

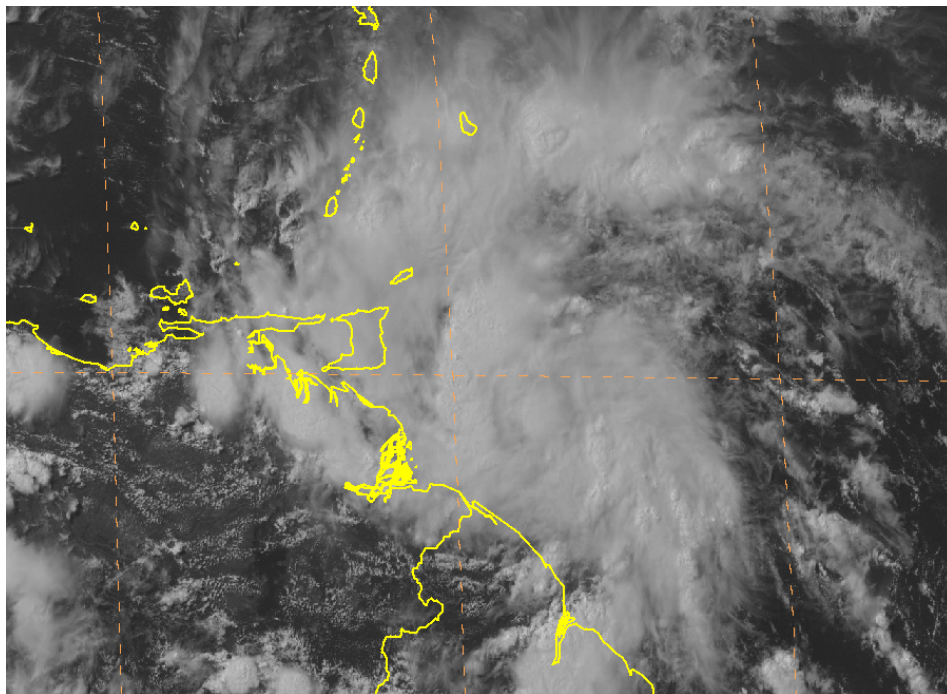


# NATIONAL HURRICANE CENTER TROPICAL CYCLONE REPORT

## TROPICAL STORM BRET (AL022017)

19–20 June 2017

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National Hurricane Center  
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GOES-E VISIBLE SATELLITE IMAGE OF BRET AT 1845 UTC 19 JUNE 2017 NEAR THE TIME OF BRET'S FORMATION

Bret formed southeast of Trinidad and affected portions of the southern Windward Islands and the Paria Peninsula of Venezuela before dissipating over the southeastern Caribbean Sea. Bret marked the earliest formation of a named storm during the season in the Atlantic basin's main development region (south of 20°N and east of 70°W).

# Tropical Storm Bret

19–20 JUNE 2017

## SYNOPTIC HISTORY

Bret formed from a low-latitude tropical wave that moved off the west coast of Africa on 13 June. The wave was accompanied by a large area of shower and thunderstorm activity through early 14 June, but convection diminished later that day. While the wave continued moving westward to the south of a mid-level ridge for the next few days, deep convection flared up intermittently. Satellite surface wind data from the European Space Agency's Advanced Scatterometer (ASCAT) around 1200 UTC on 18 June indicated that while a broad area of low pressure had formed at the surface, the low did not have a well-defined circulation. At this time, however, the system was already producing a large area of 25–30 kt winds north of the broad low. Shower and thunderstorm activity increased in coverage and organization on 19 June, and an Air Force Reserve Hurricane Hunter aircraft found that a well-defined center had formed by 1800 UTC that day. Aircraft data also indicated that the system was already producing tropical-storm-force winds at that time, and it is estimated that Tropical Storm Bret formed about 160 n mi east-southeast of Trinidad. The “best track” chart of Bret'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<sup>1</sup>.

Bret moved quickly west-northwestward after formation and made landfall on the southeastern coast of Trinidad around 0200 UTC 20 June, and surface observations indicated that maximum sustained winds had increased to 45 kt by that time. Southwesterly vertical wind shear increased to 15 to 20 kt by 0600 UTC, and Bret's cloud pattern became elongated and disorganized after the center reached the Paria Peninsula of Venezuela around 0900 UTC. The combination of the increasing shear, the fast translational speed of Bret, and interaction with the topography of the peninsula likely contributed to the low-level center dissipating by 1200 UTC 20 June. An area of disorganized showers and thunderstorms associated with the remnants of Bret continued moving quickly westward across the Caribbean Sea during the next day or so.

