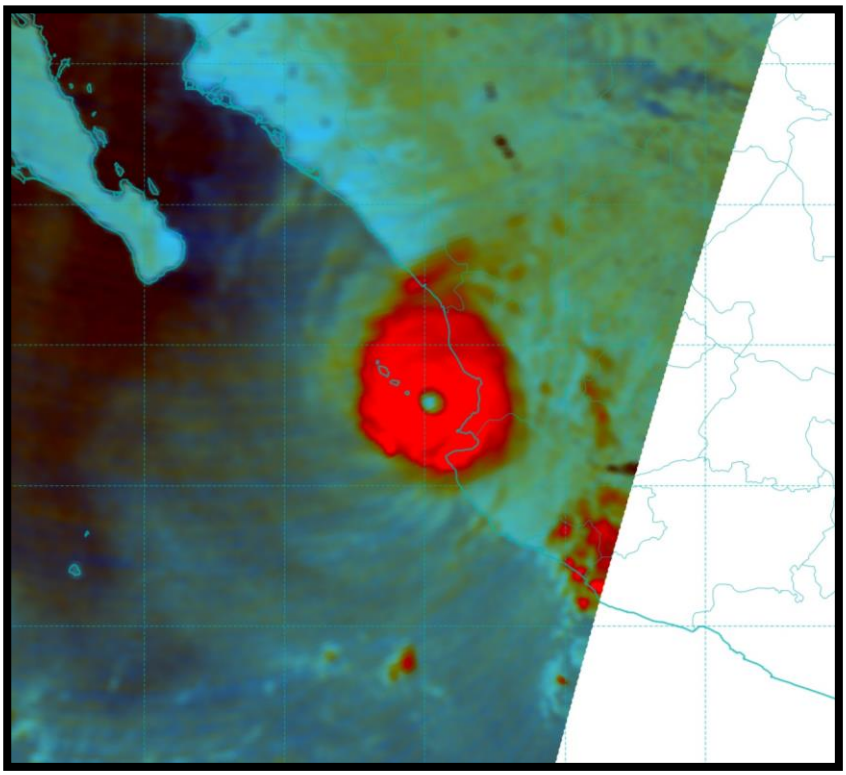
NATIONAL HURRICANE CENTER TROPICAL CYCLONE REPORT

HURRICANE ROSLYN

(EP192022)

20 – 23 October 2022

Robbie Berg
National Hurricane Center
15 February 2023



89-GHZ AMSR-2 MICROWAVE SATELLITE IMAGE OF HURRICANE ROSLYN AT 0910 UTC 23 OCTOBER, ABOUT TWO HOURS BEFORE IT MADE LANDFALL ALONG THE COAST OF NAYARIT, MEXICO (IMAGE COURTESY OF THE NAVAL RESEARCH LABORATORY)

Roslyn became a category 4 hurricane (on the Saffir-Simpson Hurricane Wind Scale) off the west-central coast of Mexico before making landfall near the villages of Mayorquín and Santa Cruz, Nayarit, Mexico, at category 3 intensity. Roslyn caused three direct deaths in the state of Nayarit.

Hurricane Roslyn

20 – 23 OCTOBER 2022

SYNOPTIC HISTORY

Roslyn can be traced from a disturbance that became apparent over the far southwestern Caribbean Sea near Panama as early as 13 October. The origins of the disturbance are less clear, but a model analysis of mid-tropospheric vorticity suggests that a weak tropical wave moved into that area after moving quickly across the Atlantic basin starting on 7 October (Fig. 1). As shown in the figure, the environment over the eastern and central Atlantic was very dry, which prevented development of convection near the wave while it moved across the basin. The wave crossed Central America and reached the far eastern Pacific waters by 16 October, with deep convection gradually increasing in coverage during the next few days. A broad area of low pressure took shape south of the southern coast of Mexico by 19 October, and a sufficiently well-defined center of circulation developed later in the day, marking the formation of a tropical depression by 0000 UTC 20 October about 120 n mi south-southwest of Acapulco, Mexico. The depression strengthened into a tropical storm 12 h later. The "best track" chart of Roslyn's path is given in Fig. 2, with the wind and pressure histories shown in Figs. 3 and 4, respectively. The best track positions and intensities are listed in Table 1[1].

Roslyn strengthened at a steady rate for the next day and a half, moving west-northwestward over very warm waters of about 30°C and within an environment of minimal deep-layer shear. The rate of strengthening increased after 1800 UTC 21 October, and Roslyn became a hurricane shortly after that time while located about 160 n mi south-southwest of Manzanillo, Mexico (Fig. 5a). On 22 October, mid-tropospheric ridging over northern Mexico slid eastward toward the western Gulf of Mexico, causing Roslyn to turn toward the north-northwest near the coast of west-central Mexico. Rapid strengthening continued, and Roslyn reached its peak intensity as a category 4 hurricane with maximum winds of 115 kt by 1800 UTC that day, about 120 n mi west-southwest of Manzanillo (Fig. 5b).

As Roslyn recurved around the western periphery of the mid-level ridge, deep-layer shear began to increase out of the south-southwest, inducing some slight weakening after 0000 UTC 23 October. Roslyn accelerated toward the north-northeast, with its eye moving between mainland Mexico and Las Islas Marías during the early morning hours of 23 October (cover photo). The hurricane then made landfall at category 3 intensity around 1120 UTC, near the villages of Mayorquín and Santa Cruz in the state of Nayarit (Fig. 5c). Roslyn rapidly weakened over the mountainous terrain of western Mexico during the day, becoming a tropical storm by 1800 UTC over the state of Durango (Fig. 5d). Roslyn lost its deep convection late in the day, degenerating into a remnant low by 0000 UTC 24 October to the west of Monterrey over the state

[1] 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.

of Coahuila. The remnant low dissipated soon thereafter when it no longer possessed a closed surface wind circulation.

METEOROLOGICAL STATISTICS

Observations in Roslyn (Figs. 3 and 4) include subjective satellite-based Dvorak technique intensity estimates from the Tropical Analysis and Forecast Branch (TAFB) and Satellite Analysis Branch (SAB), and objective Advanced Dvorak Technique (ADT) estimates and Satellite Consensus (SATCON) estimates from the Cooperative Institute for Meteorological Satellite Studies/University of Wisconsin-Madison. Observations also include flight-level, stepped frequency microwave radiometer (SFMR), and dropwindsonde observations from two flights of the 53rd Weather Reconnaissance Squadron of the U.S. Air Force Reserve Command. 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 Roslyn.

There were no ship reports of winds of tropical storm force associated with Roslyn. Selected surface observations from land stations are given in Table 2.

Winds and Pressure

Roslyn's estimated peak intensity of 115 kt from 1800 UTC 22 October to 0000 UTC 23 October is based on a blend of subjective and objective satellite intensity estimates, as well as data from an Air Force Reserve Hurricane Hunter flight. TAFB and SAB Dvorak estimates were a consensus T6.0/115 kt at those times, while objective UW-CIMSS ADT estimates were just over 120 kt. The reconnaissance aircraft measured a peak 700-mb flight-level wind of 124 kt at 1909 UTC, which adjusts to a surface intensity estimate of 110–115 kt.

Roslyn's estimated landfall intensity of 105 kt at 1120 UTC 23 October is also based on a blend of satellite intensity estimates and aircraft data. Objective ADT estimates decreased during the early morning hours of 23 October to values just over 110 kt by 0900 UTC. Meanwhile, an Air Force Reserve Hurricane Hunter aircraft measured peak 700-mb flight-level winds of 120 kt at 0528 UTC and 119 kt at 0658 UTC, which both support a surface intensity of 105–110 kt. The aircraft also measured an unflagged SFMR surface wind of 109 kt at 0649 UTC. Since Roslyn was on a gradual weakening trend up until landfall due to increasing shear, the landfall intensity is estimated to be at the low end of those measurements.

Roslyn likely produced sustained hurricane-force winds across portions of Nayarit and southern Durango states in Mexico. Sustained tropical-storm-force winds likely occurred across other portions of the states of Nayarit, Durango, western and northern Jalisco, and western Zacatecas. However, available observations in the affected areas were limited, and the highest sustained wind report received was 36 kt with a gust to 68 kt at Acaponeta in the state of Nayarit.

