

Tropical Cyclone Report  
Hurricane Tomas  
(AL212010)  
29 October-7 November 2010

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Updated 16 March 2011 for revised deaths and damage in St. Lucia, an additional fatality in Curacao, and for additional observations in Martinique.

Tomas, which reached category 2 intensity, was the latest hurricane on record (1851-present) in the calendar year to strike the Windward Islands. It caused significant damage and 8 fatalities in those islands. It later passed near Haiti and was responsible for 35 deaths in that country.

a. Synoptic History

Tomas formed from a vigorous tropical wave that moved off the coast of west Africa on 24 October. The wave produced considerable deep convection as it moved at low latitudes across the eastern Atlantic, and disturbed weather associated with the wave showed signs of organization by 26 October. There was a further increase in organization the following day, prompting initial Dvorak satellite classifications of the system while it was centered about 1000 n mi east-southeast of Trinidad. Upper-level winds became increasingly conducive for development, and curved bands of convection became evident by 28 October. The system continued to become better organized, and it is estimated that a tropical depression formed around 0600 UTC 29 October while centered a little over 400 n mi southeast of Barbados. Upper-tropospheric outflow was very well defined over the system, and the cyclone intensified into a tropical storm within the next 6 h while moving west-northwestward. The “best track” chart of the path of Tomas 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<sup>1</sup>.

While continuing to strengthen, Tomas turned northwestward and its forward speed slowed as it approached the Windward Islands. The cyclone then resumed a west-northwestward heading, and the center passed over the southern coast of Barbados around 0900 UTC 30 October. A couple of hours after its center departed Barbados, Tomas became a hurricane. The eye of the hurricane moved over the northern coast of St. Vincent around 2000 UTC 30 October, while the intense northern eyewall passed over St. Lucia (Fig. 4). Tomas was at its peak intensity of 85 kt during that time.

After moving through the Windward Islands, Tomas encountered an increase in southwesterly shear as it moved west-northwestward to westward over the eastern Caribbean

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<sup>1</sup> 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 *bt* directory, while previous years’ data are located in the *archive* directory.

Sea. The low-cloud circulation center became exposed well (more than 100 n mi) to the west of the main mass of deep convection, and Tomas weakened to a tropical storm by 0000 UTC 1 November. Although the vertical shear relaxed considerably on 2 November, the system was already very disorganized with an elongated and tilted circulation. In addition, some dry air at mid-levels was affecting the system. Tomas degenerated to a tropical depression by 0000 UTC 3 November as it turned northwestward over the central Caribbean Sea. Later that day, the low-level circulation and deep convection became better organized, and Tomas regained tropical storm strength. However, the storm struggled to intensify much further until late on 4 November, when deep convection became more concentrated near the center. Tomas turned northward to northeastward ahead of an unusually deep mid-tropospheric trough, and re-strengthened into a hurricane around 0600 UTC 5 November. Later that day, the center of the hurricane moved between Jamaica and the southwest peninsula of Haiti and then through the Windward Passage. There was a modest increase in shear over Tomas, and the cyclone weakened once again to a tropical storm while it approached the Caicos Islands early on 6 November. Shortly after moving over the Caicos Islands, Tomas intensified into a hurricane for a third and final time.

Hurricane status was short-lived however and on 7 November, vertical shear increased rapidly, and very dry air invaded the circulation of the cyclone. Tomas weakened back to a tropical storm by 1200 UTC 7 November and became a storm-force extratropical cyclone by 0000 UTC 8 November. The post-tropical cyclone gradually weakened, turned sharply eastward and then accelerated and rotated around a broad cyclonic gyre over the western Atlantic on 9 and 10 November. The system was absorbed by another extratropical low a couple hundred miles south of Newfoundland early on 11 November.

#### b. Meteorological Statistics

Observations in Tomas (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 Dvorak 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 flights of the 53<sup>rd</sup> Weather Reconnaissance Squadron of the U. S. Air Force Reserve Command (53WRS) and NOAA. There were 15 missions with 50 center fixes by the 53WRS and 5 missions with 12 center fixes by NOAA. Data and imagery from NOAA polar-orbiting satellites, the NASA Tropical Rainfall Measuring Mission (TRMM) and Aqua, 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 Tomas.

The estimated maximum intensity of this hurricane, 85 kt, is based on a maximum 10-min wind observation of 77 kt from Hewanorra Airport in St. Lucia at 1926 UTC 30 October, adjusted by applying a gust factor of 1.11 to convert from a 10-min average to a maximum 1-min average (Harper et al. 2009). In addition, there was an SFMR-based surface wind measurement of 85 kt at 0537 UTC 31 October from the 53WRS.

It should be noted that late on 3 November and early on 4 November, one center within the broad circulation of the cyclone apparently dissipated while a new one formed farther to the

north and northwest. Consequently, the analyzed northwestward track of Tomas during this time represents a smoothed motion of the overall cyclonic circulation.

Ship reports of winds of tropical storm force associated with Tomas are given in Table 2, and selected surface observations from land stations and data buoys are given in Table 3. Tomas produced phenomenal rainfall in St. Lucia, with totals ranging from 21 to 25 inches and a maximum total of 26.3 inches from Desraches over about a 23-h period. It is likely that 1-min mean winds of hurricane force occurred somewhere along the extreme western portion of the southwest peninsula of Haiti, although no observations were received from that area.

c. Casualty and Damage Statistics

Tomas was responsible for a total of 44 deaths in the Lesser and Greater Antilles.

The hurricane battered St. Lucia, producing severe and widespread damage. High winds toppled trees and power lines. The heavy rains generated mud slides and landslides that flooded or swept away numerous houses, some commercial buildings, bridges, and vehicles. Flood waters rendered roads impassable, and the associated landslides tore away large portions of St. Lucia's main highway. The agricultural sector of the country sustained extensive damage as most of the banana and plantain crops or trees were destroyed. Eight people are confirmed as dead on the island, and total damage is estimated to be 336.15 million U.S. dollars.

Damage in Barbados and St. Vincent was less severe. Tomas downed trees and power lines, ripped off roofs, and knocked out power on these islands. No casualties were reported in Barbados or St. Vincent. Approximately 1200 homes were damaged in Barbados, and island-wide damage was estimated to be near 8.5 million U.S. dollars. The damage estimate is 3.3 million U.S. dollars in St. Vincent and the Grenadines.