## METEOROLOGICAL STATISTICS

Observations in Bret (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). Data and imagery from NOAA polar-orbiting satellites including the Advanced Microwave Sounding Unit (AMSU), the NASA Global Precipitation Mission (GPM),

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<sup>1</sup> 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 *bt* directory, while previous years' data are located in the *archive* directory.

ASCAT, and Defense Meteorological Satellite Program (DMSP) satellites, among others, were also useful in constructing the best track of Bret. Radar imagery from the Trinidad and Tobago Meteorological Service was also helpful in determining the landfall timing and location on Trinidad.

Aircraft observations include flight-level, stepped frequency microwave radiometer (SFMR), and dropwindsonde observations from one flight of the 53<sup>rd</sup> Weather Reconnaissance Squadron of the U.S. Air Force Reserve Command on 19 June. The highest flight-level wind reported by the aircraft during its low-level invest mission was 42 kt at 1649 UTC that day, and the highest rain-free SFMR wind was 39 kt at 1650 UTC.

Bret's peak intensity of 45 kt at landfall at 0200 UTC 20 June is based on a 10-minute sustained wind of 42 kt measured at Guayaguayare on the southeastern tip of Trinidad at that time (Table 3). Based on the conversion factor from Harper et al. (2010), this observation would correspond to a 1-min wind of 46–47 kt. A 10-minute sustained wind of 42 kt was also measured at Grenada at 0600 UTC 20 June. The highest wind gust reported with Bret was 62 kt at Guayaguayare. A 48-kt gust was reported in Grenada, with a 43-kt wind gust measured at Crown Point on the southwest tip of Tobago. Wind gusts of 30 to 35 kt were also reported on Barbados and St. Lucia. Other selected surface observations from Bret are given in Table 3. There were no ship reports of tropical-storm-force winds in association with Bret.

Bret produced rainfall totals of 2 to 5 inches on Grenada, Trinidad, and Tobago. The highest reported total was 4.76 inches at Penal on Trinidad.

## CASUALTY AND DAMAGE STATISTICS

According to media reports, one indirect death<sup>2</sup> from Bret occurred in Trinidad, where a man fell to his death after slipping on a makeshift bridge while running through heavy rains.

Roof damage was reported to nearly 100 homes in Trinidad, along with some downed utility poles and power outages. Flooding was noted in several towns in southern and central Trinidad, with flood waters rising as high as 13 feet outside of homes in Lower Barrackpore.

In Venezuela, two people were injured on Margarita Island due to a collapsed wall, and mudslides damaged and destroyed numerous homes on the island. Several boats were damaged and some flooding was also noted on the island.

On Grenada, only minor damage and some power outages were reported.

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<sup>2</sup> Deaths occurring as a direct result of the forces of the tropical cyclone are referred to as “direct” deaths. These would include those persons who drowned in storm surge, rough seas, rip currents, and freshwater floods. Direct deaths also include casualties resulting from lightning and wind-related events (e.g., collapsing structures). Deaths occurring from such factors as heart attacks, house fires, electrocutions from downed power lines, vehicle accidents on wet roads, etc., are considered indirect” deaths.

## FORECAST AND WARNING CRITIQUE

The genesis of Bret was generally well anticipated. The tropical wave that eventually spawned Bret was first given a low (< 40%) chance of formation during the next 5 days 132 h prior to formation (Table 2). The 5-day formation probability was raised to the medium (40–60%) category 78 h before genesis, and reached the high (> 60%) category 60 h before formation. However, the 5-day probability was lowered back to the medium category 48 h prior to genesis before being raised to the high category again 18 h prior to Bret's formation. The 48-h formation chance first entered the low category 132 h before formation and reached the medium and high categories 66 h and 18 h before Bret became a tropical cyclone, respectively (Table 2). Given the high chance of Bret's formation and the fact that the system was expected to bring tropical storm conditions to the Windward Islands, advisories were initiated on the system as a potential tropical cyclone at 2100 UTC 18 June 2017, about 26 h before Bret reached the Windward Islands.

Given Bret's short life span as a tropical cyclone, only one NHC official forecast was available for verification at 12 h. The track forecast had an error of 18 n mi while the intensity forecast had an error of 10 kt. Given the very small sample size, a verification of model forecasts for Bret is not presented.

