Tropical Cyclone Report
Hurricane Lane
(EP122012)
15-19 September 2012

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Lane was a short-lived category one hurricane (on the Saffir-Simpson Hurricane Wind Scale) that remained far from land during its lifetime.

a. Synoptic History

Lane was initiated by a tropical wave that moved off the west coast of Africa late on 26 August. The wave was convectively active over the tropical Atlantic, and it spawned Hurricane Leslie well to the east of the Lesser Antilles on 30 August. Afterward the wave continued westward with minimal deep convection, eventually crossing Central America on 6 September. Showers and thunderstorms associated with the system increased when it passed near the Gulf of Tehuantepec on 8 September. The area of disturbed weather continued westward for the next several days with little change until 12 September, when a broad area of low pressure formed about 500 n mi south-southwest of Cabo San Lucas, Mexico. Additional development of this low over the next couple of days appeared to be inhibited by the large circulation envelope associated with developing Tropical Storm Kristy a few hundred n mi to the east. By 15 September, however, Kristy had weakened and was moving farther away from the low. The system acquired a well-defined center of circulation and enough organized deep convection to be designated as a tropical depression by 1200 UTC 15 September, centered about 940 n mi southwest of Cabo San Lucas. 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].

Initially, the cyclone moved generally westward to the south of a weak mid-tropospheric ridge extending from a high pressure system centered over the southwestern United States. The cyclone was in an environment of fairly low shear with sea surface temperatures on the order of 28°C, and it strengthened into a tropical storm by 1800 UTC 15 September. Lane acquired better-defined banding features and continued to strengthen gradually on 16 September, while turning toward the northwest. The storm turned toward the north-northwest on 17 September as it moved along the western periphery of a weak subtropical ridge over the Baja California peninsula. Although Lane was beginning to move over slightly cooler ocean waters, the sea surface was still warm enough to allow the system to strengthen into a hurricane on 17 September. Around 0000 UTC 18 September, Lane reached its estimated maximum intensity of

[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.

75 kt while centered roughly 1000 n mi west-southwest of Cabo San Lucas. Soon thereafter on 18 September, under the influence of cooler ocean waters and increasing southwesterly vertical shear, Lane weakened back to a tropical storm. With most of the associated deep convection being sheared well to the northeast of the center, the tropical cyclone continued to weaken. By 0600 UTC 19 September, Lane stopped producing deep convection and became a remnant low pressure system. The low moved westward for about a day and dissipated shortly after 0600 UTC 20 September about 1300 n mi west of Cabo San Lucas.

b. Meteorological Statistics

Observations in Lane (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. 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 Lane.

The estimated 75-kt maximum intensity of Lane is based on subjective Dvorak estimates of 77 kt from both TAFB and SAB.

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

c. Casualty and Damage Statistics

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

d. Forecast and Warning Critique

The genesis of Lane was very well forecast. The precursor disturbance was first included in the Tropical Weather Outlook 42 h prior to genesis, and was given a "low" (less than 30%) chance of genesis within the next 48 hours. The probability of tropical cyclone formation was raised to the "medium" (30 to 50%) category 36 h prior to genesis, and increased to the "high" (greater than 50%) category 12 h before genesis occurred.

A verification of NHC official track forecasts for Lane is given in Table 2a. The official track forecast errors were lower than the mean NHC errors for the previous 5-yr period at all forecast lead times. This is notable given that the climatology and persistence (OCD5) errors were higher than the previous 5-yr period for all forecast intervals. A homogeneous comparison of the official track errors with selected guidance models is given in Table 2b. While the official forecasts were generally good, several models performed even better. In fact, the track model consensus (TVCE) bested the official forecasts at all forecast intervals. One of the reasons for

the superiority of the numerical guidance was that, in several cases, the models more accurately predicted Lane's turn toward the north-northwest than the official forecasts.

A verification of NHC official intensity forecasts for Lane is given in Table 3a. Official forecast and OCD5 intensity errors were lower than their respective mean errors for the previous 5-yr period. A homogeneous comparison of the official intensity errors with selected guidance models is given in Table 3b. All of the intensity guidance models had low errors, which undoubtedly contributed to the low errors of the official forecasts. Both the FSSE and HWFI models had lower mean errors than the official forecast for all forecast intervals. While the sample size was very small, the model guidance was unusually good at 72 h, when nearly every model was better than the NHC official forecast. Only the DSHP model was worse, and its 9-kt average error would typically be considered very good for a 72 h forecast. The low errors of the official and model forecasts are probably related to the climatological rate at which Lane intensified, and later weakened.