The outer rain bands of Tomas resulted in one drowning death in Curacao.

Heavy rains associated with Tomas triggered floods and landslides in Haiti as it passed near that country. The core of the heaviest winds and rains remained offshore, however, which likely prevented an even larger humanitarian disaster. Rains due to Tomas caused mud slides in some areas and flooding that destroyed homes and blocked roads. According to Haiti's Meteorological Service, the death toll in Haiti was 35. There are no monetary damage estimates for that country.

No reports of casualties or damage have been received from Jamaica or the Turks and Caicos Islands.

d. Forecast and Warning Critique

The formation of Tomas was not well predicted. The tropical wave that led to its development was initially noted in the Tropical Weather Outlook (TWO) at 1800 UTC 27 October, 36 h prior to tropical cyclogenesis. At that time it was assigned a "low" or 10% probability of development. In the TWO issued just 12 h before formation, the genesis probability was raised to 30% ("medium"). Guidance from global models such as the GFS and ECMWF forecasts did not depict the development of Tomas to the east of the Lesser Antilles.

Overall, the track of Tomas was well predicted in the NHC forecasts. A verification of NHC official track forecasts for Tomas is given in Table 4a. For forecast intervals greater than 24 h, the mean official forecast track errors were lower than the mean official errors for the previous 5-yr period and considerably lower than the 5-yr means at 96 and 120 h. The mean climatology-persistence (OCD5) errors for this storm were above average, suggesting a more difficult to forecast than normal system. A homogeneous comparison of the official track errors with selected guidance models is given in Table 4b. It is noteworthy that the mean track errors of the official forecasts were mostly less than those of the various consensus models, in particular the variable consensus TVCN, which the OFCL beat at all forecast intervals.

As opposed to track, the intensity of Tomas was poorly handled in the NHC forecasts. A verification of NHC official intensity forecasts for Tomas is given in Table 5a. Official forecast intensity errors were greater than the mean official errors for the previous 5-yr period at all forecast intervals and considerably greater at 48 through 120 h. NHC did not forecast well the initial rapid or near-rapid intensification during Tomas's first day, and this was critical for portions of the Windward Islands. Tomas, like Hurricane Humberto of 2007, was a rare example of a tropical system intensifying to hurricane strength within its first day or so of existence. Scenarios like this, and NHC's inability to forecast them, remain of great concern to the NHC and to the users of its products and services.

Overall, however, there was a high bias in the official intensity forecasts, particularly during the period from after Tomas became a hurricane to 2 November, where the official forecasts failed to anticipate the rapid weakening of the hurricane associated with shear over the Caribbean Sea (Fig. 5). A homogeneous comparison of the official intensity errors with selected guidance models is given in Table 5b. With the exception of the 12-h forecast range, practically all of the numerical guidance had lower intensity forecast errors than the official forecasts. The variable intensity forecast consensus IVCN had the lowest errors of any of the individual statistical-dynamical or dynamical guidance models at 24 through 120 h.

Watches and warnings associated with Tomas are given in Table 6.

#### *Acknowledgements.*

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#### **References**

Harper, B.A., J.D. Kepert, and J.D. Ginger, 2009: Guidelines for Converting Between Various Wind Averaging Periods in Tropical Cyclone Conditions. World Meteorological Organization, 52 pp.

Table 1. Best track for Hurricane Tomas, 29 October-7 November 2010.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
29 / 0600	9.0	53.7	1006	30	tropical depression
29 / 1200	9.8	55.3	1003	35	tropical storm
29 / 1800	10.8	56.8	998	45	"
30 / 0000	11.9	57.8	999	55	"
30 / 0600	12.7	58.9	997	60	"
30 / 0900	13.0	59.5	997	60	"
30 / 1200	13.1	60.1	993	65	hurricane
30 / 1800	13.3	61.0	990	80	"
30 / 2000	13.4	61.2	987	85	"
31 / 0000	13.5	61.7	982	85	"
31 / 0600	13.8	62.4	983	85	"
31 / 1200	14.0	63.3	988	80	"
31 / 1800	14.2	64.4	994	65	"
01 / 0000	14.1	65.8	997	55	tropical storm
01 / 0600	13.9	67.1	1003	45	"
01 / 1200	13.6	68.2	1005	40	"
01 / 1800	13.5	69.2	1005	40	"
02 / 0000	13.5	70.3	1005	40	"
02 / 0600	13.5	71.4	1003	45	"
02 / 1200	13.5	72.5	1004	40	"
02 / 1800	13.6	73.4	1006	35	"
03 / 0000	13.8	73.9	1006	30	tropical depression
03 / 0600	14.0	74.3	1006	30	"
03 / 1200	14.3	74.7	1006	30	"
03 / 1800	14.7	75.1	1004	35	tropical storm
04 / 0000	15.1	75.5	1003	40	"
04 / 0600	15.5	75.9	998	40	"
04 / 1200	15.9	76.2	996	45	"
04 / 1800	16.4	76.2	995	50	"
05 / 0000	17.0	75.7	989	60	"
05 / 0600	17.7	75.2	985	70	hurricane
05 / 1200	18.7	74.7	987	75	"
05 / 1800	19.7	74.0	992	70	"
06 / 0000	20.4	73.1	995	60	tropical storm
06 / 0600	21.4	71.8	992	60	"
06 / 0730	21.7	71.6	992	60	"
06 / 1200	22.6	70.9	990	60	"
06 / 1800	23.8	70.3	988	65	hurricane
07 / 0000	24.9	69.8	987	70	"
07 / 0600	25.4	69.6	990	65	"

07 / 1200	25.7	69.5	992	60	tropical storm
07 / 1800	26.0	69.3	992	50	"
08 / 0000	26.0	68.5	992	50	extratropical
08 / 0600	25.8	67.5	992	50	"
08 / 1200	25.6	66.2	992	50	"
08 / 1800	25.8	64.5	993	45	"
09 / 0000	26.5	62.3	993	45	"
09 / 0600	27.9	60.4	994	45	"
09 / 1200	29.4	58.6	994	45	"
09 / 1800	31.0	56.9	994	45	"
10 / 0000	33.3	55.4	994	45	"
10 / 0600	36.0	54.0	994	45	"
10 / 1200	39.0	53.5	995	35	"
10 / 1800	42.0	53.5	995	35	"
11 / 0000					absorbed
30 / 0900	13.0	59.5	997	60	landfall on the south coast of Barbados
30 / 2000	13.4	61.2	987	85	landfall on the north coast of St. Vincent
06 / 0730	21.7	71.6	992	60	landfall on Caicos Islands
31 / 0000	13.5	61.7	982	85	maximum wind and minimum pressure

Table 2. Selected ship reports with winds of at least 34 kt for Hurricane Tomas, 29 October – 7 November 2010.

