Tropical Cyclone Report
Unnamed Tropical Storm
(AL202011)
1– 2 September 2011

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As part of its routine post-season review, the National Hurricane Center (NHC) occasionally identifies from new data or meteorological interpretation a previously undesignated tropical or subtropical cyclone. The NHC re-analysis of 2011 has concluded that a short-lived low that passed between Bermuda and Nova Scotia from 31 August to 3 September briefly had sufficient tropical characteristics to be considered a tropical storm.

a. Synoptic History

The unnamed tropical storm originated from a low-level trough located to the south of Tropical Storm Jose. A large area of disorganized showers and thunderstorms was present on 28 August along the surface trough a few hundred miles to the southwest of Bermuda. On 29 August, a deep convective burst resulted in the formation of a low- to mid-level cyclonic circulation that began to move slowly north-northeastward. Convection increased markedly on 31 August near the circulation center, which resulted in the formation of a well-defined surface low by 1200 UTC 31 August. Although the initial convection diminished, a new area of convection formed near the low, which was organized enough to designate the formation of a tropical depression near 0000 UTC 1 September, about 290 n mi north of Bermuda. The "best track" chart of the system'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 depression moved slowly and erratically while caught in an area of light steering currents not too far to the southeast of a stationary front. Within an environment of moderate southwesterly shear, the system intensified following a convective burst just east of the center, and ASCAT data indicated that it became a tropical storm 12 h after genesis. Only small changes in intensity occurred for the next 24 h, with some weakening as the burst moved farther from the center, and a slight increase noted when a new burst formed over the center. A mid- to upper-level trough moving over the northeastern United States also caused the storm to accelerate northeastward on 2 September. Later that day, the center of the cyclone became fully exposed due to an increase in wind shear, and convection decreased due to cooler waters. The system entered a more baroclinic low-level environment north of the Gulf Stream near the front and extratropical transition is estimated to have occurred around 0000 UTC 3 September about

[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.

310 n mi south-southeast of Halifax, Nova Scotia. Surface data indicate that the extratropical low degenerated into a trough 24 h later a few hundred miles south of Newfoundland.

b. Meteorological Statistics

Observations in the unnamed storm (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), as well as the Advanced Dvorak Technique (ADT) estimates from the Cooperative Institute for Meteorological Satellite Studies/University of Wisconsin-Madison. Microwave satellite imagery from NOAA polar-orbiting satellites including the Advanced Microwave Sounding Unit (AMSU) and the European ASCAT satellite were also useful in tracking and determining the structure of this system.

Operationally, advisories were not issued on this system due to the intermittent nature of the convection and the somewhat frontal nature of the satellite presentation. On a couple of occasions advisories were prepared, but withheld when the convection began to diminish. Taken in its entirety, however, NHC now views the convection as having been sufficiently organized to consider the system a tropical cyclone. In addition, several data sources have clarified that the system was non-frontal. Surface analyses from the Ocean Prediction Center indicated that the unnamed storm formed in the warm sector southeast of a cold front over the western Atlantic, and the limited surface data near the cyclone indicated that it was embedded in a warm and moist air mass. An important piece of evidence is a 1351 UTC 1 September ASCAT overpass (Fig. 4). These data indicated a radius of maximum wind of about 40 n mi, as well as a separation of this maximum from the nearby frontal boundary. Microwave imagery also suggested that low-level cool and dry air behind the front had not penetrated the cyclone's surface circulation. Buoy 41972 was located relatively close to the tropical cyclone and, as the convection increased late on 31 August, significant pressure falls could be seen in the observations (almost 10 mb in 24 h), indicative of the warm core building aloft. This warm core can be observed from data from an Advanced Microwave Sounding Unit (AMSU) at 0901 UTC 1 September (Fig. 5), which was not available in real time.

