NATIONAL HURRICANE CENTER
TROPICAL CYCLONE REPORT

SUBTROPICAL STORM ANDREA

(AL012019)

20 – 21 May 2019

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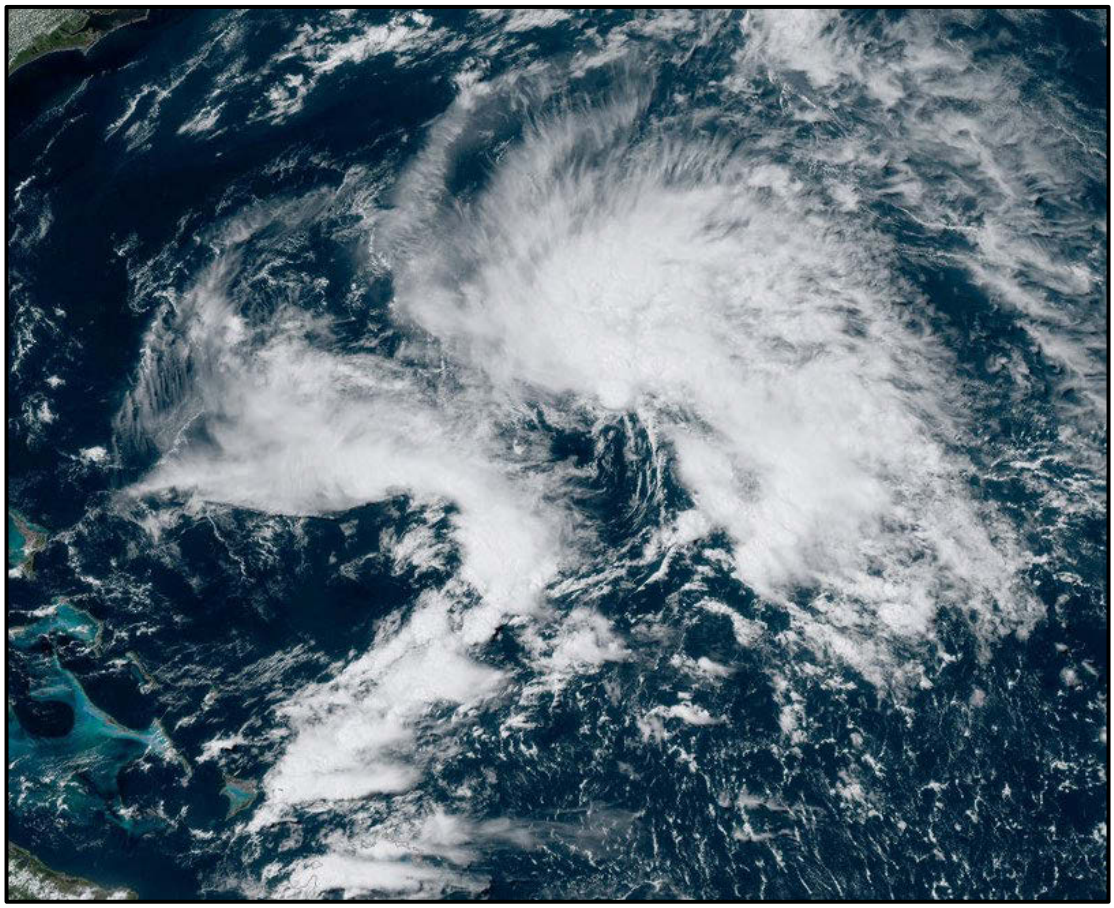
National Hurricane Center
6 August 2019



GOES-16 NATURAL-COLOR VISIBLE SATELLITE IMAGE OF SUBTROPICAL STORM ANDREA AT 1750 UTC 20 MAY 2019. IMAGE COURTESY OF NOAA/RAMMB.

Andrea was a short-lived subtropical storm that formed well east of the Bahamas and moved northward before dissipating southwest of Bermuda.

