NATIONAL HURRICANE CENTER
CENTRAL PACIFIC HURRICANE CENTER
TROPICAL CYCLONE REPORT

TROPICAL STORM ELA

(EP042015)

8 – 10 July 2015

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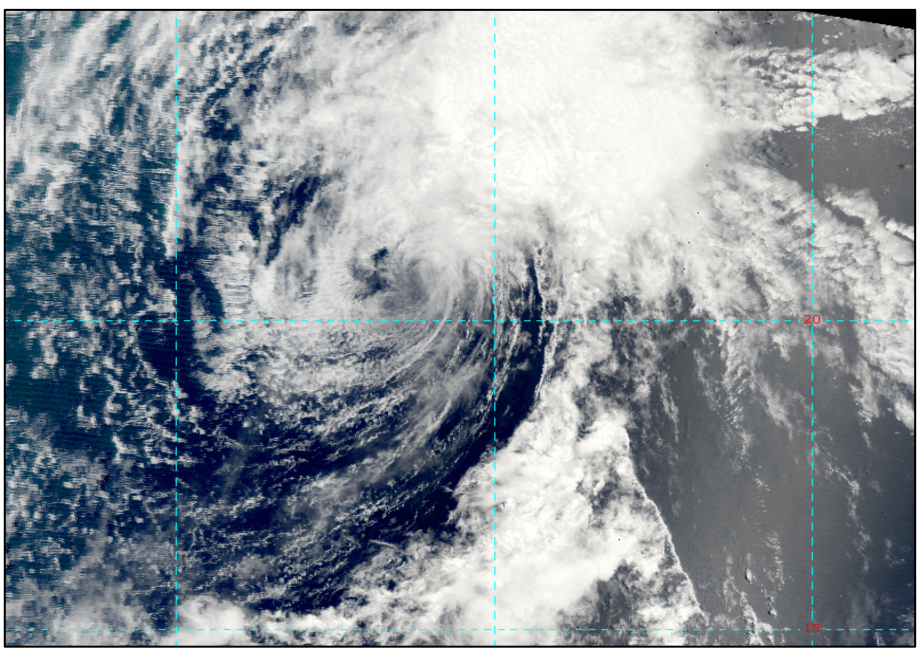

A 2010 UTC 9 JUL 2015 TERRA VISIBLE SATELLITE IMAGE OF TROPICAL STORM ELA NEAR ITS PEAK INTENSITY.

Ela originated as a tropical depression in the extreme western portion of the eastern North Pacific basin, and became a short-lived tropical storm in the central Pacific basin before dissipating well to the east of the Hawaiian Islands.

Tropical Storm Ela

8 – 10 JULY 2015

SYNOPTIC HISTORY

Ela originated from a tropical wave that entered the eastern Atlantic on 21 June and moved quickly and uneventfully across the tropical Atlantic, reaching the eastern North Pacific basin on 29 June. The relatively benign wave continued its westward trek across the deep tropics of the eastern Pacific for the next few days. A broad low pressure system formed along the wave axis early on 3 July, along with a large area of disorganized showers and thunderstorms. The low began moving west-northwestward later that day and accelerated around the southwestern periphery of a deep-layer subtropical ridge located across the central and eastern portions of the basin. The broad low slowed down and turned toward the northwest on 4 July. Upper-level northerly vertical wind shear hindered development for the next three days while the low continued its northwestward motion across the far western portion of the basin. By late on 6 July, however, the shear began to decrease, which allowed thunderstorm activity to increase and become a little better organized. A strong burst of deep convection developed near the system center around 0600 UTC 7 July, resulting in the formation of a well-defined center of circulation. Curved bands of convection began developing around the center shortly after 1800 UTC, which became sufficiently organized by 0000 UTC 8 July for the system to be designated as a tropical depression while centered about 890 n mi east-southeast of Hilo, Hawaii. 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.

