANDFALL RECORDS

Strongest landfalls

World

1. Hurricane Dorian	185mph
=. Hurricane Dorian	185mph
3. Hurricane Dorian	175mph

Most landfalls

World

1. Hurricane Dorian	5
2. Cyclone Trevor	3
=. Typhoon Phanfone	

Most hurricane landfalls

World

1. Hurricane Dorian	4
2. Typhoon Phanfone	3
3. Multiple storms	2

Most major hurricane landfalls

World

1. Hurricane Dorian	2
=. Cyclone Trevor	2

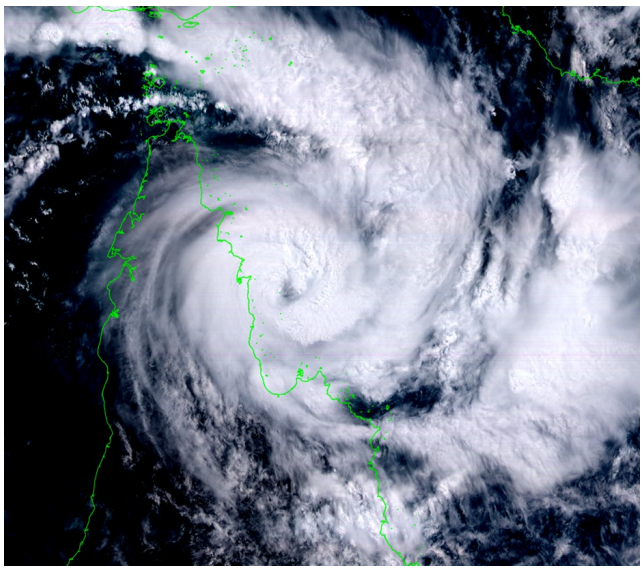


Image: Himawari-8 satellite image of Cyclone Trevor on March 19, shortly before its first of two Category 3 landfalls in Australia.

LOCATION AND MOVEMENT RECORDS

Furthest north Category 5 cyclone

Basin	Storm	Latitude	Date	Year
N. Atlantic	Dorian	26.7	September 2	2019
Highest lat since	Michael	30.0	October 10	2018
E. Pacific	Barbara	13.0	July 3	2019
Highest lat since	Willa	17.9	October 22	2018
W. Pacific	Hagibis	24.4	October 10	2019
Highest lat since	Lan	25.5	October 21	2017
N. Indian	Fani	17.6	May 2	2019
Highest lat since	Sidr	19.3	November 15	2007
S. Indian	Ambali	-10.5	December 6	2019
Lowest lat since	Fantala	-9.3	April 18	2016
S. Pacific	None recorded	N/A	N/A	N/A
Lowest lat since	N/A	N/A	N/A	N/A

Furthest south Category 5 cyclone

Basin	Storm	Latitude	Date	Year
N. Atlantic	Dorian	26.2	September 1	2019
Lowest lat since	Maria	16.1	September 19	2017
E. Pacific	Barbara	13.0	July 3	2019
Lowest lat since	Walaka	12.9	October 2	2018
W. Pacific	Wutip	12.0	February 23	2019
Lowest lat since	Maysak	10.0	March 31	2015
N. Indian	Kyarr	17.3	October 27	2019
Lowest lat since	Chapala	14.1	October 30	2015
S. Indian	Ambali	-10.5	December 6	2019
Highest lat since	Cilida	-15.1	December 21	2018
S. Pacific	None recorded	N/A	N/A	N/A
Highest lat since	N/A	N/A	N/A	N/A

LOCATION AND MOVEMENT RECORDS

Furthest north tropical cyclone

Basin	Storm	Latitude	Date	Year
N. Atlantic	Pablo	46.6	October 28	2019
Highest lat since	Ernesto	48.3	August 17	2018
E. Pacific	Lorena	27.9	September 22	2019
Highest lat since	Invest 96C	41.1	September 2	2018
W. Pacific	Lingling	43.1	September 7	2019
Highest lat since	Chanthu	44.5	August 17	2016
N. Indian	Fani	24.4	May 4	2019
Highest lat since	Mora	24.6	May 31	2017
S. Indian	Lili	-4.0	April 21	2019
Lowest lat since	Abaimba	-3.8	September 5	2002
S. Pacific	Mona	-6.9	January 1	2019
Lowest lat since	Raquel	-4.2	June 29	2015

Furthest south tropical cyclone

Basin	Storm	Latitude	Date	Year
N. Atlantic	Dorian	10.4	August 24	2019
Lowest lat since	Kirk	7.7	September 22	2018
E. Pacific	TD 21-E	9.2	November 16	2019
Lowest lat since	Hilary	9.2	July 22	2017
W. Pacific	Wutip	4.4	February 19	2019
Lowest lat since	Dolphin	2.8	May 7	2015
N. Indian	Fani	2.1	April 25	2019
Lowest lat since	Agni	0.7	November 27	2004
S. Indian	Funani	-29.3	February 9	2019
Highest lat since	Fernando	-29.9	March 14	2017
S. Pacific	Oma	-28.2	February 23	2019
Highest lat since	Gita	-32.6	February 19	2018

Fastest measured cyclone movement

World

1. Tropical Storm Sebastien 45mph
2. Hurricane Lorenzo 44mph
3. Tropical Storm Podul 42mph

Slowest measured cyclone movement

World

1. Veronica, Wallace, Vayu, Dorian, and Neoguri 0mph

CHRONOLOGICAL RECORDS

Earliest and latest Category 5 cyclones (with regard to local season)

Basin	Storm	Earliest	Year	Storm	Latest	Year
N. Atlantic	Dorian	September 1	2019	Dorian	September 2	2019
Previous record	Dean	August 21	2007	Michael	October 10	2018
E. Pacific	Barbara	July 3	2019	Barbara	July 3	2019
Previous record	Celia	June 25	2010	Willa	October 22	2018
W. Pacific	Wutip	February 23	2019	Halong	November 6	2019
Previous record	Alice	January 7	1979	Nock-ten	December 25	2016
N. Indian	Fani	May 2	2019	Kyarr	October 28	2019
Previous record	Unnamed	April 29	1991	Chapala	October 30	2015
S. Indian	Ambali	December 6	2019	Cilida	December 21	2018
Previous record	Graham	December 5	1991	Marcus	March 22	2018
S. Pacific	None	N/A	N/A	N/A	N/A	N/A
Previous record	N/A	N/A	N/A	N/A	N/A	N/A

Earliest and latest Category 3+ cyclones (with regard to local season)

Basin	Storm	Earliest	Year	Storm	Latest	Year
N. Atlantic	Dorian	August 30	2019	Lorenzo	September 29	2019
Previous record	Gert	August 13	2017	Michael	October 10	2018
E. Pacific	Barbara	July 2	2019	Kiko	September 16	2019
Previous record	Aletta	June 8	2018	Willa	October 24	2018
W. Pacific	Wutip	February 22	2019	Phanfone	December 25	2019
Previous record	Higos	February 10	2015	Nock-ten	December 25	2016
N. Indian	Fani	April 30	2019	Maha	November 5	2019
Previous record	Mala	April 28	2006	Megh	November 8	2015
S. Indian	Ambali	December 5	2019	Kenneth	April 25	2019
Previous record	Anais	October 14	2012	Quang	April 30	2015
S. Pacific	Trevor	March 18	2019	Trevor	March 23	2019
Previous record	Hola	March 8	2018	Donna	May 8	2017

EYE AND SIZE RECORDS

Largest Eyes

World

1. Typhoon Krosa	206nm
2. Cyclone Oma	66nm
=. Cyclone Idai	66nm

Smallest Eyes

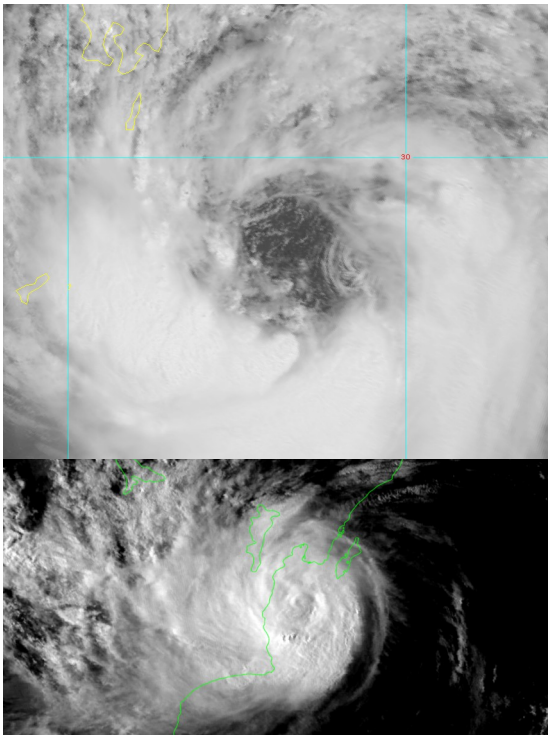
World

1. Cyclone Hikaa	6nm
2. Typhoon Hagibis	7nm
1. Hurricane Erick	9nm

Warmest Eyes

World

1. Typhoon Hagibis	25.4°C (77.4°F)
2. Hurricane Dorian	21.8°C (71.2°F)
3. Cyclone Ambali	21.7°C (71.1°F)



Images from top to bottom:
1. AVHRR visible image of Typhoon Krosa on August 14, exhibiting a very large eye.
2. INSAT-3D visible image of Cyclone Hikaa near landfall in Oman. In earlier days the small storm exhibited the smallest eye of the year.

