Tropical Cyclone Report
Hurricane Ernesto
(AL052012)
1-10 August 2012

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Updated 20 February to correct causes of the direct fatalities.

Updated 13 December to correct dates in the last two paragraphs of section a.

Ernesto was a weak tropical storm as it passed through the Windward Islands and eastern Caribbean Sea. It quickly strengthened over the northwestern Caribbean Sea and became a category 2 hurricane (on the Saffir-Simpson Hurricane Wind Scale) just before landfall along the coast of the southern Yucatan Peninsula of Mexico.

a. Synoptic History

Ernesto formed from a tropical wave that exited the west coast of Africa on 27 July. Over the next couple of days, the wave moved westward across the eastern tropical Atlantic and was accompanied by disorganized showers and thunderstorms. By 29 July, when it was located about midway between the west coast of Africa and the Lesser Antilles, a broad low pressure area formed in association with the wave. A couple of days later, the thunderstorm activity became more concentrated, and early on 1 August the low-level circulation became better defined. This resulted in the formation of a tropical depression by 1200 UTC 1 August, centered about 760 n mi east of the Windward Islands. The "best track" chart of the tropical cyclone's path is given in Fig. 1, with the wind and pressure histories shown in Figs. 2 and 3, respectively. The best track positions and intensities are listed in Table 1[1].

The depression moved briskly westward to west-northwestward to the south of a strong mid-level anticyclone. Moderate westerly shear, produced by a large upper-level low to the north of the system, and dry mid-level air initially prevented the depression from strengthening. The next day, convective banding increased in association with the system and the depression became a tropical storm at 1200 UTC 2 August. Later that day, data from a U.S. Air Force Reserve Hurricane Hunter Aircraft indicated that Ernesto strengthened further and had maximum winds of around 45 kt. Early on 3 August, wind shear and dry air caused the convective banding to deteriorate somewhat, and reconnaissance aircraft data indicated that Ernesto weakened slightly as it approached the Windward Islands. The center of the 40-kt tropical storm passed

[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.

just north of Barbados shortly before 0600 UTC 3 August and moved just south of St. Lucia a few hours later. Sustained tropical-storm-force winds were reported on both of those islands.

After entering the eastern Caribbean Sea, shower and thunderstorm activity associated with Ernesto began to gradually increase. The convection became more concentrated near the center by late on 3 August and Ernesto strengthened a little. Despite a much improved structure in early morning visible satellite imagery on 4 August (Fig. 4), data from an Air Force Reserve Hurricane Hunter aircraft indicated that Ernesto had not strengthened further. As Ernesto moved quickly across the central Caribbean Sea the next day, the organization of the system unexpectedly decreased once again while the low-level center became somewhat less defined and exposed to the west of the thunderstorm activity.

On 6 August, Ernesto slowed down as it moved into the western Caribbean Sea. As this occurred the thunderstorm activity became organized in bands around the center, and the tropical storm strengthened. Ernesto then turned west-northwestward and the period of strengthening temporarily stopped, possibly due to the entrainment of mid-level dry air into the inner core. The next day, a period of rapid intensification began as Ernesto moved west-northwestward over the northwestern Caribbean Sea. Satellite imagery (Fig. 4) revealed a significant increase in convective banding and the development of a central dense overcast early on 7 August. Ernesto attained hurricane strength at 1200 UTC that day about 225 n mi east of Chetumal, Mexico. The hurricane turned westward and continued to strengthen as it approached the coast of the southern Yucatan Peninsula of Mexico. Ernesto first made landfall at Cayo Norte in the Banco Chinchorro Islands of Mexico around 0100 UTC 8 August. The hurricane continued to strengthen and reached an estimated peak intensity of 85 kt (category two on the Saffir-Simpson Hurricane Wind Scale) as it made a second landfall at 0315 UTC 8 August, on the southern part of the Yucatan Peninsula near Majahual, Mexico (Fig. 5). After landfall, Ernesto continued westward and weakened below hurricane strength over the south-central Yucatan Peninsula by 1200 UTC 8 August.

The center of Ernesto passed very near Ciudad del Carmen around 0000 UTC 9 August and moved over the extreme southern Bay of Campeche shortly thereafter. Aircraft data and observations from Petróleos Mexicanos (PEMEX) oil rigs (Table 2) indicated that Ernesto re-intensified to just below hurricane strength. This strengthening trend, however, was short-lived as the southern portion of the circulation began interacting with the mountainous terrain of southern Mexico. Ernesto weakened and made a final landfall with an estimated intensity of 55-kt, with its center located about 10 n mi northwest of Coatzacoalcos, Mexico, around 1615 UTC 9 August. The storm then quickly weakened as it moved inland, becoming a tropical depression at 0600 UTC 10 August, and dissipating over the high terrain of southern Mexico shortly thereafter. The mid-level remnants of Ernesto moved across south-central Mexico and were responsible for the formation of eastern North Pacific Tropical Storm Hector on 11 August.

b. Meteorological Statistics

Observations in Ernesto (Figs. 2 and 3) include subjective satellite-based Dvorak technique intensity estimates from the Tropical Analysis and Forecast Branch (TAFB) and the

Satellite Analysis Branch (SAB), and objective Advanced Dvorak Technique (ADT) 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 11 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 Tropical Rainfall Measuring Mission (TRMM), 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 Ernesto.

Although aircraft reconnaissance data were not available at the time of landfall, radar data from Belize (Fig. 5) indicate that the inner-core structure improved between 1700 UTC, when the final aircraft fix was performed, and when landfall occurred on the Yucatan Peninsula about 10 h later. Satellite data reflected an increase in organization, with and eye becoming evident in infrared satellite imagery shortly after Ernesto made landfall (Fig. 6).

The 85-kt estimated landfall and peak intensity of Ernesto is based on a blend of Dvorak intensity estimates of 77 and 90 kt from 0000 UTC and 0300 UTC 8 August 2012, respectively; the 90-kt Dvorak estimate at landfall was performed by TAFB during the post-storm analysis. The improved structure and continued intensification of Ernesto through landfall is also supported by two minimum pressure observations in Mexico. An automated observing site on the Banco Chinchorro Islands reported a minimum pressure of 979.4 mb (Table 2) at 0100 UTC 8 August as the center passed over the area. This was 5 mb lower than the minimum pressure reported by reconnaissance aircraft 8 h earlier. A storm chaser located inland near Buena Vista, Mexico, reported a minimum pressure of 975.0 mb (Table 2) at 0534 UTC while still experiencing strong winds. Based on these data, the estimated minimum pressure at landfall is 973 mb.

Additional selected surface observations from land stations and data buoys are given in Table 2. Ernesto produced sustained tropical-storm-force winds of 37 and 36 kt, respectively at Barbados and St. Lucia on 3 August. Sustained winds of 40 kt with gusts to 50 kt were also recorded along the coast of the Bay of Campeche at both Ciudad del Carmen and Coatzacoalcos. Wind and pressure data from PEMEX oil rigs over the Bay of Campeche are also provided in Table 2. The highest sustained winds from the elevated rigs were 63 and 61 kt at ECO-1 (26.34 m) and Ixtoc-A (34.56m), respectively. Using the standard wind reduction factor from those heights yields 10-m surface wind estimates of 59 kt at ECO-1 and 56 kt at Ixtoc-A. These data, along with aircraft SFMR surface winds of 55-59 kt, support the 60-kt estimated intensity of Ernesto over the extreme southern Bay of Campeche at 0600 UTC 9 August.

