



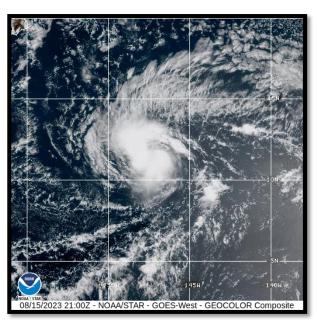
NATIONAL HURRICANE CENTER TROPICAL CYCLONE REPORT¹

TROPICAL STORM GREG

(EP082023)

14–18 August 2023

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18 September 2024¹



GOES-18 GEOCOLOR IMAGE OF TROPICAL STORM GREG AT 2100 UTC 15 AUGUST 2023.
IMAGE COURTESY OF NOAA/NESDIS/STAR.

Greg was a tropical storm that formed in the far western portion of the eastern Pacific basin and moved into the central Pacific basin.

¹ This is an abbreviated Tropical Cyclone Report since there were no coastal watches or warnings issued and no direct fatalities reported in association with Tropical Storm Greg. Original report released on 8 November 2023. Updated 18 September 2024 to include best track analysis, map, and summary from the Central Pacific Hurricane Center.



Tropical Storm Greg

14-18 AUGUST 2023

BEST TRACK

The "best track²" positions and intensities for Greg are listed in Table 1. The best track chart of Greg's path is given in Fig. 1, with the wind and pressure histories shown in Figs. 2 and 3, respectively.

There were no ship reports of winds of tropical storm force associated with Greg.

Origin

Tropical Storm Greg originated from a tropical wave that moved off the west coast of Africa on 25 July and crossed Central America on 3 August.

Peak Intensity and Minimum Pressure

Greg's peak intensity of 55 kt from 1800 UTC 15 August to 1200 UTC 16 August is based on a blend of subjective satellite intensity estimates.

The estimated minimum central pressure of 994 mb is based on the Knaff-Zehr-Courtney (KZC) pressure-wind relationship.

CASUALTY AND DAMAGE STATISTICS

There were no reports of damage or casualties associated with Greg.

² A digital record of the complete best track, including wind radii, can be found on line at ftp://ftp.nhc.noaa.gov/atcf. Data for the current year's storms are located in the *btk* directory, while previous years' data are located in the *archive* directory.

³ Observations include subjective satellite-based Dvorak technique intensity estimates from the Tropical Analysis and Forecast Branch (TAFB), the Satellite Analysis Branch (SAB), the Central Pacific Hurricane Center (CPHC), and the Joint Typhoon Warning Center (JTWC), as well as objective Advanced Dvorak Technique (ADT) estimates from the Cooperative Institute for Meteorological Satellite Studies/University of Wisconsin-Madison. Data and imagery from NOAA polar-orbiting satellites including the Advanced Microwave Sounding Unit (AMSU), the NASA Global Precipitation Mission (GPM), the European Space Agency's Advanced Scatterometer (ASCAT), and Defense Meteorological Satellite Program (DMSP) satellites, among others, were also useful in constructing the best track of Greg.



FORECAST AND WARNING VERIFICATION

Table 2 provides the number of hours in advance of formation with the first NHC Tropical Weather Outlook (TWO) forecast in each likelihood category. Figure 4 shows composites of 7-day TWO genesis areas for each category prior to the formation of Tropical Storm Greg. A verification of NHC official track forecasts for Tropical Storm Greg is given in Table 3. The National Hurricane Center only issued two forecasts on the system before it entered the Central Pacific basin. Official track forecast errors for those two forecasts were at or below the mean official errors for the previous 5-yr period at all forecast times. A verification of NHC official intensity forecasts for Tropical Storm Greg is given in Table 4. Official intensity forecast errors were lower than the mean official errors for the previous 5-yr period at all forecast times. No meaningful comparisons can be made with the model track or intensity guidance due to the small number of forecasts issued on the system in the eastern Pacific basin.

A verification of CPHC official track forecasts for Tropical Storm Greg is given in Table 5a. A homogeneous comparison of the official track errors with selected guidance models is given in Table 5b. The mean official track forecast errors for Greg were lower than the mean official errors for the previous 5-yr period at all forecast times with the exception of 24 h and 60 h. It should be noted that the 5-yr period for the mean 60 h error has not been established. EMXI and HCCA were the top performing track models, outperforming the official CPHC track forecast at all forecast hours. The CPHC official track forecast outperformed most other guidance at nearly all forecast hours.