Largest Storm Size

World

1. Typhoon Krosa	950nm
2. Typhoon Hagibis	750nm
3. Typhoon Lekima	625nm

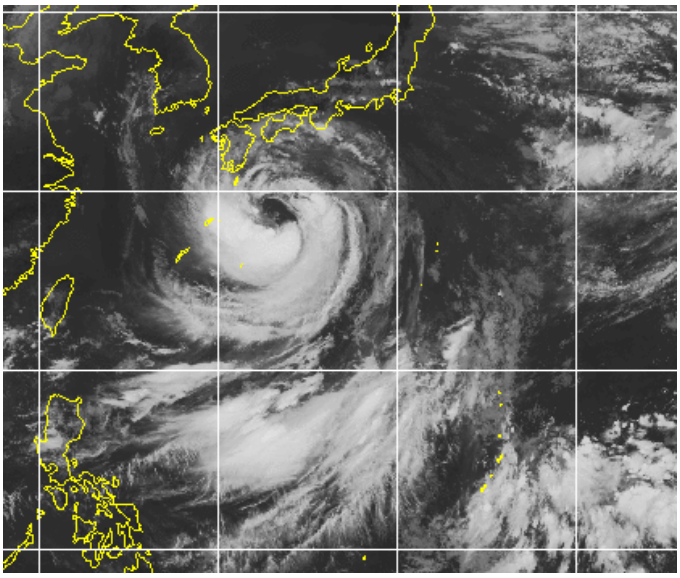


Image: Infrared image of Typhoon Krosa near its largest size extent.
SSEC

INTENSIFICATION RECORDS

Fastest over a 12 hour period

World

1. Cyclone Ambali	+75mph
2. Cyclone Veronica	+70mph
3. Typhoon Hagibis	+55mph
4. Typhoon Halong	+50mph

Fastest over a 24 hour period

World

1. Cyclone Ambali	+120mph
2. Typhoon Hagibis	+110mph
3. Typhoon Halong	+100mph
4. Cyclone Veronica	+95mph
5. Hurricane Erick	+75mph

Fastest time to increase wind speeds by 100mph

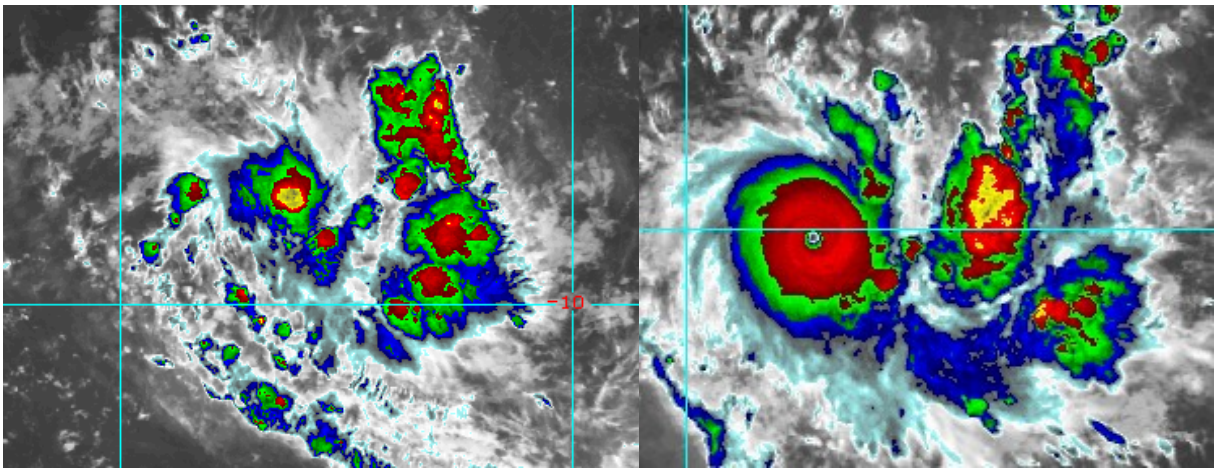
World

1. Cyclone Ambali	24 hours
=. Typhoon Hagibis	24 hours
3. Cyclone Veronica	30 hours

Fastest time to decrease pressure by 100mb

World

1. Typhoon Hagibis	30 hours
2. Typhoon Halong	54 hours



Above: Comparison images of Cyclone Ambali taken 22 hours apart between December 5-6. During this time, Ambali gained an estimated 120mph of wind speed, the highest of any storm this year.

FORCE THIRTEEN DURING 2019

2019 was largely seen as a year of consolidation on Force Thirteen, with more big ambitions for the year 2020. However, several new features did take hold on our content this year.

2018 saw difficulties handling multiple storm events simultaneously—this was somewhat improved in 2019 by the adoption of a split-screen format, as well as improvements to the Automated Streaming Service. 2019 also saw improvements on storm updates, team management, use of forecasting and observation tools, reanalysis, and increased use of other media.

As a broadcaster, our reach is important, though we never go out of our way to attain peak numbers at the expense of quality broadcasting. In any case, 2019 sets another new record for amount of views on the Force Thirteen YouTube channel, surpassing 2018's total a mere 36 hours before the end of the year.

All of these aspects, and a critique of our actual coverage, will be covered in further detail in this section of the report.

FORECASTING CRITIQUE AND STORM COVERAGE

In total, there were 606 videos uploaded on the Force Thirteen main channel throughout 2019, which was 94 less than in 2018.
There were also 32 (-12) videos on Force Thirteen Xtra, 19 (-11) on Force Thirteen UK & Ireland, 249 (-70) on Force Thirteen AU & Oceania, 136 (+33) on Force Thirteen US & Caribbean, and 43 (+12) on Force Thirteen's Tropical Archive and Tropical Archive MORE. Additionally, Force Thirteen's Gaming channel produced 12 videos and Space Thirteen uploaded one.

Storm coverage tended to be timely and accurate throughout 2019, with a regular video upload schedule in place for significant storms that affected the United States, the Philippines, Mauritius, Mozambique, Japan and India. Lead time for live events and storm updates improved, with early updates before the formation of a cyclone becoming increasingly common. Later in the year, advances in social media techniques and social media friendly content increased exposure and viewer base.
Limited capacities resulted from staff shortages in parts of August, November and December. However, with manageable storm numbers during these periods, standards remained fair.

Early in the year, Cyclone Idai devastated parts of Mozambique, with Force Thirteen's coverage being amongst the leaders during the event. Latest updates on the storm were used and relayed by humanitarian aid workers to better prepare for the storm and its aftermath.

For the first time, a regular Tropical Weather Bulletin schedule continued throughout the Atlantic and East Pacific hurricane seasons, quickly becoming a reliable staple for viewers. Production times for Tropical Weather Bulletins were optimised, resulting in production windows as short as 28 minutes.