Date/Time (UTC)	Ship call sign	Latitude (°N)	Longitude (°W)	Wind dir/speed (kt)	Pressure (mb)
30 / 1000	ZCBU3	14.7	61.2	050 / 41	1011.2
30 / 1300	ZCBU3	15.0	61.4	080 / 35	1010.6
30 / 1700	ZCBU3	15.6	61.7	060 / 38	1008.9
30 / 1800	ZCBU3	15.7	61.8	060 / 35	1008.1
30 / 1900	ZCBU3	15.9	61.8	060 / 35	1007.7
31 / 0000	ZCBU3	15.8	61.8	080 / 42	1008.8
31 / 0400	ZCBU3	15.7	61.7	080 / 50	1009.9
31 / 0500	ZCBU3	15.7	61.6	090 / 45	1009.4
31 / 0600	ZCBU3	15.5	61.5	080 / 45	1007.6
31 / 0700	C6FR3	13.9	60.4	100 / 42	1009.0
31 / 0700	ZCBU3	15.3	61.4	090 / 35	1009.1
31 / 0900	C6FR3	13.7	60.1	130 / 39	1011.0
31 / 1000	9HJF9	15.6	69.3	090 / 38	1010.0
31 / 1100	9HJF9	15.9	69.3	090 / 45	1010.0
01 / 0300	9HJC9	17.3	64.1	090 / 35	1015.0
01 / 0500	C6FR3	14.8	61.4	080 / 38	1011.0
01 / 0600	C6FR3	14.9	61.5	100 / 40	1011.0
01 / 0800	C6FR3	15.6	61.9	080 / 37	1012.0
04 / 0900	WCOB	16.0	75.4	220 / 35	1001.9
04 / 1800	WZZF	13.9	75.5	190 / 38	1001.8
05 / 0200	9HJD9	10.7	76.0	270 / 35	1009.0
05 / 0300	WCOB	16.1	74.1	130 / 37	1004.7
05 / 0600	PHET	22.6	71.0	140 / 37	1007.0
05 / 1300	9HJD9	14.1	78.2	330 / 35	1011.0
05 / 1300	ZCDY2	17.3	70.7	160 / 37	1006.7
05 / 1300	PHET	21.5	69.0	130 / 39	1009.0
05 / 1400	9HJD9	14.3	78.3	350 / 35	1010.0
05 / 1400	PHET	21.3	68.8	130 / 37	1010.0
05 / 1500	9HJD9	14.6	78.5	350 / 35	1010.0
05 / 1500	PHET	21.2	68.5	130 / 37	1010.0
05 / 1600	PBIG	18.9	68.4	150 / 35	1009.0
05 / 1700	9HJD9	15.2	78.9	350 / 35	1010.0
05 / 1900	9HRJ9	19.7	69.9	150 / 35	1007.0
05 / 2000	PBIG	17.7	68.3	160 / 38	1007.0

Date/Time (UTC)	Ship call sign	Latitude (°N)	Longitude (°W)	Wind dir/speed (kt)	Pressure (mb)
05 / 2100	9HJD9	16.4	79.9	300 / 35	1010.0
06 / 0100	ZCDM6	25.6	76.8	340 / 39	1007.1
06 / 0200	9HRJ9	20.2	71.9	160 / 36	1001.0
06 / 0200	ZCDM6	25.7	77.1	350 / 35	1009.8
06 / 0300	9HRJ9	20.3	72.2	270 / 60	997.0
06 / 0300	ZCDM6	25.8	77.0	340 / 40	1011.4
06 / 0600	PBWQ	24.9	74.8	350 / 40	1008.0
06 / 0700	C6FT7	22.6	78.4	340 / 41	1012.0
06 / 0800	C6FT7	22.5	78.0	340 / 38	1012.0
06 / 1000	9HRJ9	20.9	74.7	360 / 36	1007.0
06 / 1100	9HRJ9	21.0	74.9	360 / 42	1007.0
06 / 1100	ZCDF4	22.7	78.5	010 / 38	1015.6
06 / 1200	ZCDY2	21.0	75.1	010 / 39	1008.1
06 / 1200	9HRJ9	21.1	75.3	350 / 38	1009.0
06 / 1200	ZCDF4	22.5	78.1	010 / 35	1016.0
06 / 1300	ZCDY2	21.1	75.3	010 / 39	1009.9
06 / 1300	9HRJ9	21.3	75.7	350 / 38	1009.0
06 / 1400	ZCDY2	21.2	75.6	010 / 41	1010.5
06 / 1400	9HRJ9	21.4	76.0	360 / 38	1011.0
06 / 1500	ZCDY2	21.4	75.9	010 / 40	1010.9
06 / 1500	9HRJ9	21.5	76.2	360 / 38	1011.0
06 / 1700	ZCDY2	21.7	76.5	360 / 39	1013.3
06 / 1800	C6FT7	20.9	74.7	340 / 35	1010.0
06 / 1800	ZCDY2	21.8	76.8	360 / 39	1013.3
06 / 2000	C6FT7	20.7	73.9	330 / 39	1010.0
06 / 2100	C6FT7	20.6	73.7	330 / 40	1010.0
06 / 2300	9HJI9	28.0	71.0	350 / 39	1013.0
07 / 0000	ZCBU5	20.3	72.1	350 / 38	1009.9
07 / 0100	9HJI9	27.8	71.5	340 / 42	1014.0
07 / 0600	ZCBU5	20.6	73.7	340 / 35	1012.2
07 / 0600	PHQW	26.7	72.4	340 / 35	1010.5
07 / 2200	WDC697	26.0	70.5	350 / 40	1002.8

Table 3. Selected surface observations for Hurricane Tomas, 29 October–7 November 2010.