The estimated peak intensity of 40 kt is based primarily on the ASCAT data, which generally supported a wind speed between the higher AMSU/ADT estimates and the lower TAFB/SAB estimates. Figure 6 shows the system near the time of its peak intensity. Note that the TAFB fixes contain both the real-time values and an independent post-analysis. The operational Dvorak estimates were initiated well after the post-storm analysis of genesis because it was thought that the system was too embedded within a frontal zone. Since the post-storm analysis indicated the system was non-frontal, the delayed Dvorak estimates introduced artificial constraints into the operational estimates, and these constraints caused them to be not representative of the storm's intensity. The independent estimates were performed under the assumption that this low was non-frontal, which allowed for more realistic estimates of the storm's intensity and convective organization.

Buoy 41972 reported a minimum pressure of 1005.4 mb at 1900 UTC 1 September, when the center was about 25 n mi northeast of the buoy. There were no reports of tropical-storm-force winds from ships.

c. Casualty and Damage Statistics

There were no reports of damage or casualties associated with this system.

d. Forecast and Warning Critique

No official forecasts were issued for the unnamed storm, thus no verification is available. Operationally, it was treated as a non-tropical low. It was introduced into the Tropical Weather Outlook coincident with the time of post-analyzed genesis.

Acknowledgements:

Jeff Hawkins of the Naval Research Lab Monterey provided microwave data. Jessica Schauer of TAFB performed independent satellite fixes for the post-storm analysis. Derrick Herndon of CIMSS provided the AMSU and ADT data. The Hurricane Specialist Unit at NHC gave thoughtful reviews and helpful analyses for this report.

Table 1. Best track for the Unnamed Tropical Storm, 1– 2 September 2011.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
31 / 1200	37.1	64.3	1013	25	low
31 / 1800	37.1	64.1	1013	25	"
01 / 0000	37.3	63.9	1011	25	tropical depression
01 / 0600	37.4	63.7	1008	30	"
01 / 1200	37.4	63.7	1004	40	tropical storm
01 / 1800	37.4	63.8	1005	35	"
02 / 0000	37.5	63.8	1005	35	"
02 / 0600	37.8	63.7	1002	40	"
02 / 1200	38.0	62.8	1002	40	"
02 / 1800	39.0	61.8	1003	35	"
03 / 0000	40.0	60.7	1004	30	extratropical
03 / 0600	41.0	59.9	1004	30	"
03 / 1200	42.0	59.2	1004	30	"
03 / 1800	42.4	57.8	1004	30	"
04 / 0000	-	-	-	-	dissipated
02 / 0600	37.8	63.7	1002	40	minimum pressure/ maximum winds

