Tropical Cyclone Report
Hurricane Alberto
3 - 23 August 2000

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Alberto was a long-lived Cape Verde hurricane that remained at sea through its lifetime. It is the longest-lived Atlantic tropical cyclone to form in August, and the third-longest-lived of record in the Atlantic. Alberto's track included intensifying into a hurricane three times, a large anticyclonic loop that took five days, and extratropical transition near 53°N.

a. Synoptic history

A well-developed tropical wave was observed in satellite imagery over central Africa on 30 July. This system progressed steadily westward and moved off the coast on 3 August. Development occurred quickly upon reaching the Atlantic, and the wave became Tropical Depression Three at 1800 UTC that day (Figure 1 and Table 1). The cyclone moved west-northwestward at 15-20 kt and became Tropical Storm Alberto early the next day. Alberto continued to strengthen and reached hurricane status early on the 6th. This was coincident with a brief westward turn. The hurricane resumed a west-northwestward motion later that day, which continued as Alberto reached a first peak in intensity of 80 kt on the 7th.

A strong upper-level low developed west and southwest of Alberto on 7-8 August. This caused an increase in vertical shear, a northwestward turn on the 8th, and weakening to a tropical storm on the 9th. Alberto continued quickly northwestward on the 10th while it regained hurricane strength. A gradual curve northward and north-northeastward through a break in the subtropical ridge occurred on 11-12 August. Alberto passed about 300 n mi east of Bermuda on the 11th. The hurricane reached its second and greatest peak intensity of 110 kt on the 12th, when a 50 n mi wide eye was present. Increasing upper level westerlies caused weakening on the 13th and 14th as Alberto moved east-northeastward, with the cyclone losing most of its convection as it became a tropical storm on the 14th.

A westerly trough that had been guiding Alberto outran the storm, and strong ridging developed to the north and west. This caused Alberto to turn southward on 15 August, southwestward on 16 August, and westward on 17 August. The storm started to re-intensify on the 17th, and it regained hurricane status for the third time the next day. A third peak intensity of 90 kt, along with a 60 n mi wide eye, occurred on the 20th. The hurricane completed its loop during this period, turning northwestward on the 18th, northward on the 19th, and north-northeastward on the 20th and 21st.

Weakening and acceleration occurred on 22 August, and Alberto again weakened to a tropical storm before becoming extratropical the next day. Extratropical Alberto continued north-northeastward, passing near Iceland on the 24th. Winds dropped below gale force as the increasingly

poorly-defined center turned east-northeastward on the 25th, and Alberto finally dissipated about 75 n mi east of Jan Mayen Island later that day.

b. Meteorological statistics

Table 1 shows the best track positions and intensities for Alberto, with the track plotted in Figure 1. Figures 2 and 3 depict the curves of minimum central sea-level pressure and maximum sustained one-minute average "surface" (10 m above ground level) winds, respectively, as functions of time. These figures also contain the data on which the curves are based: satellite-based Dvorak technique intensity estimates from the Tropical Analysis and Forecast Branch (TAFB), the Satellite Analysis Branch (SAB) of the National Environmental Satellite Data and Information Service (NESDIS), and the Air Force Weather Agency (AFWA).

Other data were scarce. Alberto was far from land, and no reconnaissance flights were made. Only a few ships encountered the storm. A ship with the call sign **MZYF3** (name unknown) reported 44 kt winds and a 1007.8 mb pressure at 0600 UTC 4 August; this was the basis for upgrading the cyclone to a tropical storm. A drifting buoy near the center reported 78 kt at 0900 UTC 8 August, while another drifting buoy reported 93 kt at 0900 UTC 10 August; however, the reliability of these measurements is suspect. Yet another drifting buoy just south of the center reported a 991.8 mb pressure near1800 UTC 11 August. Table 2 contains selected ship reports of observations of tropical storm-force winds from Alberto.