There were no believable ship reports of winds of tropical storm force in association with Ernesto.

c. Casualty and Damage Statistics

Media reports indicate that Ernesto is responsible for seven direct deaths[2] and five indirect deaths in Mexico. Three of the direct deaths were wind related, three were caused by water, and one was the result of a lightning strike. None of the deaths occurred in the region where Ernesto made landfall as a hurricane.

Five of the direct fatalities occurred in the Mexican state of Veracruz. The deaths due to wind occurred when three members of a family were killed when a tree struck their pickup truck in Rio Blanco. A fourth member of the family, a six-year-old child, suffered injuries. A teenage girl was killed in a car that was swept away in a river near Tihuatlan, and a 62-year-old man was struck and killed by lightning. In the Mexican state of Tabasco, two men drowned in rough surf conditions while trying to secure a fishing boat. Media reports also indicated that five indirect deaths occurred in the Mexican state of Guerrero due to storm-related traffic accidents.

Although complete damage estimates in Mexico are not available, media reports indicate that Ernesto caused at least $174 million (USD) in damage, including $76.4 million (USD) in agricultural losses. Impacts included fallen trees, power outages, and broken windows in homes and buildings in and near Majahual, Mexico. Mexican officials reported that 85,000 people in Majahual lost power and 1,300 tourists were evacuated from resorts in the state of Quintana Roo, where some roads were also damaged. Fresh-water flooding occurred along the coast of the Bay of Campeche, including in Coatzacoalcos. Flooding and several landslides were reported in the mountainous areas of Veracruz, Puebla, and Oaxaca. Officials indicated that 10,000 houses were partially damaged by flooding in Veracruz. Flooding also occurred well inland in association with the remnants of Ernesto. In the state of Guerrero, along the Pacific coast of southern Mexico, emergency declarations were made in 81 municipalities.

There have been no reports of damage in the Lesser Antilles in association with Ernesto.

d. Forecast and Warning Critique

The genesis of Ernesto was not particularly well forecast, as the formation of this system was not expected to occur as quickly as it did. The tropical wave from which Ernesto formed was introduced into the Tropical Weather Outlook at 0600 UTC 30 July, about 54 h prior to formation. The disturbance was initially assessed to have a low chance (<30%) of development during the next 48 h. The probability was raised to the medium category (30-50%) in the TWO about 18 h prior to formation and to the high category (>50%) at the time of genesis.

A verification of NHC official track forecasts for Ernesto is given in Table 3a. Official forecast track errors were comparable to the mean official errors for the previous 5-yr period,

[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.

except at 48, 72, and 96 h were they were somewhat lower than the long-term mean. Some of the long-range (4- and 5-day) NHC forecasts for Ernesto, when the storm was located over the eastern Caribbean Sea, exhibited a northward bias (Fig. 7) with many of these forecasts incorrectly predicting that Ernesto would move into the south-central Gulf of Mexico. A homogeneous comparison of the official track errors with selected guidance models is given in Table 3b. The European Centre for Medium-Range Weather Forecasts global model (EMXI) was the only individual dynamical model that consistently outperformed the NHC forecasts for Ernesto. The Florida State Superensemble (FSSE) and multi-model consensus TVCA also performed quite well. The FSSE model was superior to the NHC forecasts at all lead times and exhibited the lowest errors at all but 12 h, when it was slightly bettered by the GFS (GFSI).

A verification of NHC official intensity forecasts for Ernesto is given in Table 4a. Official forecast intensity errors were significantly lower than the mean official errors for the previous 5-yr period, except at 12 h when it was slightly higher than the long-term average. Although the NHC forecasts accurately anticipated Ernesto becoming a hurricane over the northwestern Caribbean Sea prior to landfall, the official forecasts slightly under-predicted the intensity of Ernesto around the time it made landfall as a hurricane. A homogeneous comparison of the official intensity errors with selected guidance models is given in Table 4b. The NHC intensity forecast had a lower average error than nearly all of the individual intensity models. However, the consensus models, ICON, IVCN, and FSSE all slightly bettered the NHC forecasts at nearly all forecast lead times.

Watches and warnings associated with Ernesto are listed in Table 5. A hurricane warning was issued by the Government of Mexico for the southern half of the east coast of the Yucatan Peninsula at 1500 UTC 6 August. This was about 36 h prior to Ernesto's landfall in that area.

e. Acknowledgements

Josh Morgerman of iCyclone provided the pressure observation near Buena Vista, Mexico and Fabián Vazquéz Romaña of PEMEX made available observations from PEMEX oil platforms in the Bay of Campeche.

Table 1. Best track for Hurricane Ernesto, 1-10 August 2012.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
01 / 1200	11.6	46.7	1008	30	tropical depression
01 / 1800	12.0	48.2	1008	30	"
02 / 0000	12.4	49.9	1008	30	"
02 / 0600	12.7	51.7	1008	30	"
02 / 1200	13.0	53.6	1007	35	tropical storm
02 / 1800	13.2	55.5	1006	45	"
03 / 0000	13.4	57.5	1005	45	"
03 / 0600	13.6	59.7	1005	40	"
03 / 1200	13.7	61.6	1003	40	"
03 / 1800	13.8	63.3	1003	40	"
04 / 0000	13.8	64.8	1004	40	"
04 / 0600	13.9	66.4	1005	45	"
04 / 1200	14.2	67.9	1005	45	"
04 / 1800	14.6	69.5	1005	45	"
05 / 0000	15.0	71.5	1006	45	"
05 / 0600	15.0	73.8	1006	45	"
05 / 1200	15.0	76.1	1006	45	"
05 / 1800	15.1	77.8	1005	45	"
06 / 0000	15.2	78.9	1003	45	"
06 / 0600	15.4	79.6	998	50	"
06 / 1200	15.7	80.2	996	55	"
06 / 1800	16.2	81.2	995	55	"
07 / 0000	16.7	82.2	994	55	"
07 / 0600	17.3	83.3	993	55	"
07 / 1200	17.8	84.4	988	65	hurricane
07 / 1800	18.4	85.7	983	75	"
08 / 0000	18.7	87.1	979	80	"
08 / 0315	18.8	87.7	973	85	"
08 / 0600	18.8	88.3	973	80	"
08 / 1200	18.8	89.6	983	60	tropical storm
08 / 1800	18.8	90.8	993	50	"
09 / 0000	18.8	91.7	993	55	"
09 / 0600	18.7	92.8	992	60	"
09 / 1200	18.4	93.8	989	55	"
09 / 1800	18.2	94.9	993	50	"
10 / 0000	18.0	96.0	997	40	"
10 / 0600	17.9	97.2	1002	30	tropical depression
10 / 1200					dissipated
08 / 0315	18.8	87.7	973	85	Maximum winds and minimum pressure
08 / 0100	18.7	87.2	977	80	Landfall on Cayo Norte in Banco Chinchorro, Mexico
08 / 0315	18.8	87.7	973	85	Landfall near Majahual, Mexico
09 / 1615	18.3	94.6	989	55	Landfall about 10 n mi northwest of Coatzacoalcos, Mexico

Table 2. Selected surface observations for Ernesto, 1-10 August 2012.