Watches and warnings issued in association with Bret are listed in Table 4. Tropical storm warnings were issued for Trinidad and Tobago and Grenada about 26 h before landfall on Trinidad. Tropical storm watches were issued for the islands of Aruba, Bonaire, and Curacao since several NHC forecasts showed Bret passing near those islands as a tropical depression or tropical storm. However, Bret dissipated before reaching those islands.

## References

Harper, B.A., J. D. Kepert, and J. D. Ginger 2010: Guidelines for Converting Between Various Wind Averaging Periods in Tropical Cyclones. WMO Technical Programme Report TD 1555. [https://www.wmo.int/pages/prog/www/tcp/documents/WMO\\_TD\\_1555\\_en.pdf](https://www.wmo.int/pages/prog/www/tcp/documents/WMO_TD_1555_en.pdf)

## *Acknowledgements*

Thanks to the Trinidad and Tobago Meteorological Service for providing a summary of observations and impacts from Bret that was utilized in this report.



Table 1. Best track for Tropical Storm Bret, 19–20 June 2017.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Stage
18 / 1800	7.5	49.6	1008	30	disturbance
19 / 0000	7.8	51.7	1008	35	"
19 / 0600	8.1	53.9	1007	35	"
19 / 1200	8.6	56.5	1007	35	"
19 / 1800	9.2	58.9	1007	40	tropical storm
20 / 0000	9.7	60.5	1008	40	"
20 / 0200	10.1	61.1	1008	45	"
20 / 0600	10.4	62.1	1008	45	"
20 / 0900	10.6	62.6	1008	45	"
20 / 1200					dissipated
19 / 1800	9.2	58.9	1007	40	minimum pressure
20 / 0200	10.1	61.1	1008	45	maximum winds and landfall in southwestern Trinidad
20 / 0900	10.6	62.6	1008	45	Landfall on Paria Peninsula of Venezuela



Table 2. Number of hours in advance of formation 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 (<40%)	132	132
Medium (40%-60%)	66	78
High (>60%)	18	60

Table 3. Selected surface observations for Tropical Storm Bret, 19–20 June 2017.

Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/time (UTC)	Press. (mb)	Date/time (UTC) <sup>a</sup>	Sustained (kt) <sup>b</sup>	Gust (kt)	
<b>St. Lucia</b> Hewanorra International Airport (TLPL) (13.73N 60.95W)			20/0800	25	35	
<b>Barbados</b> Grantley Adams International Airport (TBPB) (13.07N 59.48W)	19/2300	1013	20/0300	23	31	
<b>Grenada</b> Maurice Bishop International Airport (TGPY) (12.00N 61.78W)	19/2000	1011	20/0600	42	48	1.97
<b>Trinidad and Tobago</b>						
Arthur Napoleon Raymond Robinson International Airport (TTCP) (11.15N 60.85W)	19/2000	1011	20/0300	32	43	2.52
Piarco International Airport (TTPP) (10.62N 61.35W)	19/1900	1010	20/0400	25	36	3.23
Mount St. Benedict AWS 10.65N 61.40W	19/1928	1011.4	20/0338	23		4.70
Cypress AWS 10.25N 61.45W	19/2055	1010.7	20/0326	17	24	4.09
Penal AWS (10.18N 61.46W)	20/0100	1009.9	20/0500		36	4.76
Guayaguayare AWS (10.15N 61.00W)	19/1800	1007	20/0200	42	62	4.54
Piarco AWS (10.58N 61.33W)	20/0014	1009.4			36	2.93
Crown Point AWS (11.15N 60.83W)					43	1.72



Location	Minimum Sea Level Pressure		Maximum Surface Wind Speed			Total rain (in)
	Date/time (UTC)	Press. (mb)	Date/time (UTC) <sup>a</sup>	Sustained (kt) <sup>b</sup>	Gust (kt)	
<b>NOAA Integrated Coral Observing Network Buoy 42088</b> Angel Reef, Trinidad and Tobago (11.30N 60.52W)	19/2040	1011	20/0300	18 (8 min, 3.35 m)	30	

<sup>a</sup> Date/time is for sustained wind when both sustained and gust are listed.

<sup>b</sup> Except as noted, sustained wind averaging periods for land-based reports are 10 min; buoy averaging periods are 8 min.



Table 4. Watch and warning summary for Tropical Storm Bret, 19–20 June 2017.