There were no coastal watches or warnings issued for Lane.

Table 1. Best track for Hurricane Lane, 15-19 September 2012.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
15 / 1200	13.2	122.8	1006	30	tropical depression
15 / 1800	13.1	123.2	1004	35	tropical storm
16 / 0000	13.1	123.6	1002	40	"
16 / 0600	13.3	124.2	1001	50	"
16 / 1200	13.7	124.7	1001	50	"
16 / 1800	14.1	125.2	997	55	"
17 / 0000	14.7	125.6	995	60	"
17 / 0600	15.5	126.0	993	65	hurricane
17 / 1200	16.4	126.4	993	65	"
17 / 1800	17.2	126.9	988	70	"
18 / 0000	18.0	127.4	985	75	"
18 / 0600	18.8	127.9	989	65	"
18 / 1200	19.6	128.4	995	55	tropical storm
18 / 1800	20.1	129.0	999	45	"
19 / 0000	20.5	129.7	1005	40	"
19 / 0600	20.7	130.5	1009	30	low
19 / 1200	20.8	131.0	1010	30	"
19 / 1800	20.9	131.5	1011	30	"
20 / 0000	21.0	132.2	1012	30	"
20 / 0600	21.0	133.0	1013	25	"
20 / 1200					dissipated
18 / 0000	18.0	127.4	985	75	maximum wind and minimum pressure

Table 2a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) track forecast errors (n mi) for Hurricane Lane, 15-19 September 2012. 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	**25.4**	**32.4**	**49.4**	**64.6**	**99.5**		
OCD5	44.0	78.8	144.2	218.9	349.4		
Forecasts	13	11	9	7	3		
OFCL (2007-11)	28.6	46.3	62.7	78.1	108.0		
OCD5 (2007-11)	38.5	74.8	116.0	159.8	246.1		

Table 2b. Homogeneous comparison of selected track forecast guidance models (in n mi) for Hurricane Lane, 15-19 September 2012. 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 2a due to the homogeneity requirement.

Model ID	Forecast Period (h)						
	12	24	36	48	72	96	120
OFCL	21.0	29.6	47.7	63.9	100.6		
OCD5	42.1	79.4	144.1	221.0	358.4		
GFSI	25.8	31.0	**44.6**	**55.0**	**74.0**		
GHMI	**19.3**	**20.4**	**31.2**	**46.1**	**42.8**		
HWFI	**20.5**	34.5	54.8	**60.1**	**92.7**		
EGRI	**17.0**	40.7	55.1	79.3	106.7		
EMXI	24.6	40.4	60.4	76.3	**79.8**		
CMCI	**20.3**	35.5	**41.3**	**46.4**	**91.9**		
AEMI	26.4	38.7	58.4	75.6	**76.2**		
FSSE	**20.0**	33.6	55.6	68.0	**44.6**		
TVCE	**16.0**	**20.5**	**40.7**	**51.6**	**71.1**		
LBAR	35.2	53.4	91.9	131.6	181.8		
BAMM	35.4	56.3	89.7	127.4	122.3		
BAMD	36.4	53.1	80.1	89.1	**72.6**		
BAMS	28.5	54.9	94.3	148.2	202.8		
Forecasts	10	9	8	6	2		

Table 3a. NHC official (OFCL) and climatology-persistence skill baseline (OCD5) intensity forecast errors (kt) for Hurricane Lane, 15-19 September 2012. 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	**5.0**	**6.8**	**10.0**	**12.9**	**15.0**		
OCD5	7.2	11.2	13.1	17.1	12.3		
Forecasts	13	11	9	7	3		
OFCL (2007-11)	6.4	10.6	13.7	15.1	17.0		
OCD5 (2007-11)	7.5	12.4	16.1	18.4	20.1		