The most important point of the year was during the passage of Hurricane Dorian, where public interest elevated to record levels. Force Thirteen ran continuous live coverage on the storm for five days, along with multiple other streams in the storm's early and late stages.
In the early stages of Dorian, few models or forecasters picked up on the storm's upcoming intensification phase—indeed, the National Hurricane Center forecasted Dorian to only reach tropical storm status at first.
Once Hurricane Dorian cleared the Virgin Islands, our coverage and forecasting accuracy was good, and at times outstanding—particularly around the storm's peak where the forecasting and broadcasting teams were under immense and unprecedented pressures.
Notably, the team declared Dorian to have reached Category 5 intensity at 9pm EDT on August 31, over six hours before the National Hurricane Center followed suit. Our subsequent reanalysis supports the claims that we made operationally.
Our Hurricane Dorian coverage was also simulcast by Michigan-based Horizon Broadband.

Along with extensive live coverage, there were also 38 regular storm updates produced on Dorian, beating the previous record 37 produced during Hurricane Irma.

Force Thirteen also engaged audiences in Asia during its coverage on Typhoon Hagibis in October, setting new viewing records for our audiences in Japan, Thailand, Indonesia and the Northern Mariana Islands, and second highest recorded daily viewership in the Philippines.

Towards the end of the year, new graphics streamlined video uploads, reducing render times to a record low 4 minutes.

VIEWING STATISTICS

2019 had approximately 5,415,283 views on the channel during the year. This figure may be inaccurate by up to 5,000 each way. By comparison, 2018 finished with 5,367,516 views.
September 1st set a new record daily viewcount, at 246,298. The old record was 242,575 on March 27, 2017. That day also set a subscriber record at 943 (previous record 942 on September 13, 2018). This day also set a watch time record of 1.3 million minutes (previous record 745,677 on October 5, 2016).
No weekly record was broken in 2019, but weeks during this year set new records for 2nd, 3rd, 7th and 10th busiest weeks.
2019 also set new records for 2nd, 3rd, 5th, 7th and 9th busiest months.

In terms of watch time (amount of minutes viewers spent viewing the videos), 2019 also comes out on top, with 14,322,774 minutes of viewing time, collectively. This is almost two million more than in 2018. Future reports will display viewing time in hours.

In 2019, approval rate also reached a new record, with 75,885 likes compared to 47,905 last year. Typically, the amount of dislikes has also been the highest on record this year, with 2,539 dislikes compared to 2,050 last year. However, the actual approval rating has risen by 0.9%.

In 2019, comments on YouTube videos amounted to 234,570, compared to 153,218 in 2018.

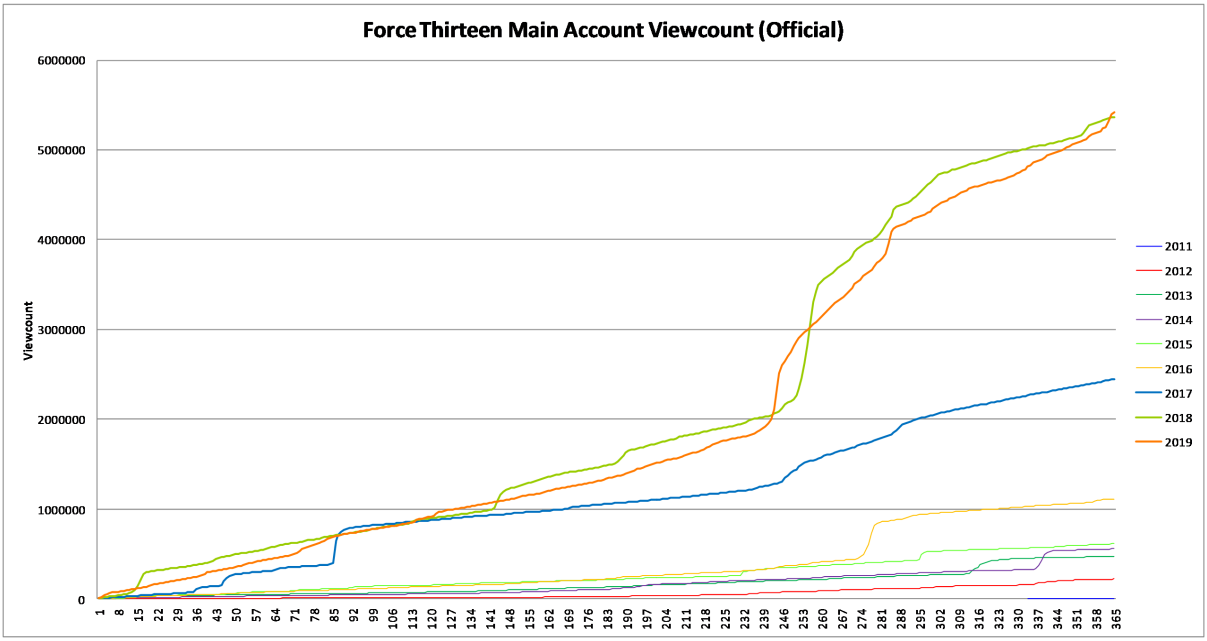
The subscriber base has grown by a further 12,867 in 2019, after an increase of 18,152 in 2018.

The Hurricane Dorian event set numerous new viewing records, with the channel at times reaching 12,000 views per hour during the height of the event.
On Force Thirteen's live coverage, concurrent viewers surpassed 1,800—well above the previous record of 1,079 set during Typhoon Mangkhut.
Overnight viewcounts also set new "highest minimum" records, with the automated feed retaining over 500 concurrent viewers during the early morning of September 2.

This year's report does not contain top ten country viewing numbers due to calculation errors beyond our control.

Channel	2019 Viewcount	2018 Viewcount
Main Channel	5,415,283	5,367,516
Force Thirteen Xtra	188,719	124,657
Force Thirteen UK & Ireland	3,048	4,974
Force Thirteen AU & Oceania	26,018	35,019
Force Thirteen US & Caribbean	36,697	12,862
Force Thirteen's Tropical Archive	55,061	77,729
Force Thirteen Gaming	999	786
Facebook Videos	653,137	725,204
Total	**6,378,962**	**5,623,165**