There is one notable ship report not included in table 2. The **Conti Sydney** (call sign DEHU) reported 34 kt at 0600 UTC 3 August as the pre-Alberto disturbance was moving off the African coast. This suggests Alberto may have become a tropical storm earlier than indicated in the best track. This observation is not supported by satellite intensity estimates.

c. Casualty and damage statistics

The National Hurricane Center has received no reports of damage or casualties.

d. Forecast and warning critique

Table 3 shows the average track forecast errors during Alberto, including the official forecast error, the 10-year average forecast error, and the track guidance errors. The official forecast errors were generally close to the 10-year average, being a little less than the average from 12-48 h and a little greater than the average at 72 hr. The forecasts were also better than climatology and persistence (CLIPER or CLIP in the table) and thus showed skill. However, many of the numerical guidance models made better forecasts than the official. The most notable was the GFDL, which had errors of 31, 48, 60, 72, and 120 n mi at 12, 24, 36, 48, and 72 h respectively.

There were two periods where the official forecasts were far worse than average. The first was from 0000-1800 UTC 8 August, where four consecutive 72 h forecasts had errors greater than 500 n mi. This was due to the official forecasts calling for a west-northwestward motion while Alberto actually turned northwestward at 16-20 kt. The second was from 1200 UTC 11 August to 1200 UTC 12 August, where five consecutive 72 h forecasts had errors in excess of 600 n mi, including one of 939 n mi. This was due to the official forecast calling for a fast east-northeastward motion though the period where Alberto actually began to loop. Figure 4 shows the guidance for 0000 UTC 12 August. Note that the guidance is somewhat split into two clusters - a faster and somewhat further north set and a slower set and somewhat further south set. The official forecasts followed the former set, while the latter, though not perfect, was more accurate.

The impact of the second set of poor forecasts can be illustrated in two ways. First, if the 939 n mi 72 h forecast error had actually been the normal 235 nm forecast error, that by itself would have reduced the over 72 h average error for Alberto by 10 n mi. If the five consecutive forecast errors in excess of 600 n mi had been half of their actual magnitude (which would still be worse than average forecasts), the overall 72 h average error for Alberto would have been reduced by 30 n mi. Peliminary computations suggest that this second set of errors had a large influence on the annual forecast errors for the official forecasts.

The official intensity forecast errors for Alberto were 5, 7, 8, 11, and 14 kt for 12, 24, 36, 48, and 72 h. This was better than the 10-year average of 7, 11, 13, 16, and 19 kt at those times. The forecasts showed a slight negative bias from 24-72 h. The largest intensity forecast errors on 10-11 August were due to underforecasting intensification as Alberto became a major hurricane.

No watches or warnings were necessary for Alberto.

Acknowledgements

Joe Sienkiewicz of the Marine Prediction Center provided the track for the extratropical stage. James Franklin created several of the figures.

Table 1. Best track, Hurricane Alberto, 3 - 23 August 2000.

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Date/Time (UTC)
03/ 1800	10.8	18.0	1007	25	tropical depression
04 / 0000	11.5	20.1	1005	30	"
04 / 0600	12.0	22.3	1004	35	tropical storm
04 / 1200	12.3	23.8	1003	35	"
04 / 1800	12.7	25.2	1002	40	"
05 / 0000	13.2	26.7	1001	40	"
05 / 0600	13.7	28.2	1000	45	"
05 / 1200	14.1	29.8	999	45	"
05 / 1800	14.5	31.4	994	55	"
06 / 0000	14.5	33.2	987	65	hurricane
06 / 0600	14.6	34.4	985	65	"
06 / 1200	14.7	35.4	983	70	"
06 / 1800	15.2	36.6	981	75	"
07 / 0000	15.7	38.1	979	75	"
07 / 0600	16.0	39.6	978	80	"
07 / 1200	16.2	41.0	977	80	"
07 / 1800	16.5	42.2	978	80	"
08 / 0000	16.7	43.6	979	75	"
08 / 0600	17.0	44.9	982	70	"
08 / 1200	17.7	45.7	985	70	"
08 / 1800	18.6	46.5	987	65	"
09 / 0000	19.6	47.2	989	60	tropical storm
09 / 0600	20.6	48.5	992	60	"
09 / 1200	21.9	49.9	994	55	"
09 / 1800	23.4	51.3	991	60	"
10 / 0000	24.8	52.6	988	65	hurricane