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Storm surge (ft) <sup>c</sup>	Storm tide (ft) <sup>d</sup>	Total rain (in)
	Date/time (UTC)	Press. (mb)	Date/time (UTC) <sup>a</sup>	Sustained (kt) <sup>b</sup>	Gust (kt)			
<b>Barbados</b>								
Grantley Adams Airport	30/0900	983	30/0755	46	91			11.56
<b>Martinique</b>								
Lamentin-Aéroport	30/1800	1006.6	30/2100	33	55			5.77
Fonds St Denis Morne des Cadets			31/0700	62 <sup>e</sup>	93			4.20
Vauclin			31/0400	43	59			3.00
Marin								8.46
Absalon-Fort de France								6.76
Ste Anne-SECI								6.75
Pirogue-Lorrain								6.47
<b>St. Lucia</b>								
Hewanorra Airport <sup>f</sup>	30/1926	997.8	30/1915	77	85			23.35
George F. L. Charles Airport <sup>g</sup>	30/2000	1003.8	31/0050	30	55			21.00
Anse La Raye <sup>h</sup>								15.94
Desraches <sup>i</sup>								26.30
Forestier <sup>j</sup>								25.00
<b>Haiti</b>								
Port-au-Prince	05/0900	1003.9	05/0900	24	34			
<b>Buoys</b>								
42059 15.1 N 67.5 W	01/0800	1009	01/1530	30	37			
41046 23.8 N 70.8 W	06/1800	1001	06/1810	33	41			
41047 27.5 N 71.5 W	07/2200	1008	07/2000	35	45			

<sup>a</sup> Date/time is for sustained wind when both sustained and gust are listed.

- <sup>b</sup> Except as noted, sustained wind averaging periods for land stations outside of the U.S. are 10 min; buoy averaging periods are 8 min.
- <sup>c</sup> Storm surge is water height above normal astronomical tide level.
- <sup>d</sup> Storm tide is water height above National Geodetic Vertical Datum (1929 mean sea level).
- <sup>e</sup> Site on top of a hill (1673 feet asl) and subject to strong wind enhancement.
- <sup>f</sup> The pressure sensor at Hewanorra failed around the time of the minimum reading.
- <sup>g</sup> GFL Charles wind speed and direction from SUTRON AWS.
- <sup>h</sup> Anse la Raye is located at 13° 56' 09.9"N 61° 02' 40.7"W. The elevation is 305 feet. Rainfall occurred from 06:19:56 UTC on 10/30/2010 to 07:03:20 UTC on 10/31/2010.
- <sup>i</sup> Desraches is located at 13° 51' 12.1"N 61° 01' 14.2"W. The elevation is at 2070 feet. Rainfall occurred from 08:08:59 UTC on 10/30/2010 to 07:03:57 UTC on 10/31/2010.
- <sup>j</sup> Forestierre is located at 13° 58' 44.1"N 60° 57' 53.9"W. The elevation is 876 feet. Rainfall occurred from 08:04:29 UTC on 10/30/2010 to 07:03:20 UTC on 10/31/2010.

Table 4a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) track forecast errors (n mi) for Hurricane Tomas, 29 October–7 November 2010. Mean errors for the 5-yr period 2005-9 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 (Tomas)	39.0	58.4	<b>68.7</b>	<b>71.7</b>	<b>101.3</b>	<b>131.5</b>	<b>125.1</b>
OCD5 (Tomas)	54.4	101.2	155.3	228.1	395.2	553.2	610.4
Forecasts	36	34	32	30	26	22	18
OFCL (2005-9)	31.8	53.4	75.4	96.8	143.8	195.6	252.1
OCD5 (2005-9)	46.9	97.3	155.4	211.6	304.8	387.9	467.8

Table 4b. Homogeneous comparison of selected track forecast guidance models (in n mi) for Hurricane Tomas, 29 October–7 November 2010. 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	36.0	56.9	69.5	73.7	106.1	143.6	125.5
OCD5	56.4	109.2	163.0	248.3	412.0	567.2	601.4
GFSI	<b>32.0</b>	<b>54.3</b>	<b>67.5</b>	82.5	145.1	<b>130.6</b>	180.8
GHMI	<b>35.1</b>	63.9	94.7	132.7	222.4	205.2	214.8
HWFI	50.0	85.0	130.4	175.8	346.6	376.8	487.8
GHMI	<b>35.1</b>	63.9	94.7	132.7	222.4	205.2	214.8
NGPI	49.1	81.0	112.1	138.9	220.6	289.5	384.3
EGRI	42.0	64.7	93.8	114.8	133.2	167.3	177.0
EMXI	38.0	57.7	78.8	101.4	<b>103.0</b>	<b>109.1</b>	150.0
AEMI	<b>32.5</b>	<b>52.9</b>	<b>67.1</b>	81.3	158.6	217.8	296.7
FSSE	37.5	60.3	78.0	99.0	159.3	187.6	239.9
TCON	37.2	59.3	77.5	99.1	164.3	183.8	185.4
TCCN	36.9	<b>56.3</b>	74.9	101.5	170.7	198.2	194.4
TVCN	36.9	63.6	85.3	93.1	128.6	152.8	207.9
TVCC	36.3	58.5	76.6	89.4	134.6	168.0	229.4
GUNA	<b>35.4</b>	57.2	77.2	95.1	150.8	185.6	193.3
CGUN	<b>35.5</b>	<b>54.0</b>	71.7	95.9	155.8	202.3	192.8
BAMS	53.2	96.7	123.7	143.9	160.9	188.1	276.7
BAMM	46.5	77.3	105.3	138.0	202.7	<b>118.9</b>	135.8
BAMD	64.4	112.1	167.9	261.0	394.5	303.2	540.5
Forecasts	24	21	19	17	14	10	9

Table 5a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) intensity forecast errors (kt) for Hurricane Tomas, 29 October-7 November 2010. Mean errors for the 5-yr period 2005-9 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 (Tomas)	9.7	13.7	15.6	20.2	26.9	30.5	28.3
OCD5 (Tomas)	11.8	16.1	18.6	21.9	21.1	17.2	16.9
Forecasts	36	34	32	30	26	22	18
OFCL (2005-9)	7.0	10.7	13.1	15.2	18.6	18.7	20.1
OCD5 (2005-9)	8.6	12.5	15.8	18.2	21.0	22.7	21.7