A verification of CPHC official intensity forecasts for Tropical Storm Greg is given in Table 6a. A homogeneous comparison of the official intensity errors with selected guidance models is given in Table 6b. The mean official intensity forecast errors for Greg were lower than the mean official errors for the previous 5-yr period at all forecast times with the exception of 60 h. It should be noted that the 5-yr period for the mean 60 h error has not been established. The CPHC official intensity forecast outperformed nearly all guidance at 12 h and 24 h. Most dynamical and a couple consensus intensity models outperformed the official forecast beyond 24 h. The statistical intensity model forecast errors were particularly high when compared to the other intensity model forecast errors.

There were no coastal watches or warnings issued for Greg.



Table 1. Best track for Tropical Storm Greg, 14–18 August 2023.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
14 / 0000	11.3	138.2	1007	30	tropical depression
14 / 0600	11.3	139.2	1005	35	tropical storm
14 / 1200	11.2	140.3	1005	35	"
14 / 1800	11.1	141.4	1003	40	"
15 / 0000	11.1	142.6	1002	40	"
15 / 0600	11.1	143.9	1000	45	"
15 / 1200	11.1	145.2	997	50	"
15 / 1800	11.1	146.5	994	55	"
16 / 0000	11.4	147.8	994	55	"
16 / 0600	11.5	149.1	994	55	"
16 / 1200	11.6	150.5	994	55	"
16 / 1800	11.8	151.8	997	50	"
17 / 0000	11.9	152.9	997	50	"
17 / 0600	12.0	154.0	1003	40	"
17 / 1200	12.1	155.1	1005	35	"
17 / 1800	12.1	156.4	1006	35	"
18 / 0000	12.0	157.8	1007	30	tropical depression
18 / 0600	11.7	159.3	1008	30	"
18 / 1200	11.4	160.7	1008	30	u
18 / 1800	11.0	162.0	1008	30	и
19 / 0000	-	-	-	-	dissipated



Date/Time	Latitude	Longitude	Pressure	Wind	Stage	
(UTC)	(°N)	(°W)	(mb)	Speed (kt)		
15 / 1800	11.1	146.5	994	55	maximum winds and minimum pressure	

Table 2. Number of hours in advance of formation associated with the first NHC Tropical Weather Outlook forecast in the indicated likelihood category. Note that the timings for the "Low" category do not include forecasts of a 0% chance of genesis.

	Hours Befo	ore Genesis
	48-Hour Outlook	168-Hour Outlook
Low (<40%)	60	102
Medium (40%-60%)	48	54
High (>60%)	18	42

Table 3. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) track forecast errors (n mi) for Tropical Storm Greg, 14–18 August 2023. Mean errors for the previous 5-yr period are shown for comparison. Official errors that are smaller than the 5-yr means are shown in boldface type.

		Forecast Period (h)								
	12	24	36	48	60	72	96	120		
OFCL	12.7	27.6	44.0	54.1	71.0	71.6				
OCD5	33.4	72.8	107.3	123.2	153.1	170.9				
Forecasts	2	2	2	2	2	2				
OFCL (2018-22)	22.1	34.0	45.4	56.0	70.9	78.7	100.5	117.8		
OCD5 (2018-22)	36.7	73.4	114.0	156.9	193.2	244.5	317.0	376.0		



Table 4. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) intensity forecast errors (kt) for Tropical Storm Greg, 14–18 August 2023. Mean errors for the previous 5-yr period are shown for comparison. Official errors that are smaller than the 5-yr means are shown in boldface type.

		Forecast Period (h)								
	12	24	36	48	60	72	96	120		
OFCL	0.0	0.0	0.0	2.5	5.0	2.5				
OCD5	2.0	2.5	4.5	6.5	18.5	21.5				
Forecasts	2	2	2	2	2	2				
OFCL (2018-22)	5.4	8.9	11.0	12.8	14.3	15.8	17.0	17.6		
OCD5 (2018-22)	6.9	12.1	15.9	18.6	18.7	21.0	22.3	22.1		

Table 5a. CPHC official (OFCL) and climatology-persistence skill baseline (OCD5) track forecast errors (n mi) for Tropical Storm Greg, 14–18 August 2023. Mean errors for the previous 5-yr period are shown for comparison. Official errors that are smaller than the 5-yr means are shown in boldface type.

