Tropical Cyclone Report
Tropical Storm Patty
(AL162012)
11 – 13 October 2012

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Patty was a short-lived, nearly stationary tropical storm over the western Atlantic Ocean just east of the Bahamas.

a. Synoptic History

At the beginning of October, a weak mid-level disturbance moved northward along the southeastern United States coast and turned eastward off the coasts of North Carolina and Virginia around a mid-level anticyclone located over the western Atlantic Ocean. The disturbance merged with a frontal system over the northwestern Atlantic on 3 and 4 October, and the front then moved southward over the next couple of days. The front became quasi-stationary to the north and northeast of the Leeward Islands by 6 October, and a weak surface trough broke off the tail end of the front about 300 to 400 n mi north of Puerto Rico and the Virgin Islands. The trough produced some deep convection while it moved slowly westward, reaching the southern Bahamas on 7 October and then turning northwestward and northward ahead of a cold front that moved east of Florida on 9 October. The trough began meandering just east of the Bahamas later that day, and visible and microwave satellite imagery indicated that it became a low when a closed wind circulation developed by 1800 UTC 10 October. The low is estimated to have become a tropical depression at 0000 UTC 11 October after the associated shower and thunderstorm activity became sufficiently organized near the center of circulation. The depression strengthened to a tropical storm 6 h later about 150 n mi east-northeast of the island of San Salvador in the Bahamas. 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].

Patty was located in an environment of weak steering flow and moved little during the next couple of days. Several environmental factors inhibited significant intensification. A building low-level ridge to the north of the cyclone and strong southwesterly winds aloft resulted in persistent vertical shear, and dry stable air behind a frontal boundary on the western side of Patty was entrained into the cyclone's circulation. Patty therefore only reached a maximum intensity of 40 kt at 0000 UTC 12 October and began to weaken 12 h later. Vertical shear increased further due to strengthening low-level northeasterly background winds, and the cyclone became a tropical depression by 0600 UTC 13 October. Patty dissipated into a trough 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.

low pressure and lost all of its deep convection by 1200 UTC. The remnant trough lasted for another day or two while moving quickly west-southwestward across the Bahamas.

b. Meteorological Statistics

Observations in Patty (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 and stepped frequency microwave radiometer (SFMR) observations from one flight of the 53rd Weather Reconnaissance Squadron of the U. S. Air Force Reserve Command. Data and imagery from NOAA polar-orbiting satellites (including UW-CIMSS Advanced Microwave Sounding Unit [AMSU] intensity estimates), the NASA Tropical Rainfall Measuring Mission (TRMM) and Aqua, the European Space Agency's Advanced Scatterometer (ASCAT), the Naval Research Laboratory WindSat, and Defense Meteorological Satellite Program (DMSP) satellites, among others, were also useful in constructing the best track of Patty.

Patty's estimated peak intensity of 40 kt from 0000 UTC through 1200 UTC 12 October is based on subjective and objective Dvorak satellite estimates of 40 to 45 kt. Data from the U.S. Air Force Reserve reconnaissance mission later that day suggested that Patty had begun to weaken during the morning. The highest SFMR observation was 43 kt (which reduces to 39 kt when corrected for heavy rainfall), but the peak 850-mb flight-level wind of 38 kt at 1609 UTC only supported a maximum intensity of about 30 kt.

There were no ship reports or surface observations from land stations of winds of tropical storm force directly associated with Patty. Several ships reported gale-force winds in association with a frontal boundary that was located well to the west of Patty's tropical-storm-force wind radii.

c. Casualty and Damage Statistics

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

d. Forecast and Warning Critique

The genesis of Patty was not well forecast since environmental conditions were not particularly conducive for tropical cyclogenesis due to strong vertical shear. The cyclone's precursor trough was introduced in the Tropical Weather Outlook and given a "low" (less than 30%) chance of genesis during the ensuing 48 h at 1800 UTC 6 October, a little over 4 days before genesis actually occurred. The probabilities remained low for several days, and mention of the system was even discontinued from the Tropical Weather Outlook for a period on 10 October. The probability of genesis never reached higher than 20% before the post-analyzed

time of genesis since it was thought that strong vertical wind shear would preclude significant development.

Only six 12-h forecasts and four 24-h forecasts were verifiable for Patty. The sample sizes are therefore too small to derive any meaningful conclusions.

There were no coastal watches or warnings associated with Patty.