Table 5b. Homogeneous comparison of selected intensity forecast guidance models (in kt) for Hurricane Tomas, 29 October-7 November 2010. 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	72	96	120
OFCL	10.0	14.3	16.0	22.4	29.2	35.0	26.1
OCD5	11.4	15.6	16.6	<b>21.5</b>	<b>22.7</b>	<b>18.0</b>	<b>16.9</b>
HWFI	10.5	<b>12.8</b>	<b>13.1</b>	<b>10.4</b>	<b>16.4</b>	<b>25.4</b>	<b>16.6</b>
GHMI	11.2	<b>14.2</b>	<b>15.5</b>	<b>16.0</b>	<b>21.0</b>	<b>25.3</b>	27.9
DSHP	11.4	14.9	<b>15.8</b>	<b>19.7</b>	<b>19.7</b>	<b>23.3</b>	<b>17.0</b>
LGEM	11.3	14.9	<b>14.3</b>	<b>14.6</b>	<b>18.2</b>	<b>26.1</b>	<b>20.3</b>
ICON	10.5	<b>13.3</b>	<b>12.9</b>	<b>13.0</b>	<b>15.8</b>	<b>20.9</b>	<b>16.5</b>
IVCN	10.4	<b>12.8</b>	<b>11.0</b>	<b>12.0</b>	<b>14.1</b>	<b>18.9</b>	<b>14.7</b>
FSSE	10.5	<b>14.2</b>	<b>14.5</b>	<b>15.0</b>	<b>17.9</b>	<b>22.3</b>	<b>15.4</b>
Forecasts	31	28	26	23	19	15	14

Table 6. Watch and warning summary for Hurricane Tomas, 29 October – 7 November 2010.

Date/Time (UTC)	Action	Location
29 / 2100	Tropical Storm Watch issued	Dominica
29 / 2100	Tropical Storm Warning issued	Barbados/St. Vincent/ Grenadines/Grenada/ Martinique/St. Lucia/ Trinidad/Tobago
30 / 0300	Tropical Storm Watch changed to Tropical Storm Warning	Dominica
30 / 0300	Tropical Storm Warning changed to Hurricane Warning	Barbados/St. Vincent/Grenadines/ Martinique/St. Lucia
30 / 1500	Hurricane Warning changed to Tropical Storm Warning	Barbados
30 / 1800	Tropical Storm Warning discontinued	Trinidad
30 / 2100	Tropical Storm Warning discontinued	Barbados
31 / 0300	Hurricane Warning changed to Tropical Storm Warning	St. Vincent/Grenadines/St. Lucia/Martinique
31 / 0600	Tropical Storm Warning discontinued	Tobago/Grenada
31 / 1500	Tropical Storm Warning discontinued	All
2 / 2100	Hurricane Watch issued	Jamaica
3 / 1500	Hurricane Watch changed to Tropical Storm Warning	Jamaica
3 / 2100	Tropical Storm Warning changed to Tropical Storm Watch	Jamaica
3 / 2100	Tropical Storm Watch issued	Santiago de Cuba to Holguín/ S Border Haiti/Dominican Republic to Barahona/ Southeastern Bahamas/Turks and Caicos Islands
3 / 2100	Tropical Storm Warning issued	Haiti
3 / 2100	Hurricane Watch issued	Haiti
4 / 0300	Tropical Storm Watch changed to Hurricane Watch	Southeastern Bahamas/Turks and Caicos Islands
4 / 0300	Tropical Storm Warning changed to Hurricane Warning	Haiti
4 / 0300	Hurricane Watch discontinued	Haiti
4 / 0900	Tropical Storm Watch changed to Tropical Storm Warning	Jamaica
4 / 0900	Hurricane Watch changed to Hurricane Warning	Southeastern Bahamas/Turks and Caicos Islands
4 / 1500	Tropical Storm Watch changed to Tropical Storm Warning	Santiago de Cuba and Holguín

Date/Time (UTC)	Action	Location
4 / 1500	Hurricane Warning issued	Guantanamo
5 / 1500	Tropical Storm Warning discontinued	Jamaica
5 / 1500	Tropical Storm Warning issued	Central Bahamas
5 / 1800	Tropical Storm Watch issued	N Border Haiti/Dominican Republic to Puerto Plata
5 / 2100	Hurricane Warning changed to Tropical Storm Warning	Guantanamo
5 / 2100	Tropical Storm Warning discontinued	Santiago de Cuba and Holguín
6 / 0000	Tropical Storm Watch discontinued	S Border Haiti/Dominican Republic to Barahona
6 / 0300	Tropical Storm Watch changed to Tropical Storm Warning	N Border Haiti/Dominican Republic to Puerto Plata
6 / 0300	Tropical Storm Warning discontinued	Guantanamo/ Central Bahamas
6 / 0900	Hurricane Warning changed to Tropical Storm Warning	Haiti/ Southeastern Bahamas/Turks and Caicos Islands
6 / 1200	Tropical Storm Warning discontinued	Haiti
6 / 1500	Tropical Storm Warning discontinued	All