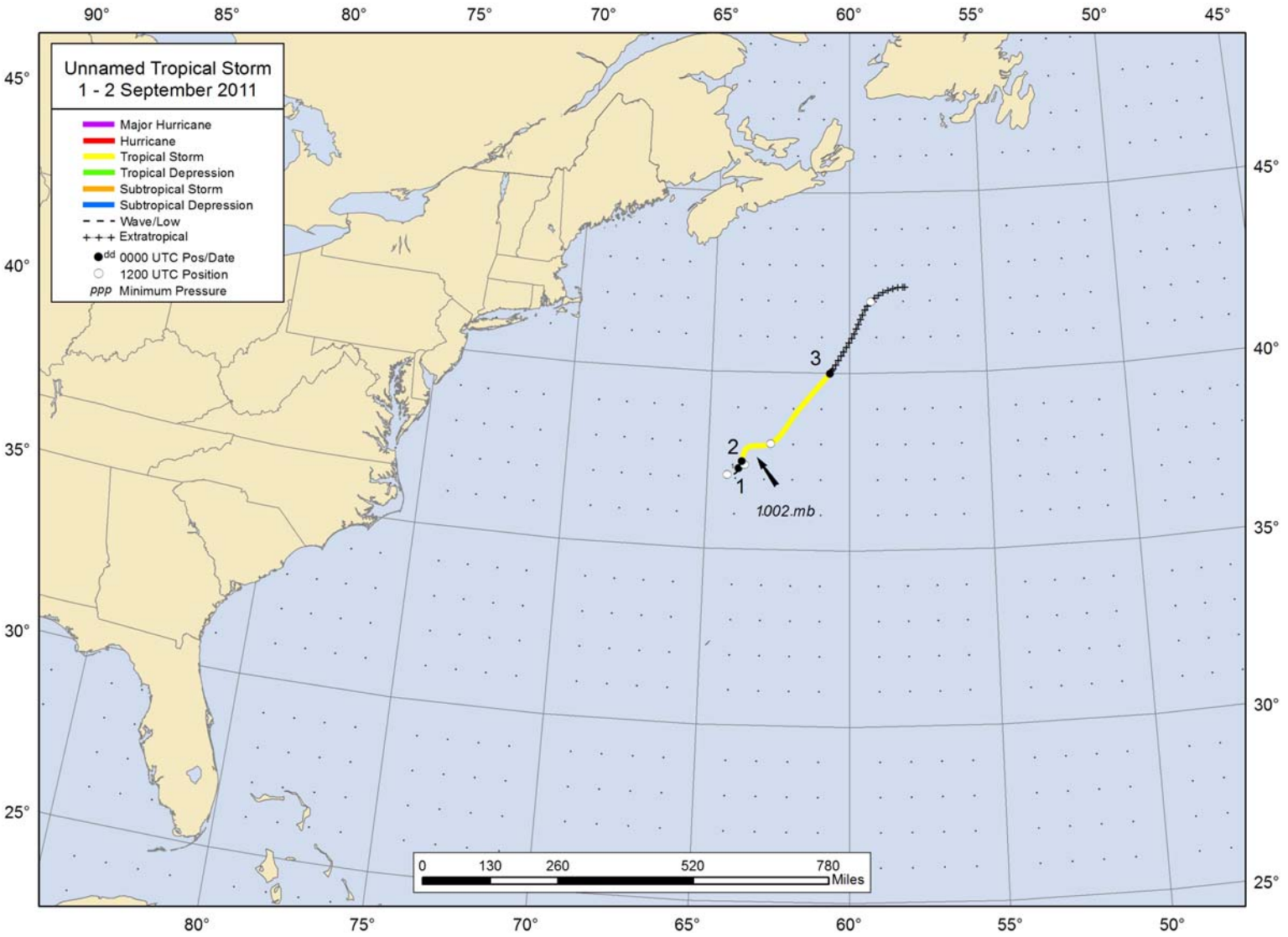

Figure 1. Best track positions of the Unnamed Tropical Storm, 1– 2 September 2011. The track during the extratropical stage is partially based on analyses from the NOAA Ocean Prediction Center.