Table 1. Best track for Tropical Storm Patty, 11 – 13 October 2012.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
10 / 1800	25.5	72.5	1012	25	low
11 / 0000	25.4	72.4	1010	30	tropical depression
11 / 0600	25.4	72.2	1009	35	tropical storm
11 / 1200	25.5	72.2	1008	35	"
11 / 1800	25.6	72.3	1007	35	"
12 / 0000	25.5	72.4	1005	40	"
12 / 0600	25.4	72.3	1005	40	"
12 / 1200	25.3	72.2	1006	40	"
12 / 1800	25.4	72.1	1007	35	"
13 / 0000	25.4	71.9	1007	35	"
13 / 0600	25.3	71.7	1008	30	tropical depression
13 / 1200					dissipated
12 / 0000	25.5	72.4	1005	40	maximum wind and minimum pressure

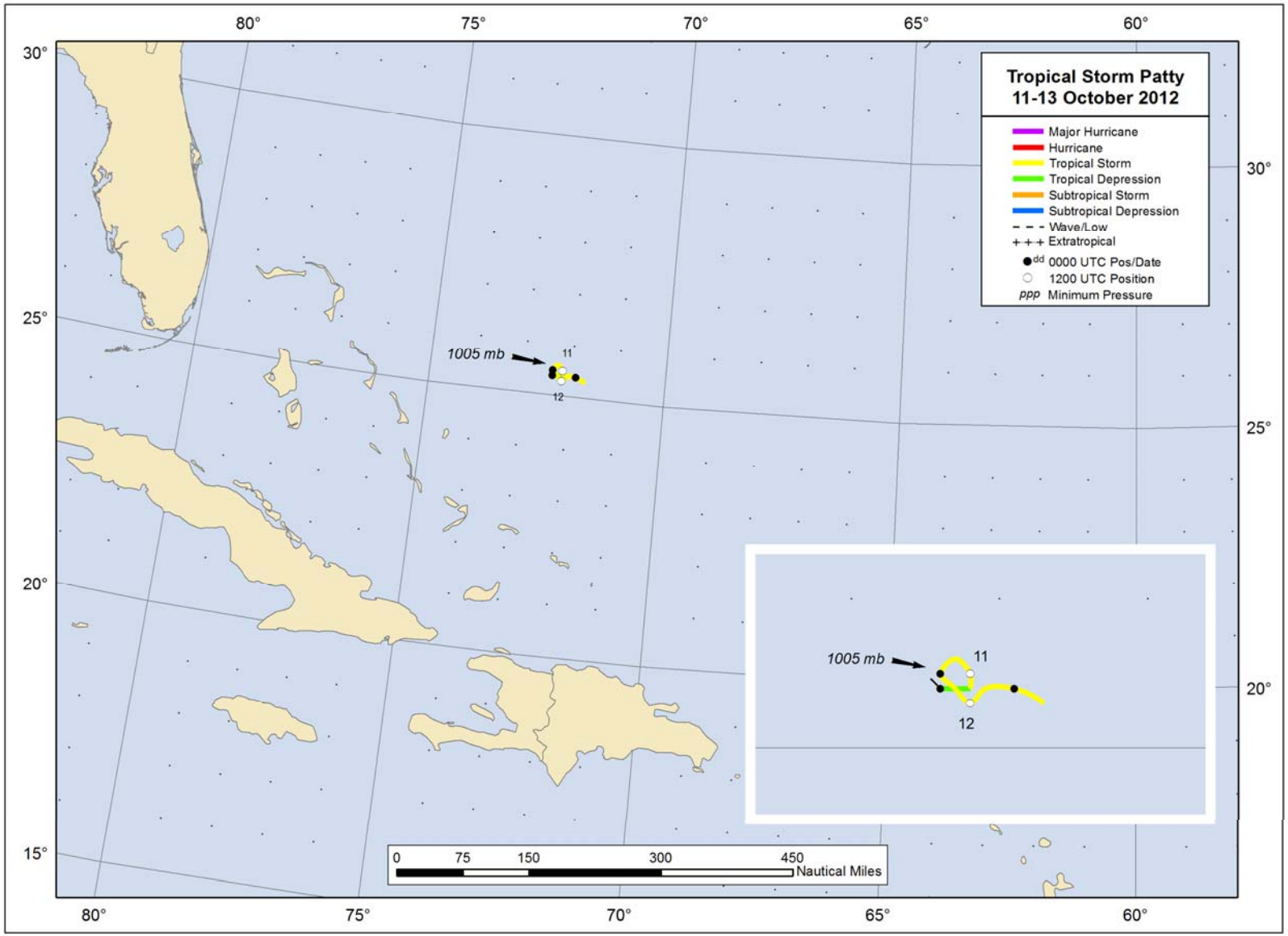

Figure 1. Best track positions for Tropical Storm Patty, 11 – 13 October 2012.