A gust to 86 kt was reported at La Machilia in Durango (in the mountains at an elevation of about 8000 ft), and a gust of 50 kt was reported at San Blas in Nayarit.

Roslyn's estimated minimum central pressure of 954 mb from 1800 UTC 22 October to 0000 UTC 23 October is based on data from a dropsonde which was released from a Hurricane Hunter aircraft at 1905 UTC 22 October. The dropsonde did not report surface data, but data measured at other levels yield an extrapolated surface pressure of 954 mb. Dropsonde data from the Hurricane Hunter flight on the morning of 23 October indicated that Roslyn's central pressure was gradually rising during that time, and the hurricane's pressure at landfall at 1120 UTC is estimated to be 961 mb. Storm chasers from iCyclone measured a surface pressure of 962.4 mb within Roslyn's eye about 10 minutes after landfall in Santa Cruz, Nayarit, a couple of miles inland from the coast.

Rainfall and Flooding

Over the two-day period from 22 to 23 October, Roslyn produced at least 4 inches (100 mm) of rain over western and central portions of the state of Nayarit in Mexico (Fig. 6). The highest rainfall totals reported were 7.21 inches (183.2 mm) at the Aguamilpa Dam (Aguamilpa Solaridad), 6.26 inches (159.0 mm) at Acaponeta, and 5.28 inches (134.0 mm) at Pajaritos. Some flooding was reported in Nayarit, as well as farther south in Puerto Vallarta in the state of Jalisco.

CASUALTY AND DAMAGE STATISTICS

Roslyn caused three direct deaths and one indirect death[2] in the Mexican state of Nayarit. According to authorities in Mexico, an 80-year-old man died in Mexcaltitán de Santiago Ixcuintla when a beam fell on him at his home, and two women in Rosamorada were buried in the rubble of their homes from landslides. A male police officer died from a heart attack in Bahía de Banderas while cleaning up a highway after the storm.[3]

Roslyn made landfall in a sparsely populated section of coastline. No total damage estimates are available as of this writing, however more than 70 million pesos (3.5 million USD) were set aside by the state government for rebuilding in Nayarit. Of that amount, 20 million pesos (1.0 million USD) were to go to the island of Mexcaltitán, where 80% of the homes were destroyed.[4] Media reports indicate that Roslyn caused flooding, damaged homes, and toppled

[2] Deaths occurring as a direct result of the forces of the tropical cyclone are referred to as "direct" deaths. These would include those persons who drowned in storm surge, rough seas, rip currents, and freshwater floods. Direct deaths also include casualties resulting from lightning and wind-related events (e.g., collapsing structures). Deaths occurring from such factors as heart attacks, house fires, electrocutions from downed power lines, vehicle accidents on wet roads, etc., are considered "indirect" deaths.

[3] Huracán Roslyn deja cuatro Muertos a su paso por el Golfo de México. *El Tiempo Latino*. 24 October 2022. https://eltiempolatino.com/2022/10/24/latinoamerica/huracan-roslyn-deja-cuatro-muertos-y-danos-materiales-en-mexico/

[4] Fernández, Arely. Nayarit inicia reconstrucción de zonas afectadas por Huracán Roslyn. Debate. 25 October 2022. https://www.debate.com.mx/estados/Nayarit-inicia-reconstruccion-de-zonas-afectadas-por-Huracan-Roslyn-20221025-0216.html

trees in Nayarit, including the state capital Tepic. The Federal Electricity Commission stated that nearly 160,000 customers lost power in Nayarit, Jalisco, and Sinaloa. Heavy rains and large waves were reported in Puerto Vallarta, causing some damage to beachside eateries.[5] In Boca de Camichín, fishermen reported losing their entire oyster harvest for the year.[3] Storm chaser Josh Morgerman from iCyclone, who was located in Santa Cruz near Roslyn's landfall, reported that the core of the hurricane lasted barely an hour, but the winds were violent and destructive. Wind damage across the town was extensive, with many homes and businesses suffering major damage, including roofs torn off (Fig. 7). Roads within and to the east of Santa Cruz were blocked by fallen trees, broken power poles and lines, and smashed concrete.

FORECAST AND WARNING CRITIQUE

Roslyn's genesis was fairly well predicted, although the lead times fell a little short for the 5-day forecasts. Table 3 provides the number of hours in advance of formation with the first NHC Tropical Weather Outlook (TWO) forecast in each likelihood category. A low (<40%) chance of genesis during the next 5 days was first indicated in the TWO 78 h before Roslyn formed, and chances were raised to the medium (40–60%) category 72 h before formation and to the high (>60%) category 54 h before formation. For the 2-day forecast period, the precursor disturbance was given a low chance of genesis 54 h before formation, and the chances were raised to the medium and high categories 42 and 24 h, respectively, before genesis. NHC accurately forecast the location of Roslyn's formation, which was contained within all tropical cyclone genesis areas depicted in the Graphical Tropical Weather Outlook (Fig. 8).

A verification of NHC official track forecasts for Roslyn is given in Table 4a. Official track forecast errors were lower than the mean official errors for the previous 5-year period through 60 h but then higher at 72 h. Climatology-persistence (OCD5) errors were higher than or similar to their respective 5-year means at all forecast times, suggesting that Roslyn's track was a bit more atypical than for most eastern Pacific tropical cyclones.

A homogeneous comparison of the official track errors with selected guidance models is given in Table 4b and Fig. 9. The official track forecasts generally had lower errors than the individual deterministic models and had similar errors to many of the consensus aids through 48 h. However, several deterministic and consensus aids performed better than the NHC official forecasts at 60 and 72 h. The Canadian model (CMCI) was the best-performing deterministic model, having consistently lower errors at all forecast times. The NHC official forecasts likely had larger errors at 60 and 72 h due to poor performances of the European (EMXI), HWRF (HWFI), and HMON (HMNI) models, which all had higher errors at those times. However, several consensus aids, particularly HCCA and FSSE, performed better than the official forecasts at those forecast intervals.

A verification of NHC official intensity forecasts for Roslyn is given in Table 5a. Official intensity errors were higher than the mean official errors for the previous 5-year period at all

[5] Hurricane Roslyn weakens to a tropical depression after making landfall in Nayarit. *Mexico News Daily*. 24 October 2022. https://mexiconewsdaily.com/news/hurricane-roslyn-tropical-depression-nayarit/

forecast times through 72 h. OCD5 errors were significantly higher than their respective 5-year means, indicating that Roslyn's intensity was particularly difficult to forecast. Even though NHC explicitly forecast rapid intensification (at least a 30-kt increase in winds over a 24-h period) in a couple of advisories on 21 October, Fig. 10 shows that even these forecasts did not show enough strengthening and ended up being 15 to 20 kt too low during the period of Roslyn's highest intensity . In fact, Roslyn's rate of intensification was as high as 55 kt over the two overlapping 24-h periods beginning at 1200 and 1800 UTC 21 October.

A homogeneous comparison of the official intensity errors with selected guidance models is given in Table 5b and Fig. 11. Despite official intensity errors being higher than normal, the official forecasts performed quite well compared to the guidance, most of which did not show nearly enough intensification. In fact, NHC's intensity forecasts had the lowest errors at 12, 24, and 60 h and were only bested by the COAMPS-TC (CTCI) model at 36 and 48 h. CTCI was the model that most accurately projected Roslyn's peak intensity of 115 kt.

Coastal watches and warnings issued by the government of Mexico in association with Roslyn are given in Table 6.

ACKNOWLEDGMENTS

Data in Table 2 were provided by CONAGUA, the national meteorological service of Mexico. Josh Morgerman from iCyclone provided data, eyewitness reports, and damage photos near Roslyn's location of landfall.