The depression continued moving northwestward and 6 h later crossed 140˚ W longitude and moved into the area of responsibility of the Central Pacific Hurricane Center (CPHC). The depression strengthened into a tropical storm shortly thereafter, thus receiving a Hawaiian name from the Central Pacific’s list, the first of what turned out to be a record-setting number of named tropical cyclones in the Central Pacific basin during 2015.

Ela tracked generally northwestward, embedded within an environment characterized by persistent south to southwesterly vertical wind shear. Although the cyclone’s satellite appearance was elongated by the aforementioned vertical shear throughout most of its lifetime, bands of convection wrapping into the center were observed in conventional and microwave imagery near 1800 UTC 8 July. The first reconnaissance flight into Ela conducted by the 53rd Weather Reconnaissance Squadron (WRS) of the U. S. Air Force Reserve Command late on 8 July found flight-level and SFMR-based surface winds that supported tropical storm status, an intensity that previously had been based on satellite estimates. A later mission at 0600 UTC 9 July also supported tropical storm intensity. Subsequent satellite images indicated that the persistent and strong shear prevented organized deep convection from developing and remaining over the center, and Ela gradually weakened to a shallow low cloud swirl by 1200 UTC 10 July, when it was deemed to be post-tropical. The remnant low then tracked toward the west-northwest and west as it became increasingly shallow, steered by the low-level trade wind flow provided by a surface high to the north of the system. The low eventually dissipated by 1800 UTC 12 July over water to the northeast of the main Hawaiian Islands. The lingering surface trough moved west-southwestward toward the main Hawaiian islands over the next couple of days, with the north-south oriented trough moving near Kauai between 0000 and 0600 UTC 13 July. Although high dew points associated with Ela brought uncomfortable conditions to the main Hawaiian Islands, significant rainfall did not occur.

METEOROLOGICAL STATISTICS

Observations in Ela (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) east of 140˚ W longitude, WFO Honolulu (PHFO) and the Joint Typhoon Warning Center (JTWC) west of 140˚ W, 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 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 Ela. West of 140˚W, flight-level, stepped frequency microwave radiometer (SFMR), and dropwindsonde observations from flights of the 53rd Weather Reconnaissance Squadron of the U. S. Air Force Reserve Command were also available.

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

Winds and Pressure

The U.S. Air Force Reserve 53WRS "Hurricane Hunters" conducted two reconnaissance missions into Tropical Storm Ela on 8 and 9 July. The maximum intensity of 40 kt at 1800 UTC 8 July is based on a blend of a peak 850-mb flight-level wind of 41 kt and a peak SFMR surface wind of 43 kt. The minimum pressure of 1002 mb is based on a dropwindsonde report of 1002 mb in the center of Ela.

CASUALTY AND DAMAGE STATISTICS

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

FORECAST AND WARNING CRITIQUE

The genesis of Ela was reasonably well anticipated (Table 2). The precursor disturbance was first mentioned in NHC's Tropical Weather Outlook issued at 1800 UTC 2 July, and was given a "low" probability of genesis (< 30%) in the 120 h period. However, the genesis forecast only remained in the low category for 12 h when the probabilities were increased to the "medium" category (40-60%) at 0600 UTC 3 July. Six hours later, the genesis probabilities were increased to the "high" category (> 70%) at 1200 UTC 3 July, which was 108 h before Ela developed into a depression.

The 48-h genesis forecasts weren't quite as impressive as the long-term genesis forecasts. The disturbance was given a "low" chance of development 114 h prior to actual genesis and was raised to the "medium" category 102 h before the tropical cyclone formed, based on what were expected to be favorable environmental and oceanic conditions. However, the vertical wind shear did not decrease as much or as quickly as expected and the broad low pressure system was also unable to develop a significant inner-core wind field for a few more days, a combination that inhibited the development of persistent, organized deep convection near the center. The probabilities were increased to the "high" category 24 h before genesis occurred.