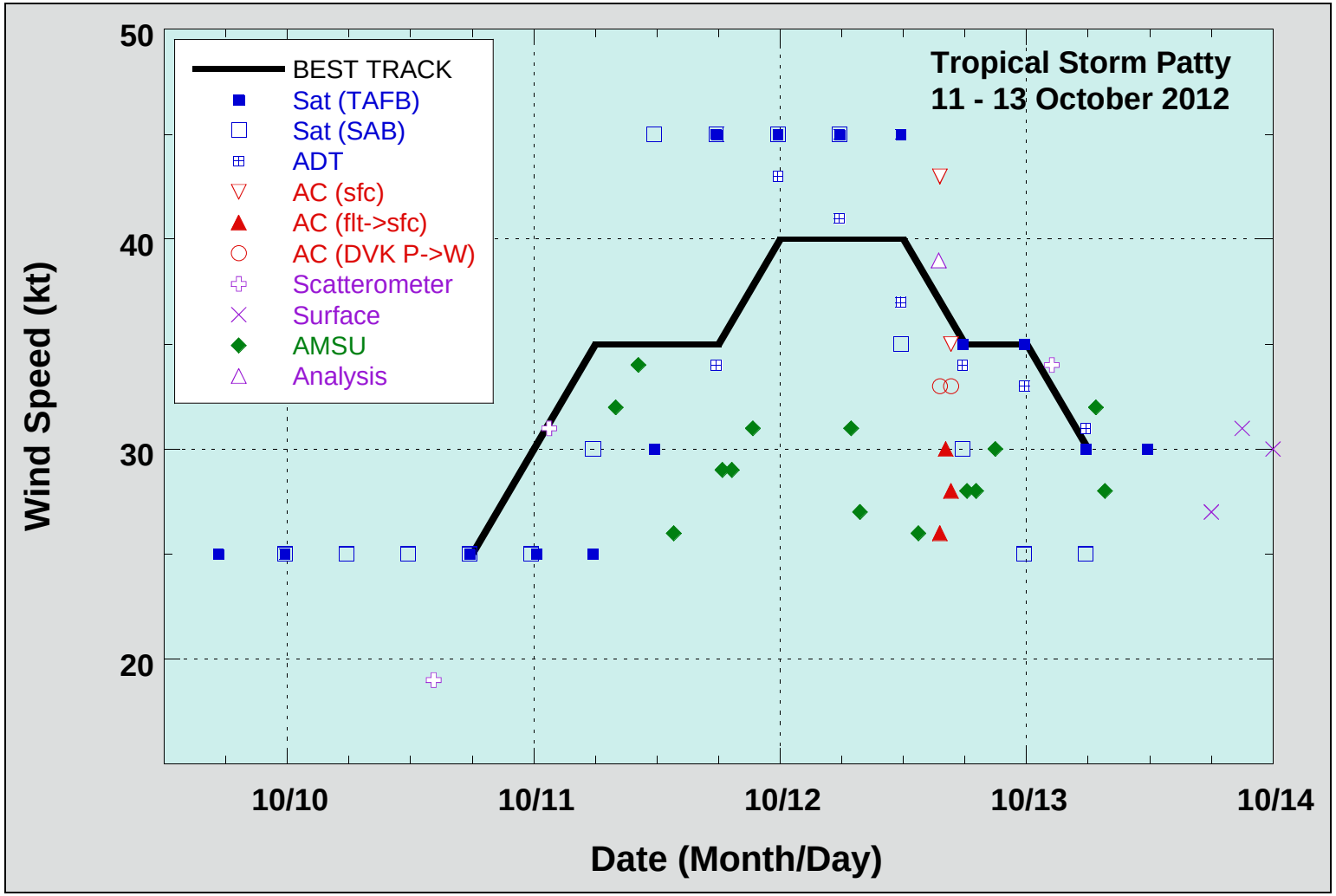

Figure 2. Selected wind observations and best track maximum sustained surface wind speed curve for Tropical Storm Patty, 11 – 13 October 2012. Aircraft observations have been adjusted for elevation using an 80% adjustment factor for observations from 850 mb. Advanced Dvorak Technique estimates represent 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.