Table 1. Best track for Hurricane Roslyn, 20–23 October 2022.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
20 / 0000	15.1	100.9	1007	30	tropical depression
20 / 0600	15.1	101.3	1007	30	"
20 / 1200	15.1	101.8	1006	35	tropical storm
20 / 1800	15.3	102.4	1004	40	"
21 / 0000	15.6	103.0	1001	45	"
21 / 0600	15.9	103.5	999	50	"
21 / 1200	16.2	104.1	997	55	"
21 / 1800	16.4	104.7	992	60	"
22 / 0000	16.6	105.3	982	75	hurricane
22 / 0600	17.0	105.8	963	100	"
22 / 1200	17.6	106.2	955	110	"
22 / 1800	18.5	106.6	954	115	"
23 / 0000	19.5	106.7	954	115	"
23 / 0600	20.5	106.4	958	110	"
23 / 1120	21.9	105.6	961	105	"
23 / 1200	22.1	105.5	962	100	"
23 / 1800	23.9	103.9	990	60	tropical storm
24 / 0000	25.6	101.5	1006	25	low
24 / 0600					dissipated
22 / 1800	18.5	106.6	954	115	maximum winds and minimum pressure
23 / 1120	21.9	105.6	961	105	landfall near Mayorquín, Nayarit, Mexico

Table 2. Selected surface observations for Hurricane Roslyn, 20–23 October 2022.

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)	Gust (kt)	
Mexico						
Nayarit						
San Blas (SNBR3) (21.53N 105.29W)	23/1030	1002.5	23/1145	29	50	
Acaponeta (ACPR3) (22.47N 105.39W)	23/1340	983.6	23/1340	36	68	6.26
Francisco Villa – Marismas Nacionales (MRNR3) (22.22N 105.33W)	23/1300	976.8				
Santa Cruz (iCyclone) (21.98N 105.60W)	23/1130	962.4				
Aguamilpa Solaridad						7.21
Pajaritos						5.28
Durango						
La Machilia (MCHD4) (23.39N 104.25W - elev. 8084 ft)			23/1700		86	

[a] Date/time is for sustained wind when both sustained and gust are listed.

Table 3. 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 Before Genesis	
	48-Hour Outlook	**120-Hour Outlook**
Low (<40%)	54	78
Medium (40%-60%)	42	72
High (>60%)	24	54

Table 4a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) track forecast errors (n mi) for Hurricane Roslyn, 20–23 October 2022. 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	**19.5**	**27.4**	**33.6**	**32.1**	**53.9**	97.8		
OCD5	43.4	85.1	119.4	150.1	192.6	240.9		
Forecasts	14	12	10	8	6	4		
OFCL (2017-21)	21.9	33.8	45.6	56.9	74.8	79.9	99.5	121.3
OCD5 (2017-21)	35.8	72.3	112.7	155.0	198.7	239.0	309.2	372.2

Table 4b. Homogeneous comparison of selected track forecast guidance models (in n mi) for Hurricane Roslyn, 20–23 October 2022. Errors smaller than the NHC official forecast are shown in boldface type. The number of official forecasts shown here will generally be smaller than that shown in Table 4a due to the homogeneity requirement.

Model ID	Forecast Period (h)							
	12	24	36	48	60	72	96	120
OFCL	15.7	26.2	36.3	34.8	64.1	140.8		
OCD5	38.0	75.2	132.3	170.2	235.1	346.0		
GFSI	17.9	33.7	50.1	53.2	**47.5**	**82.7**		
EMXI	20.2	32.5	53.3	55.6	110.5	180.4		
EGRI	21.9	33.8	66.4	74.3	87.4	**128.7**		
CMCI	23.9	**23.4**	**32.4**	**30.6**	**52.2**	**27.9**		
NVGI	23.1	36.3	60.8	74.8	65.9	**81.9**		
HWFI	17.2	37.6	57.2	82.6	113.1	197.8		
HMNI	16.5	32.9	53.2	48.7	102.0	208.8		
CTCI	19.1	33.2	47.3	50.3	**43.2**	**92.2**		
HCCA	**15.4**	**24.6**	36.9	**33.1**	**59.3**	**132.9**		
FSSE	**15.6**	**25.9**	38.3	**34.7**	**45.1**	**115.6**		
AEMI	**15.3**	**24.0**	39.1	48.9	**49.6**	**133.0**		
GFEX	16.6	27.6	41.8	**31.5**	**51.7**	**130.4**		
TVCE	**14.7**	**24.8**	39.0	**34.5**	**63.9**	**140.5**		
TVCX	**14.8**	**25.0**	39.3	37.2	68.3	**136.6**		
TVDG	**15.5**	**25.6**	39.5	35.2	**58.6**	**126.9**		
TABD	20.7	35.3	56.6	64.1	**59.1**	**119.8**		
TABM	27.7	41.3	66.8	74.8	99.6	171.9		
TABS	31.9	51.7	93.1	115.4	149.3	216.9		
Forecasts	11	9	8	6	4	2		

Table 5a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) intensity forecast errors (kt) for Hurricane Roslyn, 20–23 October 2022. 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	6.1	9.6	15.0	21.9	25.8	21.2		
OCD5	11.4	22.5	34.2	40.6	47.5	44.0		
Forecasts	14	12	10	8	6	4		
OFCL (2017-21)	5.5	9.1	11.1	12.9	15.3	15.6	16.4	17.0
OCD5 (2017-21)	7.0	12.2	15.8	18.6	20.4	21.2	22.3	21.8

Table 5b. Homogeneous comparison of selected intensity forecast guidance models (in kt) for Hurricane Roslyn, 20–23 October 2022. Errors smaller than the NHC official forecast are shown in boldface type. The number of official forecasts shown here will generally be smaller than that shown in Table 5a due to the homogeneity requirement.

Model ID	Forecast Period (h)							
	12	24	36	48	60	72	96	120
OFCL	7.3	12.8	18.8	22.5	21.2	20.0		
OCD5	10.4	23.9	40.4	41.7	40.0	25.5		
HWFI	11.6	19.0	31.9	26.0	25.5	20.0		
HMNI	11.2	22.3	33.2	39.7	29.2	**6.5**		
CTCI	11.8	14.4	**10.5**	**13.5**	25.2	20.0		
DSHP	9.4	19.9	33.0	39.7	41.2	34.0		
LGEM	9.5	21.9	36.5	44.8	44.5	34.5		
ICON	9.4	20.1	32.6	37.3	34.8	**17.5**		
IVCN	9.4	18.3	28.2	32.3	32.5	**17.5**		
IVDR	10.2	18.1	26.8	30.7	31.2	**18.0**		
HCCA	9.5	15.2	24.0	26.8	29.5	**14.0**		
FSSE	8.7	15.6	23.9	25.7	22.8	**11.5**		
GFSI	13.2	20.1	26.6	37.7	49.2	53.5		
EMXI	15.3	31.9	49.8	52.0	47.5	27.0		
Forecasts	11	9	8	6	4	2		

Table 6. Watch and warning summary along the Pacific coast of Mexico for Hurricane Roslyn, 20–23 October 2022.

Date/Time (UTC)	Action	Location
20 / 2100	Tropical Storm Watch issued	Manzanillo to Cabo Corrientes
21 / 0300	Hurricane Watch issued	Playa Perula to San Blas
21 / 0900	Hurricane Warning issued	Playa Perula to Cabo Corrientes
21 / 0900	Tropical Storm Warning issued	south of Playa Perula to Manzanillo
21 / 0900	Hurricane Watch extended	San Blas to El Roblito and Las Islas Marias
21 / 1500	Hurricane Warning extended	Cabo Corrientes to Punta Mita
21 / 2100	Hurricane Warning extended	Punta Mita to San Blas and Las Islas Marias
21 / 2100	Hurricane Watch extended	El Roblito to Mazatlan
22 / 0300	Hurricane Warning extended	San Blas to El Roblito
22 / 0900	Tropical Storm Warning issued	north of El Roblito to Mazatlan
22 / 2100	Hurricane Warning extended	El Roblito to Escuinapa
23 / 1500	All Warnings discontinued	south of Punta Mita and Las Islas Marias
23 / 1500	Hurricane Watch discontinued	north of Escuinapa to Mazatlan
23 / 1800	All Warnings discontinued	south of San Blas
23 / 1800	Hurricane Warning changed to Tropical Storm Warning	San Blas to Escuinapa
23 / 2100	Tropical Storm Warning discontinued	All

