

Preliminary Report
Tropical Storm Barry
05-10 July 1995

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a. Synoptic History

The NHC surface analysis showed a weak 1019 mb frontal low midway between Bermuda and the South Carolina coast at 0600 UTC 5 July. Maximum sustained winds around the low were 10 to 20 knots based on available ship reports. Satellite imagery indicated that the clouds associated with the low gradually became isolated from the frontal cloud band over the next 24 to 36 hours. The satellite imagery also revealed that a low-level cloud system center became better defined just to the west of a small cluster of deep convection, and it is estimated that the frontal low transformed into Tropical Depression Two near 1800 UTC 6 July (Fig. 1 and Table 1). Upper-level westerly shear was evident from the small area of deep convection remaining displaced to the east of the low-level center. Little overall movement was noted on 5 and 6 July.

The center of circulation became better defined by a curved low- to mid-level cloud band, and post-analysis suggests that the depression strengthened into Tropical Storm Barry near 0600 UTC 7 July. During the day, the storm began moving toward the north-northeast near 10 knots. This allowed the storm-relative shear to decrease and deep convection to move cyclonically around the western semicircle of the circulation. The deepest convection moved from just north through west to south of the circulation center. The presence of a negatively tilted mid- to upper-level trough just to the southwest of Barry appears to have favored the temporary increase in convection.

The maximum sustained winds are estimated to have occurred near 2100 UTC 7 July. At this time, an Air Force Reserve unit aircraft reported hurricane force winds at a flight-level of 1500 feet, but the minimum central pressure of 998 mb reported by the plane does not appear to support sustained hurricane strength. Central convection decreased dramatically after the strong winds were reported, and it is assumed that the aircraft winds were associated with a transitory mesoscale feature.

Satellite imagery revealed a cloud-free center within relatively weak surrounding convection by 0000 UTC 8 July. The next aircraft reconnaissance report indicated that the minimum central pressure had changed little, but the maximum flight-level winds had decreased about 40 knots from those that were measured the previous day. By 1800 UTC 8 July, a small area of deep convection had developed near the low-level circulation center. The storm began accelerating toward the north-northeast in advance of a large amplitude trough moving eastward over the eastern United

States. The central dense overcast grew until near 1200 UTC on 9 July. Some of this increase in convection may have been related to the passage of Barry over a warm water eddy that bulged northward from the Gulf Stream to near 42°N between 63-66°W.

Convection associated with Barry began to weaken as the tropical cyclone continued to accelerate toward the north-northeast over cooler water. The maximum winds began to spread out away from the cyclone center as Barry gradually lost tropical characteristics, although upper-air soundings indicated that the cyclone still exhibited a warm core when it passed near Sable Island. The center of the storm crossed the eastern tip of the peninsula of Nova Scotia, near Hart Island, around 2130 UTC 9 July and then continued north-northeastward over Cape Breton Island. Barry became extratropical near the western coast of Newfoundland shortly after 0600 UTC 10 July. As a weakening extratropical cyclone, it could be tracked to near the southeast coast of Labrador before losing its identity.

b. Meteorological Statistics

Figures 2 and 3 show "best track" curves of minimum central pressure and maximum one-minute surface wind speed, respectively, as a function of time. The observations on which the curves are based are also plotted and consist of Dvorak-technique estimates using satellite imagery, aircraft reconnaissance data on 7 and 8 July, a few land reports, as well as synoptic fixes from the Eastern Canadian Hurricane Center in Halifax, Nova Scotia. The typical relationship between pressure and wind does not appear well established during Barry. This is likely due to the fact that the minimum pressure occurred at northern latitudes as Barry was losing tropical characteristics and due to the fact that the maximum winds appear to have been related to a transitory mesoscale feature.

On 9 July, Hart Island, Nova Scotia, reported 990.8 mb at 2145 UTC and Fourchu Head, Nova Scotia, reported 990.6 mb at 2248 UTC. The minimum central pressure curve is anchored to these surface reports and to the reports from aircraft reconnaissance on 7 and 8 July.