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Date/Time (UTC)
10 / 0600	26.1	54.0	987	65	"
10 / 1200	27.5	55.3	986	65	"
10 / 1800	28.8	56.7	984	65	"
11 / 0000	29.9	57.7	982	70	"
11 / 0600	31.1	58.4	979	75	"
11 / 1200	32.2	58.6	976	80	"
11 / 1800	33.3	58.5	973	85	"
12 / 0000	34.3	58.0	970	90	"
12 / 0600	35.1	56.7	960	100	"
12 / 1200	35.9	55.3	950	110	"
12 / 1800	36.8	53.8	954	110	"
13 / 0000	37.4	52.0	958	105	"
13 / 0600	38.0	50.3	966	95	"
13 / 1200	38.4	48.3	973	85	"
13 / 1800	38.8	46.3	980	75	"
14 / 0000	39.0	44.2	987	65	"
14 / 0600	39.1	42.2	991	60	tropical storm
14 / 1200	39.1	40.6	994	55	"
14 / 1800	39.1	39.3	997	50	"
15 / 0000	38.9	38.5	1000	45	"
15 / 0600	38.3	38.5	1001	45	"
15 / 1200	37.3	38.5	1002	45	"
15 / 1800	36.6	38.9	1002	40	"
16 / 0000	36.1	39.4	1003	40	"
16 / 0600	35.4	40.2	1003	40	"
16 / 1200	34.6	41.3	1003	40	"
16 / 1800	33.9	42.4	1002	40	"

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Date/Time (UTC)
17 / 0000	33.4	43.5	1001	45	"
17 / 0600	33.0	44.2	1000	45	"
17 / 1200	33.0	44.9	998	50	"
17 / 1800	33.0	45.8	997	50	"
18 / 0000	33.2	46.5	995	55	"
18 / 0600	33.6	47.1	993	55	"
18 / 1200	34.2	47.6	991	60	"
18 / 1800	34.7	48.0	987	65	hurricane
19 / 0000	34.9	48.1	979	75	"
19 / 0600	35.3	48.2	976	80	"
19 / 1200	35.6	48.2	973	85	"
19 / 1800	36.0	48.2	970	90	"
20 / 0000	36.4	48.1	970	90	"
20 / 0600	36.7	48.0	971	90	"
20 / 1200	37.1	47.9	972	85	"
20 / 1800	37.4	47.7	973	85	"
21 / 0000	37.9	47.5	974	85	"
21 / 0600	38.3	47.3	976	80	"
21 / 1200	38.9	47.2	977	80	"
21 / 1800	40.0	46.7	978	80	"
22 / 0000	41.2	45.9	979	75	"
22 / 0600	42.6	45.4	981	75	"
22 / 1200	44.0	44.0	983	70	"
22 / 1800	46.1	42.1	985	65	"
23 / 0000	48.3	39.5	987	65	"
23 / 0600	50.7	36.8	994	55	tropical storm
23 / 1200	53.2	35.4	997	45	extratropical

Date/Time (UTC)	Latitude (°N)	Longitude (°W)	Pressure (mb)	Wind Speed (kt)	Date/Time (UTC)
23 / 1800	57.0	34.0	997	45	"
24 / 0000	59.5	30.3	995	40	"
24 / 0600	62.0	25.5	992	35	"
24 / 1200	65.5	23.0	990	35	"
24 / 1800	68.0	20.0	992	30	"
25 / 0000	69.0	12.5	990	30	"
25 / 0600	70.7	4.9	994	30	"
26/ 1200					dissipated
12 / 1200	35.9	55.3	950	110	minimum pressure

Table 2. Selected ship observations of tropical storm or greater winds associated with Hurricane Alberto, 3-23 August 2000.

Ship (Name or ID)	Date/Time (UTC)	Lat. (^{O}N)	Lon. (^{O}W)	Wind dir/speed (deg/kt)	Pressure (mb)
MZYF3	04/0600	12.1	22.1	150/44	1007.8
V2PA9	04/1800	13.3	24.8	090/37	1005.0
Iver Pride	12/0600	34.7	54.3	160/39	1012.0
Stonewall Jackson	12/0900	34.2	55.4	200/43	1010.8
Kent Voyageur	15/0300	36.7	40.7	300/43	1014.8
Liberty Sun	16/0000	34.5	39.3	250/34	1010.6

Table 3. Preliminary track forecast evaluation for Hurricane Alberto - heterogeneous sample. Errors in nautical miles for tropical storm and hurricane stages with number of forecasts in parentheses. Numbers in bold italics represent forecast which were better than the official forecast.