Table 3b. Homogeneous comparison of selected intensity forecast guidance models (in kt) for Hurricane Lane, 15-19 September 2012. 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	5.4	7.0	9.4	10.0	7.5		
OCD5	7.3	10.9	12.1	16.2	16.5		
GHMI	5.8	9.0	12.1	13.2	**7.0**		
HWFI	**5.2**	**5.8**	**4.4**	**6.0**	**3.5**		
FSSE	**4.2**	**3.7**	**5.3**	**8.3**	**3.5**		
DSHP	6.0	**6.7**	**9.0**	**9.5**	9.0		
LGEM	6.6	8.0	10.0	10.8	**1.0**		
ICON	5.7	7.4	**9.0**	**8.5**	**4.5**		
IVCN	5.7	7.4	**9.0**	**8.5**	**4.5**		
Forecasts	12	10	8	6	2		

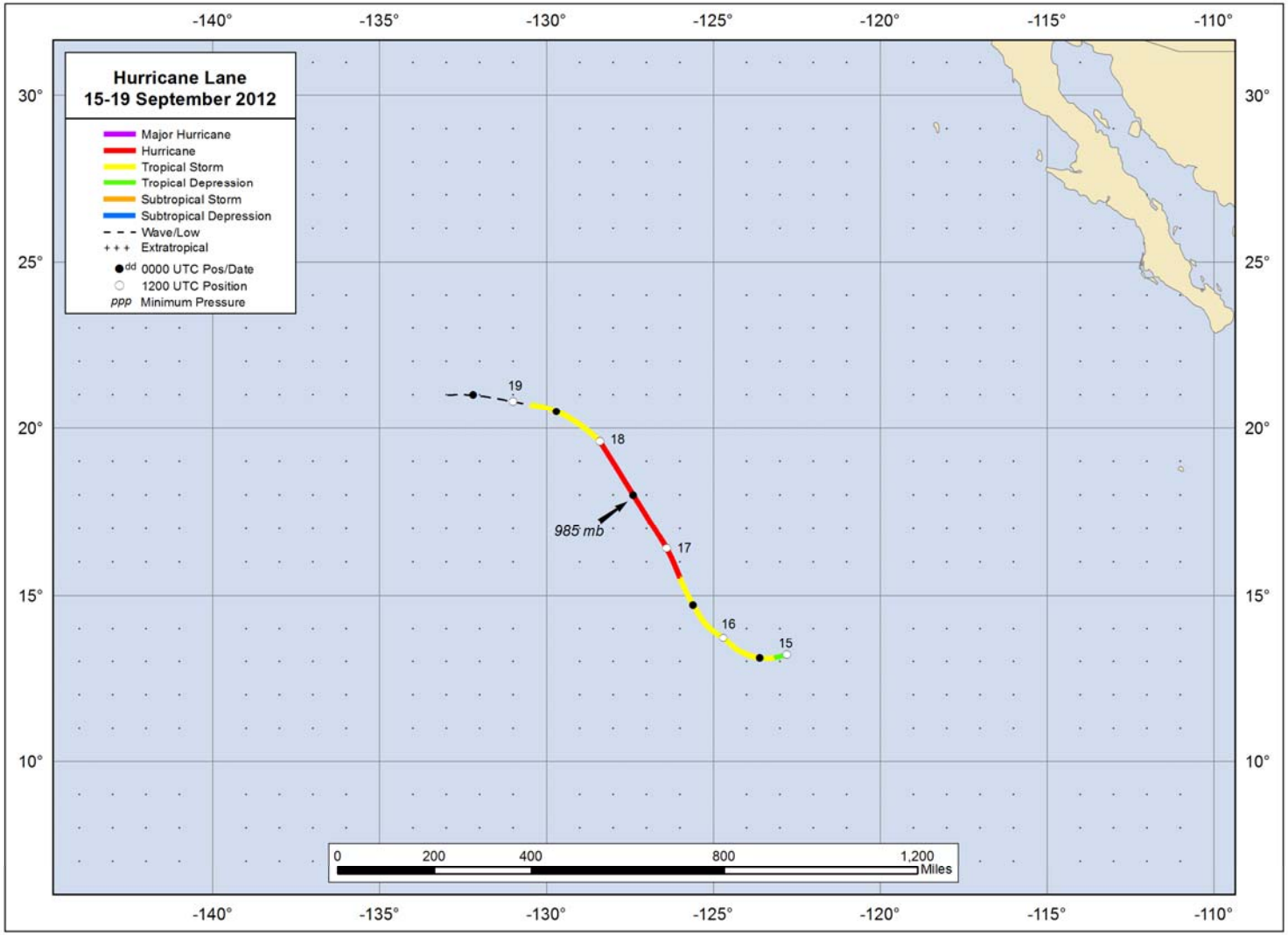

Figure 1. Best track positions for Hurricane Lane, 15-19 September 2012.