The maximum wind reported by aircraft was 86 knots at a flight-level of 1500 feet at 2050 UTC 7 July. The latest available satellite wind estimates at that time were 35 knots from both the NHC and the NESDIS Synoptic Analysis Branch (SAB). The satellite wind estimate was 30 knots from the Air Force Global Weather Central (AFGWC) a few hours before and after the maximum winds reported by aircraft. Similar scatter occurred between the satellite estimates and the aircraft measurements of maximum winds on 8 July as well. At 1200 UTC, the NHC satellite analyst estimated 65 knots while the SAB analyst estimated 45 knots. At 1438 UTC, the analyst at the AFGWC estimated 30 knots. At 1328 UTC, the aircraft reported maximum winds of 43 knots at a flight-level of 1500 feet. Given the large amount of scatter in maximum

wind information, there is obviously considerable uncertainty in the best track wind speed on Tropical Storm Barry.

c. Casualty and Damage Statistics

No reports of casualties or damage associated with Barry have been received at the NHC.

d. Forecast and Warning Critique

Barry was a tropical storm for only 3 days, so meaningful quantitative forecast evaluations are not possible. However, for the small sample, official track forecast errors were somewhat better than the average over the past 10 years. These track forecast errors ranged from 60 n mi at 24 hours (9 cases) to 111 n mi at 48 hours (5 cases) to 280 n mi (1 case) at 72 hours. The only operationally available track prediction model that had somewhat lower track forecast errors than the official forecast at 48 hours was the AVNI model. In general, the official forecasts as well as the track guidance were good in indicating a fairly consistent track that kept Barry well away from the United States east coast. More than two days in advance, the tropical cyclone discussions began correctly mentioning Nova Scotia as the most likely land to be affected by Barry.

The largest intensity forecast error was a 30 knot under-forecast. This was a 12-hour forecast made just before the rapid, and still unexplained, strengthening on 7 July.

Acknowledgements

Meteorological observations and best track data in the vicinity of Nova Scotia were kindly provided by Mr. Allan MacAfee from the Eastern Canadian Hurricane Center in Halifax, Nova Scotia.

Table 1. Preliminary best track, Tropical Storm Barry,
5-10 July 1995.

Date/Time (UTC)	Position		Pressure (mb)	Wind Speed (kt)	Stage
	Lat. (°N)	Lon. (°W)			
05/0600	32.0	72.0	1019	20	Frontal Low
1200	32.0	72.0	1019	20	" "
1800	31.9	72.0	1018	20	" "
06/0000	31.8	72.0	1017	25	" "
0600	31.7	71.9	1016	25	" "
1200	31.5	71.7	1013	30	" "
1800	31.3	71.6	1011	30	Trop. Depression
07/0000	31.3	71.3	1009	30	" "
0600	31.6	71.0	1007	35	Tropical Storm
1200	32.2	70.6	1004	40	" "
1800	33.2	70.2	1001	60	" "
08/0000	34.0	69.6	997	60	" "
0600	34.9	68.9	997	55	" "
1200	35.9	68.2	997	50	" "
1800	37.2	67.2	997	50	" "
09/0000	38.7	66.0	996	50	" "
0600	40.5	64.6	995	50	" "
1200	42.3	63.1	993	50	" "
1800	44.3	61.7	991	50	" "
10/0000	46.4	60.5	990	45	" "
0600	48.5	59.2	989	40	Becoming Extratropical
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07/2100	33.6	69.9	998	60	Maximum Wind
Landfalls:					
09/2130	45.3	61.0	990	50	Hart Island, Nova Scotia
09/2200	45.6	60.8	990	45	Cape Breton Island, Nova Scotia