<b>Date/Time (UTC)</b>	<b>Action</b>	<b>Location</b>
18 / 2100	Tropical Storm Warning issued	Barbados/St. Vincent and the Grenadines
19 / 0000	Tropical Storm Warning issued	Trinidad/Tobago/Grenada
19 / 1200	Tropical Storm Warning discontinued	Barbados
19 / 1500	Tropical Storm Watch issued	Aruba
19 / 1500	Tropical Storm Watch issued	Bonaire
19 / 1500	Tropical Storm Warning discontinued	St. Vincent and the Grenadines
19 / 1500	Tropical Storm Warning issued	Pedernales to Cumana, Venezuela
19 / 1500	Tropical Storm Warning issued	Isla de Margarita
19 / 1800	Tropical Storm Watch issued	Curacao
20 / 0900	Tropical Storm Warning discontinued	Trinidad/Tobago/Grenada
20 / 1500	Tropical Storm Warning discontinued	Pedernales to Cumana, Venezuela
20 / 1800	Tropical Storm Warning discontinued	All
20 / 2100	Tropical Storm Watch discontinued	All

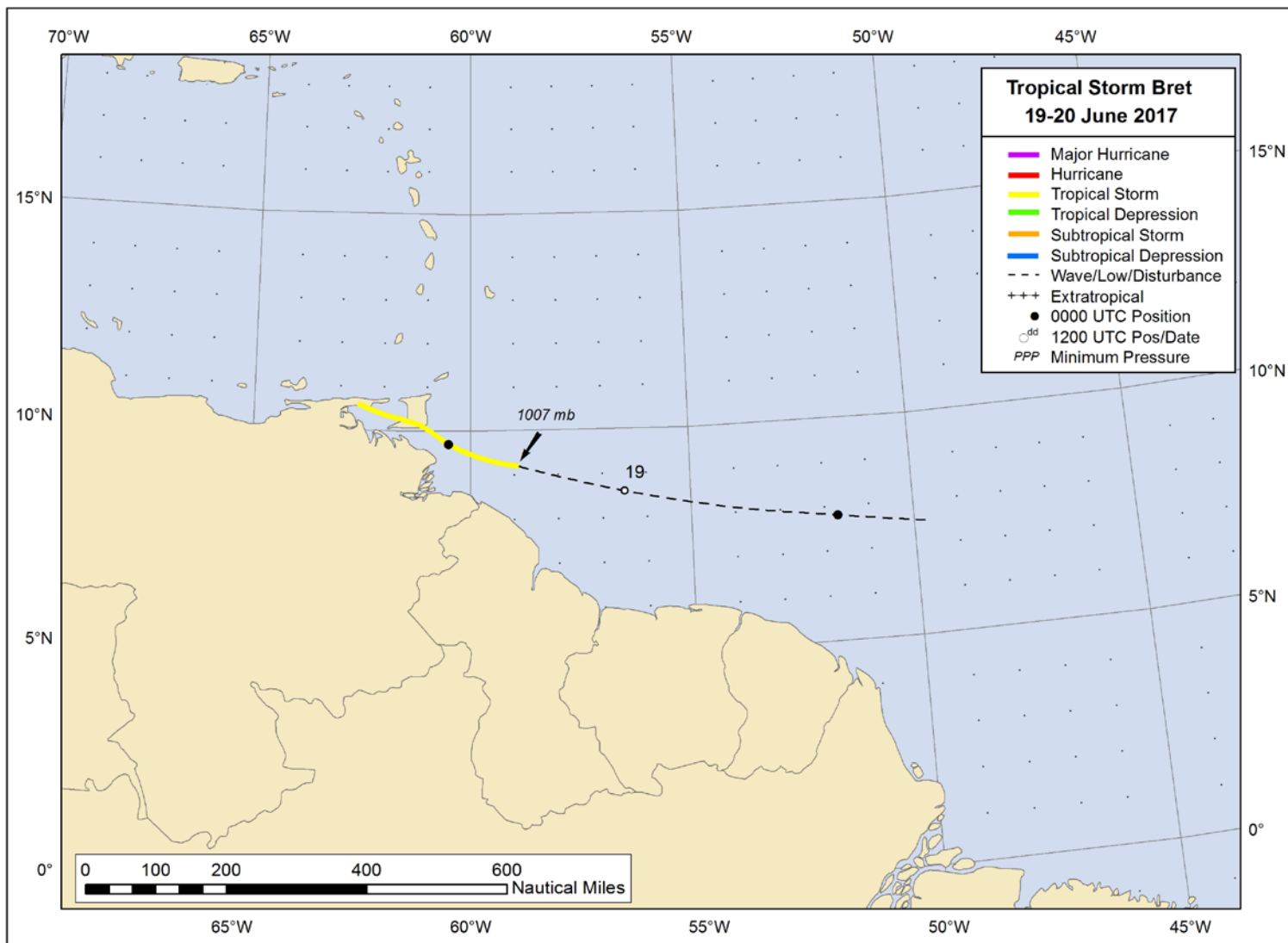


Figure 1. Best track positions for Tropical Storm Bret, 19–20 June 2017.