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed		
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)
Country					
Barbados					
Grantley Adams Airport Bridgetown (TBPB)	03/0600	1008	03/1100	37[f]	46
Saint Lucia					
Hewanorra Airport (TLPL)	03/1000	1005	03/1015	36[f]	55
George F.L. Charles Airport (TLPC)	03/1000	1008	03/1200		36
Martinique					
Aimé Césaire Airport (TFFF)			03/1030		37
Mexico					
Banco Chinchorro 18.75°N 87.3°W	08/0100	979.4			
Buena Vista 18.882°N 88.244°W	08/0534	975.0[c]			
Chetumal (MMCM)	07/2345	1003.4[d]			
Cancun (MMUN)			08/1500	28[f]	37
Campeche (MMCP)	08/2000	1003.3	08/1900	25[f]	35
Ciudad del Carmen (MMCE)	09/0000	996.6[d]	08/1949	40[d]	50[d]
Isla Aguada, Campeche (18.85°N 91.43°W)	09/0030	993.9			
Villahermosa (MMVA)	09/1000	1001.4			
Minatitlan/Coatzacoalcos Airport, Veracruz (MMMT)	09/1645	992.9	09/1455	40[f]	50
Veracruz (MMVR)	09/2050	1004.5			
Offshore Observations					
Buoy and C-MAN					
Buoy 41040 14.48°N 53.01°W	02/0750	1012.3	02/1225	31[e]	35
Buoy 42060	03/2050	1011.1	04/0224	31[e]	39

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed		
	Date/ time (UTC)	Press. (mb)	Date/ time (UTC)[a]	Sustained (kt)[b]	Gust (kt)
16.33°N 63.50°W					
Buoy 42059 15.05°N 67.47°W	04/1052	1007.1	04/1433	37[e]	43
Buoy 42058 14.92°N 74.92°W	05/1031	1006.0	05/1031	31[e]	41
Buoy 42057 17.00°N 81.50°W	06/2120	1002.2	06/2120	45[e]	52
Buoy 42056 19.80°N 84.86°W	07/1824	1006.0	07/1550	35	47
Sacrifice Island (SACV4) 19.17°N 96.09°W	09/2000	1004.5	09/1650	34[f]	44
Veracruz Harbor (VERV4) 19.20°N 96.11°W	09/2200	1004.0	09/1950	33[f]	44
PEMEX					
Ku-H (27.5 m)	08/2345	1002.0[g]	09/0354	54 (50[h])	64
ECO-1 (26.34 m)	09/0250	993.4[g]	09/0358	63 (59[h])	76
Rebombeo (27.34 m)	09/0455	994.6[g]	09/0903	49 (46[h])	65
Pol-A (45.31 m)	09/0338	995.1[g]	09/0406		75
Dos Bocas (10 m)	09/0716	995.8	09/1122	25	35
Ciudad del Carmen (10 m)	09/0139	995.0	08/2033	29	42
Cayo Arcas (52.88 m)	08/2304	1004.1[g]	09/0009	37 (33[h])	43
Ixtoc-A (34.56 m)	09/0331	997.1[g]	09/0321	61 (56[h])	79

[a] Date/time is for sustained wind when both sustained and gust are listed.
[b] Except as noted, sustained wind averaging periods for C-MAN and land-based ASOS reports are 2 min; buoy averaging periods are 8 min.
[c] Data courtesy of iCyclone Storm Chaser Josh Morgerman
[d] incomplete or missing data
[e] 1-minute sustained wind
[f] 10-minute sustained wind
[g] Pressure reduced to sea level by Pemex by adding 1 mb for each 8 m
[h] Wind after a reduction to a standard height of 10 m using the mean hurricane dropwindsonde profile.

Table 3a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) track forecast errors (n mi) for Ernesto. Mean errors for the 5-yr period 2007-11 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	72	96	120
OFCL	30.8	50.3	**62.2**	**71.9**	**88.1**	**141.7**	215.1
OCD5	44.9	93.2	135.3	166.3	219.8	276.1	380.6
Forecasts	33	31	29	27	23	19	15
OFCL (2007-11)	30.4	48.4	65.9	83.1	124.4	166.5	213.4
OCD5 (2007-11)	46.9	95.2	151.7	211.6	316.8	404.3	485.2

Table 3b. Homogeneous comparison of selected track forecast guidance models (in n mi) for Ernesto. 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 3a due to the homogeneity requirement.

Model ID	Forecast Period (h)						
	12	24	36	48	72	96	120
OFCL	31.0	49.1	53.0	61.6	77.8	121.0	219.5
OCD5	46.7	96.1	130.7	155.9	195.9	199.0	316.3
GFSI	**25.9**	**43.0**	53.7	62.0	92.8	160.1	275.5
GHMI	34.1	55.3	71.5	91.4	145.7	248.6	450.6
HWFI	**30.0**	52.6	63.8	79.4	79.1	145.1	355.5
UKMI	35.4	61.3	74.2	90.0	136.7	161.9	250.8
EGRI	35.6	61.1	75.3	90.8	135.2	162.5	237.7
EMXI	**28.5**	**40.3**	48.2	**59.9**	88.7	133.0	**184.1**
CMCI	36.4	62.3	75.7	92.2	100.4	**118.6**	**174.2**
AEMI	**27.5**	**43.8**	**52.3**	63.4	93.4	161.8	288.7
FSSE	**26.5**	**37.6**	**44.6**	**52.1**	**73.6**	**102.2**	**133.8**
TVCA	**27.0**	**44.1**	**50.3**	**57.1**	**67.0**	**103.7**	233.6
LBAR	48.5	92.3	122.6	147.6	148.1	153.8	274.1
BAMD	52.9	95.7	121.7	143.9	198.9	254.9	378.2
BAMM	44.5	77.4	100.4	118.8	134.3	137.3	**178.0**
BAMS	48.1	86.5	117.5	135.2	125.1	**104.5**	**196.2**
Forecasts	22	21	20	19	14	10	7

Table 4a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) intensity forecast errors (kt) for Ernesto. Mean errors for the 5-yr period 2007-11 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	72	96	120
OFCL	7.4	**6.9**	**8.1**	**13.7**	**11.7**	**9.7**	**11.7**
OCD5	8.9	10.4	10.6	15.0	16.7	11.1	11.7
Forecasts	33	31	29	27	23	19	15
OFCL (2007-11)	7.1	10.8	13.0	15.0	16.9	17.1	18.1
OCD5 (2007-11)	8.4	12.4	15.4	17.7	20.5	21.5	21.2

Table 4b. Homogeneous comparison of selected intensity forecast guidance models (in kt) for Ernesto. 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	72	96	120
OFCL	7.0	7.4	8.7	14.3	13.4	11.3	11.1
OCD5	9.2	11.9	12.3	16.4	17.3	12.0	13.9
GHMI	**6.6**	8.7	11.5	15.9	17.1	20.4	17.7
HWFI	7.1	9.8	12.7	17.2	17.2	18.3	**10.4**
DSHP	8.3	10.6	11.7	14.8	16.1	15.8	**8.0**
LGEM	8.5	10.6	11.7	17.9	23.3	27.8	21.2
ICON	**6.7**	**7.2**	**7.8**	**10.9**	**11.0**	**9.6**	**9.7**
IVCN	**6.7**	**7.2**	**7.8**	**10.9**	**11.0**	**9.6**	**9.7**
FSSE	7.3	8.2	8.5	**11.2**	**10.0**	**5.9**	**9.0**
Forecasts	27	25	23	21	16	12	9

Table 5. Watch and warning summary for Hurricane Ernesto, 1-10 August 2012.