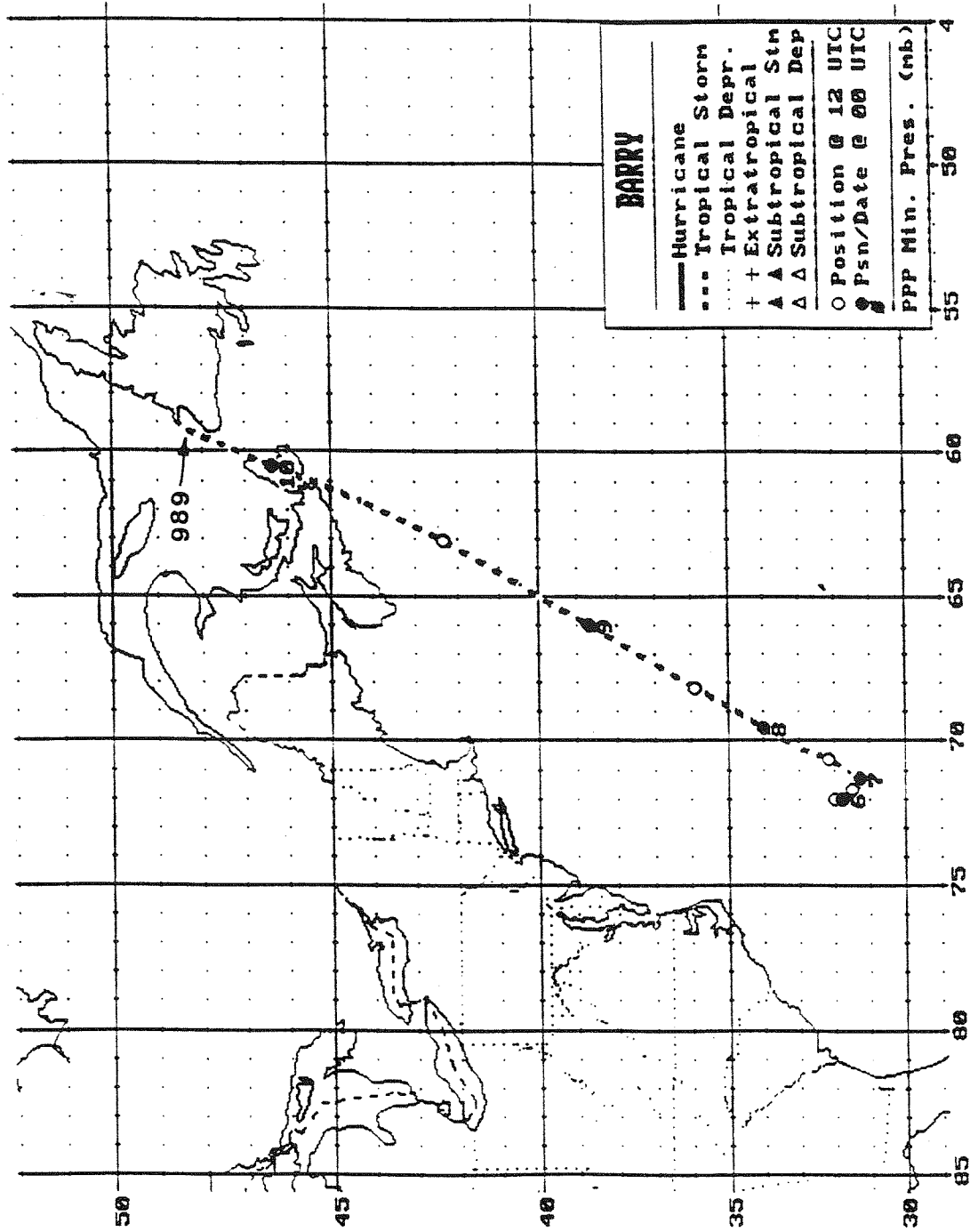


Figure 1. Best track positions for Tropical Storm Barry, 5 - 10 July 1995.