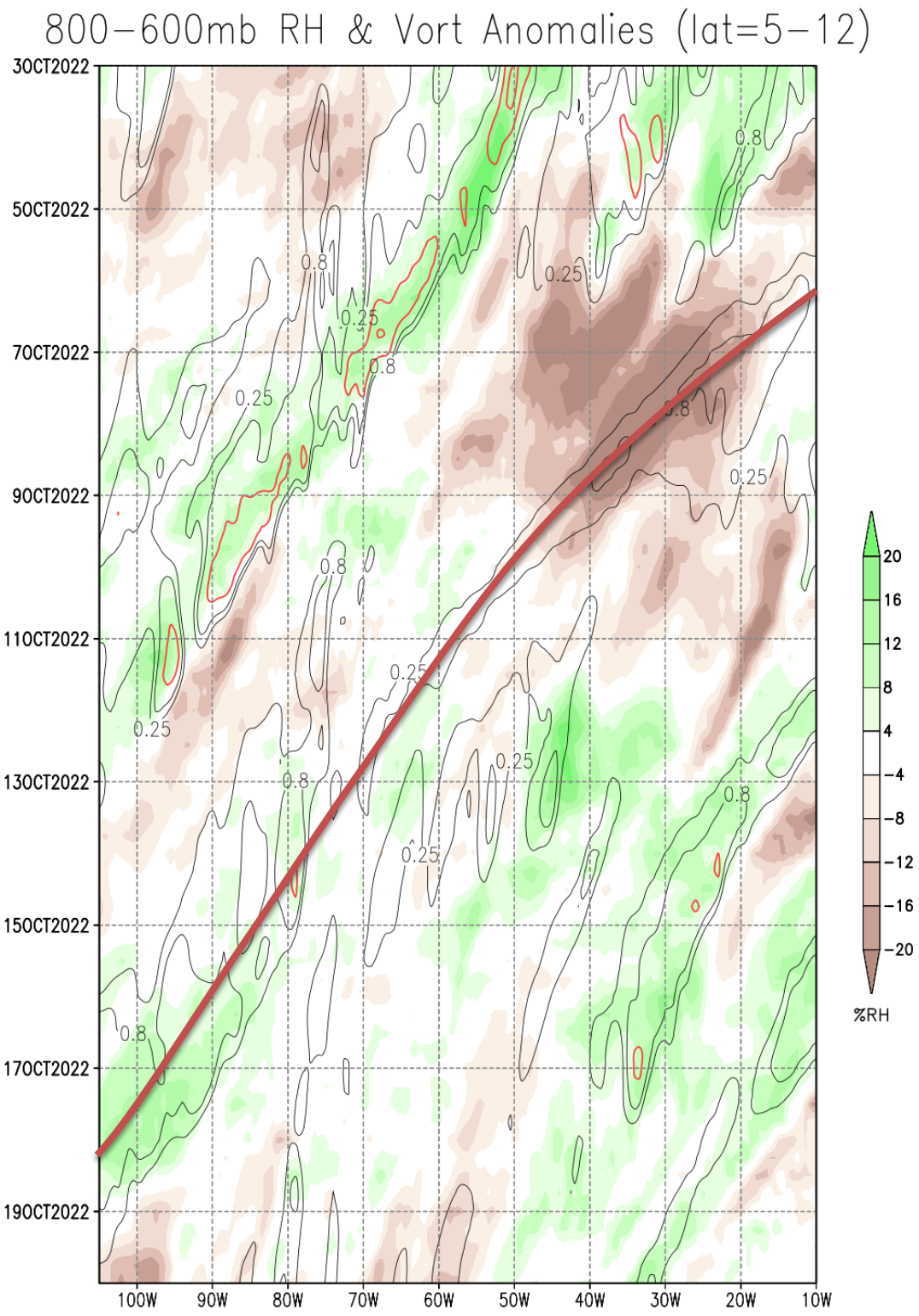


Figure 1. Hovmöller diagram of 800-600-mb relative humidity anomalies (percent, shaded) and relative vorticity anomalies (× 10^{-5} s^{-1}, contours) based on GFS analyses, averaged between 5°N and 12°N from 3 through 20 October 2022. The solid red line denotes the tropical wave that contributed to the formation of Roslyn.

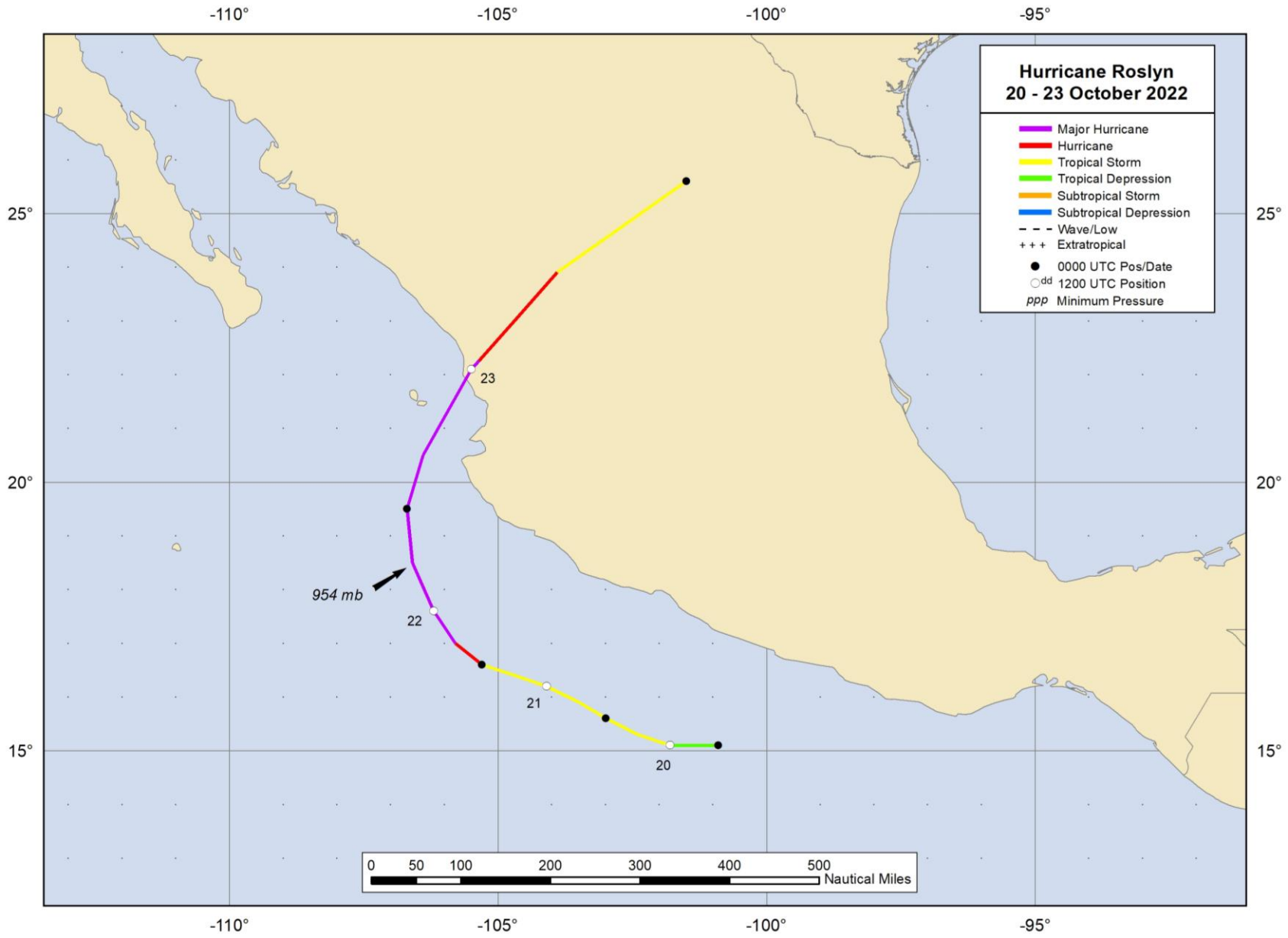


Figure 2. Best track positions for Hurricane Roslyn, 20–23 October 2022.