		Forecast Period (h)									
	12	24	36	48	60	72	96	120			
OFCL	21.2	34.3	37.1	42.9	47.9	49.8	79.8				
OCD5	28.3	55.3	69.5	84.8	106.6	140.9	283.3				
Forecasts	15	14	12	10	8	6	2				
OFCL (2018-22)	22.2	33.9	42.3	51.2	ı	67.4	95.7				
OCD5 (2018-22)	38.0	84.1	139.5	202.9	-	340.6	446.8				



Table 5b. Homogeneous comparison of selected track forecast guidance models (in n mi) for Tropical Storm Greg, 14–18 August 2023. Errors smaller than the CPHC official forecast are shown in boldface type.

		Forecast Period (h)							
	12	24	36	48	60	72	96	120	
OFCL	19.2	29.8	36.5	40.7	44.1	51.3	75.6		
OCD5	25.5	49.5	66.3	73.5	85.5	132.2	247.8		
GFSI	21.9	38.9	52.7	63.7	73.5	78.8	89.9		
EMXI	16.9	21.4	25.0	27.5	26.7	41.9	67.6		
CMCI	21.5	32.0	38.3	43.8	51.7	61.9	71.7		
HWFI	22.0	42.0	61.3	79.1	105.4	124.6	162.9		
HFAI	22.4	41.5	58.0	68.3	80.5	99.6	139.3		
HFBI	19.0	31.6	39.9	44.5	43.3	52.7	112.5		
CTCI	29.8	54.0	74.3	85.4	98.0	104.5	101.5		
HCCA	16.1	24.1	26.7	28.7	30.8	40.7	29.6		
GFEX	18.2	28.5	36.6	40.7	44.6	52.2	59.1		
AEMI	19.9	33.8	42.9	46.8	50.8	51.0	26.7		
TVCN	18.9	30.3	37.3	41.0	45.1	51.7	63.0		
TVCX	18.1	30.1	39.0	46.5	51.4	61.8	80.5		
TVCE	18.3	32.4	40.7	48.1	51.5	64.4	88.2		
TVDG	18.2	30.2	38.4	41.6	45.1	56.8	75.9		
HMNI	18.1	40.5	65.2	80.4	96.4	125.4	132.3		
TABS	22.9	41.5	60.9	72.0	90.8	103.0	122.9		
TABM	38.7	83.7	138.3	191.6	250.6	322.4	389.3		
TABD	42.1	96.4	160.8	230.9	319.7	419.3	628.1		
Forecasts	12	11	10	8	6	5	1		



Table 6a. CPHC official (OFCL) and climatology-persistence skill baseline (OCD5) intensity forecast errors (kt) for Tropical Storm Greg, 14–18 August 2023. Mean errors for the previous 5-yr period are shown for comparison. Official errors that are smaller than the 5-yr means are shown in boldface type.

		Forecast Period (h)									
	12	24	36	48	60	72	96	120			
OFCL	3.7	6.1	7.5	8.5	6.9	6.7	2.5				
OCD5	4.3	6.9	13.8	16.5	26.5	31.2	30.0				
Forecasts	15	14	12	10	8	6	2				
OFCL (2018-22)	5.6	8.3	11.0	12.5	-	14.2	16.5				
OCD5 (2018-22)	7.8	12.8	17.4	21.8	-	28.1	25.3				



Table 6b. Homogeneous comparison of selected intensity forecast guidance models (in kt) for Tropical Storm Greg, 14–18 August 2023. Errors smaller than the CPHC official forecast are shown in boldface type.