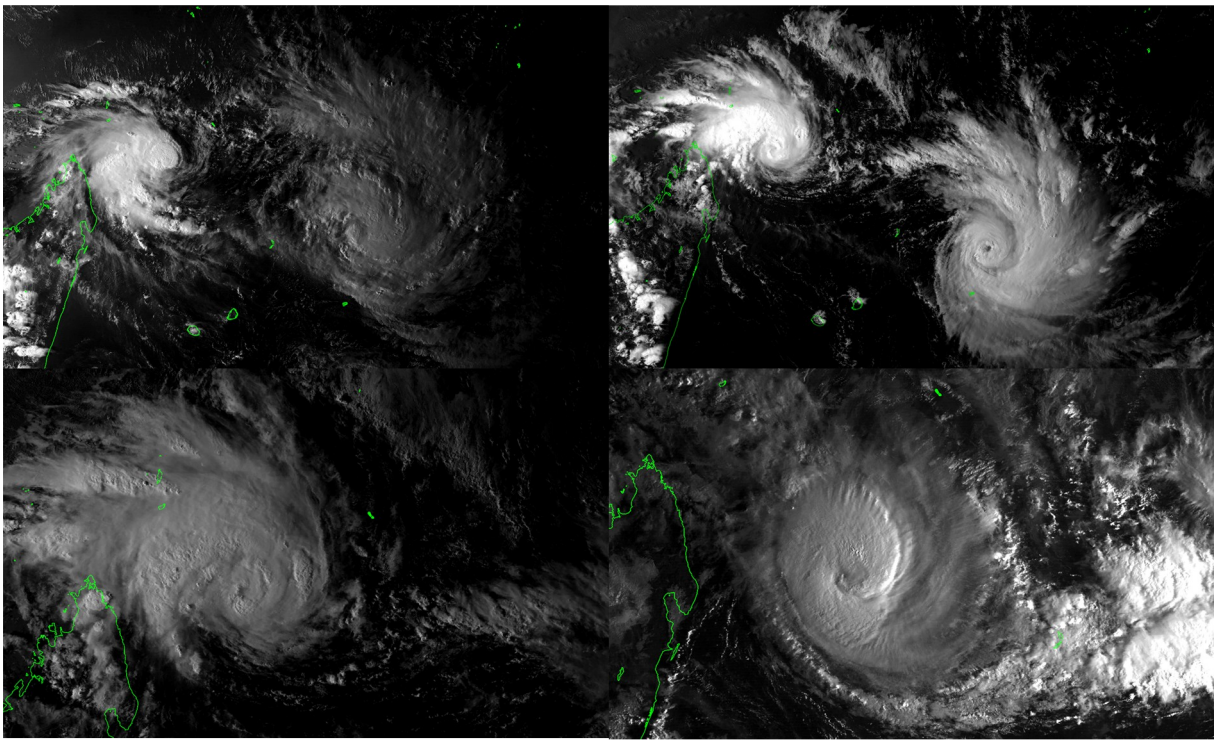
VIEWING STATISTICS



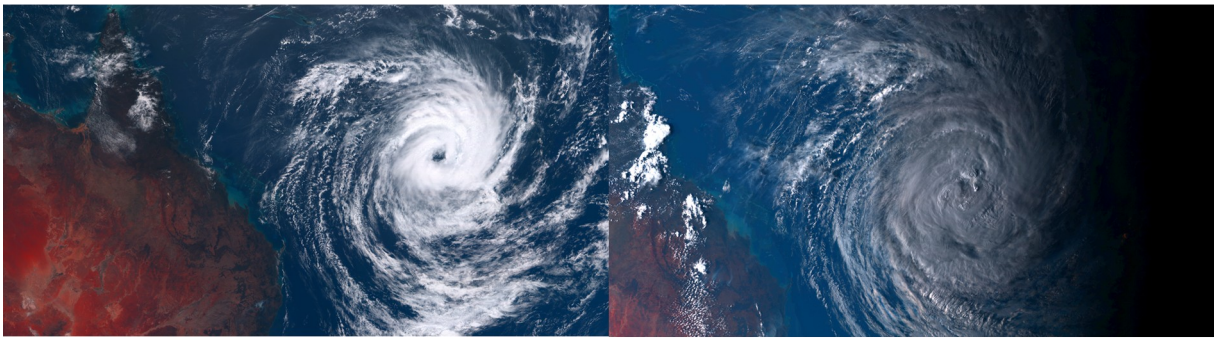
Channel	2019 Approval %	2018 Approval %
Main Channel	97% (78424 ratings)	96% (49955 ratings)
Force Thirteen Xtra	95% (2221 ratings)	91% (1410 ratings)
Force Thirteen UK & Ireland	95% (44 ratings)	97% (139 ratings)
Force Thirteen AU & Oceania	85% (910 ratings)	97% (741 ratings)
Force Thirteen US & Caribbean	97% (1268 ratings)	96% (385 ratings)
Force Thirteen's Tropical Archive	96% (508 ratings)	97% (614 ratings)
Force Thirteen Gaming	93% (28 ratings)	100% (36 ratings)