NHC made only one forecast for Ela, which prevents any meaningful forecast critique. Official track forecast errors were 24, 29, 83, and 107 n mi for the 12, 24, 36, and 48 h forecasts, respectively. Official intensity forecast errors were 0 kt at 12 and 24 h, and 10 kt at 36 and 48 h.

CPHC made a limited number of forecasts for Ela, with only one verifying 48-hour forecast, also preventing significant statistical analysis. Official track forecast errors were greater than the 5-year average, with EMXI the best performing track model at 12 and 24 hours, and EGRI performing best at 36 and 48 hours. The official intensity forecast errors were less than the 5-year average, with the official forecast outperforming all guidance at 12 and 24 hours. The IVCN and GFSI performed best at 36 hours, with most intensity models outperforming the one official verifying 48-hour forecast.

Watches and warnings were not required in either the eastern or central North Pacific basins.

ACKNOWLEDGEMENTS

Special thanks to John Cangialosi of the NHC Hurricane Specialist Unit for creating the best track map.

Table 1. Best track for Tropical Storm Ela, 8-10 July 2015.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage*
07 / 1200	13.4	136.9	1005	30	low
07 / 1800	14.4	138.3	1005	30	"
08 / 0000	15.3	139.5	1005	30	tropical depression
08 / 0600	16.0	140.6	1005	30	“
08 / 1200	16.6	142.0	1004	35	tropical storm
08 / 1800	17.2	143.4	1002	40	"
09 / 0000	18.1	144.1	1002	40	"
09 / 0600	19.0	144.7	1002	40	"
09 / 1200	19.7	145.5	1003	35	"
09 / 1800	20.3	146.2	1004	35	"
10 / 0000	20.9	147.0	1005	30	tropical depression
10 / 0600	21.4	147.9	1006	30	"
10 / 1200	21.7	148.5	1007	30	low
10 / 1800	21.9	149.1	1008	30	"
11 / 0000	22.2	149.9	1009	30	"
11 / 0600	22.4	150.6	1010	25	"
11 / 1200	22.6	151.3	1010	25	"
11 / 1800	22.8	152.3	1011	25	"
12 / 0000	22.9	153.4	1012	20	"
12 / 0600	22.9	154.6	1013	20	"
12 / 1200	22.7	155.8	1013	20	"
12 / 1800					dissipated
08 / 1800	17.2	143.4	1002	40	minimum pressure

Table 2. Number of hours in advance of formation of Tropical Storm Ela 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 (≤30%)	114	126
Medium (40%-60%)	102	114
High (≥70%)	24	108