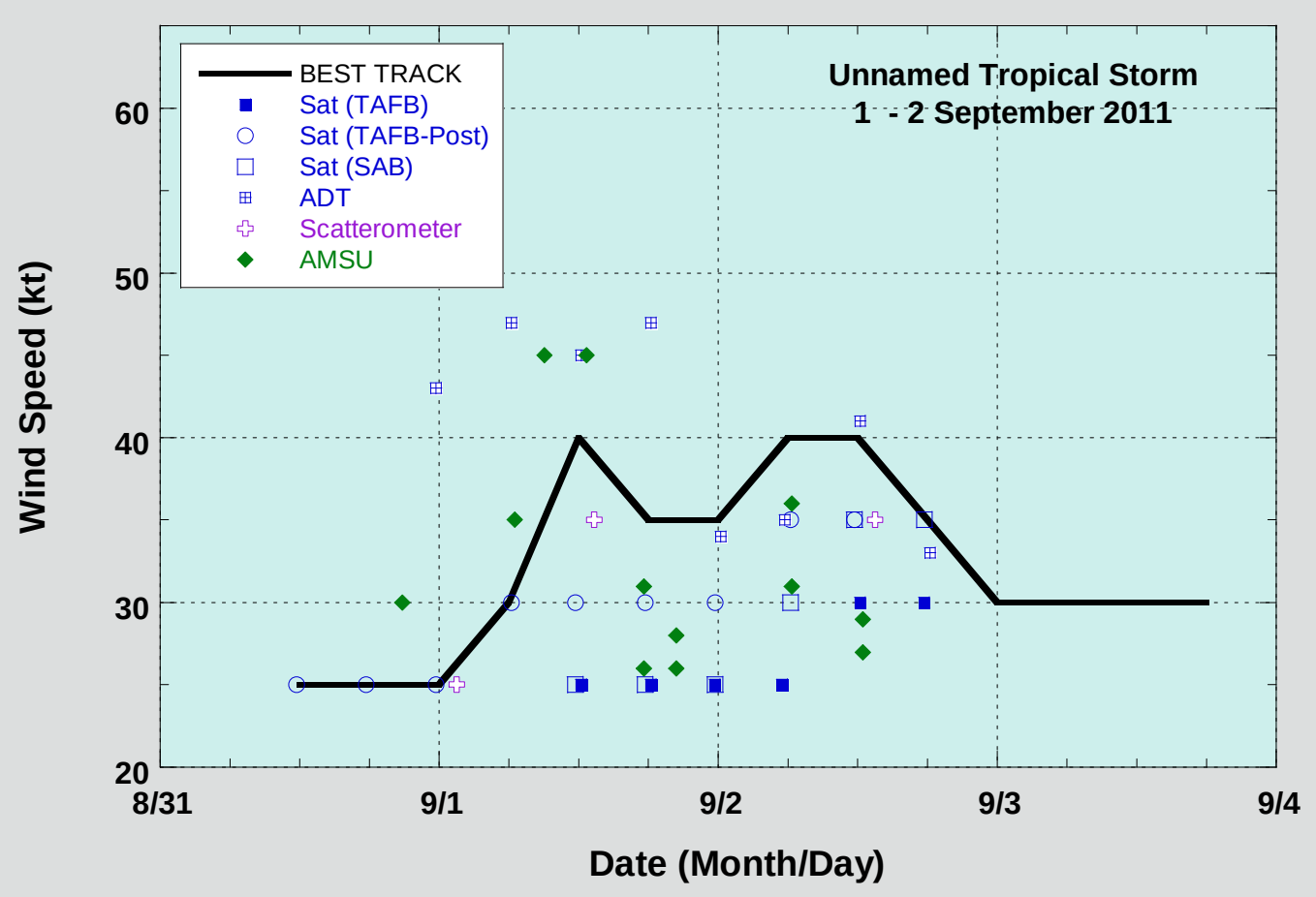

Figure 2. Selected wind observations and best track maximum sustained surface wind speed curve for the Unnamed Tropical Storm, 1 – 2 September 2011. Advanced Dvorak Technique estimates represent linear averages over a 3-hr period centered on the nominal observation time. AMSU intensity estimates are from the Cooperative Institute for Meteorological Satellite Studies technique. Estimates during the extratropical stage are based on analyses from the NOAA Ocean Prediction Center. Dashed vertical lines correspond to 0000 UTC.