Forecast Technique	Period (hours)				
	12	24	36	48	72
CLIP	46 (46)	107 (44)	175 (42)	247 (40)	400 (36)
GFDI	***32*** (76)	***51*** (74)	***64*** (72)	***81*** (67)	***134*** (62)
GFDL*	***31*** (76)	***48*** (74)	***60*** (71)	***72*** (68)	***120*** (63)
GFNI	38 (53)	71 (52)	***99*** (50)	***130*** (48)	260 (44)
GFDN*	***34*** (31)	***64*** (30)	***90*** (29)	***109*** (28)	***179*** (26)
GFUI	42 (33)	71 (33)	101 (32)	***123*** (31)	***205*** (27)
GFDU*	40 (33)	***68*** (33)	***93*** (33)	***115*** (32)	***155*** (30)
AVNI	***33*** (50)	***57*** (48)	***76*** (46)	***98*** (44)	***198*** (40)
AVNO*	***32*** (51)	***56*** (49)	***78*** (47)	***97*** (45)	***167*** (22)
BAMD	***34*** (76)	***61*** (74)	***86*** (72)	***108*** (70)	***192*** (66)
BAMM	40 (75)	73 (73)	104 (71)	***123*** (69)	***190*** (65)
BAMS	52 (76)	96 (74)	133 (72)	156 (70)	***201*** (66)
NGPI	52 (66)	96 (64)	135 (60)	174 (52)	363 (42)
NGPS*	51 (38)	86 (37)	118 (35)	***135*** (31)	265 (26)
UKMI	49 (66)	79 (64)	116 (62)	154 (61)	257 (57)
UKM*	***37*** (35)	75 (35)	***96*** (33)	***134*** (33)	***206*** (30)
GUNS	38 (60)	***64*** (58)	***91*** (54)	***122*** (47)	***242*** (39)
A90E	40 (76)	71 (74)	111 (72)	164 (70)	330 (66)
A98E	40 (76)	***70*** (74)	108 (72)	160 (70)	333 (66)
A9UK	40 (35)	74 (34)	116 (33)	178 (32)	349 (30)
LBAR	***34*** (76)	***66*** (74)	110 (72)	165 (70)	302 (66)
VBAR	***34*** (53)	***63*** (52)	***98*** (51)	139 (50)	***244*** (48)
FSSE*	38 (36)	***67*** (35)	108 (34)	154 (33)	254 (30)
NHC Official	38 (76)	71 (74)	100 (72)	137 (70)	249 (66)
NHC Official 10-Year Average (1990-1999)	46 (2057)	85 (1842)	122 (1650)	158 (1471)	235 (1165)

* Output from these models was unavailable at time of forecast issuance.