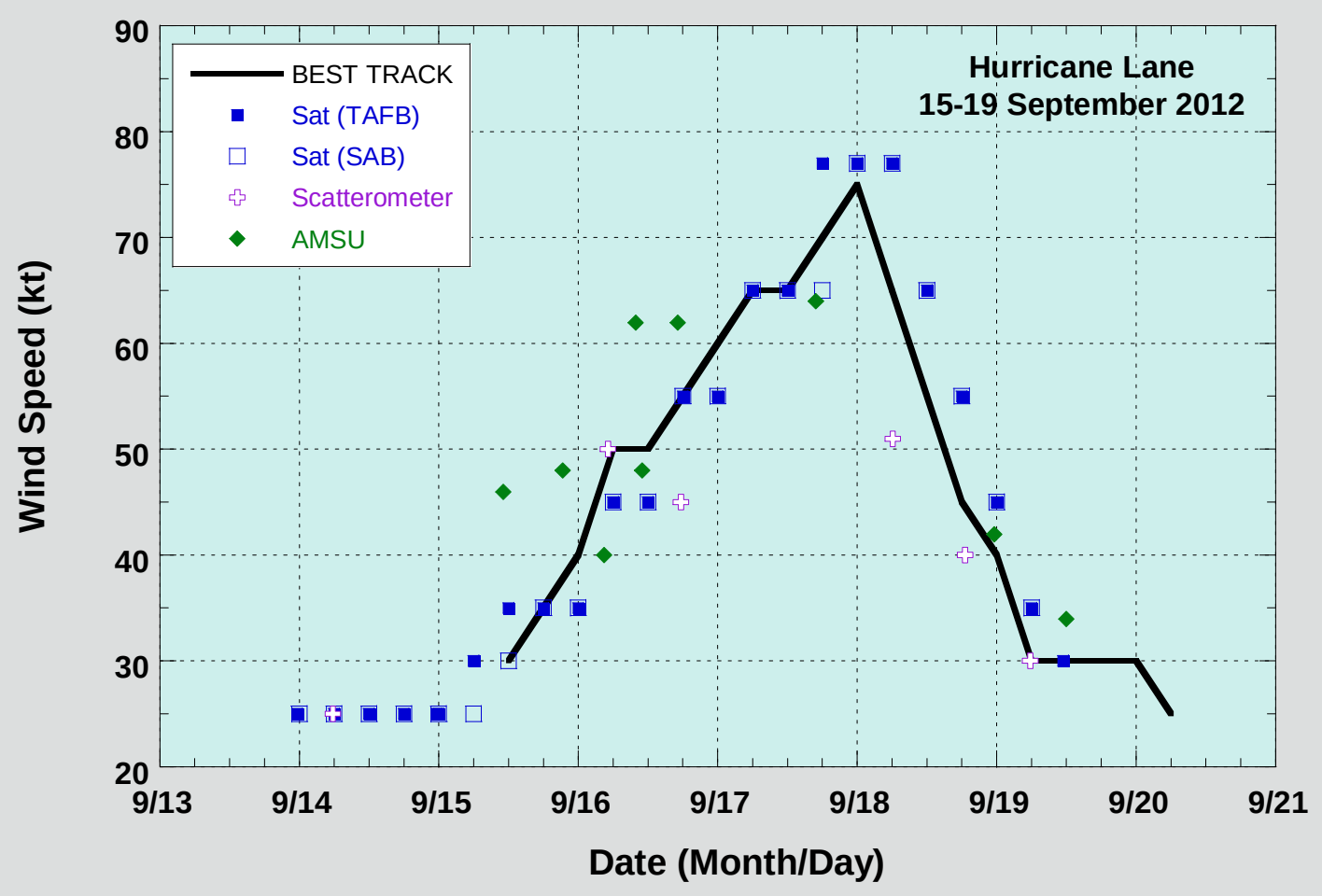

Figure 2. Selected wind observations and best track maximum sustained surface wind speed curve for Hurricane Lane, 15-19 September 2012. AMSU intensity estimates are from the Cooperative Institute for Meteorological Satellite Studies technique. Dashed vertical lines correspond to 0000 UTC.