Date/Time (UTC)	Action	Location
1 / 2100	Tropical Storm Watch issued	Barbados, Dominica, St. Lucia, Martinique, Guadeloupe, St. Vincent and the Grenadines
2 / 2100	Tropical Storm Watch changed to Tropical Storm Warning	Barbados, Dominica, St. Lucia, Martinique, Guadeloupe, St. Vincent and the Grenadines
3 / 0300	Tropical Storm Watch issued	Grenada
3 / 0900	Tropical Storm Warning discontinued	Barbados, St. Vincent and the Grenadines
3 / 1200	Tropical Storm Watch discontinued	Grenada
3 / 1500	Tropical Storm Warning discontinued	All
4 / 1200	Tropical Storm Watch issued	Jamaica
4 / 1500	Tropical Storm Watch changed to Tropical Storm Warning	Jamaica
5 / 0900	Tropical Storm Watch issued	Coast of Honduras from the Honduras/Nicaragua border to Punta Castilla
5 / 1500	Tropical Storm Watch issued	Grand Cayman
6 / 0900	Tropical Storm Watch discontinued	Coast of Honduras from the Honduras/Nicaragua border to Punta Castilla
6 / 0900	Tropical Storm Watch issued	Coast of Honduras from Punta Sal to Honduras/Guatemala border
6 / 0900	Tropical Storm Watch issued	Yucatan Peninsula of Mexico from Punta Gruesa to Tulum
6 / 0900	Tropical Storm Warning discontinued	Jamaica
6 / 0900	Tropical Storm Warning issued	Coast of Honduras from the Honduras/Nicaragua border to Punta Sal including the Bay Islands

6 / 0900	Hurricane Watch issued	East coast of Yucatan Peninsula of Mexico from Chetumal to Punta Gruesa
6 / 1500	Tropical Storm Watch discontinued	Grand Cayman
6 / 1500	Tropical Storm Watch discontinued	East coast of Yucatan Peninsula of Mexico from Punta Gruesa to Tulum
6 / 1500	Tropical Storm Warning issued	East coast of Yucatan Peninsula of Mexico from Punta Allen to Tulum
6 / 1500	Hurricane Watch discontinued	East coast of Yucatan Peninsula of Mexico from Chetumal to Punta Gruesa
6 / 1500	Hurricane Watch issued	Belize
6 / 1500	Hurricane Warning issued	East coast of Yucatan Peninsula of Mexico from Chetumal to Punta Allen
6 / 2100	Hurricane Watch changed to Hurricane Warning	Belize
7 / 0900	Tropical Storm Watch issued	West coast of Yucatan Peninsula of Mexico from Celestun to Chilitepec
7 / 0900	Tropical Storm Warning modified to	East coast of Yucatan Peninsula of Mexico from Punta Allen to Cancun
7 / 1200	Tropical Storm Watch changed to Tropical Storm Warning	West coast of the Yucatan Peninsula of Mexico from Celestun to Chilitepec
7 / 1500	Tropical Storm Warning modified to	East coast of the Yucatan Peninsula of Mexico from Tulum to Cancun
7 / 1500	Hurricane Warning modified to	East coast of the Yucatan Peninsula of Mexico from Chetumal to Tulum
7 / 1800	Tropical Storm Warning modified to	East coast of the Yucatan Peninsula of Mexico from Tulum to Cabo Catoche
7 / 1800	Hurricane Warning issued	Cozumel
7 / 2100	Tropical Storm Watch discontinued	All
7 / 2100	Tropical Storm Warning discontinued	Coast of Honduras from Honduras/Nicaragua border to Punta Sal including the Bay Islands

7 / 2100	Hurricane Warning changed to Tropical Storm Warning	Coast of Belize from the Belize/Guatemala border to Belize City
8 / 0300	Tropical Storm Watch issued	Coast of Mexico from Barra de Nautla to Tuxpan
8 / 0300	Hurricane Watch issued	Coast of Mexico from Barra de Nautla to Punta El Lagarto
8 / 0900	Tropical Storm Watch changed to Tropical Storm Warning	Coast of Mexico from Barra de Nautla to Tuxpan
8 / 0900	Hurricane Warning changed to Tropical Storm Warning	East coast of the Yucatan Peninsula of Mexico from Tulum to Chetumal
8 / 0900	Tropical Storm Warning discontinued	East coast of the Yucatan Peninsula of Mexico from Tulum to Cabo Catoche
8 / 0900	Tropical Storm Warning modified to	Coast of Mexico from Celestún to Coatzacoalcos
8 / 0900	Hurricane Watch discontinued	All
8 / 0900	Hurricane Warning discontinued	Cozumel
8 / 0900	Hurricane Warning issued	Coast of Mexico from Coatzcoalcos to Barra de Nautla
8 / 1200	Hurricane Warning changed to Tropical Storm Warning	Coast of Belize from Belize City to Belize/Mexico border
8 / 1200	Tropical Storm Warning discontinued	Coast of Belize south of Belize City
8 / 1500	Hurricane Warning changed to Hurricane Watch	Coast of Mexico from Coatzcoalcos to Barra de Nautla
8 / 1500	Tropical Storm Warning discontinued	Coast of Belize from Belize City to Belize/Mexico border
8 / 1500	Tropical Storm Warning discontinued	East coast of the Yucatan Peninsula of Mexico from Tulum to Chetumal
8 / 1500	Tropical Storm Warning modified to	Coast of Mexico from Celestún to Barra de Nautla
9 / 0300	Tropical Storm Warning issued	Coast of Mexico from Veracruz to Barra de Nautla
9 / 0300	Tropical Storm Warning modified to	Coast of Mexico from Chilitepec to Campeche

9 / 0300	Hurricane Watch modified to	Coast of Mexico from Veracruz to Barra de Nautla
9 / 0300	Hurricane Warning issued	Coast of Mexico from Veracruz to Chilitepec
9 / 1500	Hurricane Warning changed to Tropical Storm Warning	Coast of Mexico from Veracruz to Chilitepec
9 / 1500	Tropical Storm Warning discontinued	Coast of Mexico from Chilitepec to Campeche
9 / 1500	Tropical Storm Warning discontinued	Coast of Mexico from Veracruz to Barra de Nautla
9 / 1500	Hurricane Watch discontinued	All
10 / 0300	Tropical Storm Warning discontinued	All