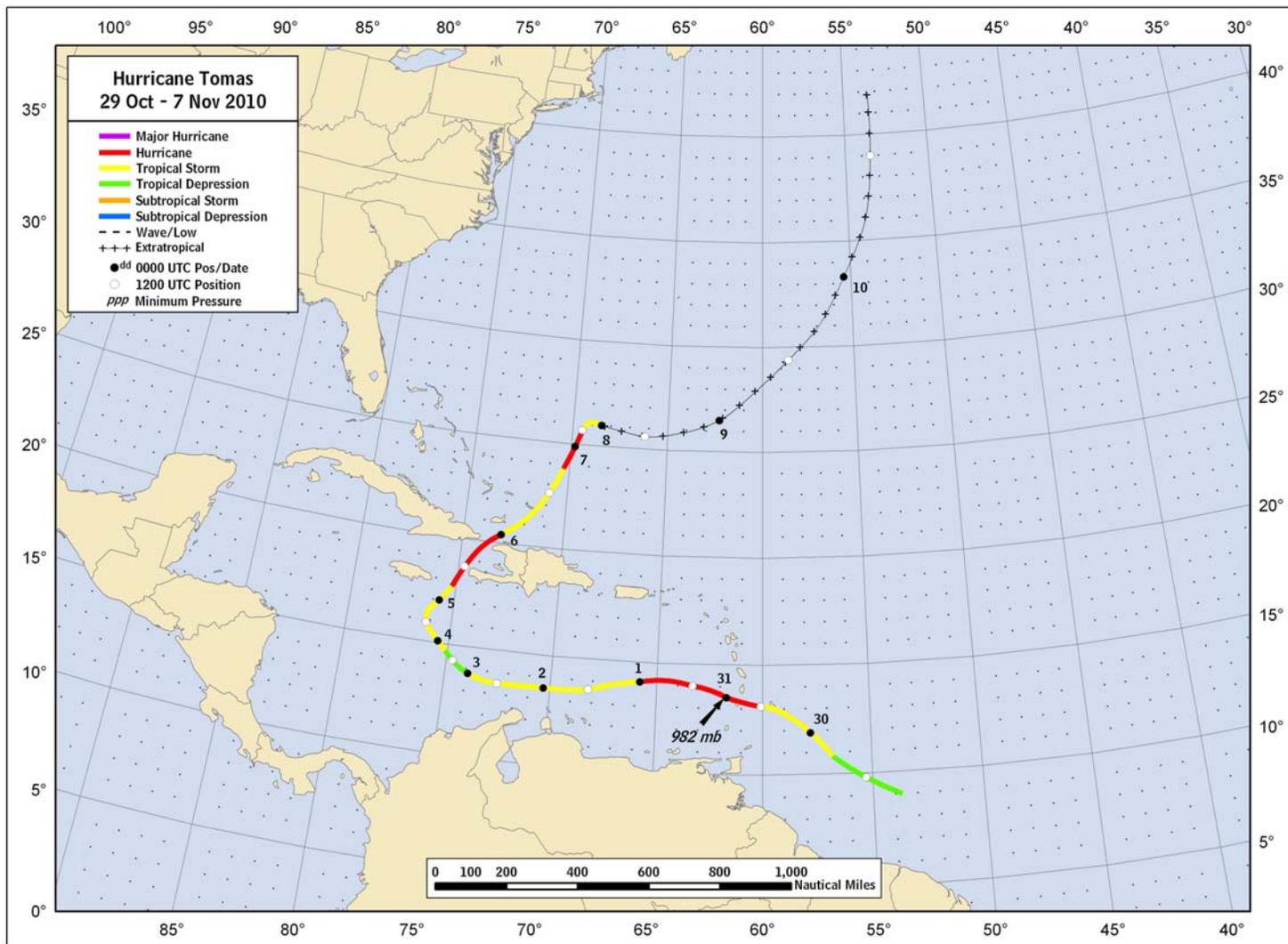


Figure 1. Best track positions for Hurricane Tomas, 29 October-7 November 2010. Track during the extratropical stage is based partially on analyses from the NOAA Ocean Prediction Center.

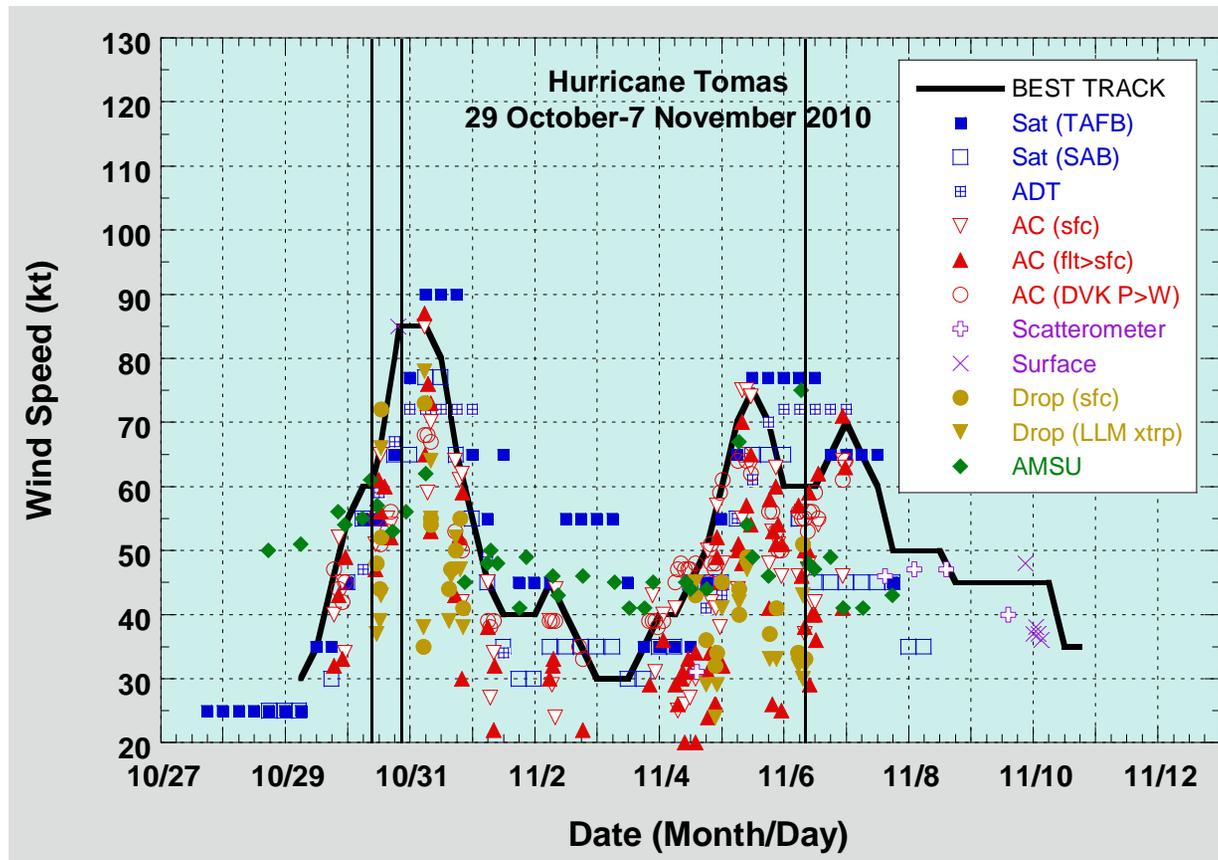


Figure 2. Selected wind observations and best track maximum sustained surface wind speed curve for Hurricane Tomas, 29 October-7 November 2010. Aircraft observations have been adjusted for elevation using 90%, 80%, and 80% adjustment factors for observations from 700 mb, 850 mb, and 1500 ft, respectively. Dropwindsonde observations include actual 10 m winds (sfc), as well as surface estimates derived from the mean wind over the lowest 150 m of the wind sounding (LLM). Advanced Dvorak Technique estimates represent linear averages over a three-hour period centered on the nominal observation time. AMSU intensity estimates are from the Cooperative Institute for Meteorological Satellite Studies technique. Estimates during the extratropical stage are based partially on analyses from the NOAA Ocean Prediction Center. Dashed vertical lines correspond to 0000 UTC. Solid vertical lines denote landfalls.