2019 STORM IMAGE GALLERY

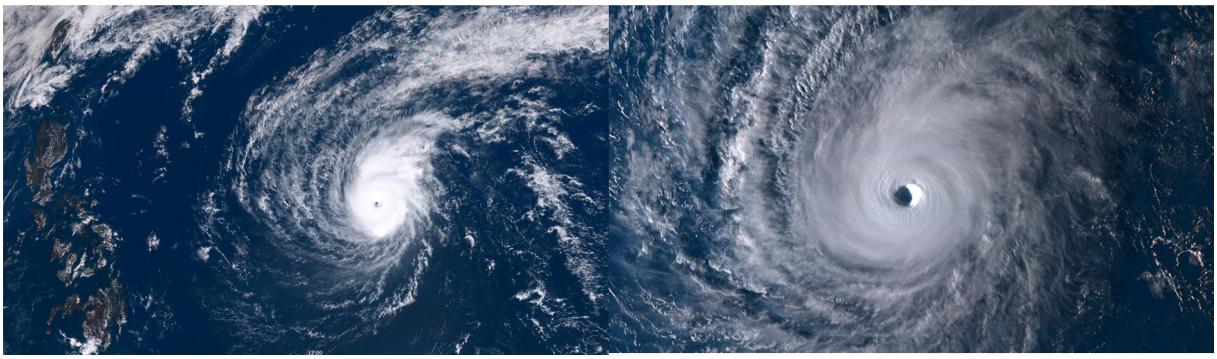
Cyclone Funani and Gelena



Cyclone Oma

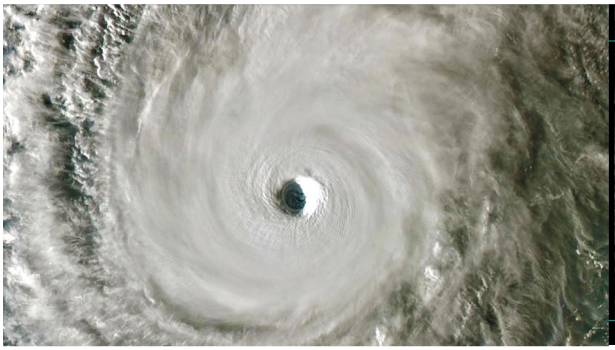


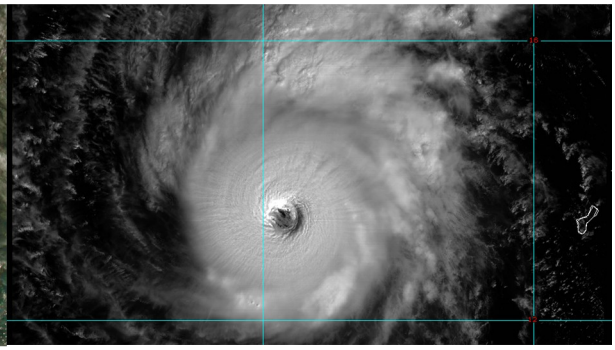
Typhoon Wutip



2019 STORM IMAGE GALLERY

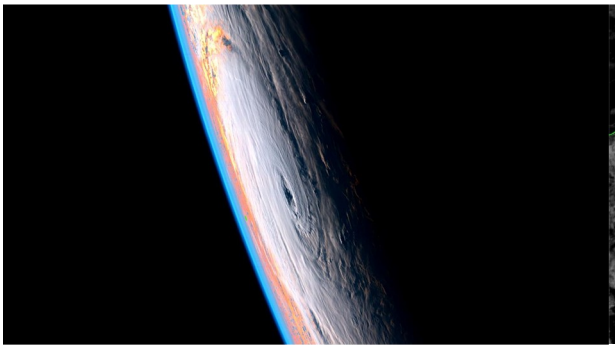
Typhoon Wutip

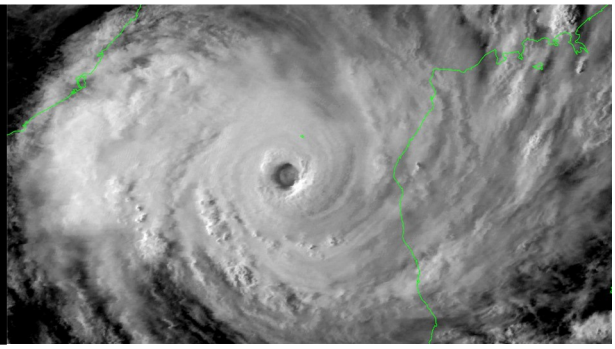




Cyclone Haleh

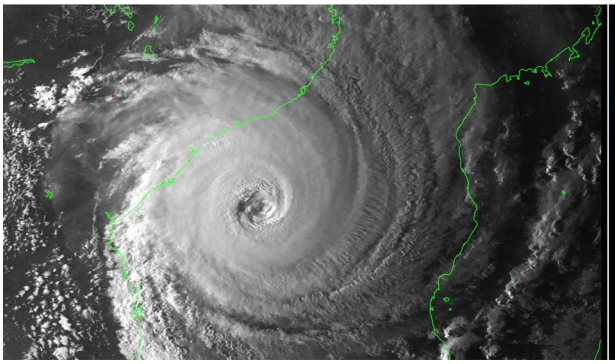
Cyclone Idai

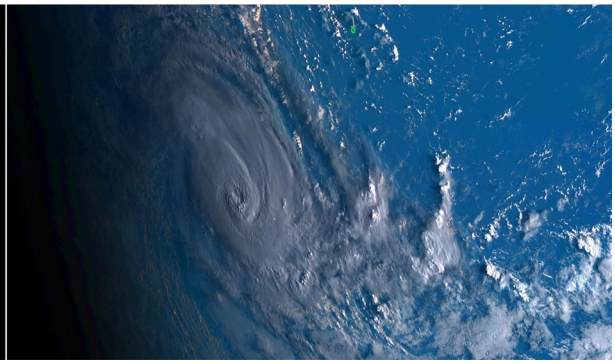




Cyclone Idai

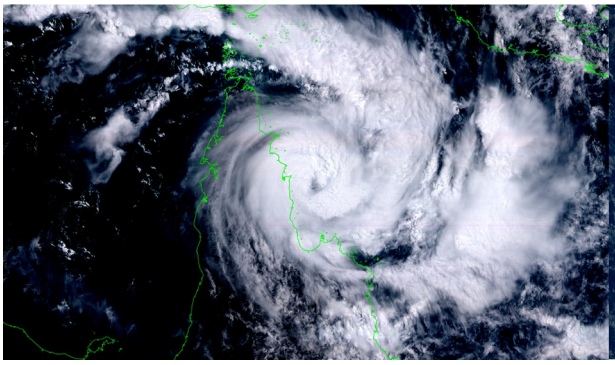
Cyclone Savannah

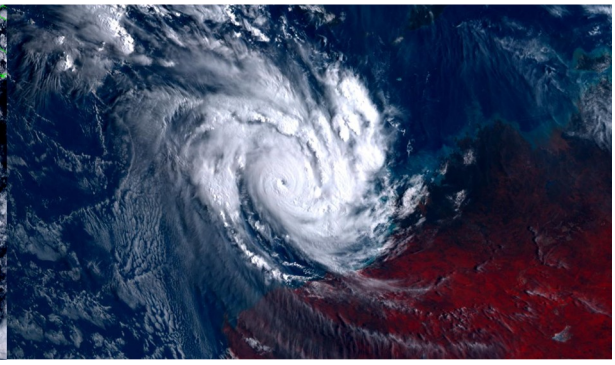




Cyclone Trevor