Subtropical Storm Andrea

20 – 21 MAY 2019

SYNOPTIC HISTORY

Andrea had non-tropical origins. An upper-level trough moved southward out of the mid-latitudes and cut off into a broad upper-level low over Florida on 17 May. This upper-level low moved eastward over the western Atlantic midway between the Bahamas and Bermuda by 18 May. A large area of cloudiness and showers developed that day east of the upper-level low within a region of strong mid- to upper-level diffluence. Meanwhile, low-level vorticity along the western end of a dissipating front that had transitioned to a shearline began to interact with the area of showers and thunderstorms and the associated upper-level low on 19 May. The merging low- and upper- level features and associated increasing convection moved northwestward to northward that day and into early 20 May. Scatterometer surface wind data indicated that a broad area of low pressure had formed by 1200 UTC 20 May about 375 n mi south-southwest of Bermuda, but the associated convection remained disorganized. This convection continued to increase and become better organized throughout the day, and a U.S. Air Force Reserve reconnaissance aircraft found the system had winds of around 35 kt by 2200 UTC and a well-defined low pressure system. These peak winds were about 60 n mi from the low center, with an asymmetric wind field present. In addition, the system was under the influence of the broad upper-level low situated to its west. Based on the aircraft reports and the structural characteristics of the system, it is estimated that Subtropical Storm Andrea formed around 1800 UTC 20 May, centered about 320 n mi southwest of Bermuda. The “best track” chart of Andrea’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].

Andrea’s subtropical characteristics persisted throughout the cyclone’s short lifetime as the upper-level low remained situated to its west. Andrea maintained its estimated peak intensity of 35 kt for about 12 hours. After that time, dry mid-level air began to entrain into the system’s circulation while southwesterly vertical wind shear increased. These factors resulted in a rapid waning of the convection early on 21 May, and the convection dissipated before 1200 UTC that day as Andrea degenerated into a remnant low. The remnant low moved east-northeastward through early 22 May while becoming elongated, and was absorbed by a cold front by 1200 UTC that day about 60 n mi southwest of Bermuda.

[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.

METEOROLOGICAL STATISTICS

Observations in Andrea (Figs. 2 and 3) include subjective satellite-based Hebert-Poteat technique intensity estimates from the Tropical Analysis and Forecast Branch (TAFB), and objective Advanced Dvorak Technique (ADT) estimates and Satellite Consensus (SATCON) 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 and a center fix from one flight conducted by the 53rd Weather Reconnaissance Squadron (WRS) of the U. S. Air Force Reserve Command. 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 Andrea.

Andrea's estimated maximum intensity of 35 kt from 1800 UTC 20 May to 0600 UTC 21 May is based on SFMR data from reconnaissance aircraft around 2200 UTC 20 May with an extrapolated minimum central pressure of 1006 mb. This intensity is also supported by an ASCAT overpass at 0043 UTC 21 May that detected 35-kt wind vectors in the northeastern quadrant, about 60 n mi from the storm's center. This overpass also reported a few 40-kt wind vectors. However, an analysis of these vectors and associated ambiguities determined that these data were unreliable. It should be noted that the Knaff-Zehr-Courtney pressure-wind relationship data was not available, as this method is not applicable to subtropical cyclones.

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

CASUALTY AND DAMAGE STATISTICS

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

FORECAST AND WARNING CRITIQUE

The genesis of Andrea (Table 2) was predicted reasonably well in the long range, but not as well in the short term. A Special Tropical Weather Outlook was first issued at 1700 UTC 17 May to give the incipient disturbance a low (<40%) chance of genesis during the next five days about 72 h (3 days) before formation. The 5-day probability of genesis was increased to the medium category (40–60%) about 48 h before genesis occurred. The possibility of tropical or subtropical cyclone formation within 2 days was mentioned 36 h before formation. The 48-h genesis probabilities were increased to the medium category about 24 h before genesis. The short-range and long-range probabilities never reached the high category (>60%). The lack of confidence in raising probabilities to the high category was due to marginal environmental

conditions in place, making it uncertain as to whether the system would acquire sufficient organization to become a tropical or subtropical cyclone.

Andrea was a subtropical cyclone for only 24 h, so the number of available forecasts is too small to draw any meaningful conclusions. The two official NHC 12-hour forecasts that were made for Andrea had average track and intensity forecast errors that were 23.6 n mi and 7.5 kt, respectively, which were near the 5-yr means.

No coastal watches or warnings were issued in association with Andrea.