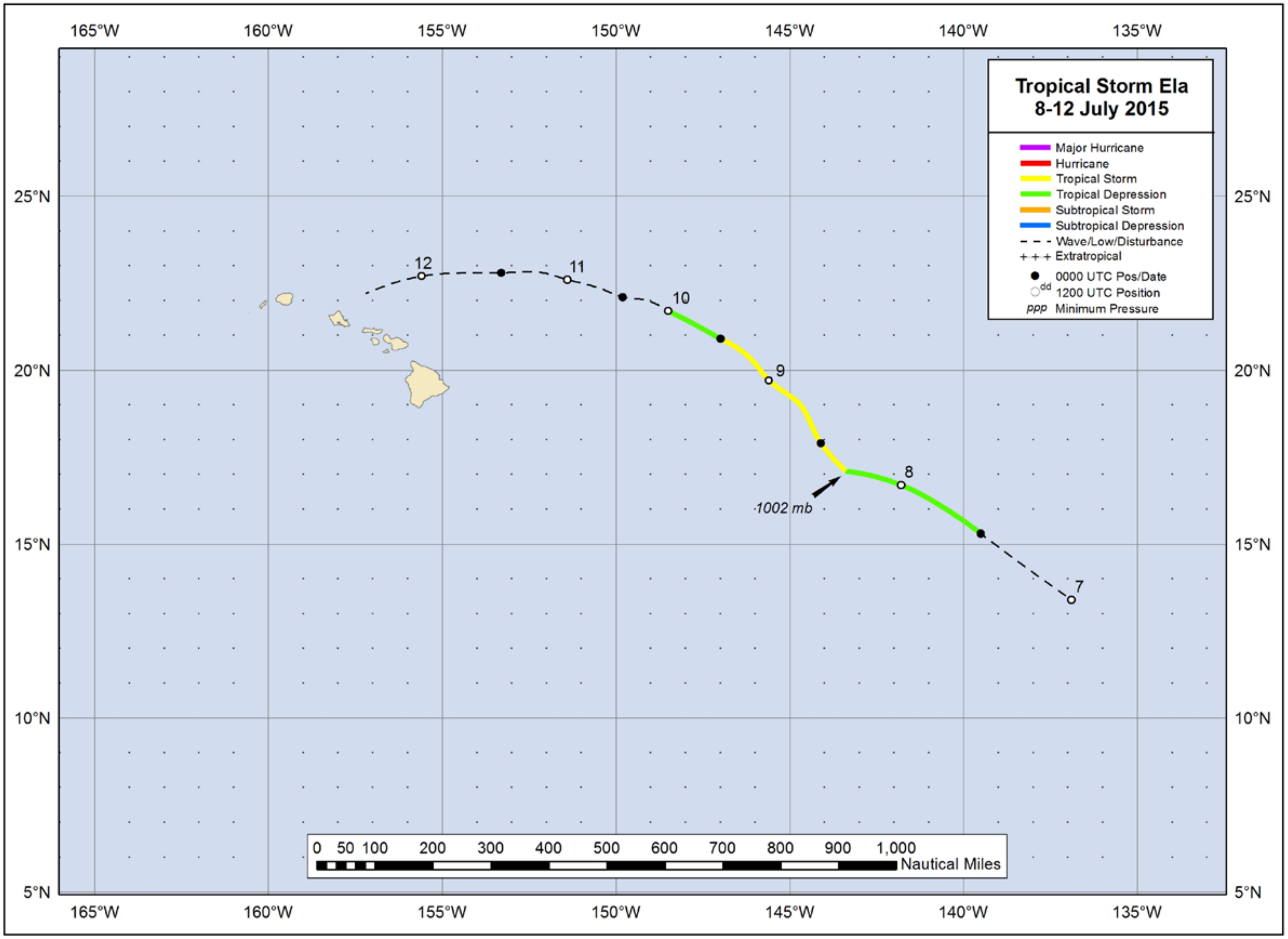

Figure 1. Best track positions for Tropical Storm Ela, 8-10 July 2015. Track east of 140^{O} W longitude was prepared by the NHC and the track west of 140^{o} W longitude was prepared by the CPHC.