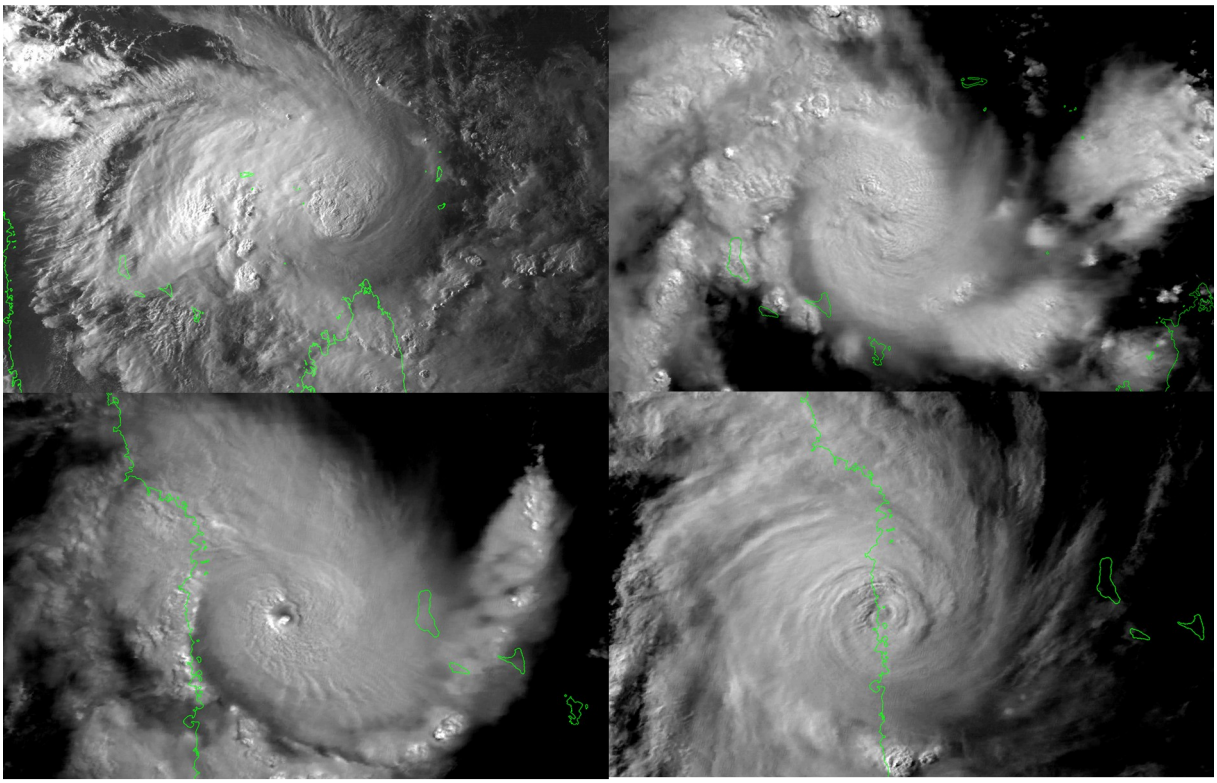
Cyclone Veronica



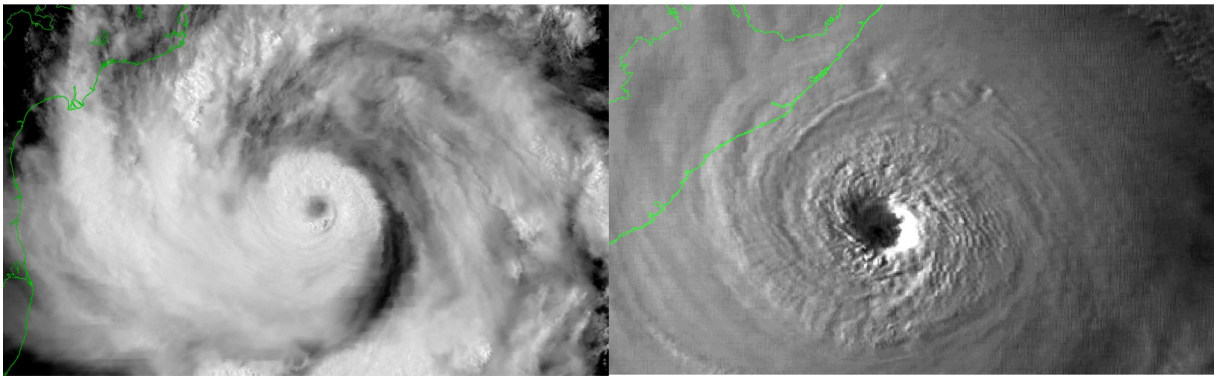


2019 STORM IMAGE GALLERY

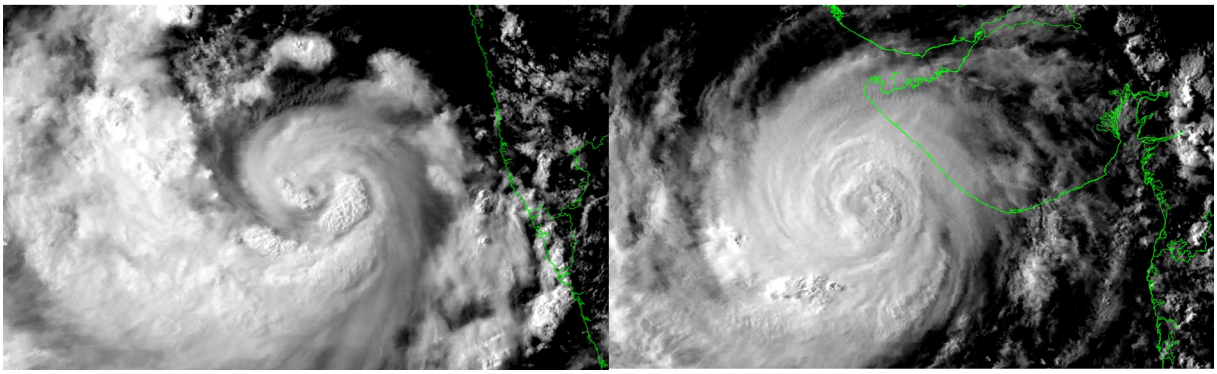
Cyclone Kenneth



Cyclone Fani

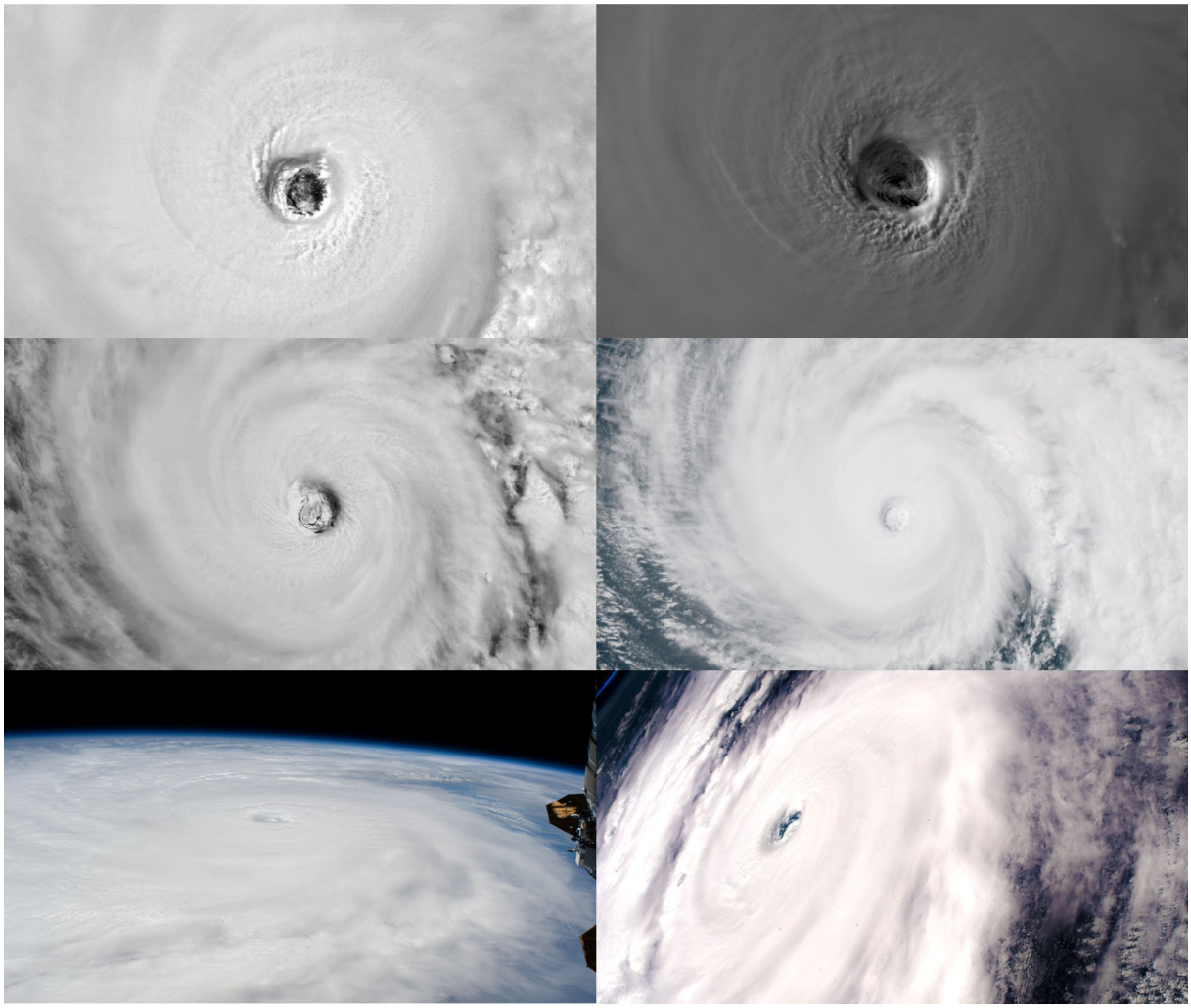


Cyclone Vayu

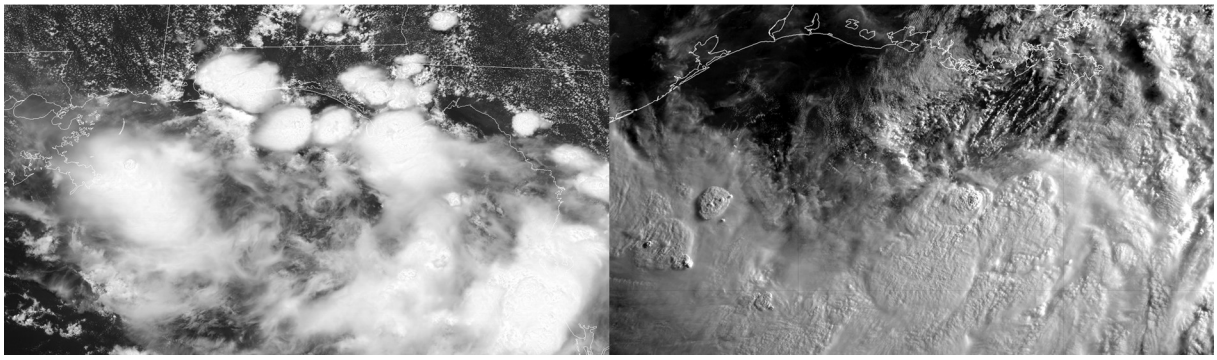


2019 STORM IMAGE GALLERY

Hurricane Barbara

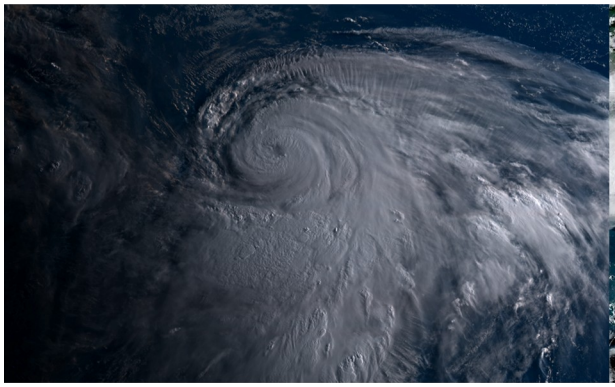


Hurricane Barry



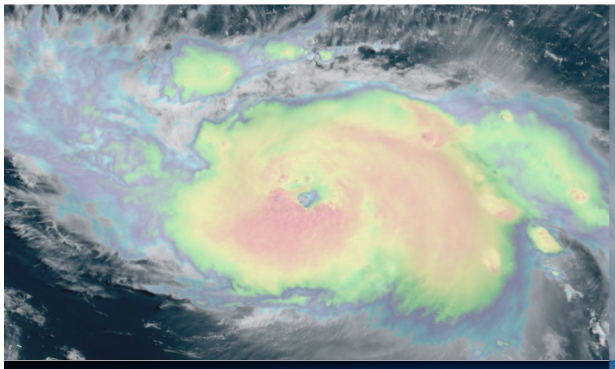
2019 STORM IMAGE GALLERY

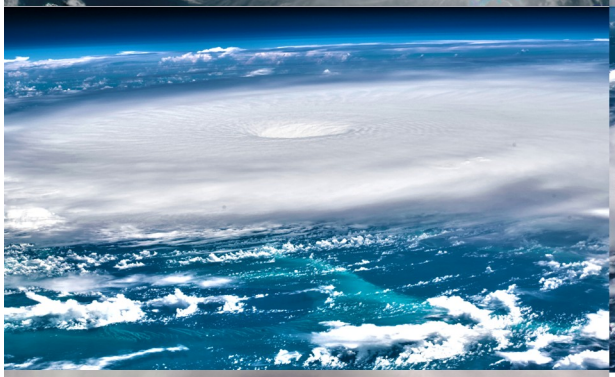
Typhoon Francisco

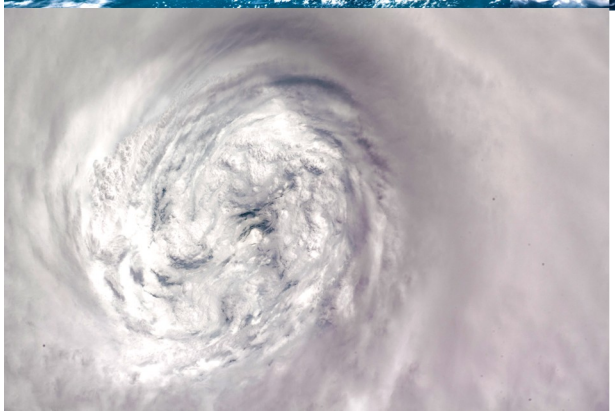


Hurricane Dorian