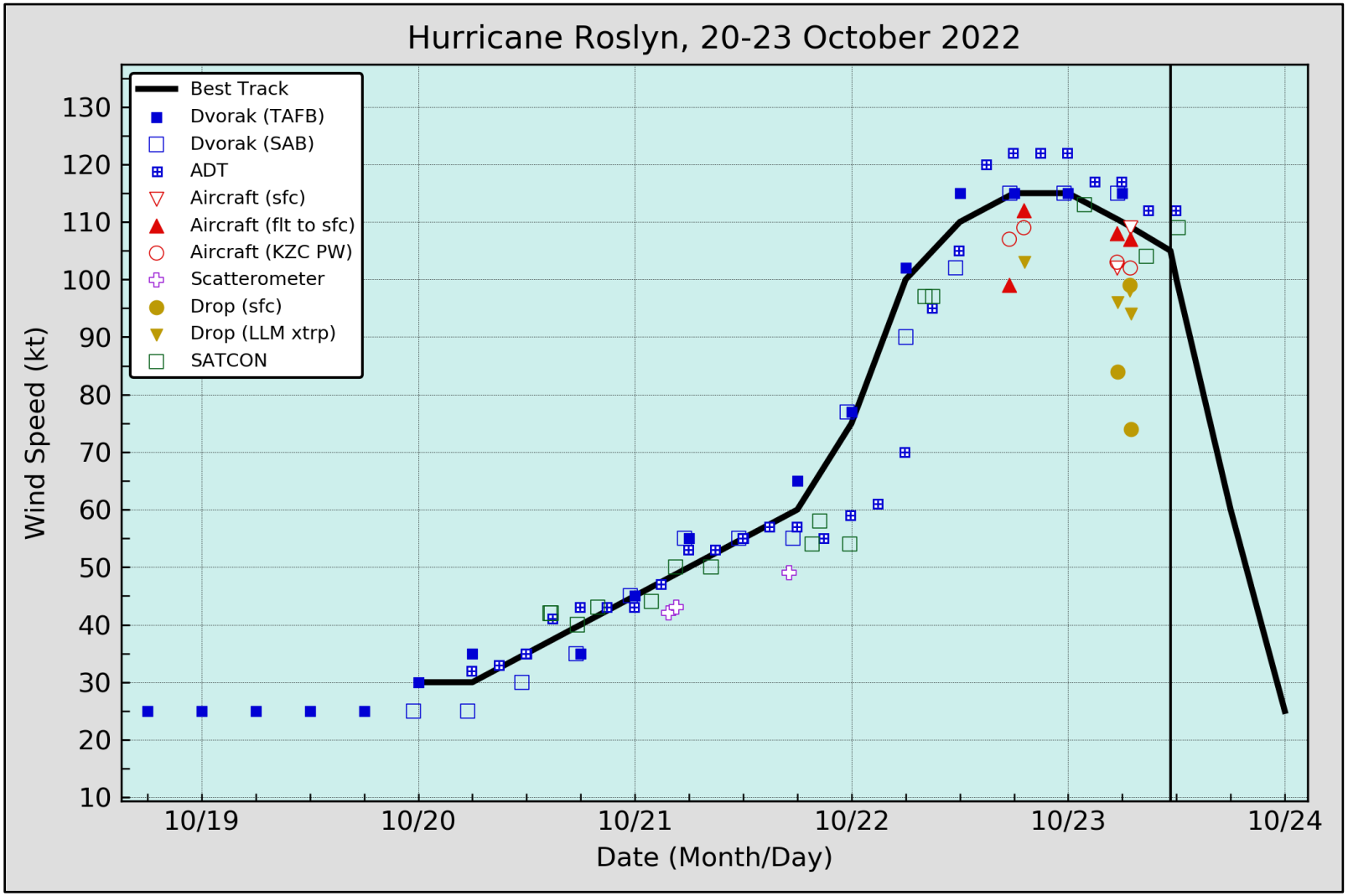


Figure 3. Selected wind observations and best track maximum sustained surface wind speed curve for Hurricane Roslyn, 20–23 October 2022. Aircraft observations have been adjusted for elevation using a 90% adjustment factor for observations from 700 mb. Advanced Dvorak Technique estimates represent the 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, and the solid vertical line corresponds to landfall.

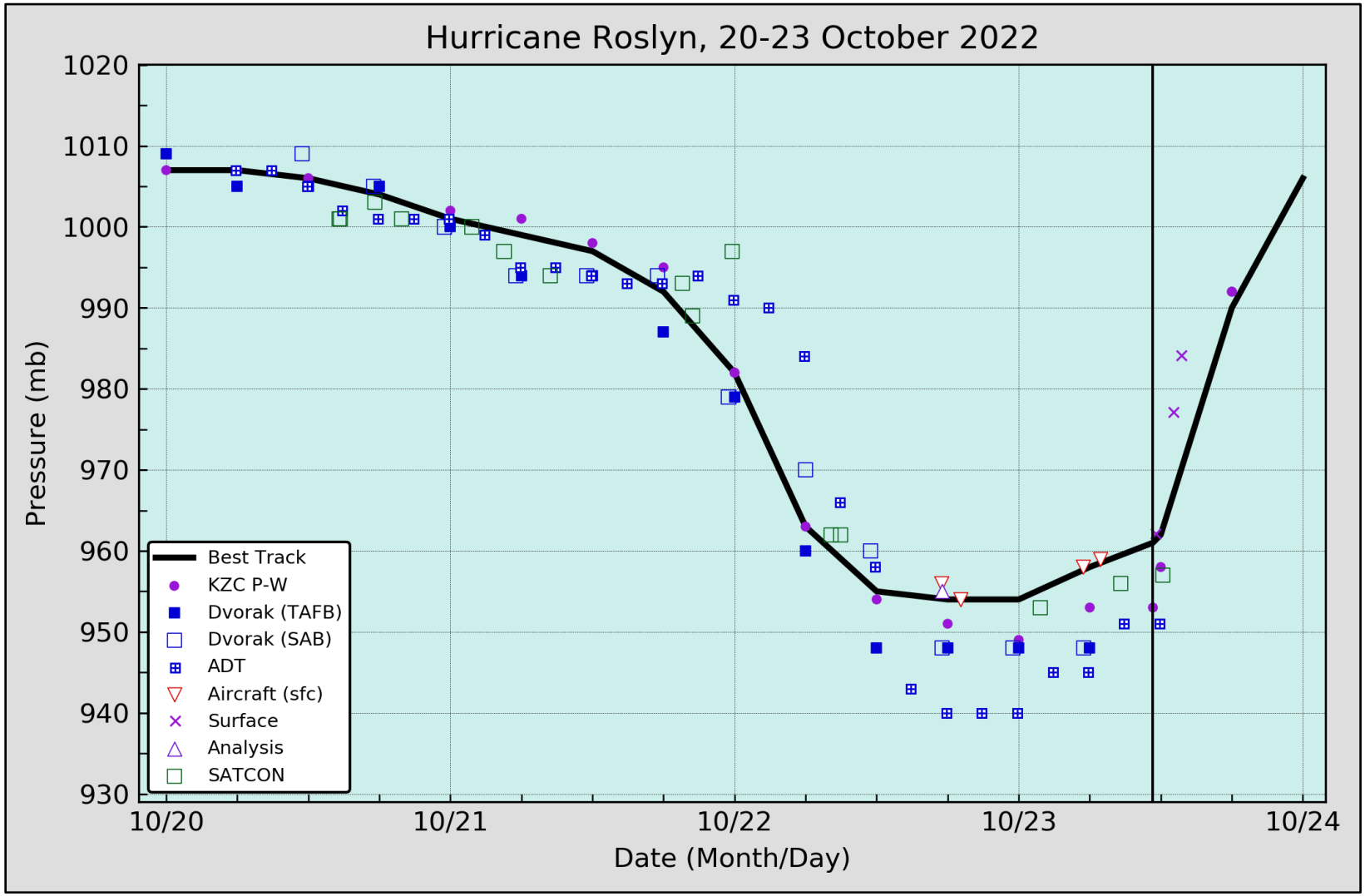


Figure 4. Selected pressure observations and best track minimum central pressure curve for Hurricane Roslyn, 20–23 October 2022. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. SATCON intensity estimates are from the Cooperative Institute for Meteorological 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, and the solid vertical line corresponds to landfall.