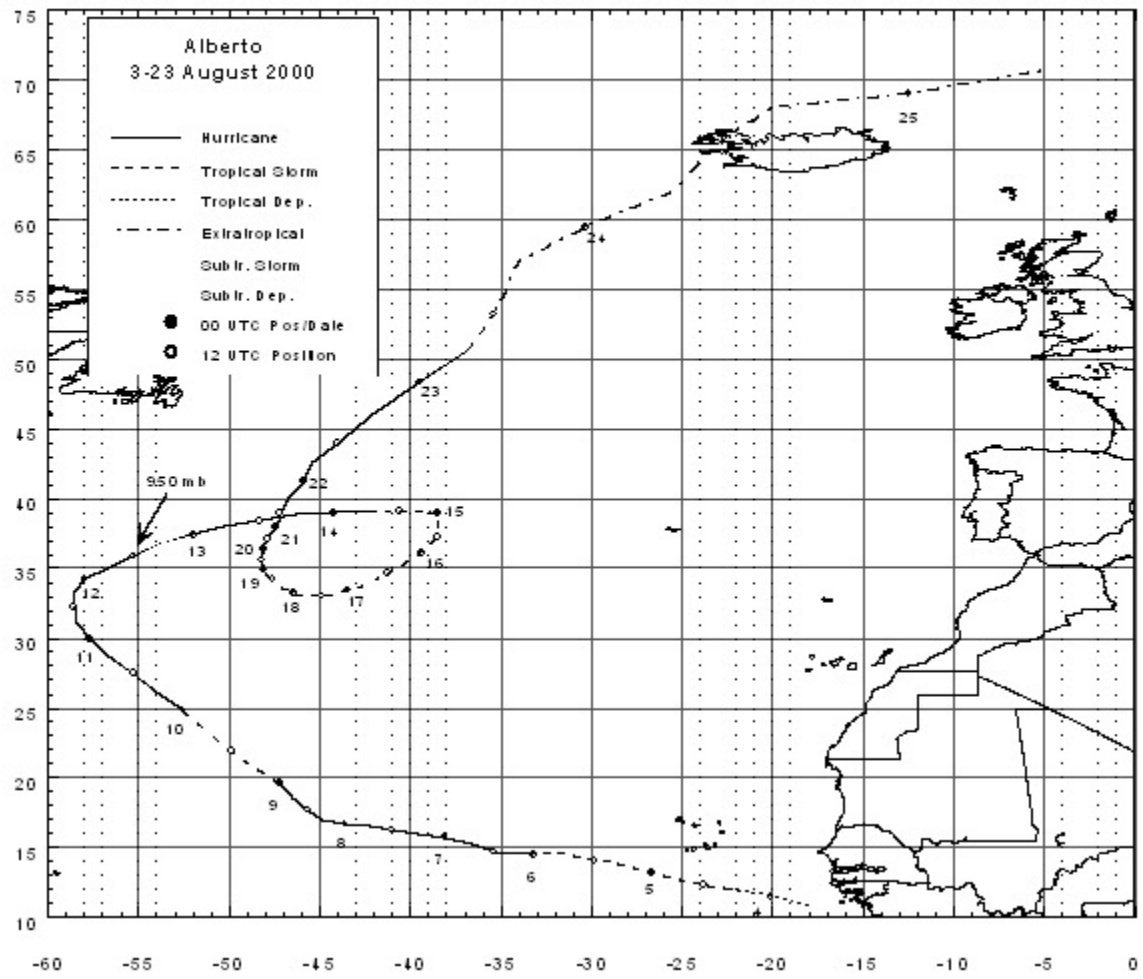

Figure 1. Best track for Hurricane Alberto, 3- 23 August 2000.