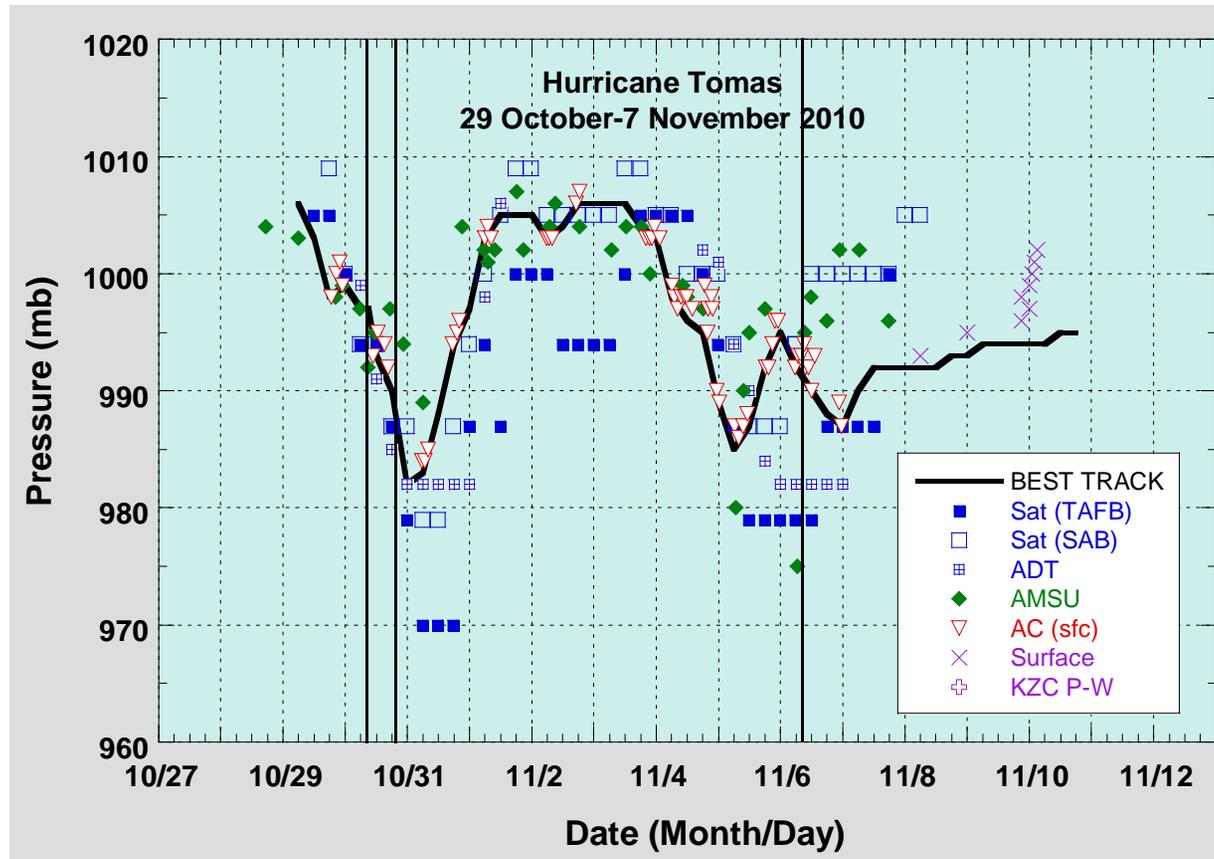


Figure 3. Selected pressure observations and best track minimum central pressure curve for Hurricane Tomas, 29 October-7 November 2010. Advanced Dvorak Technique estimates represent linear averages over a three-hour period centered on the nominal observation time. AMSU intensity estimates are from the Cooperative Institute for Meteorological Satellite Studies technique. Estimates during the extratropical stage are based partially on analyses from the NOAA Ocean Prediction Center. Dashed vertical lines correspond to 0000 UTC. Solid vertical lines denote landfalls.