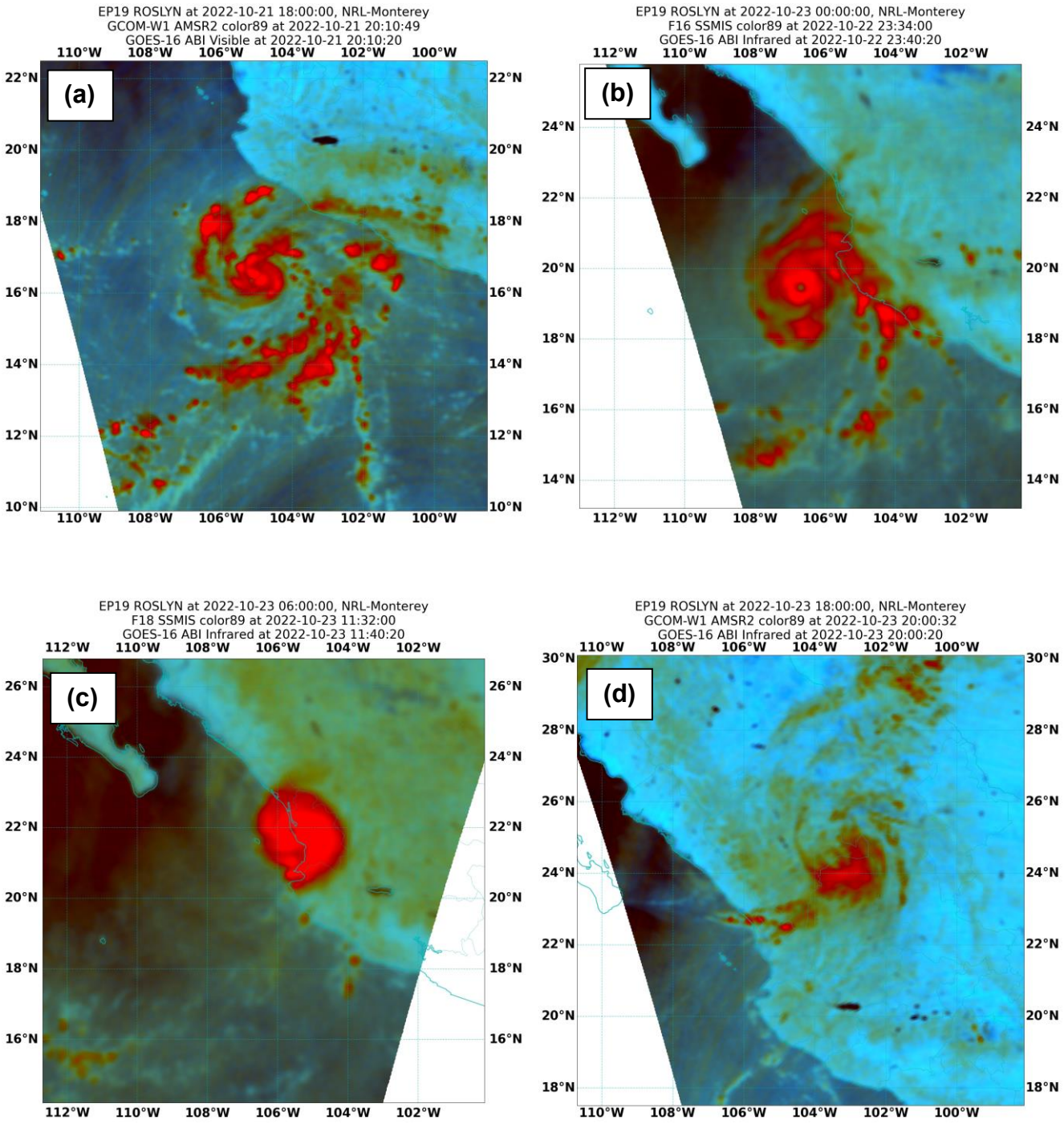


Figure 5. Structural evolution of Hurricane Roslyn in 89-GHz microwave images at (a) 2010 UTC 21 October (AMSR2), soon after it became a hurricane, (b) 2334 UTC 22 October (SSMIS), during the time of peak intensity, (c) 1132 UTC 23 October (SSMIS), about 10 minutes after landfall, and (d) 2000 UTC 23 October (AMSR2), during rapid weakening over Mexico. Images courtesy of the Naval Research Laboratory.

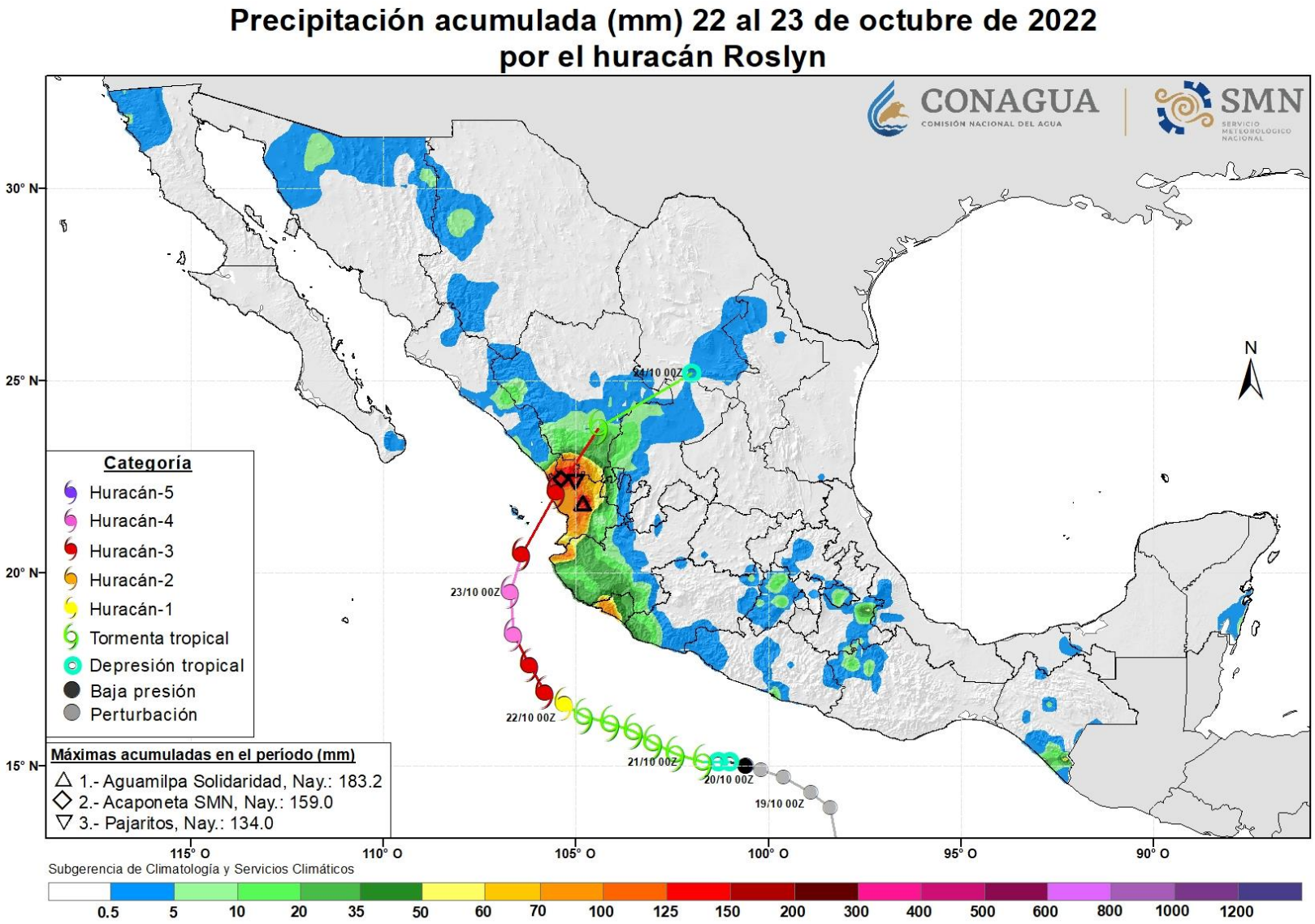


Figure 6. Rainfall accumulations (mm) in Mexico from 22 to 23 October 2022, including the effects of Hurricane Roslyn. Roslyn's track is based on operational location and intensity estimates. Image courtesy of CONAGUA, the National Meteorological Service of Mexico.

Figure 7. Pictures of damage to homes (top) and defoliation of trees (bottom left) from Hurricane Roslyn in Santa Cruz, and near-total felling of papaya trees near La Boquita (bottom right) in Nayarit, Mexico. Images courtesy of Josh Morgerman (iCyclone).