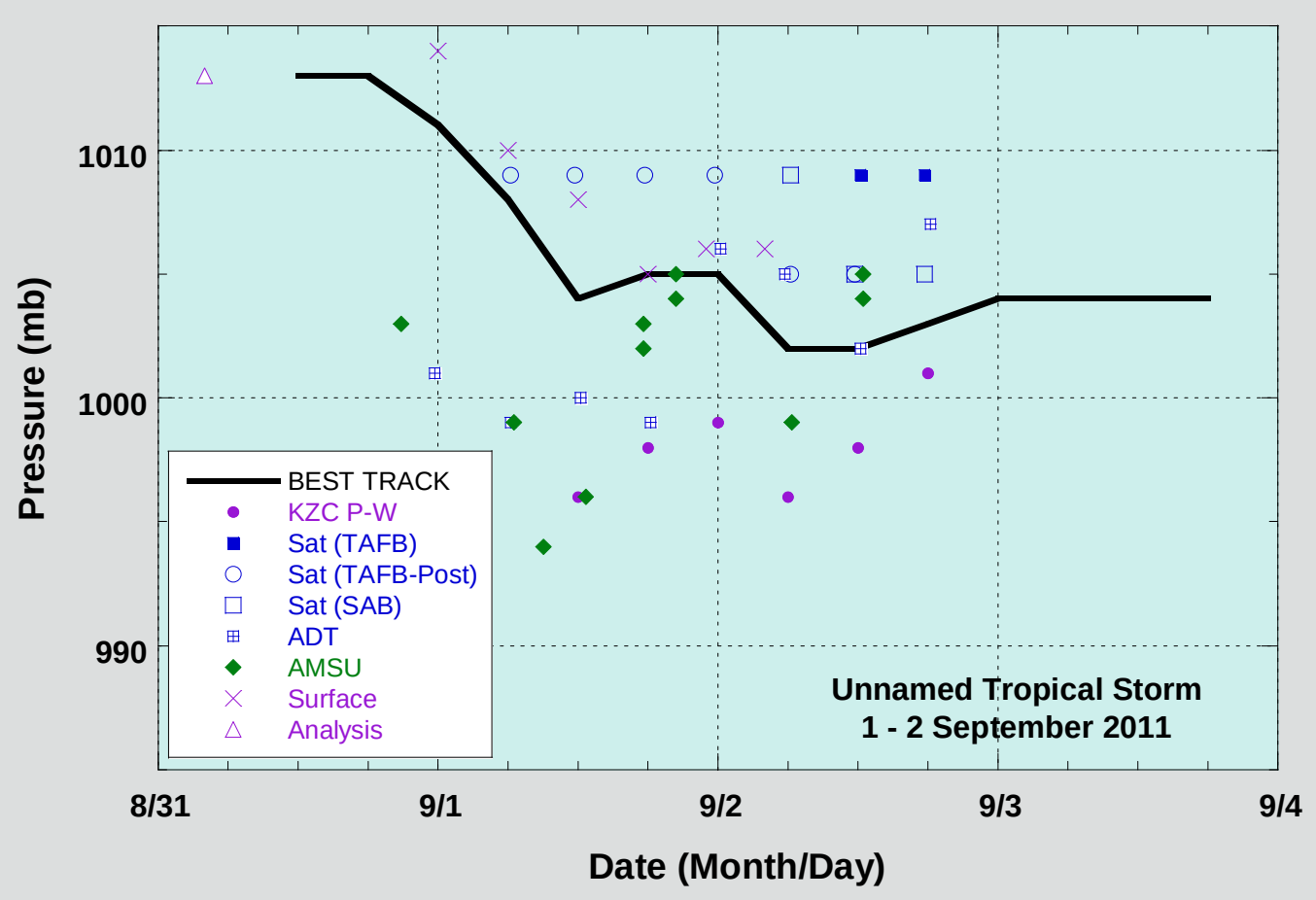

Figure 3. Selected pressure observations and best track minimum central pressure curve for the Unnamed Tropical Storm, 1 – 2 September 2011. Advanced Dvorak Technique estimates represent linear averages over a 3-hr period centered on the nominal observation time. AMSU intensity estimates are from the 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. Estimates during the extratropical stage are based on analyses from the NOAA Ocean Prediction Center. Dashed vertical lines correspond to 0000 UTC.