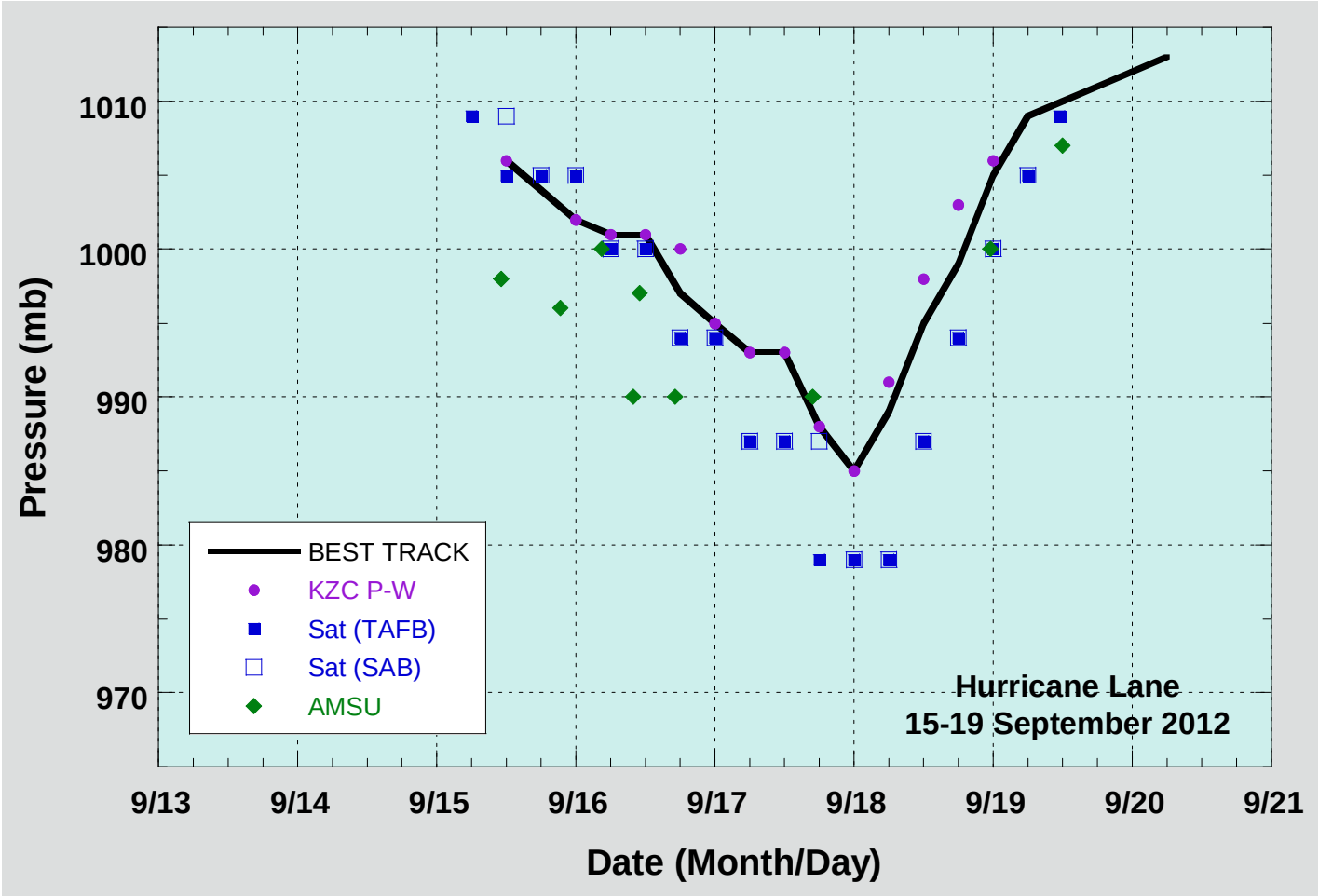

Figure 3. Selected pressure observations and best track minimum central pressure curve for Hurricane Lane, 15-19 September 2012. AMSU intensity estimates are from the Cooperative Institute for Meteorological Satellite Studies technique. The KZC P-W values are obtained by applying the Knaff-Zehr-Courtney pressure-wind relationship to the best track wind data. Dashed vertical lines correspond to 0000 UTC.