Table 1. Best track for Subtropical Storm Andrea, 20–21 May 2019.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
20 / 1800	28.1	68.6	1008	35	subtropical storm
21 / 0000	29.1	68.8	1006	35	"
21 / 0600	29.9	69.0	1007	35	"
21 / 1200	30.6	69.1	1009	30	low
21 / 1800	30.8	68.6	1009	30	"
22 / 0000	31.3	67.7	1010	30	"
22 / 0600	31.6	66.7	1011	25	"
22 / 1200					dissipated
21 / 0000	29.1	68.8	1006	35	minimum pressure and maximum intensity

Table 2. Number of hours in advance of formation associated with the first NHC Special 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 (<40%)	36	72
Medium (40%-60%)	24	48
High (>60%)	—	—

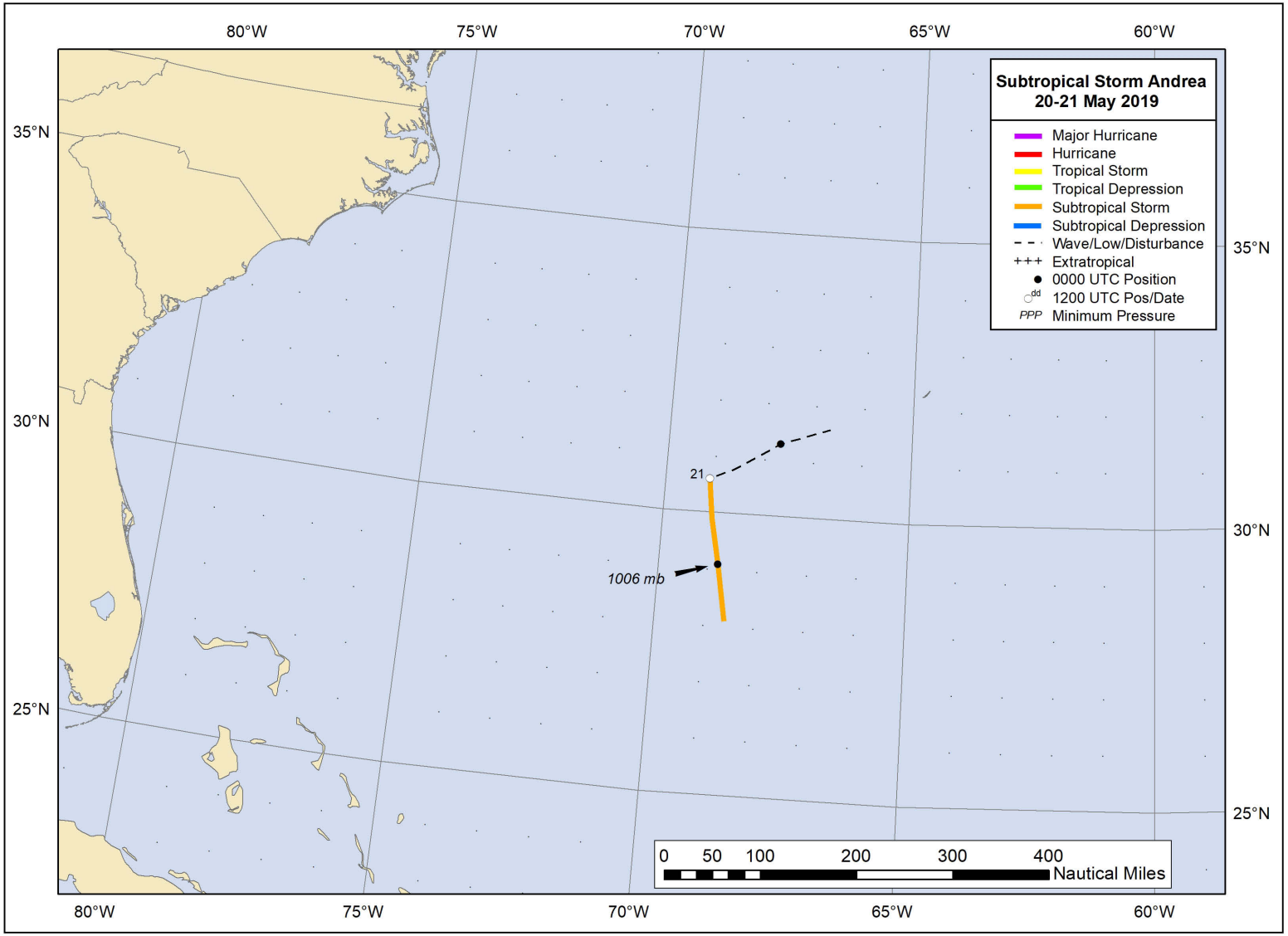


Figure 1. Best track positions for Subtropical Storm Andrea, 20–21 May 2019.