	Forecast Period (h)							
	12	24	36	48	60	72	96	120
OFCL	3.8	5.5	7.0	8.8	8.3	7.0	5.0	
OCD5	4.2	5.8	13.9	17.5	28.2	32.8	30.0	
HWFI	6.8	7.3	6.1	6.1	5.2	4.8	2.0	
HMNI	5.9	7.1	6.1	6.0	4.7	2.8	3.0	
HFAI	6.9	8.5	7.7	5.9	6.7	4.2	1.0	
HFBI	6.4	8.2	6.8	5.1	4.0	0.8	2.0	
DSHP	5.0	5.1	9.6	14.1	18.0	21.8	19.0	
DSPE	4.7	5.5	10.9	16.1	21.8	26.6	24.0	
LGEM	5.1	5.6	7.1	12.4	16.2	18.8	12.0	
IVCN	5.2	6.8	6.1	7.1	8.3	8.0	5.0	
ICON	5.3	5.9	6.4	9.5	11.3	12.4	9.0	
IVDR	5.4	7.2	5.9	5.9	6.5	5.6	3.0	
HCCA	4.4	5.8	5.4	6.6	6.5	4.0	5.0	
GFSI	6.8	7.7	5.9	4.9	3.3	2.0	2.0	
EMXI	6.2	7.7	6.5	5.6	5.2	2.0	4.0	
CMCI	6.8	8.3	8.9	9.9	11.3	9.0	1.0	
Forecasts	12	11	10	8	6	5	1	



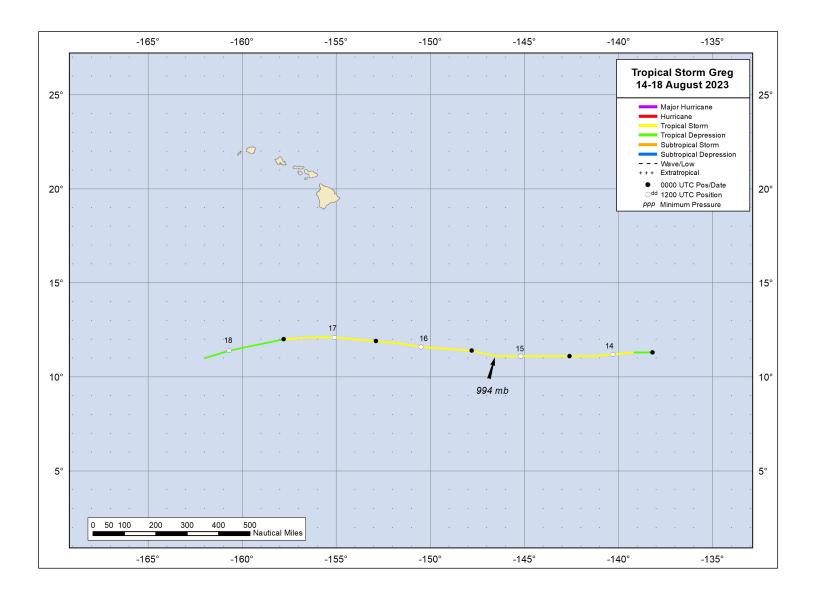
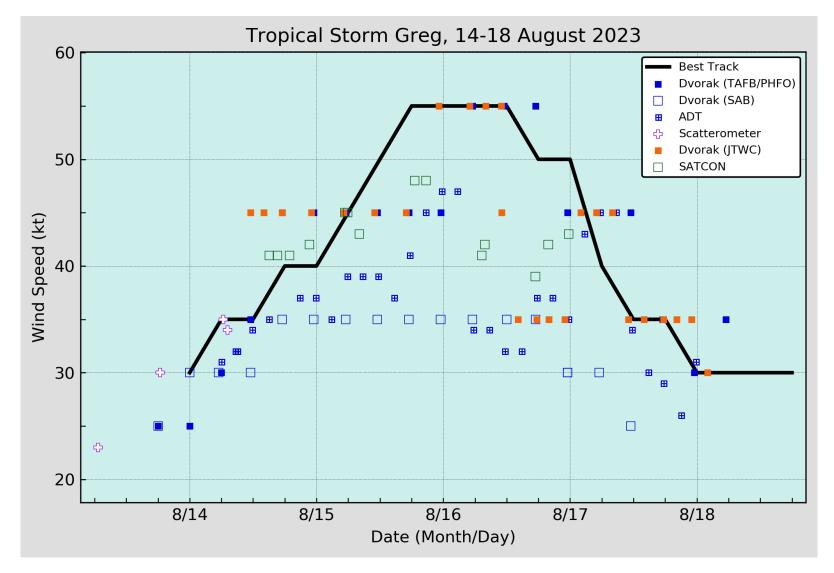