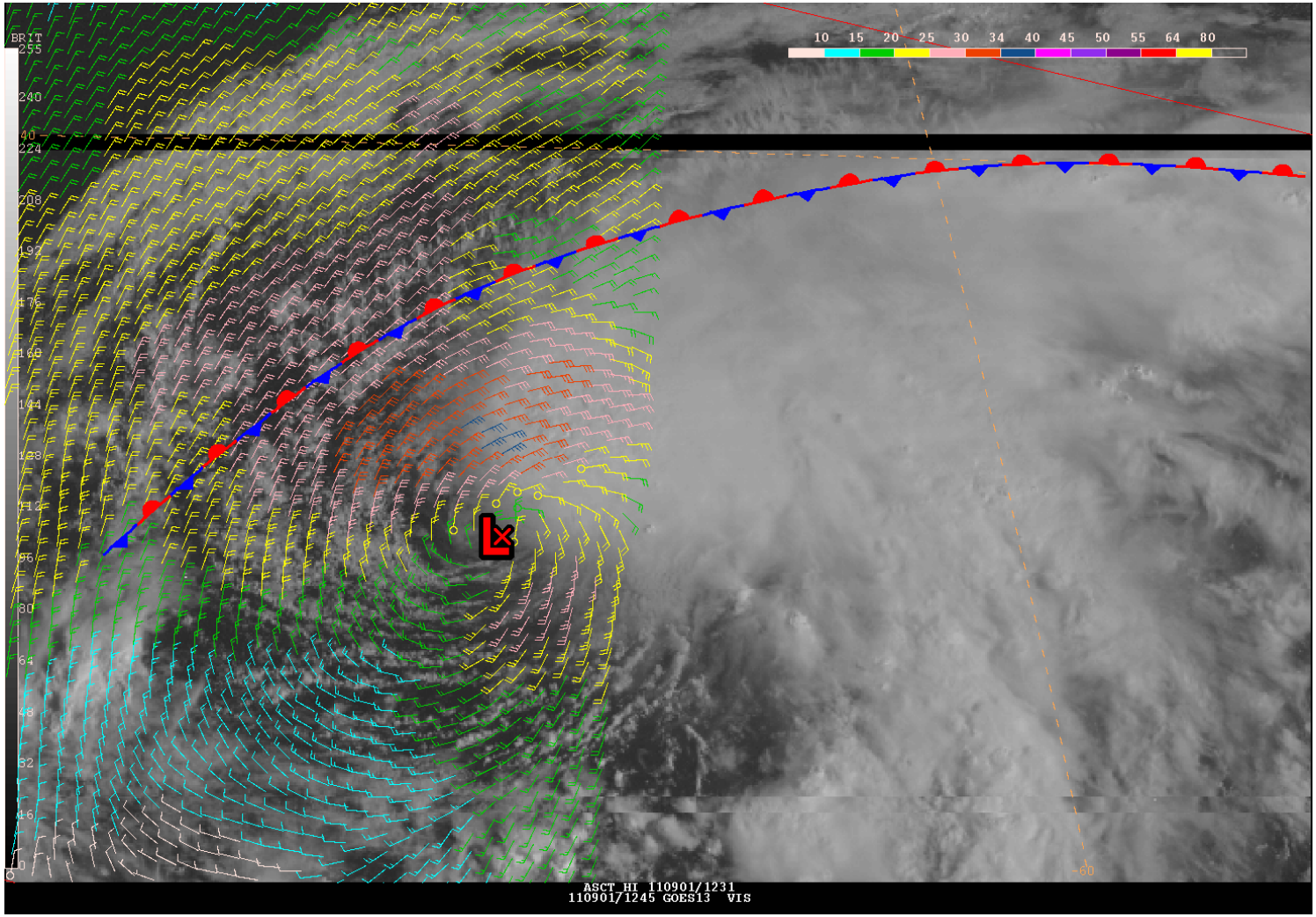

Figure 4. Visible satellite picture at 1245 UTC 1 September, overlaid with high-resolution ASCAT data from 1319 UTC and the 1200 UTC National Weather Service surface frontal analysis. Note the wind maximum of tropical-storm-force close to the center of the cyclone, along with a weak secondary wind maximum behind the front, indicating a separation of the systems' wind fields.