Hurricane Dorian

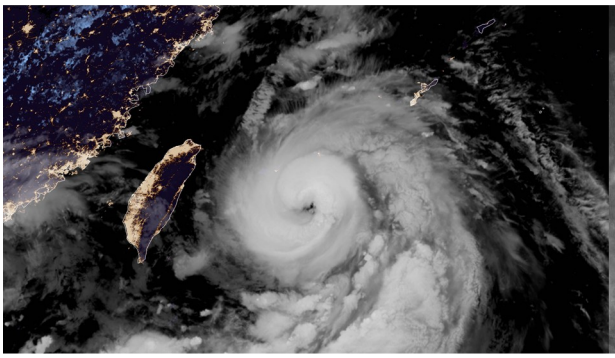




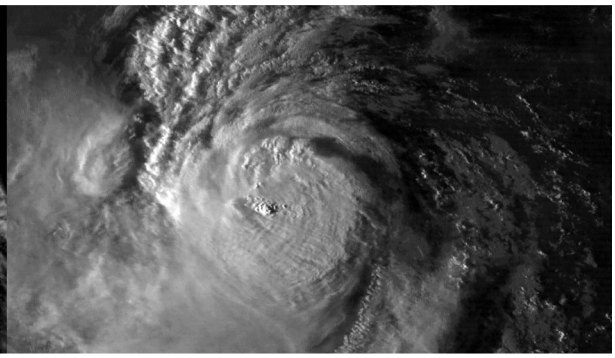


2019 STORM IMAGE GALLERY

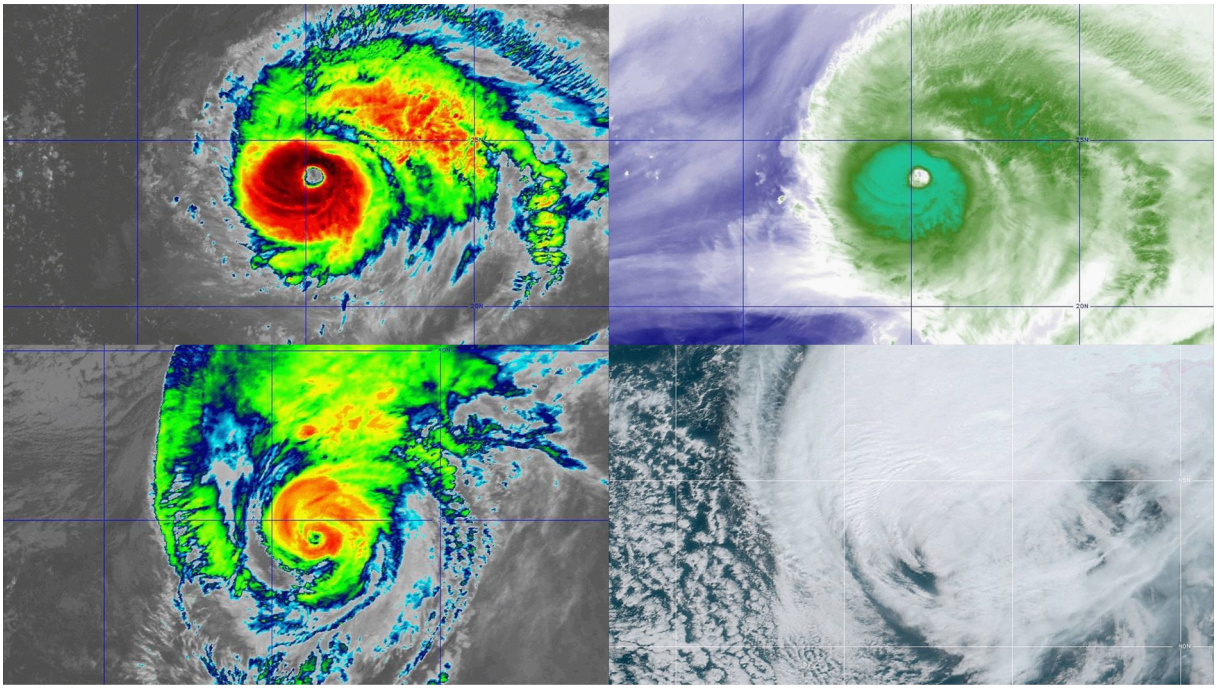
Typhoon Lingling



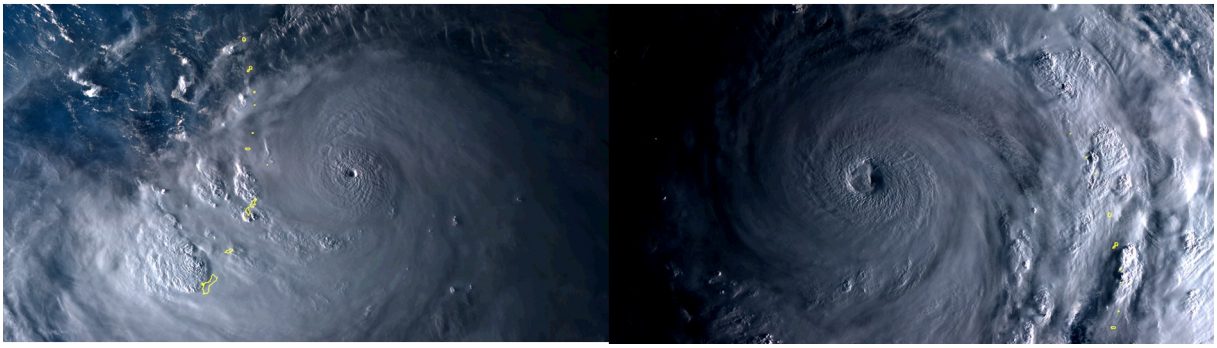
Cyclone Hikaa



Hurricane Lorenzo

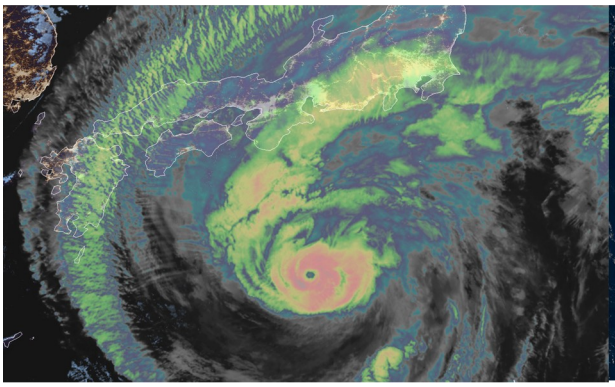


Typhoon Hagibis

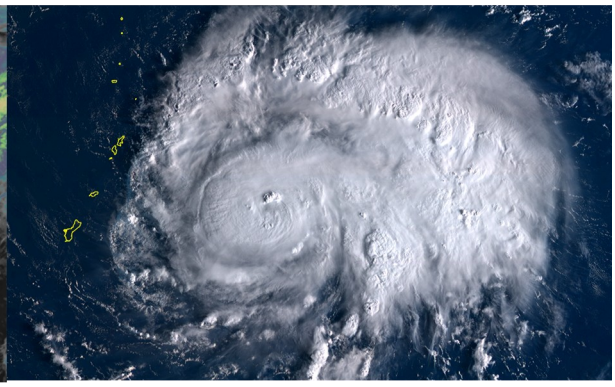


2019 STORM IMAGE GALLERY

Typhoon Hagibis



Typhoon Bualoi



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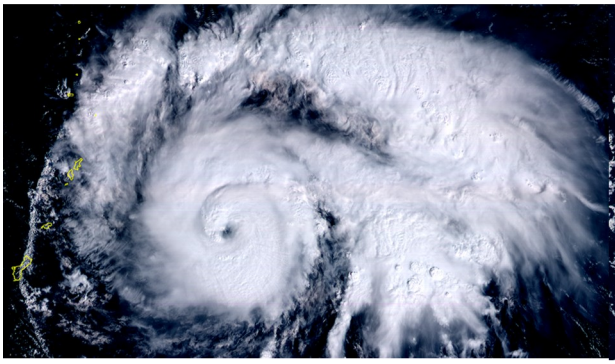
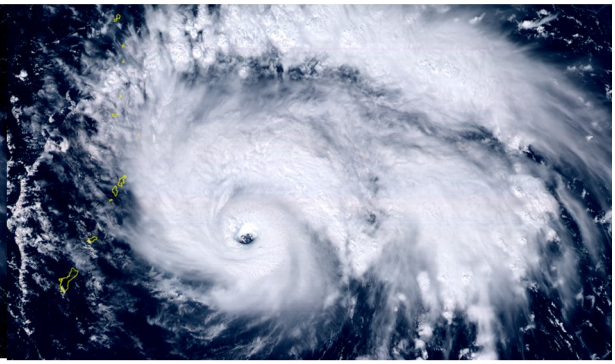