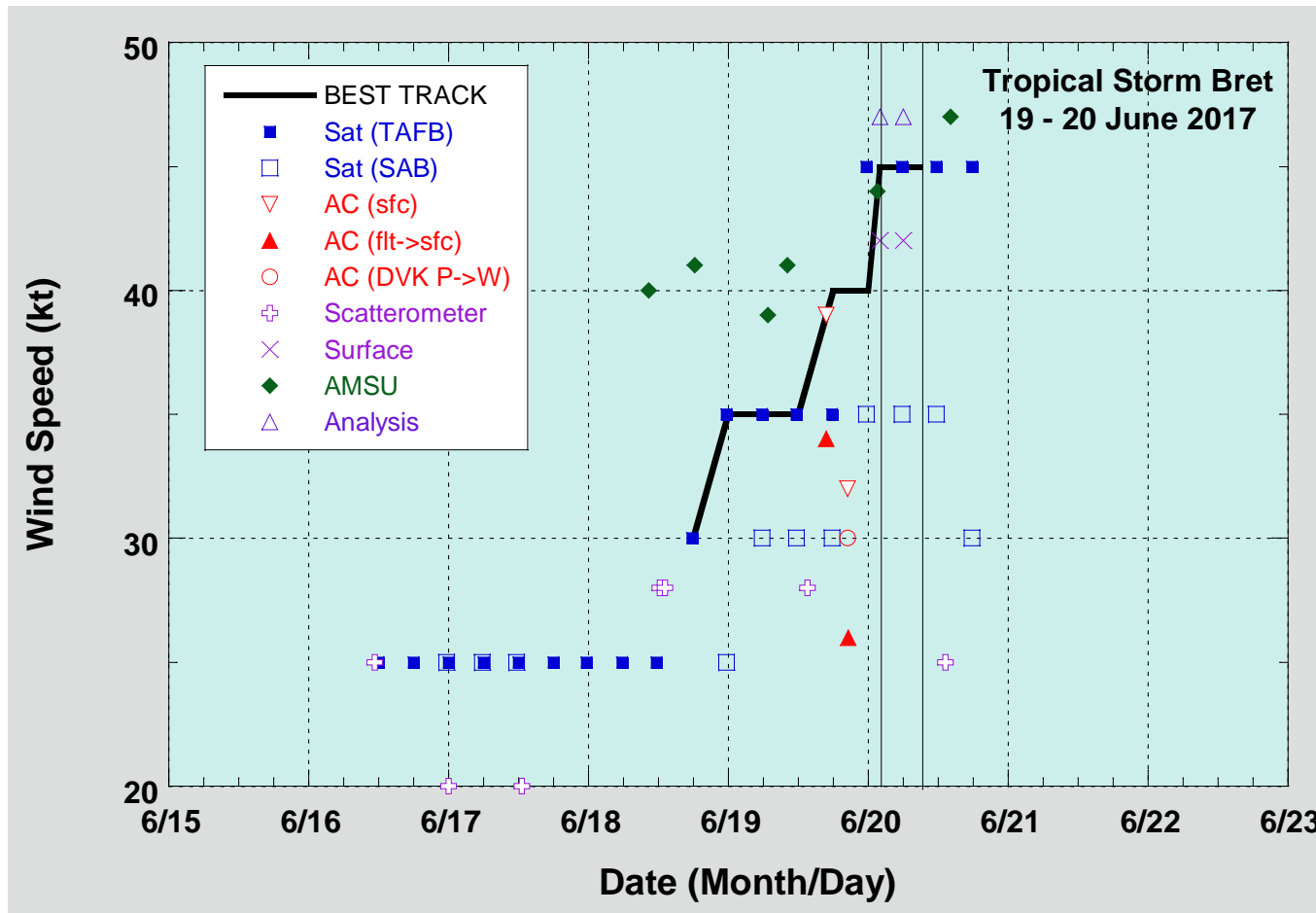


Figure 2. Selected wind observations and best track maximum sustained surface wind speed curve for Tropical Storm Bret, 19–20 June 2017. Dashed vertical lines correspond to 0000 UTC and the solid vertical lines correspond to landfalls.