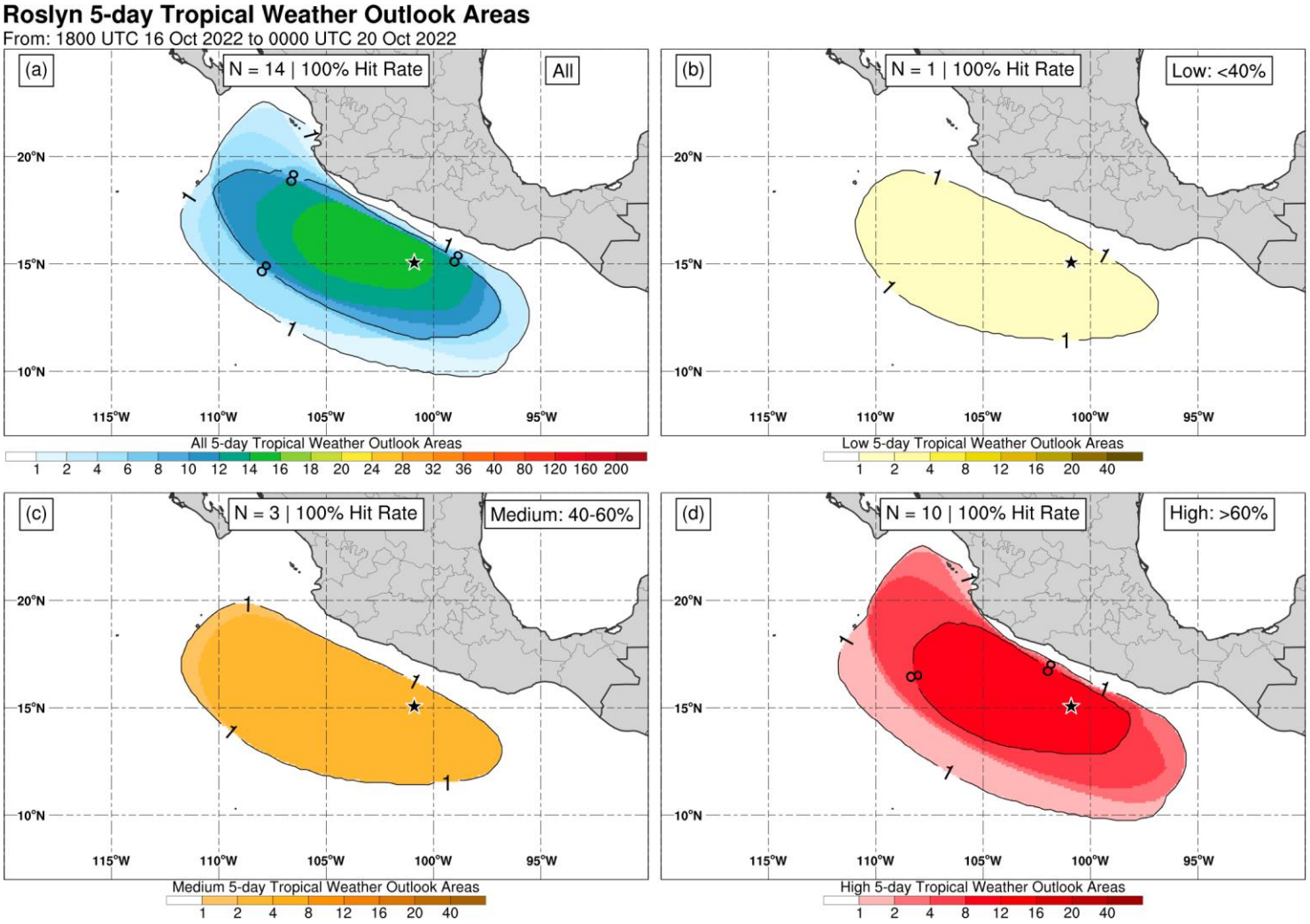


Figure 8. Composites of 5-day tropical cyclone genesis areas depicted in NHC's Tropical Weather Outlooks prior to the formation of Hurricane Roslyn for (a) all probabilistic genesis categories, (b) the low (<40%) category, (c) medium (40–60%) category, and (d) high (>60%) category. Roslyn's location of genesis is indicated by the black star.

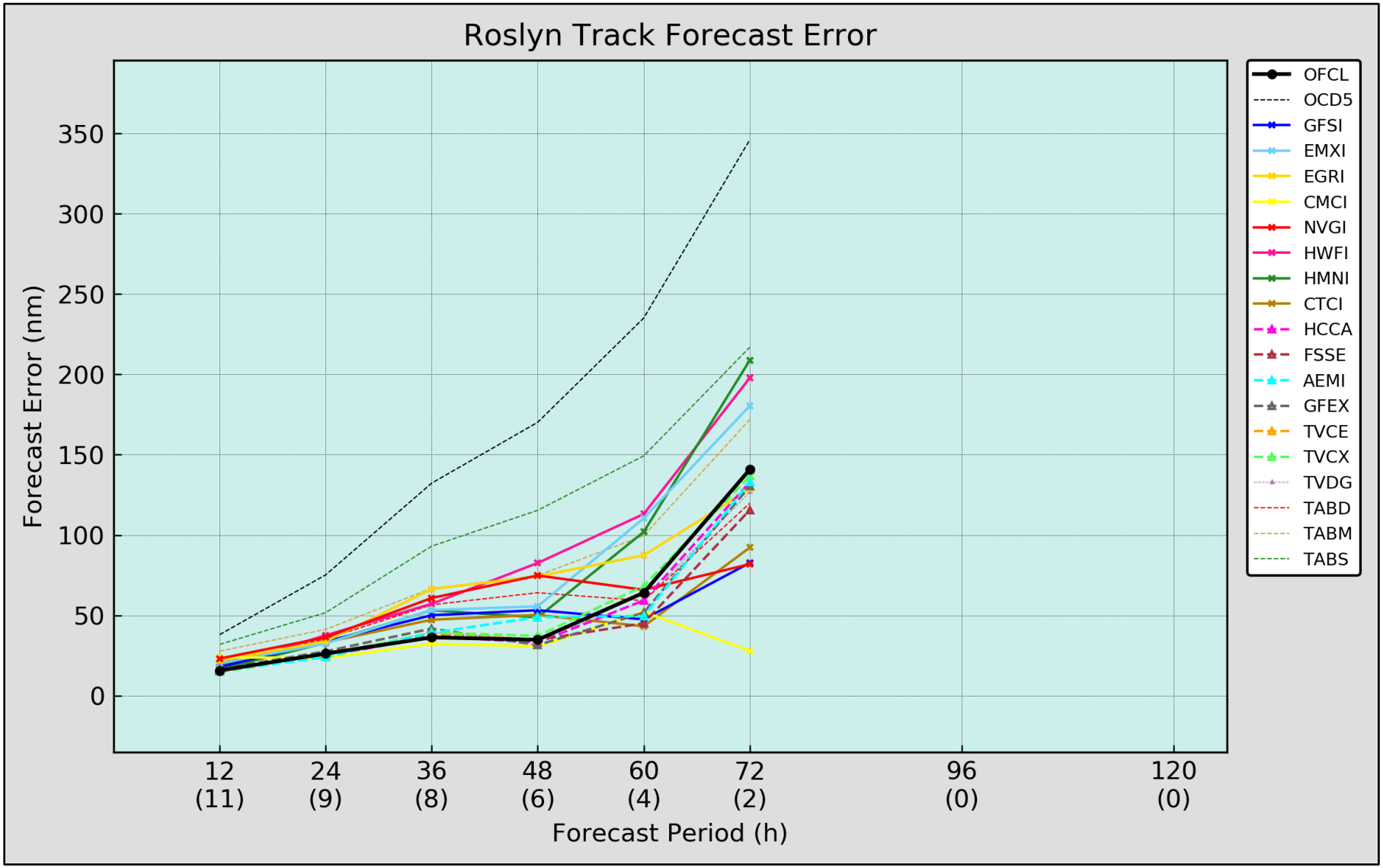


Figure 9. Homogeneous comparison of selected track forecast guidance model errors (in n mi) for Hurricane Roslyn, 20–23 October 2022. Official NHC track errors are denoted by the thick black line.