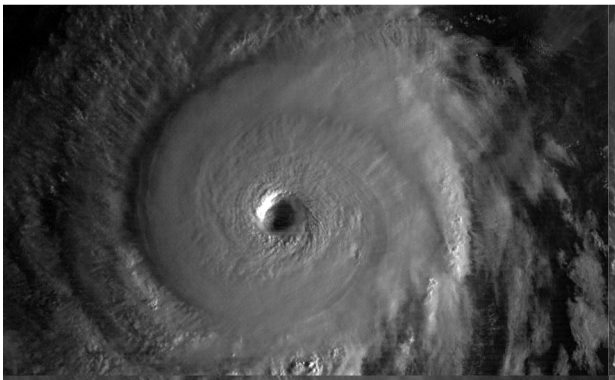
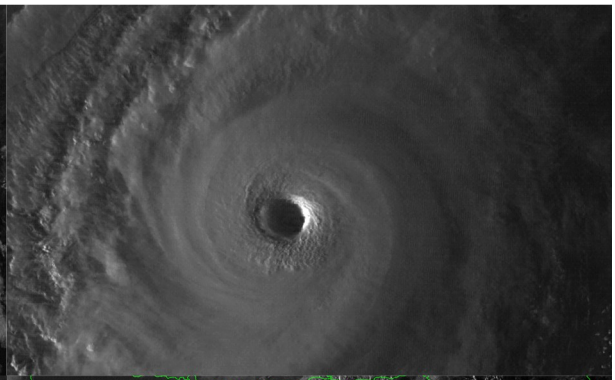
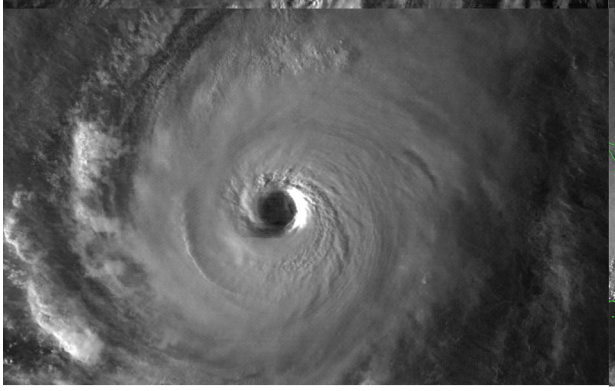


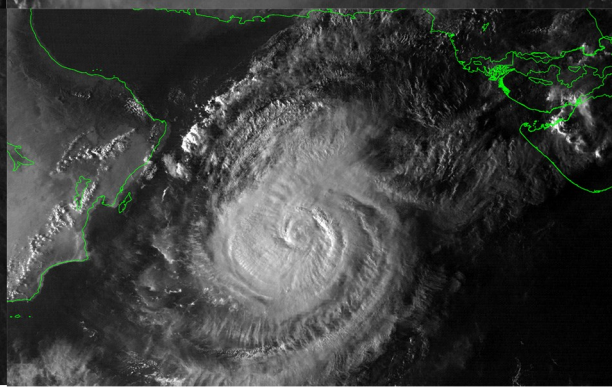


Cyclone Kyarr



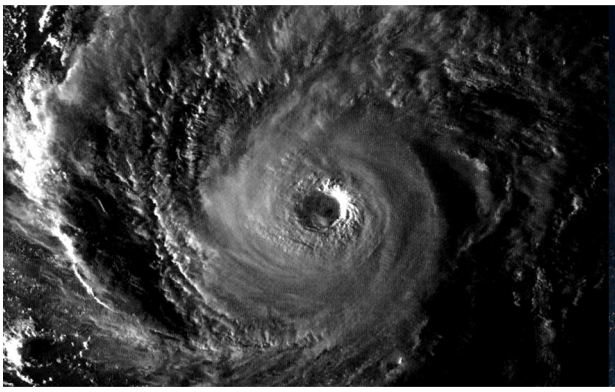




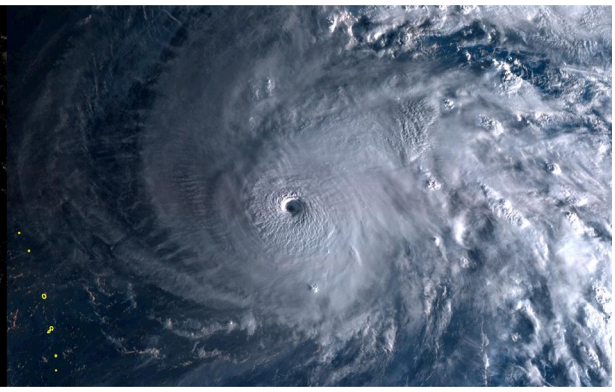


2019 STORM IMAGE GALLERY

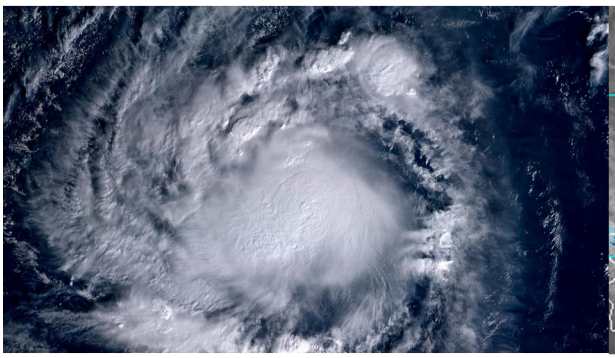
Cyclone Maha

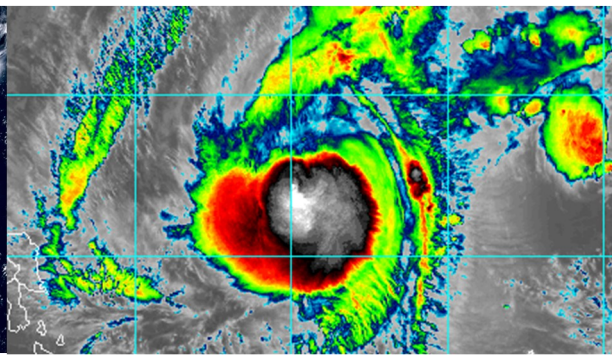


Typhoon Halong

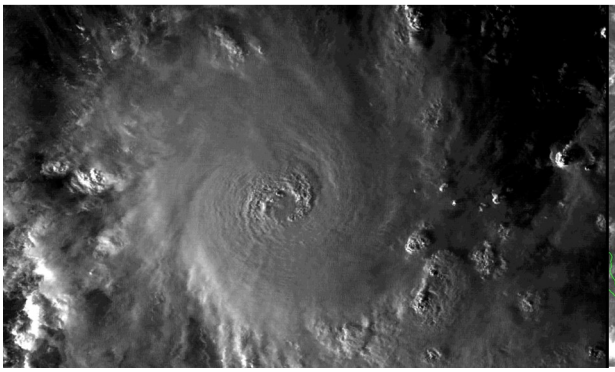


Typhoon Kammuri

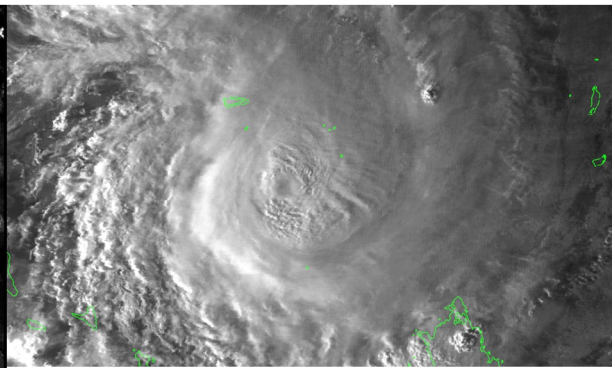




Cyclone Ambali



Cyclone Belna



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