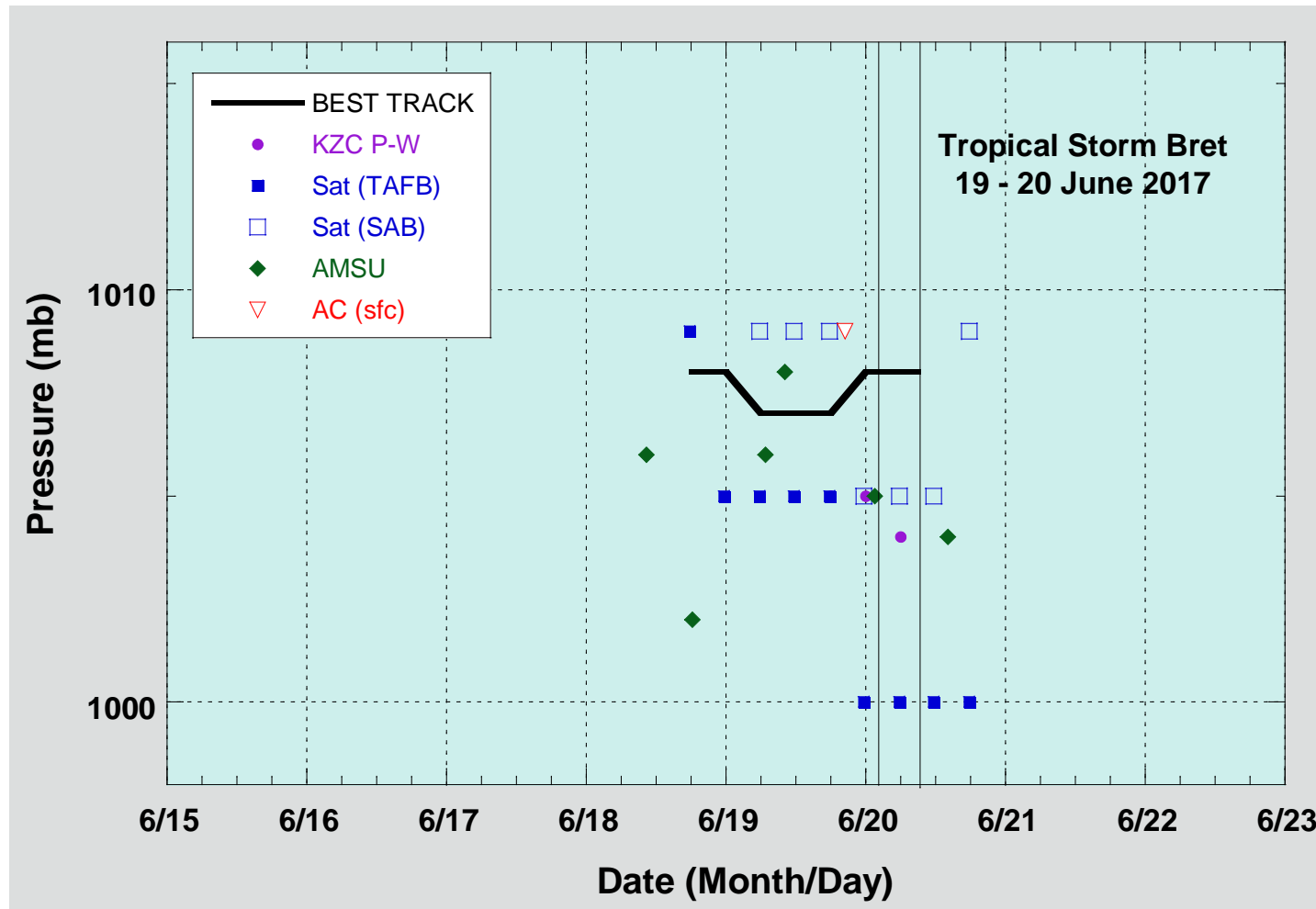


Figure 3. Selected pressure observations and best track minimum central pressure curve for Tropical Storm Bret, 19–20 June 2017. KZC P-W refers to pressure estimates derived using the Knaff-Zehr-Courtney pressure-wind relationship. Dashed vertical lines correspond to 0000 UTC and the solid vertical lines correspond to landfalls.