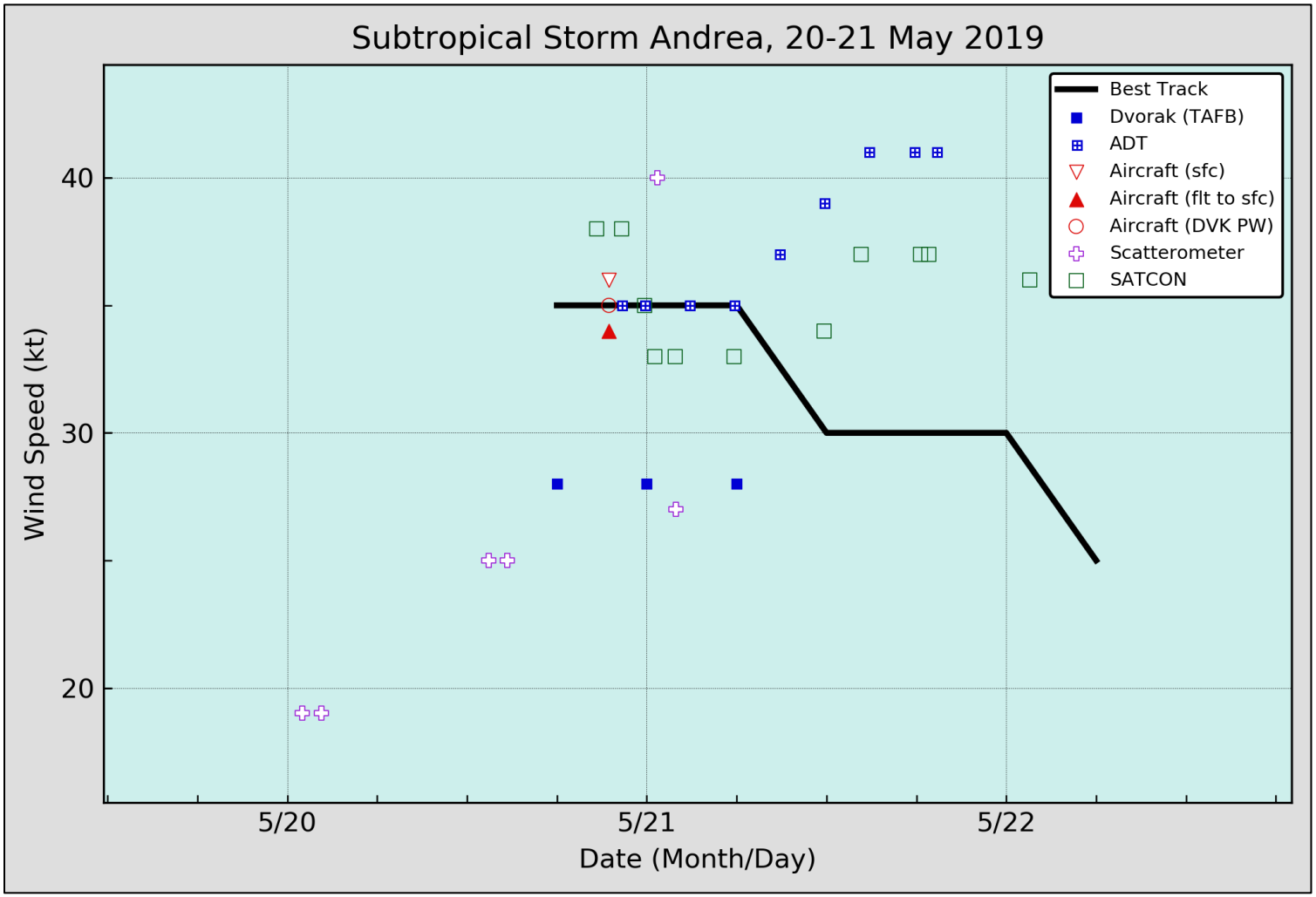


Figure 2. Selected wind observations and best track maximum sustained surface wind speed curve for Subtropical Storm Andrea, 20–21 May 2019. Aircraft observations have been adjusted for elevation using an 80% adjustment factor for observations from 1000-1500 ft. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. SATCON intensity estimates are from the Cooperative Institute for Meteorological Satellite Studies. Dashed vertical lines correspond to 0000 UTC.