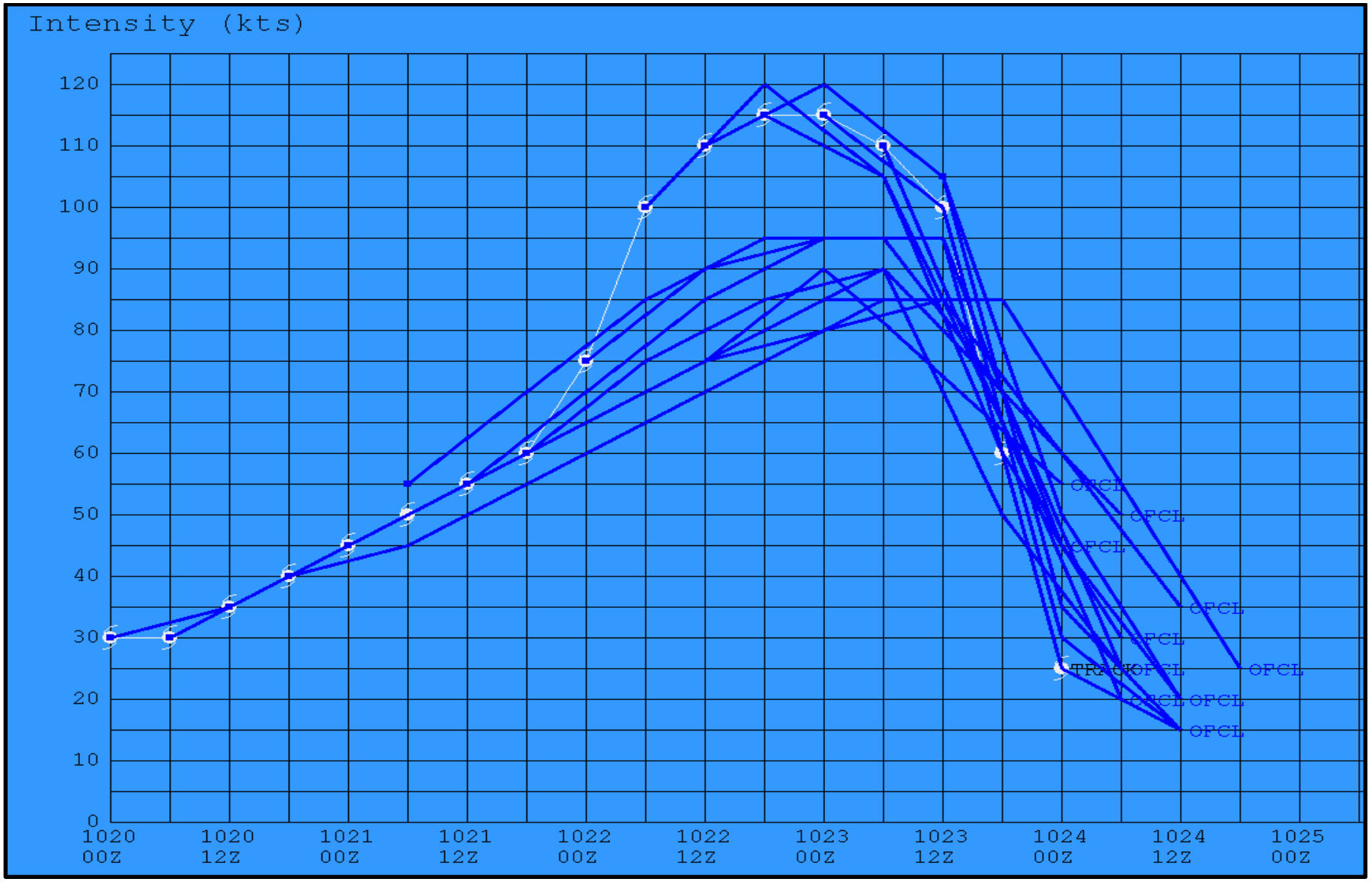


Figure 10. NHC official intensity forecasts (dark blue) for Hurricane Roslyn issued from 0000 UTC 20 October through 0600 UTC 23 October 2022. The NHC best track intensity is denoted by the white line and symbols.

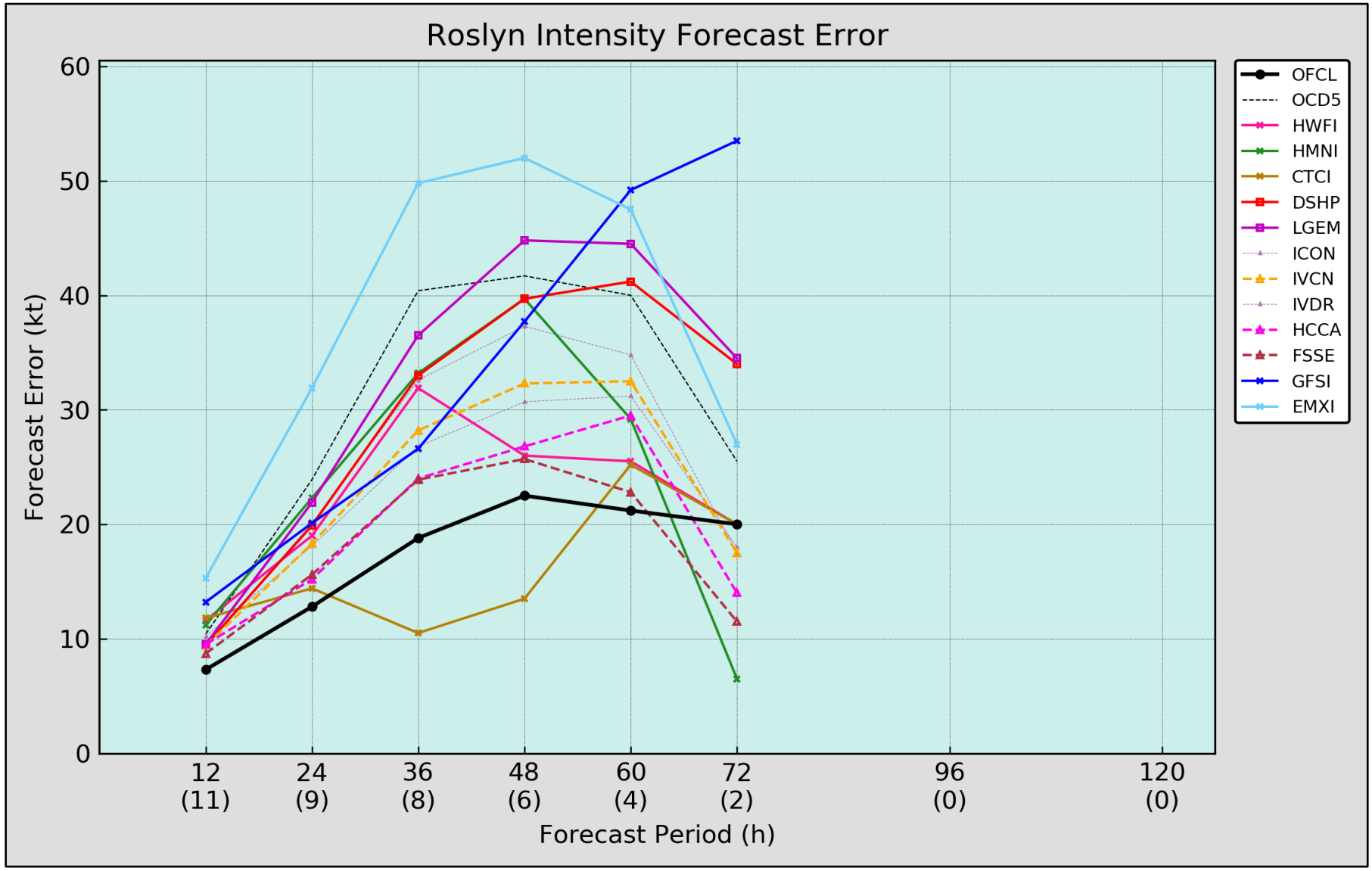


Figure 11. Homogeneous comparison of selected intensity forecast guidance model errors (in kt) for Hurricane Roslyn, 20–23 October 2022. Official NHC intensity errors are denoted by the thick black line.