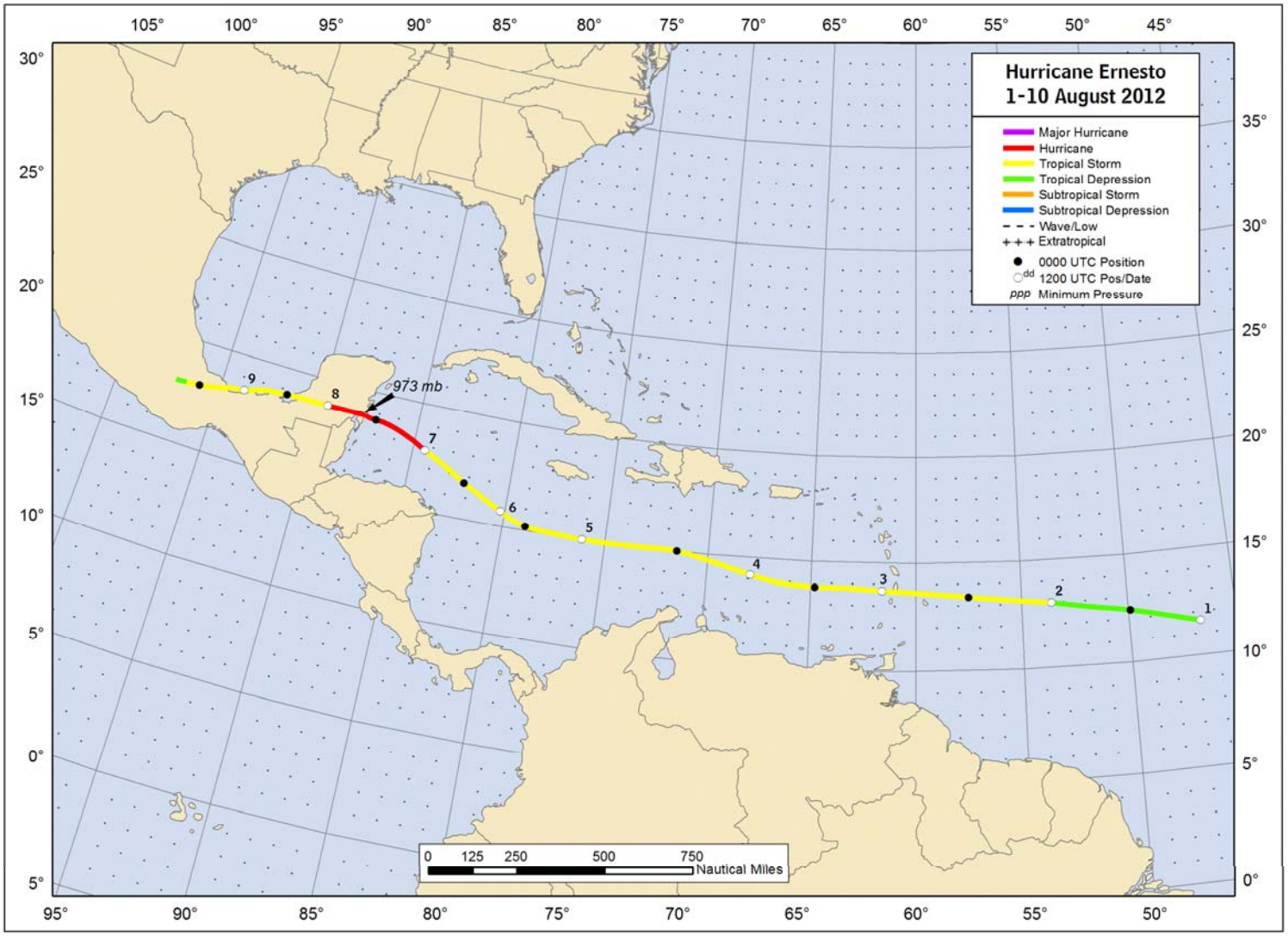


Figure 1. Best track positions for Hurricane Ernesto, 1-10 August 2012.

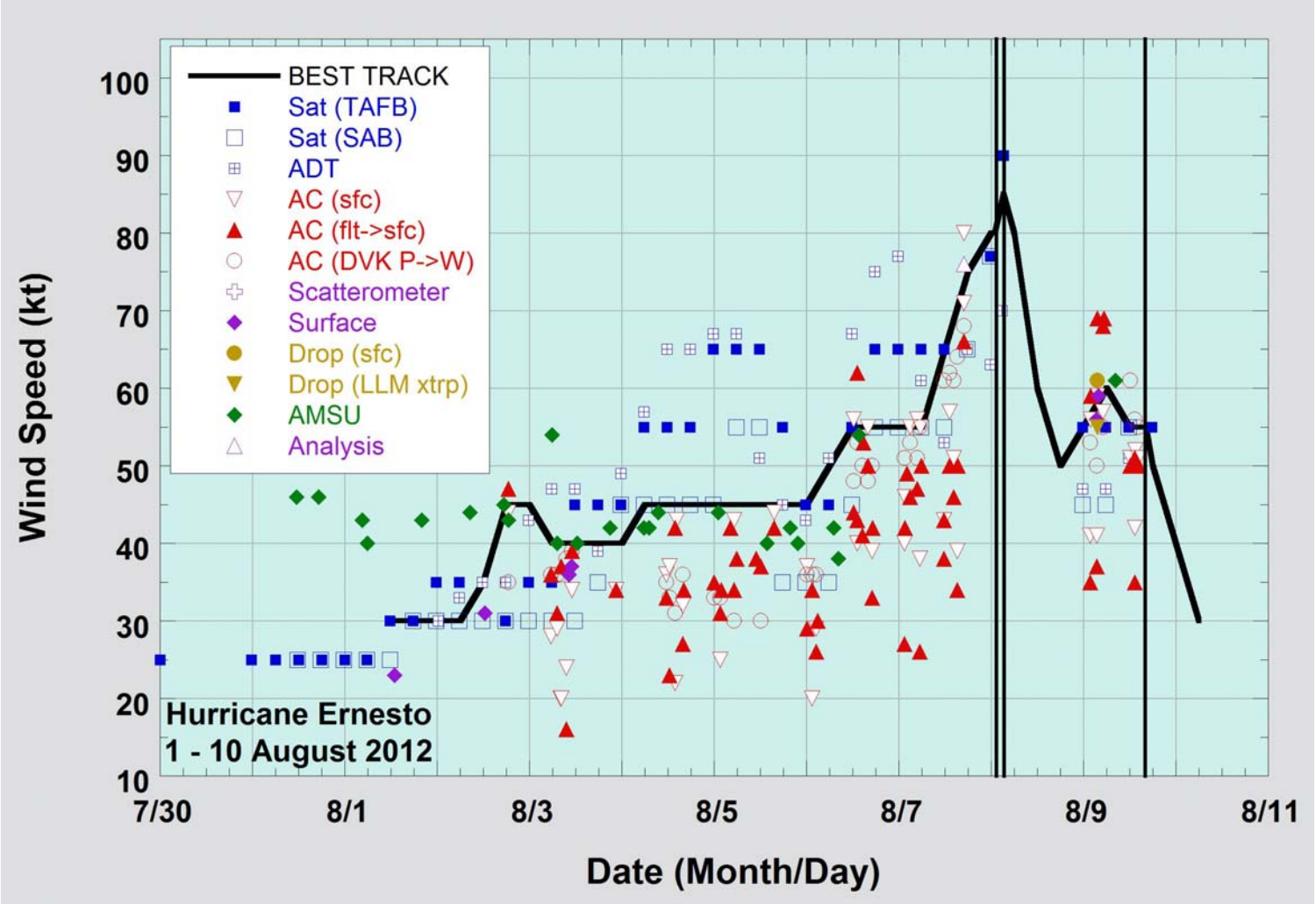


Figure 2. Selected wind observations and best track maximum sustained surface wind speed curve for Hurricane Ernesto, 1-10 August 2012. Advanced Dvorak Technique estimates represent CI numbers. AMSU intensity estimates are from the Cooperative Institute for Meteorological Satellite Studies technique. Note that the TAFB Dvorak satellite intensity estimate at the time of landfall on 8 August was performed in post-analysis. Dashed vertical lines correspond to 0000 UTC and the solid vertical lines correspond to the time of landfalls.