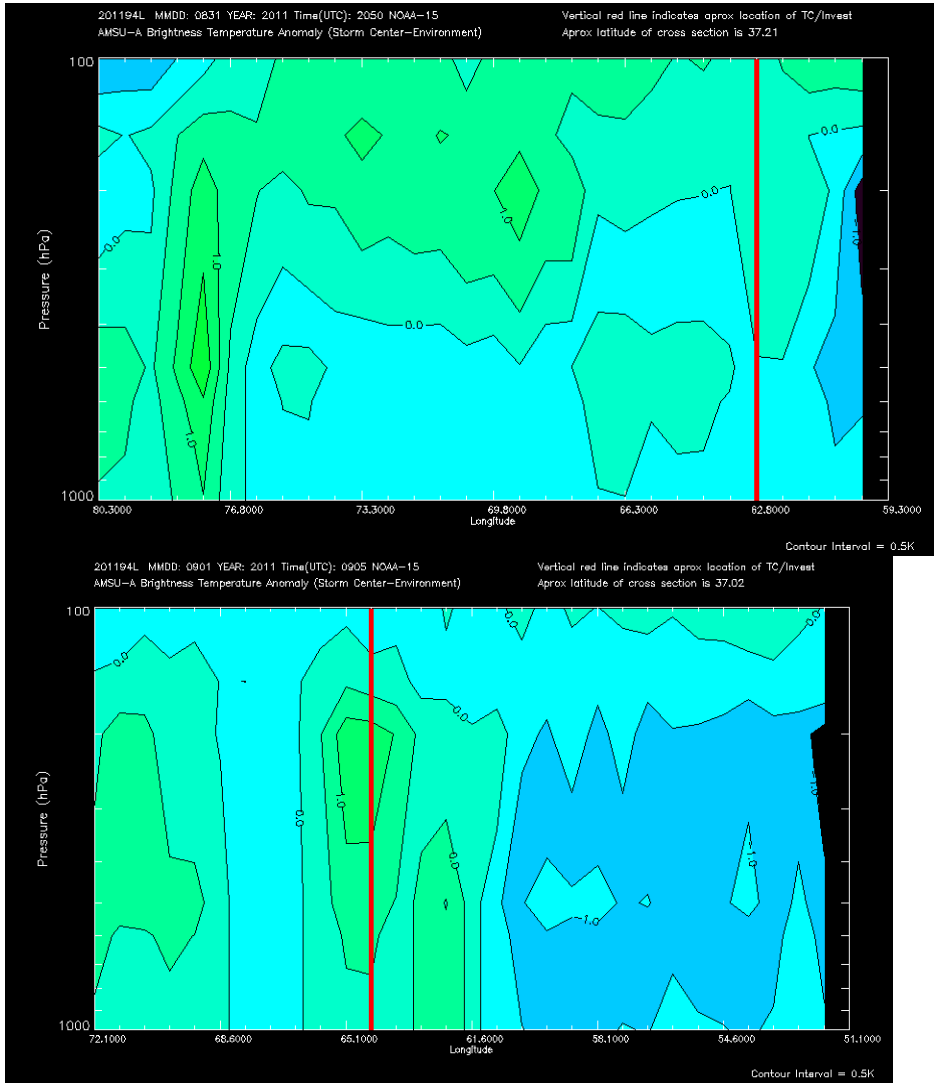

Figure 5. (top) AMSU cross-section from 2050 UTC 31 August, (bottom) AMSU cross-section from 12 hours later near 0905 UTC 1 September, courtesy of UW-CIMSS. The red line denotes the best track longitude. Note the significant warm core development in the second panel.