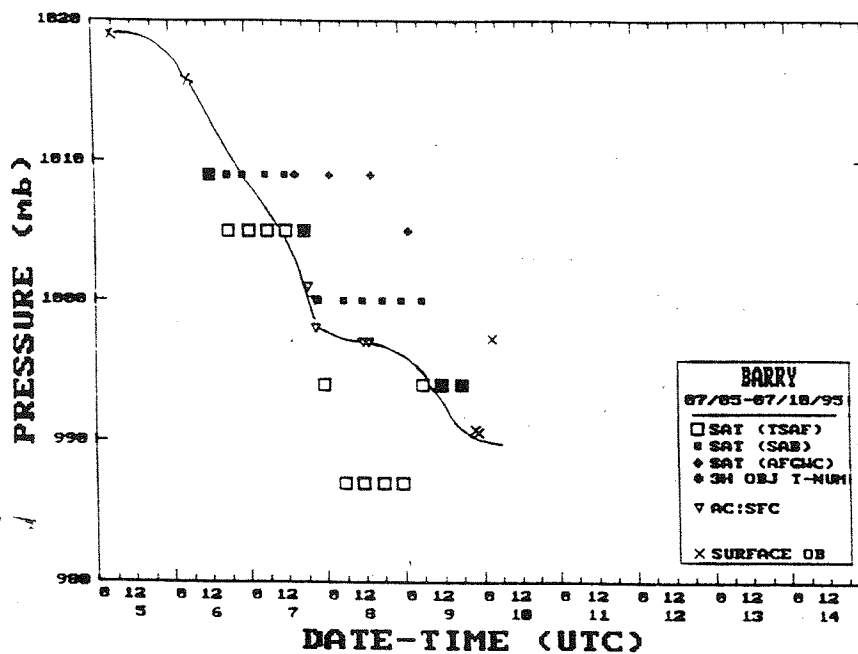


Figure 2. Best track minimum central pressure curve for Tropical Storm Barry.

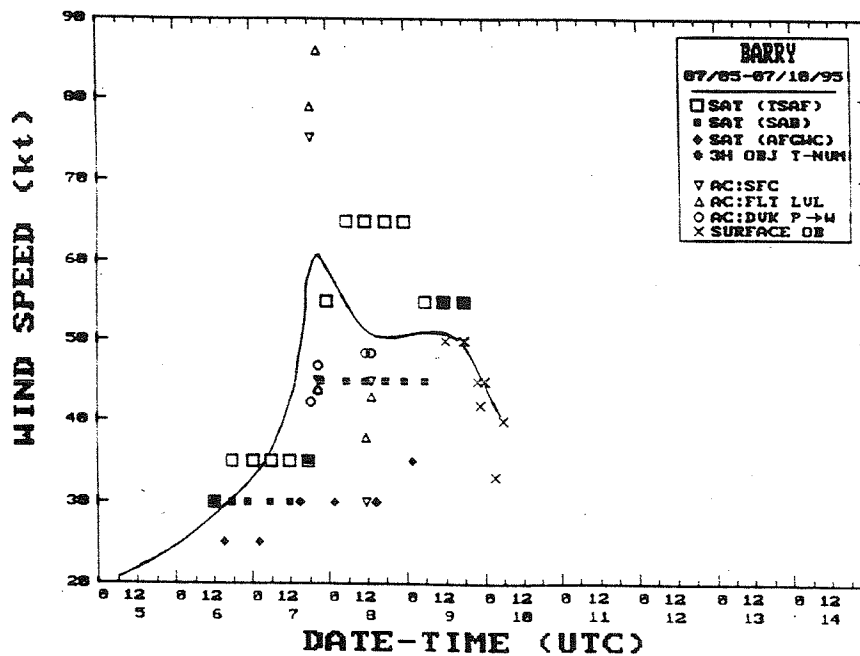


Figure 3. Best track maximum sustained wind speed curve for Tropical Storm Barry.