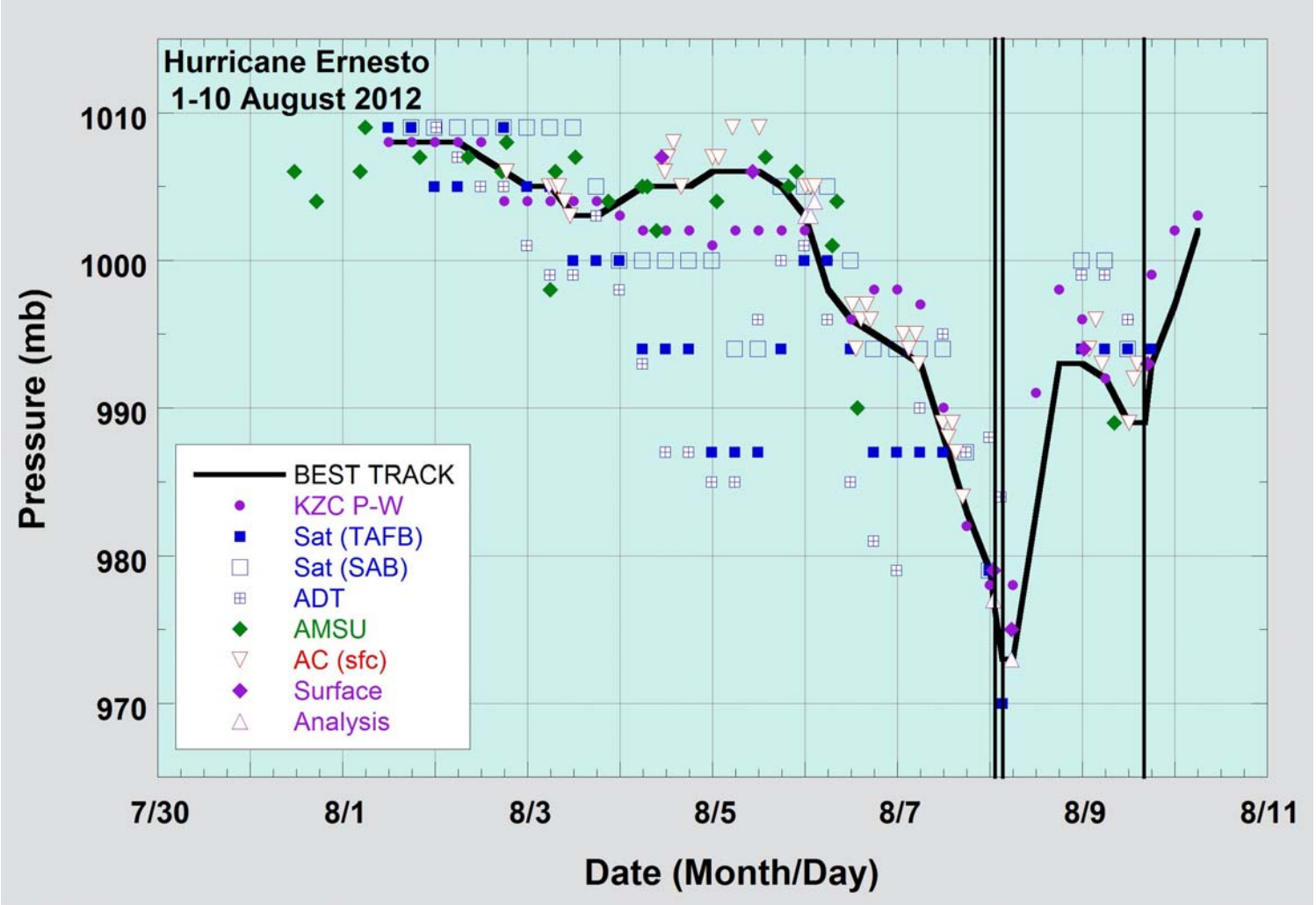
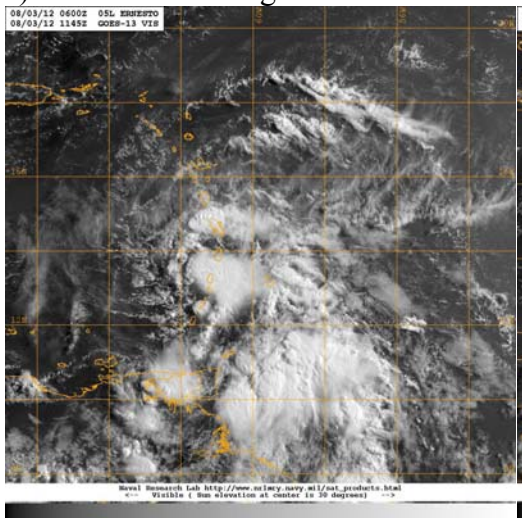
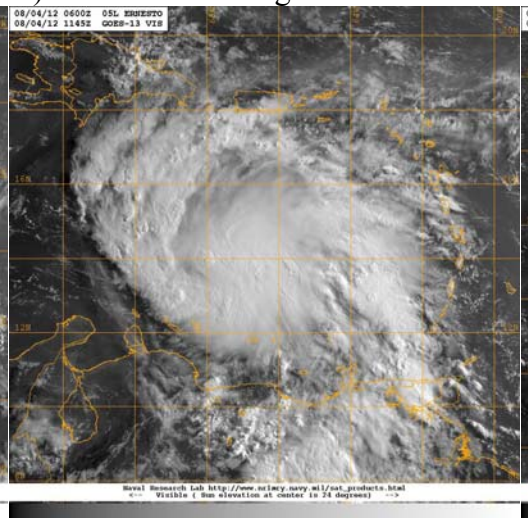


Figure 3. Selected pressure observations and best track minimum central pressure curve for Hurricane Ernesto, 1-10 August 2012. Advanced Dvorak Technique estimates represent CI numbers. AMSU intensity estimates are from the Cooperative Institute for Meteorological Satellite Studies technique. The KZC P-W values are obtained by applying the Knaff-Zehr-Courtney pressure-wind relationship to the best track wind data. Note that the TAFB Dvorak satellite estimate at the time of landfall on 8 August was performed in post-analysis. Dashed vertical lines correspond to 0000 UTC and the solid vertical lines correspond to the time of landfalls.