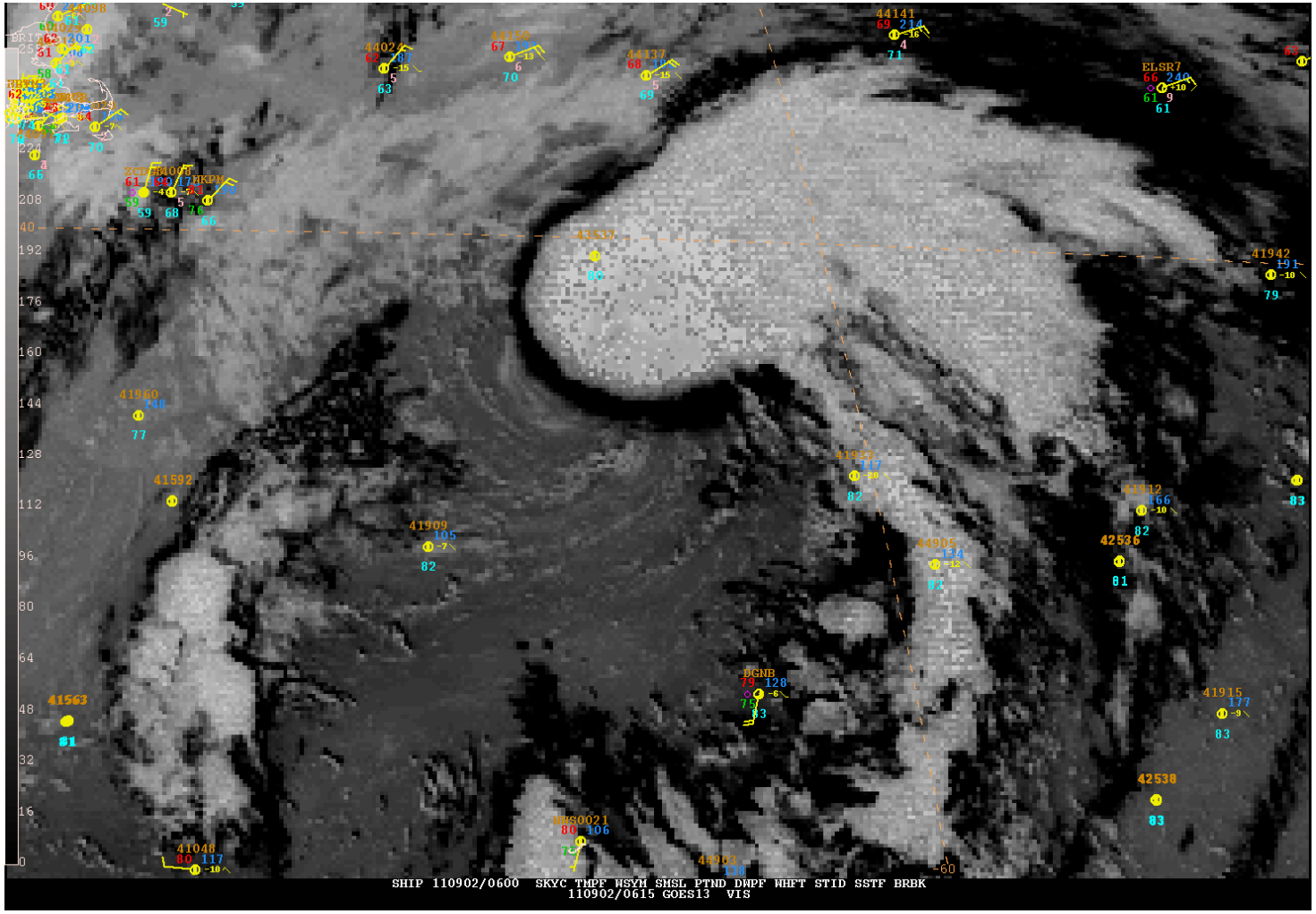

Figure 6. GOES-13 longwave and shortwave infrared combined-channel image near peak intensity, 0615 UTC 2 September.