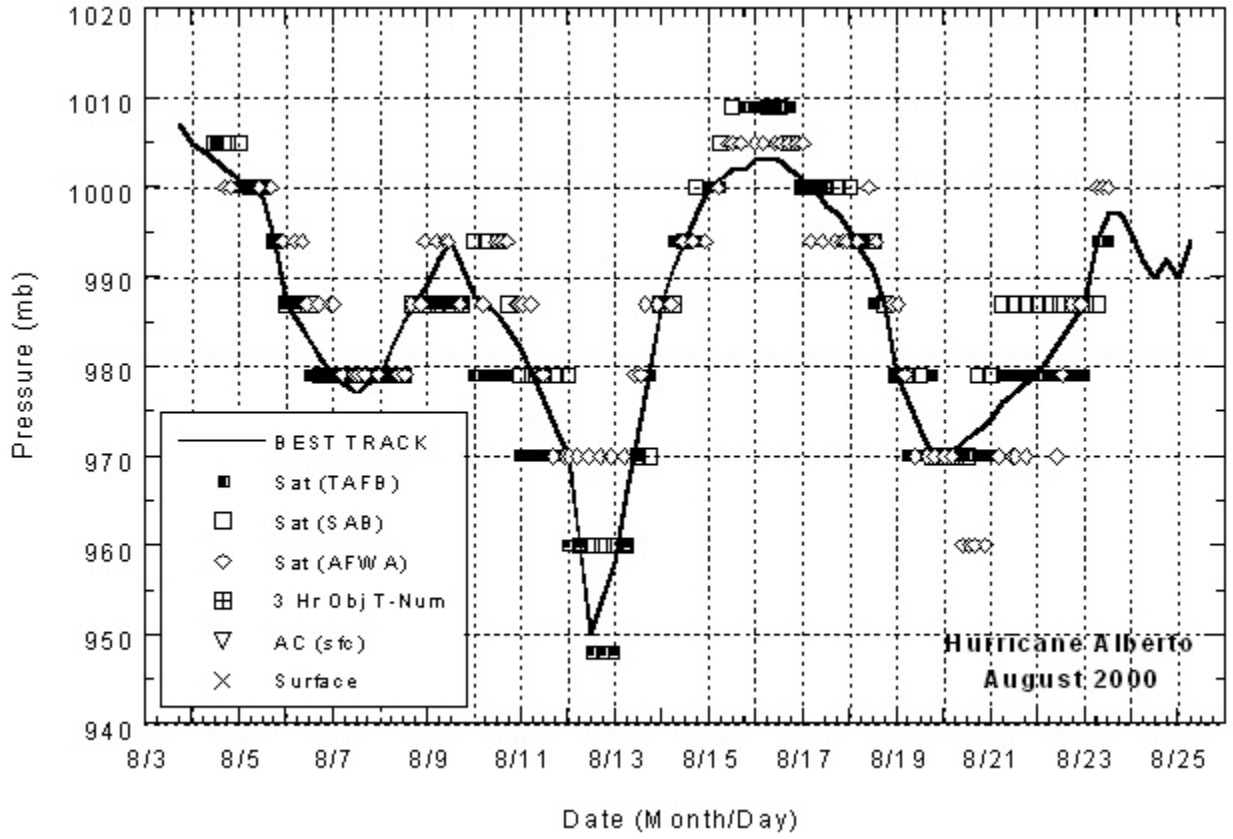

Figure 2. Best track minimum central pressure curve for Hurricane Alberto, 3 - 23 August 2000.

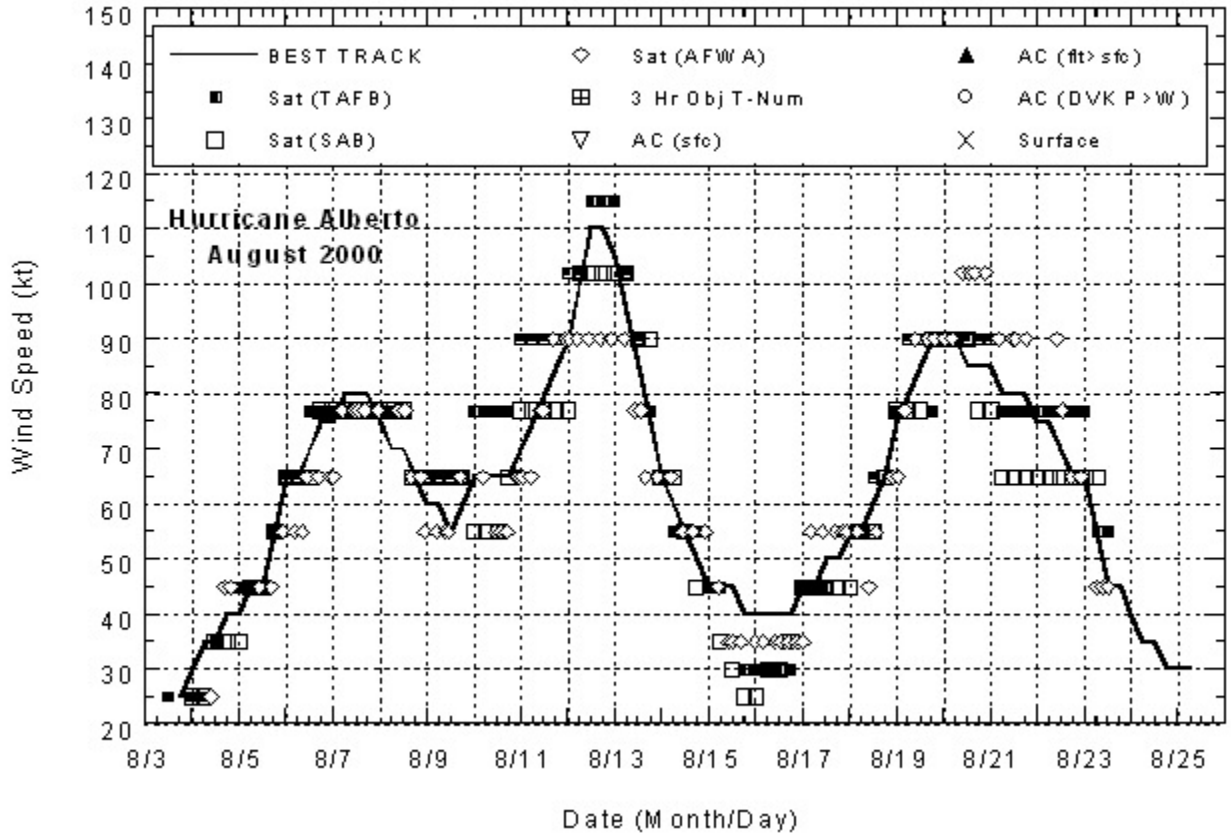

Figure 3. Best track maximum sustained 1-minute 10 meter wind speed curve for Hurricane Alberto, 3 - 23 August 2000.