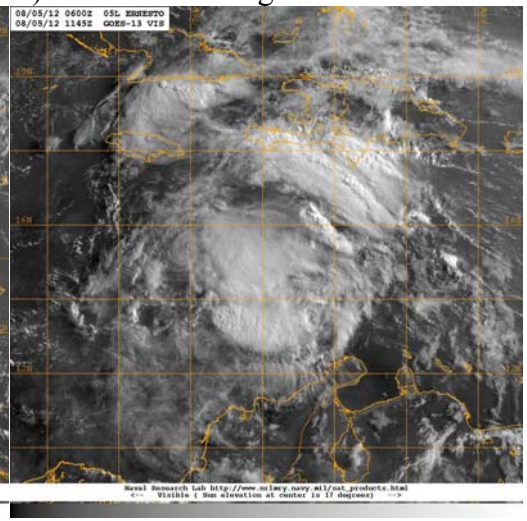
a) 1145 UTC 3 August



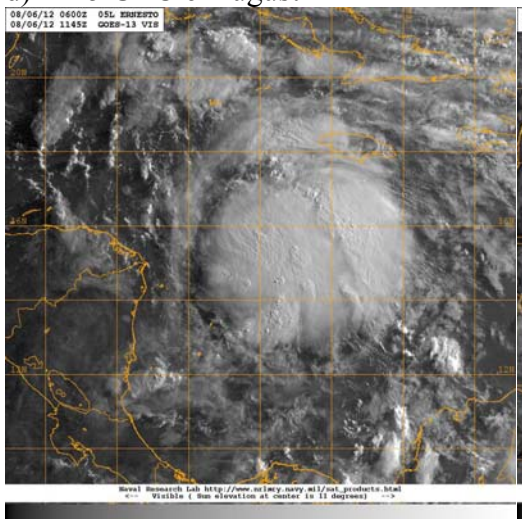
b) 1145 UTC 4 August



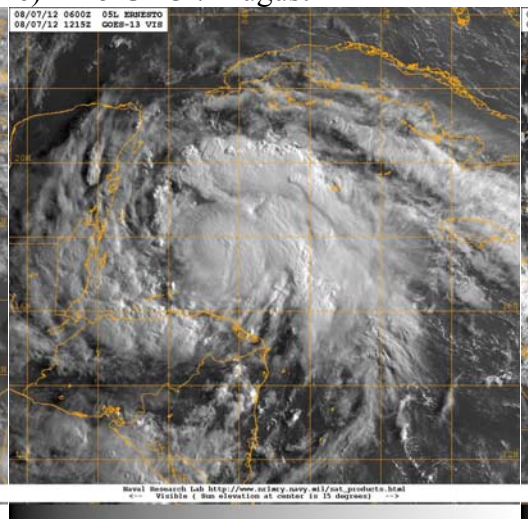
c) 1145 UTC 5 August



d) 1145 UTC 6 August



e) 1145 UTC 7 August



f) 2045 UTC 7 August

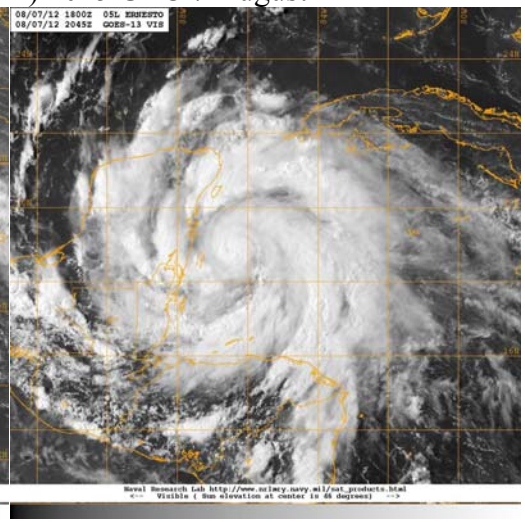


Figure 4. Visible satellite imagery of Ernesto from 3-7 August 2012 showing the variability in organization of the system between 3-7 August. The convective organization quickly increased on 7 August and Ernesto became a hurricane shortly before the time of the final image (f). Images courtesy of the Naval Research Laboratory

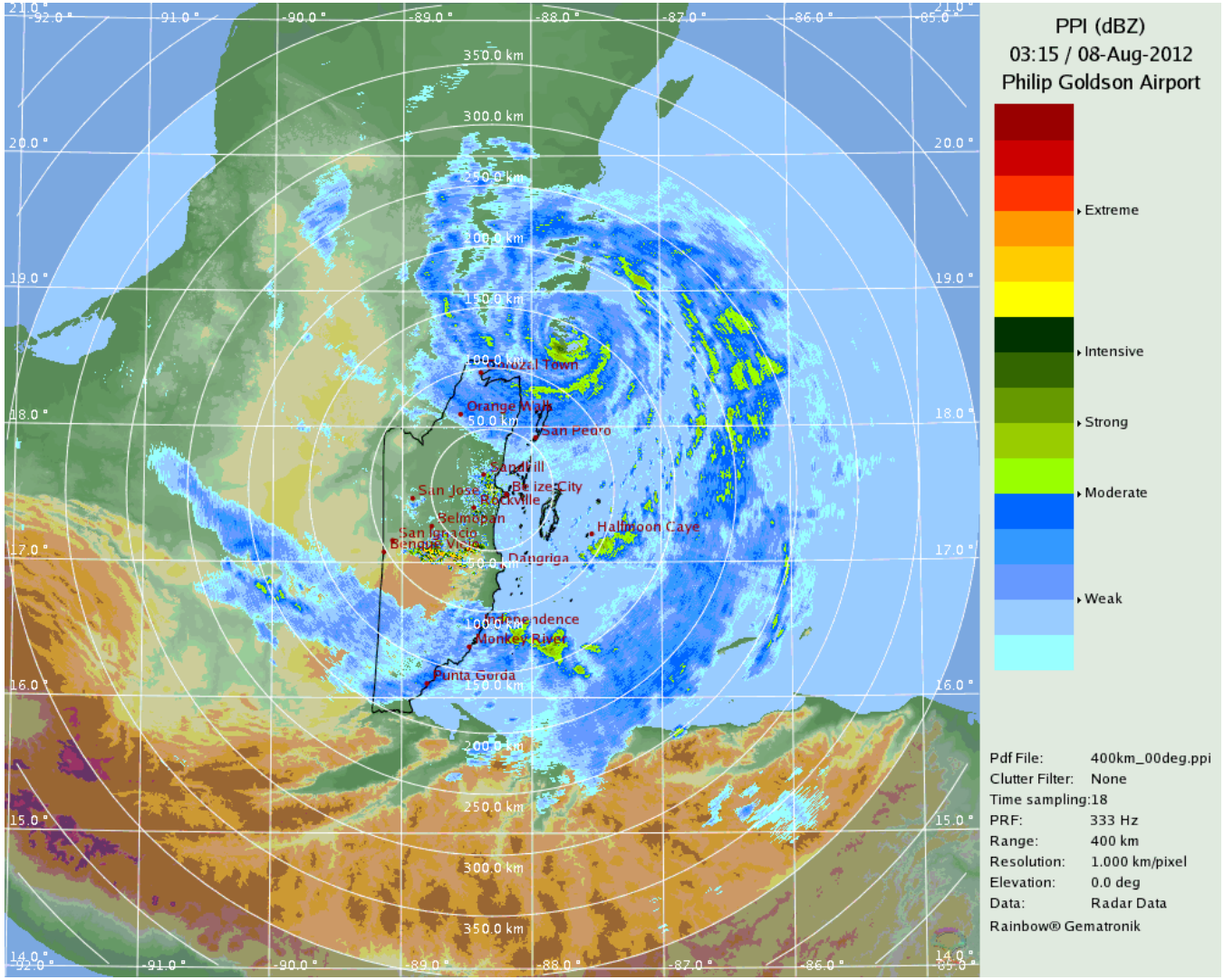


Figure 5. Radar image of Ernesto at landfall near at Majahual, Mexico, around 0315 UTC 8 August 2012. Image courtesy of the National Meteorological Service of Belize.