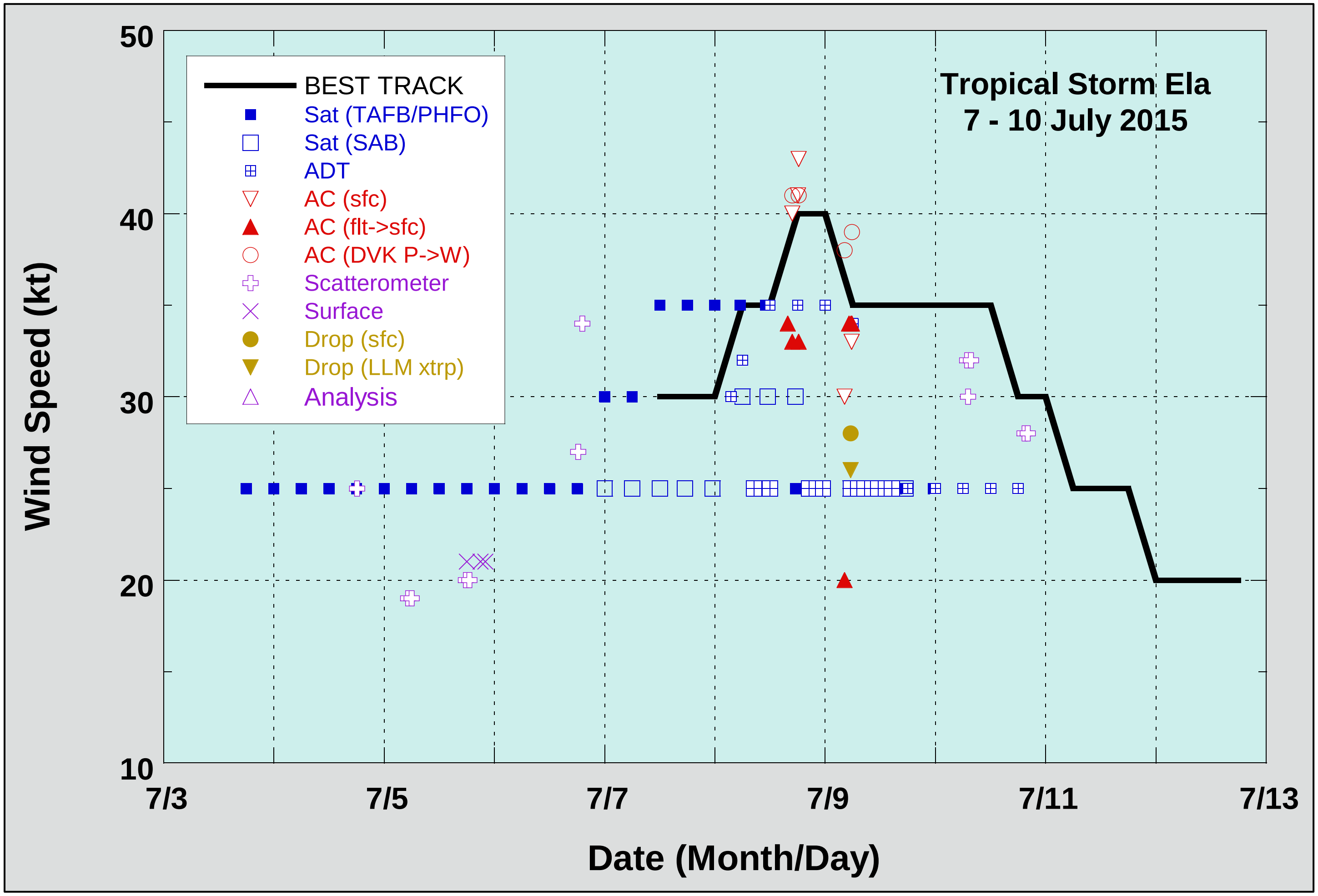

Figure 2. Selected wind observations and best track maximum sustained surface wind speed curve for Tropical Storm Ela, 8-10 July 2015. Aircraft observations have been adjusted for elevation using an 80% adjustment factor for observations from 850 mb. Dropwindsonde observations include actual 10 m winds (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 the Current Intensity at the nominal observation time. AMSU intensity estimates are from the Cooperative Institute for Meteorological Satellite Studies technique. Dashed vertical lines correspond to 0000 UTC. Best track data after 0000 UTC 8 July were produced by the Central Pacific Hurricane Center.