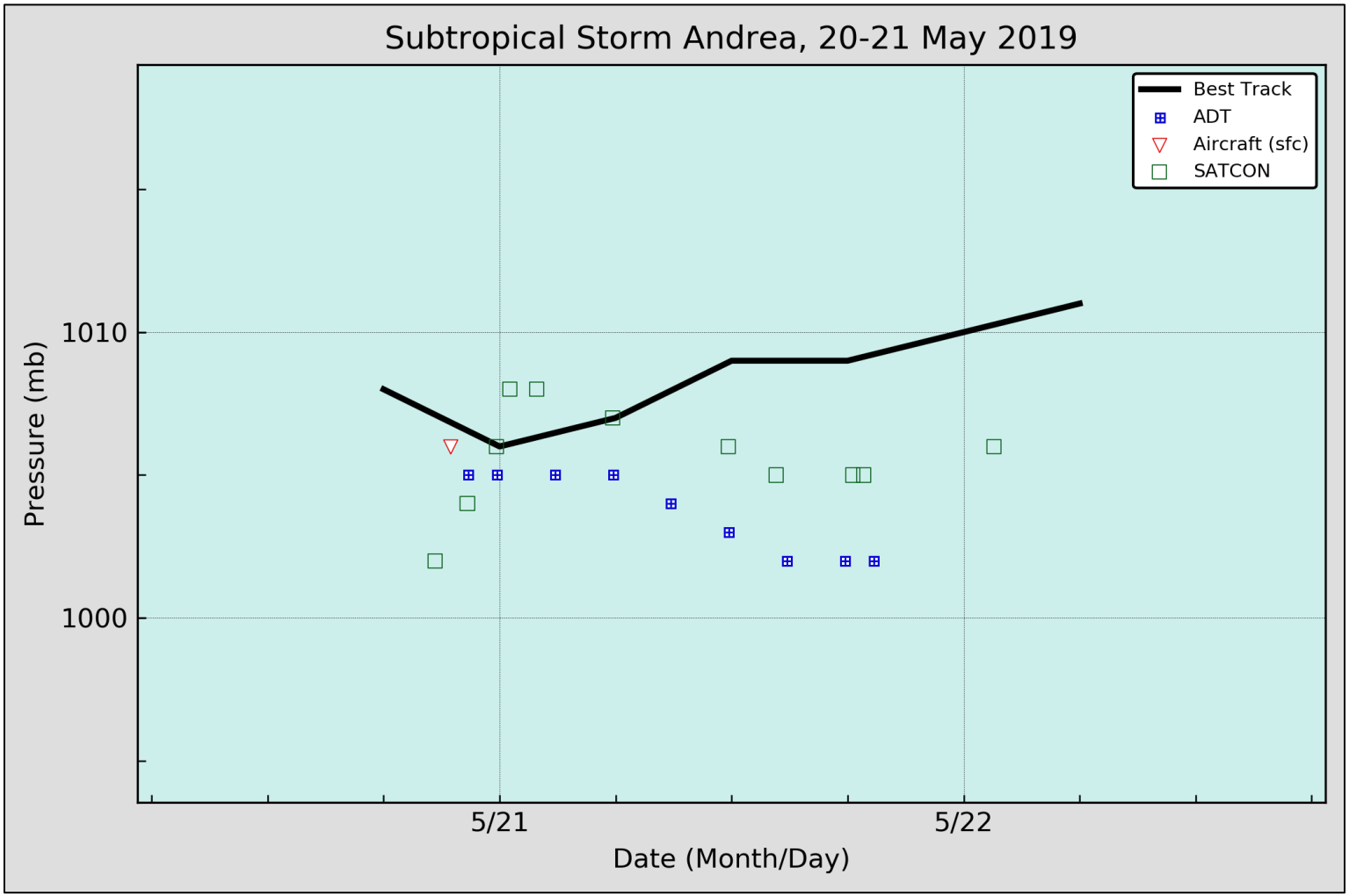


Figure 3. Selected pressure observations and best track minimum central pressure curve for Subtropical Storm Andrea, 20-21 May 2019. Advanced Dvorak Technique estimates represent the Current Intensity at the nominal observation time. SATCON intensity estimates are from the Cooperative Institute for Meteorological Satellite Studies. Dashed vertical lines correspond to 0000 UTC.