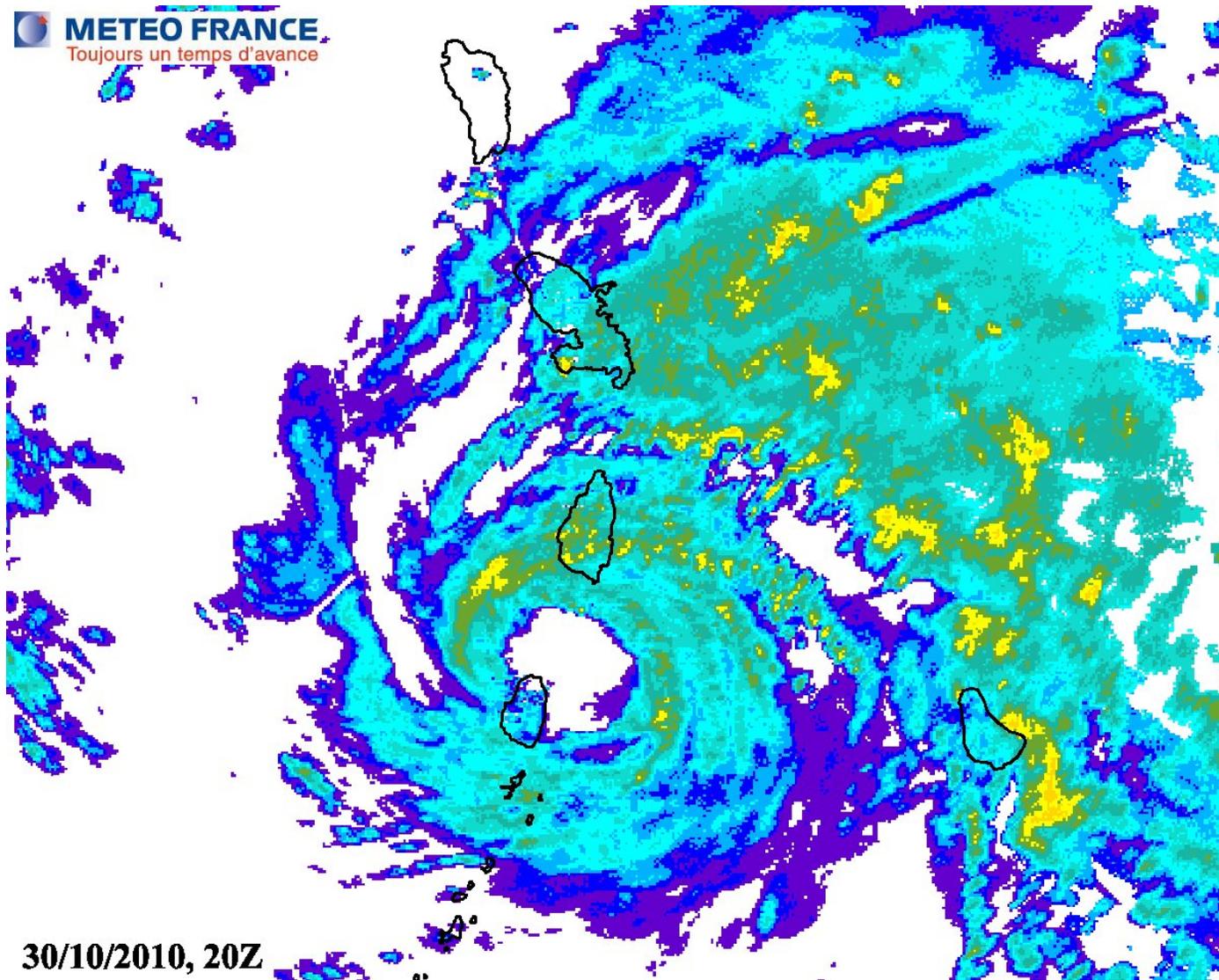


Figure 4. Martinique radar image of Hurricane Tomas at 2000 UTC 30 October 2010, showing landfall in St. Vincent. Image courtesy of Jean-Noel Degrace of Meteo-France.

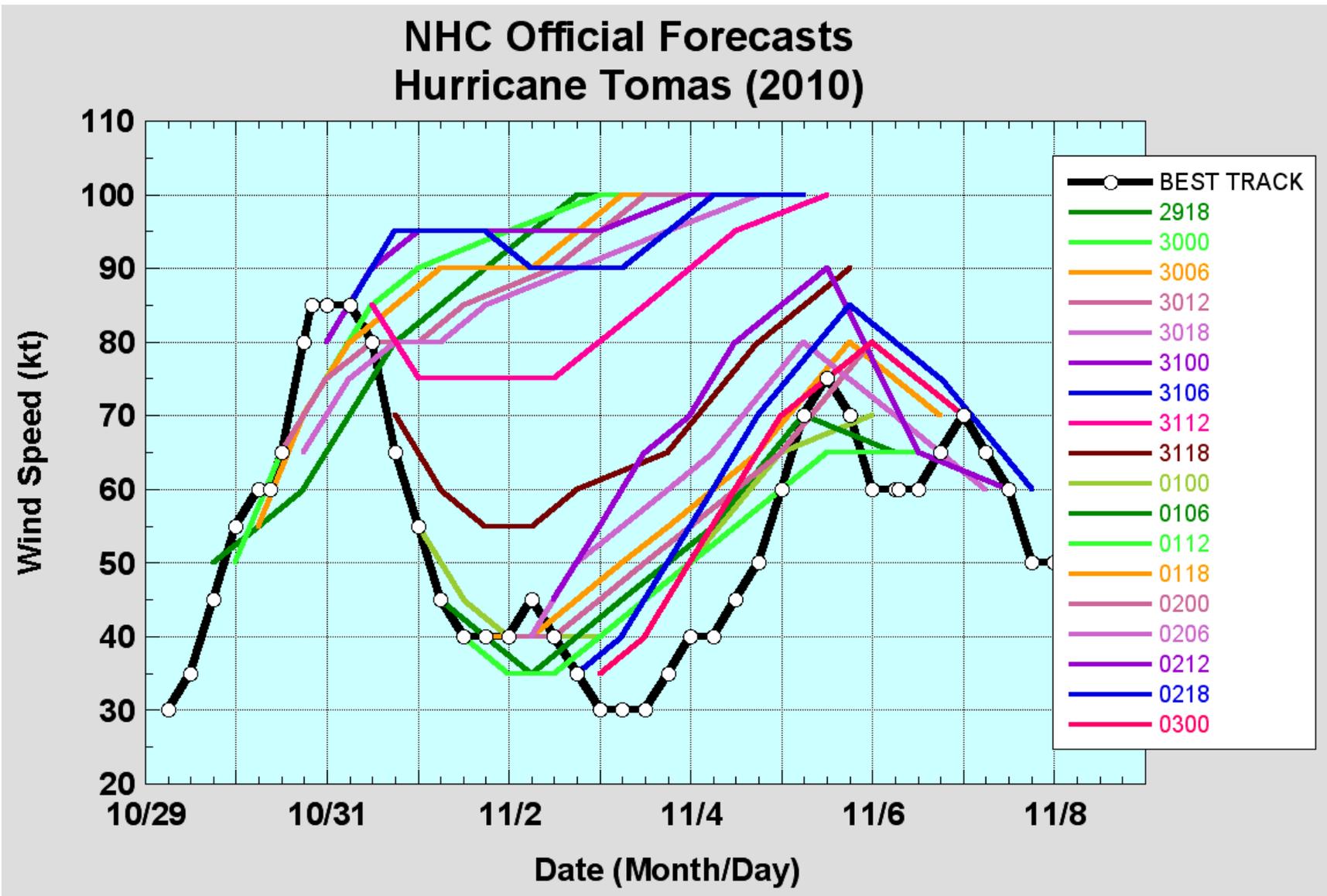


Figure 5. Official intensity forecasts for Tomas from 1800 UTC 29 October through 0000 UTC 3 November 2010.