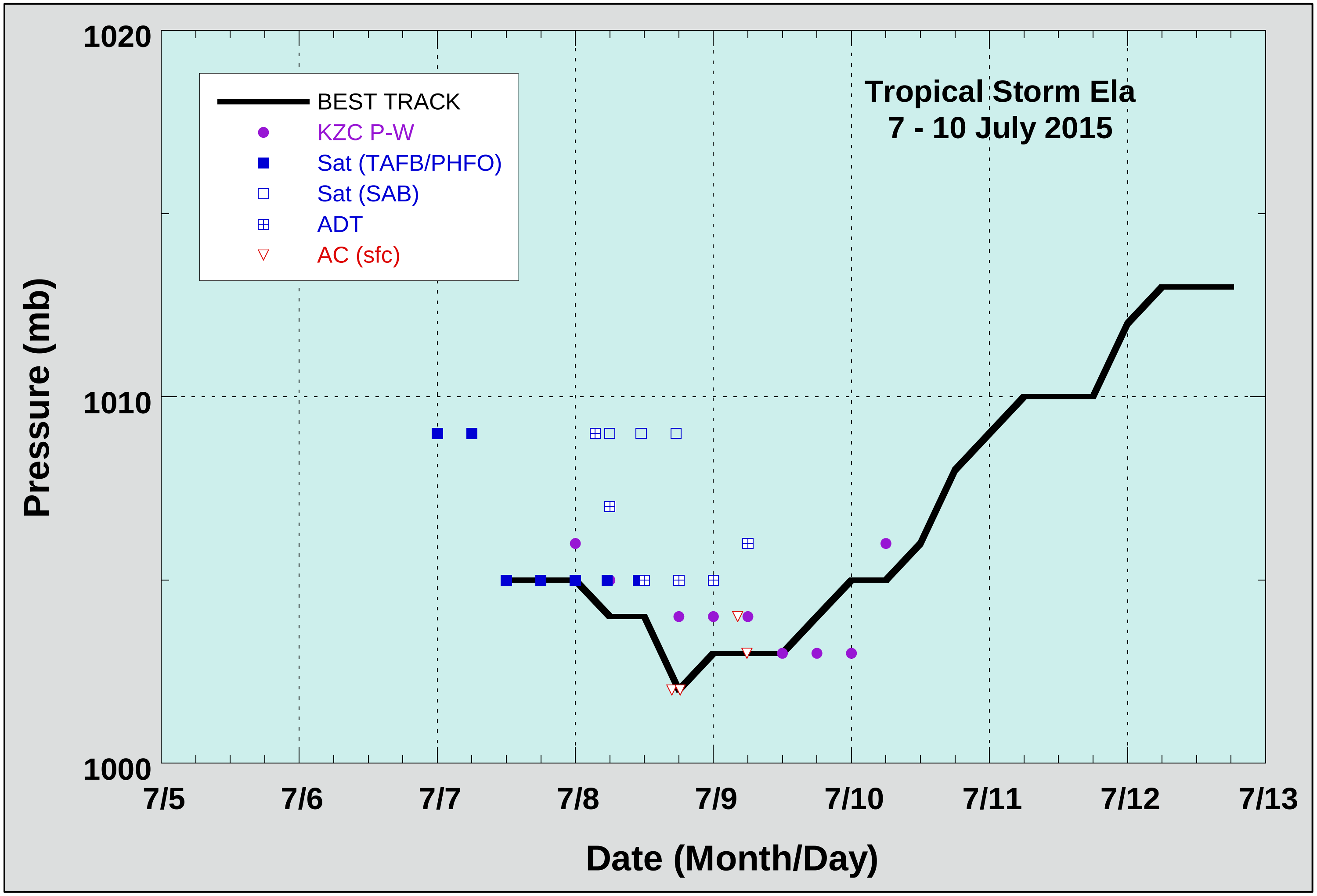

Figure 3. Selected pressure observations and best track minimum central pressure curve for Tropical Storm Ela, 8-10 July 2015. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. AMSU intensity estimates are from the Cooperative Institute for Meteorological Satellite Studies technique. KZC P-W refers to pressure estimates derived using the Knaff-Zehr-Courtney pressure-wind relationship. Dashed vertical lines correspond to 0000 UTC. Best track data after 0000 UTC 8 July were produced by the Central Pacific Hurricane Center.