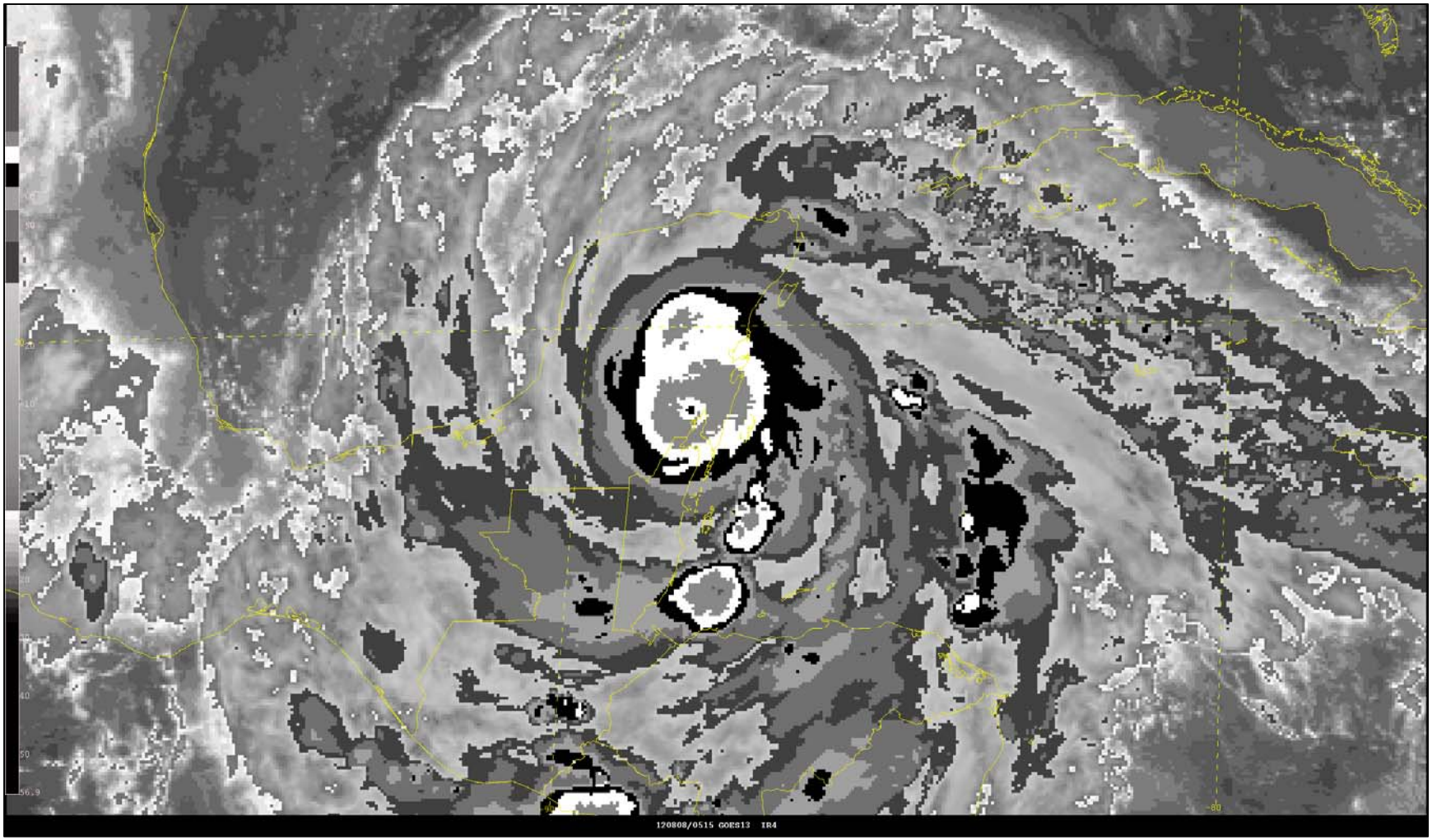


Figure 6. Goes-East Infrared satellite image of Ernesto with the Dvorak BD enhancement curve showing Ernesto at 0515 UTC 8 August 2012, a couple of hours after landfall in Mexico.

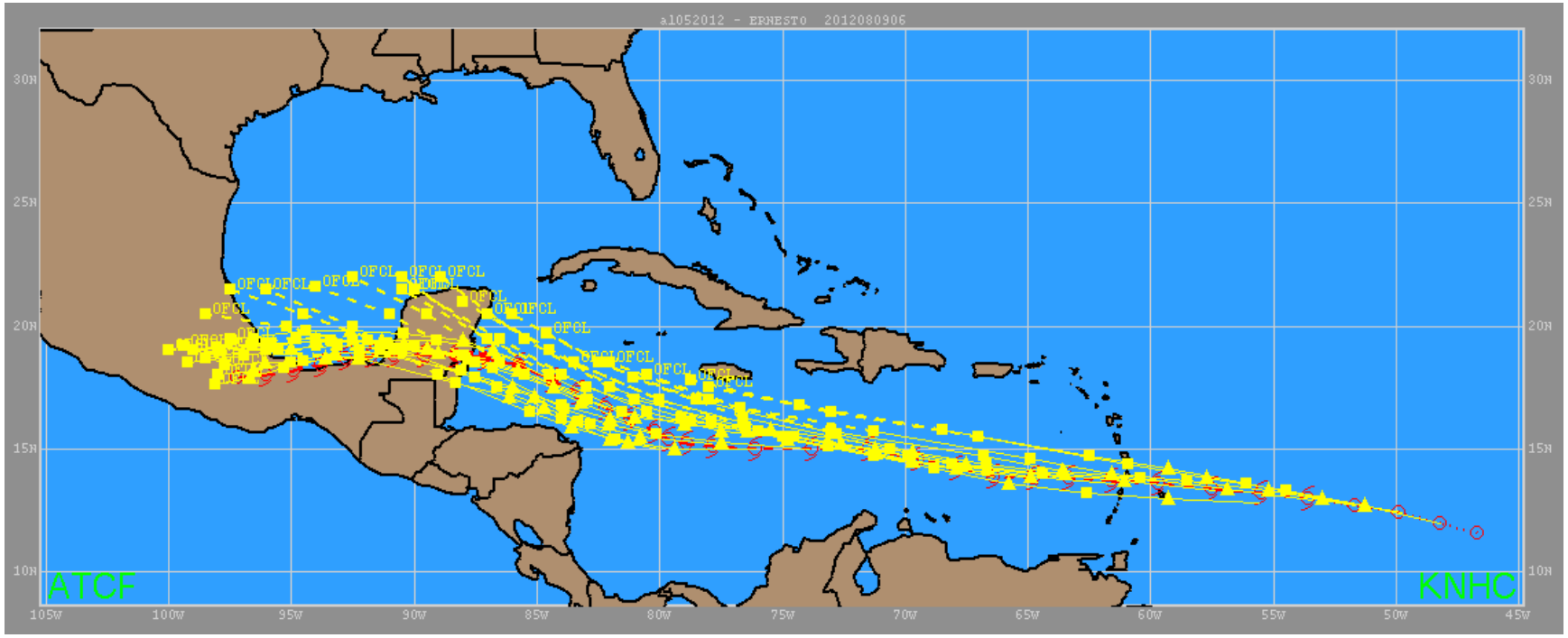


Figure 7. Selected official track forecasts (yellow) for Hurricane Ernesto, 1-10 August 2012. The best track is given by the red line with positions given at 6 h intervals. Note the northward bias of the long-range forecasts near the Yucatan Peninsula and the southern Gulf of Mexico.