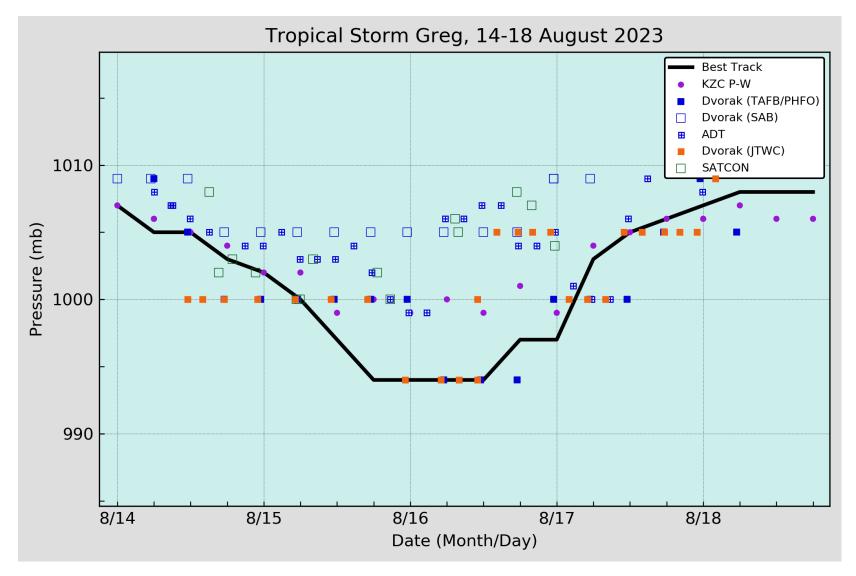
Figure 1. Best track positions for Tropical Storm Greg, 14–18 August 2023.





Selected wind observations and best track maximum sustained surface wind speed curve for Tropical Storm Greg, 14–18 August 2023. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. SATCON intensity estimates are from the Cooperative Institute for Meteorological Satellite Studies. Dashed vertical lines correspond to 0000 UTC.

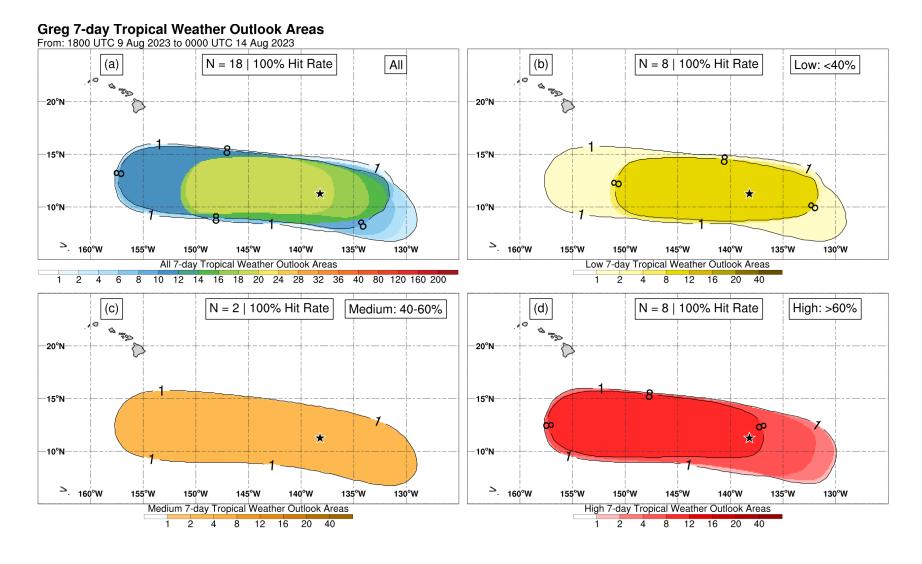




Selected pressure observations and best track minimum central pressure curve for Tropical Storm Greg, 14–18 August 2023.

Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. SATCON intensity estimates are from the Cooperative Institute for Meteorological Satellite Studies. KZC P-W refers to pressure estimates derived using the Knaff-Zehr-Courtney pressure-wind relationship. Dashed vertical lines correspond to 0000 UTC.





Composites of 7-day tropical cyclone genesis areas depicted in NHC's Tropical Weather Outlooks prior to the formation of Tropical Storm Greg for (a) all probabilistic genesis categories, (b) the low (<40%) category, (c) medium (40–60%) category, and (d) high (>60%) category. The location of genesis is indicated by the black star.