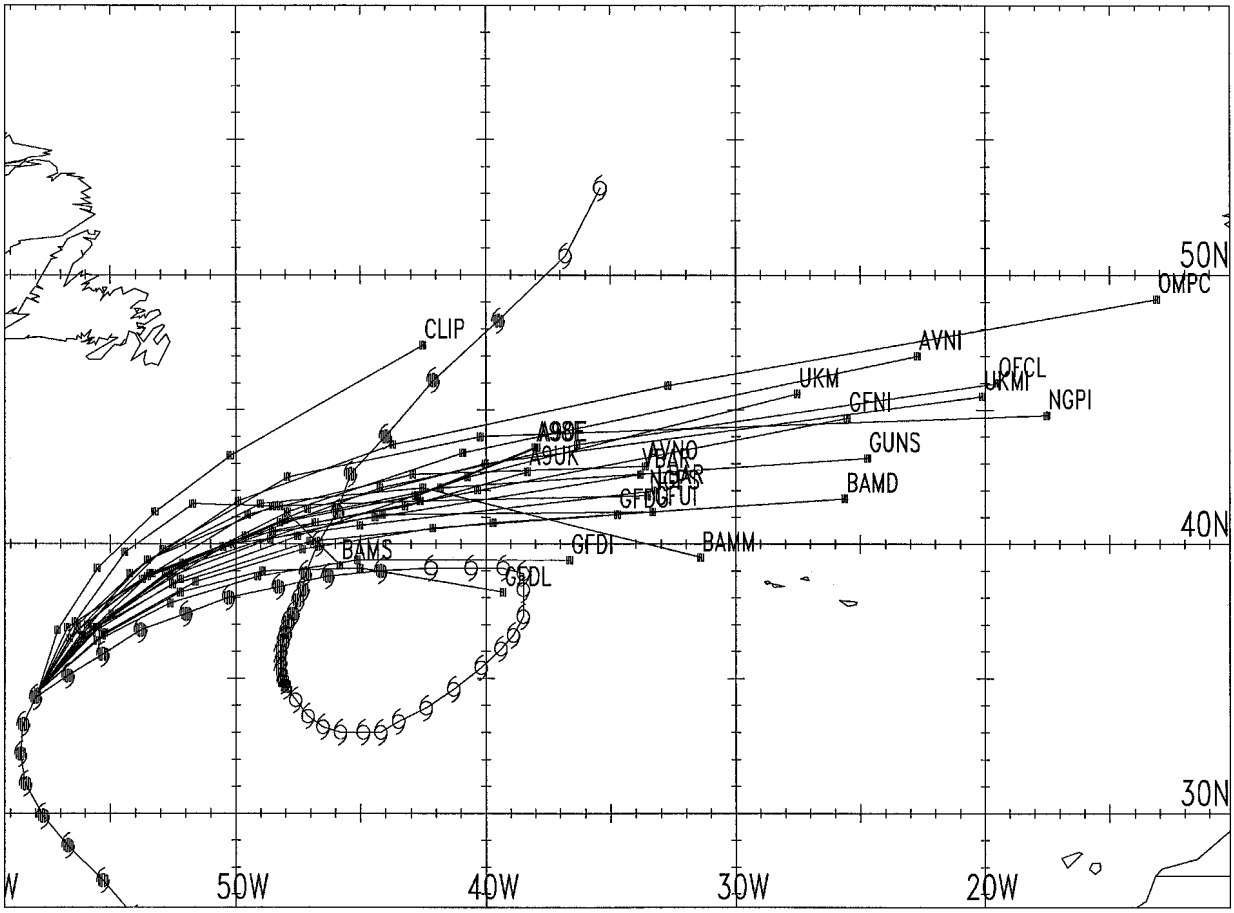

Figure 4. Track guidance for Hurricane Alberto at 0000 UTC 12 August. Best track line marked by hurricane and tropical storm symbols.