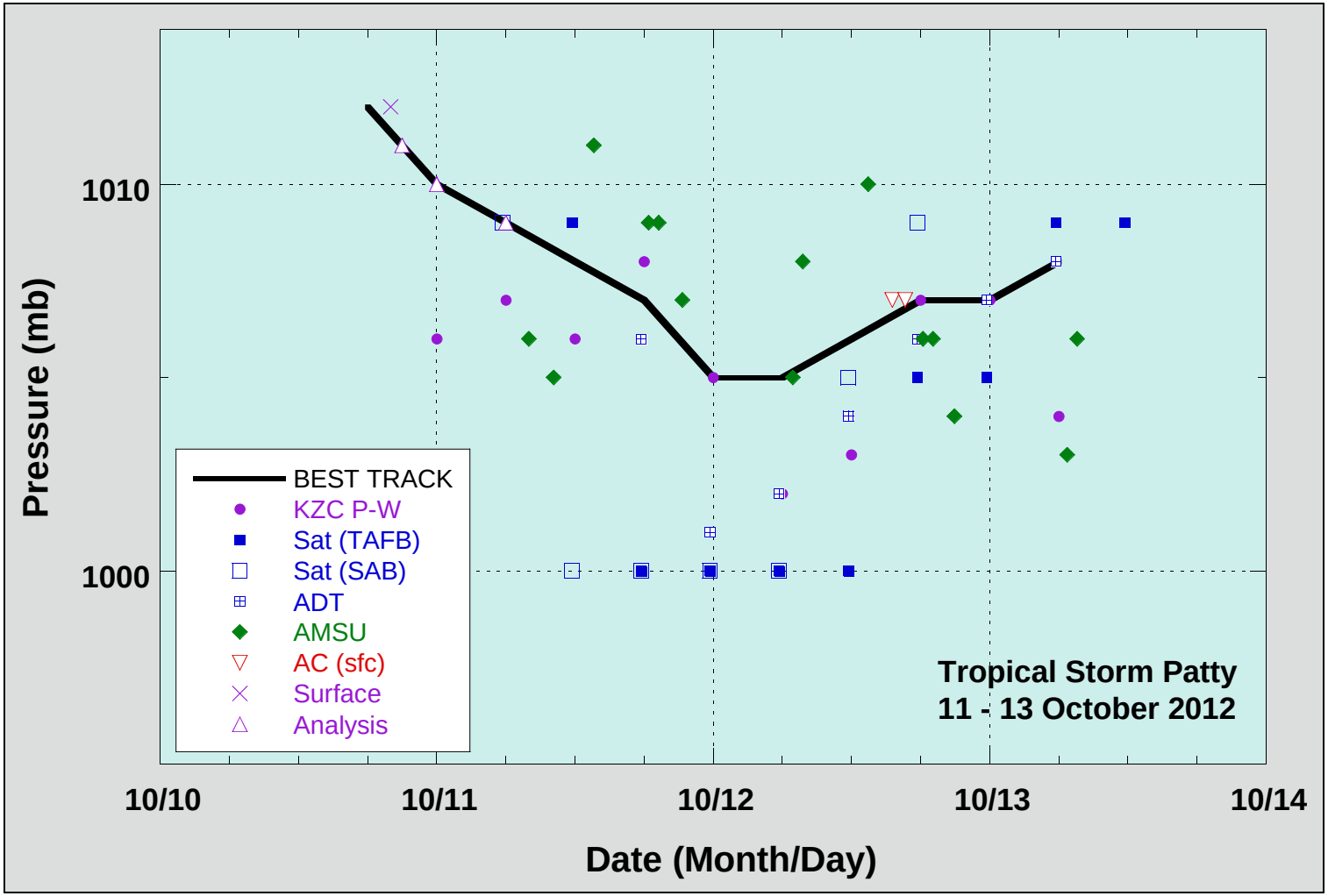

Figure 3. Selected pressure observations and best track minimum central pressure curve for Tropical Storm Patty, 11 – 13 October 2012. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. AMSU intensity estimates are from the Cooperative Institute for Meteorological 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.