Atlantic Hurricane Season of 1982

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ABSTRACT

Five named tropical cyclones and one subtropical cyclone were tracked during 1982 in the Atlantic–Caribbean–Gulf of Mexico region. There were no landfalling hurricanes.

1. Introduction

Considering the number of hurricanes (2) and the number of days (6) that a hurricane was on the weather map, one can state categorically that the 1982 hurricane season was the least active in more than 50 years. During the past 35 years the average number of named storms each year has been ten, with six becoming hurricanes.

The last year to have only two hurricanes was 1931. One other year (1972) during this period had fewer tropical storms (4), but three of these became hurricanes. Prior to 1931 more than 40 percent of the hurricane seasons had five or less tropical cyclones compared to only four seasons (1939, 1962, 1972, and 1982) since that time. Much of this difference may be attributed to the beginning of aircraft reconnaissance and the development of the satellite.

The continental United States was spared a hurricane landfall in 1981 as well as 1982 (Hawaii was struck by Hurricane Iwa in late November). This is only the second time this century that this has occurred in two consecutive years. The other occurrence was during 1930–1931.

Storm tracks and statistics for the 1982 season are given in Fig. 1 and Table 1. Note that none of the storm tracks cross each other for the first time since 1929.

2. Seasonal patterns

The most tranquil Atlantic hurricane season in half a century can be partially attributed to unseasonable westerly winds in the upper atmosphere overlying the low level easterly trade winds of the tropical North Atlantic. Figs. 2 and 3 (The mean 20.0 kPa wind pattern for August and September) show that this pattern persisted during most of the summer and fall. It is believed that the shearing effect of this pattern inhibited the process of tropical cyclone development and also was instrumental in the dissipation of several storms that formed.

Another contributing factor to the uneventful season may have been the above normal surface pressure anomalies over the North Atlantic that kept many of the disturbances at unusually low latitudes. Lacking favorable development patterns, these systems moved westward across the southern Caribbean into the eastern North Pacific, and could have been partially responsible for the large number of tropical cyclones observed in that area during 1982.

3. Storm origin

The 1982 hurricane season began with Hurricane Alberto forming in the southeast Gulf of Mexico during the first week of June. The rapid dissipation of Alberto only a short time after attaining hurricane strength was reflective of the type of season that lay ahead. Except for a mid-June subtropical storm that formed in the Gulf of Mexico and swept across Florida, none of the disturbances followed daily in the tropics during the next 12 weeks developed into tropical cyclones.

Finally, in late August, Tropical Storm Beryl formed in the far eastern North Atlantic, south of the Cape Verde Islands. Satellite pictures indicated that storm was well organized, and because of the projected long track over water, it was forecast to increase in strength. However, the circulation was soon torn apart in mid Atlantic by upper level westerlies.

There were three named tropical cyclones in the month of September with only one being classified as a hurricane. During the second week of September, Tropical Storm Chris developed from a non-tropical low pressure system over the northern Gulf of Mexico and moved into Louisiana. In mid-September, Hurricane Debby formed in the Atlantic between the Bahamas and Bermuda and became the most intense hurricane of the 1982 season. Debby turned toward the northeast shortly after developing and did not threaten the United States coastline. Ernesto formed at the end of September well to the northeast of

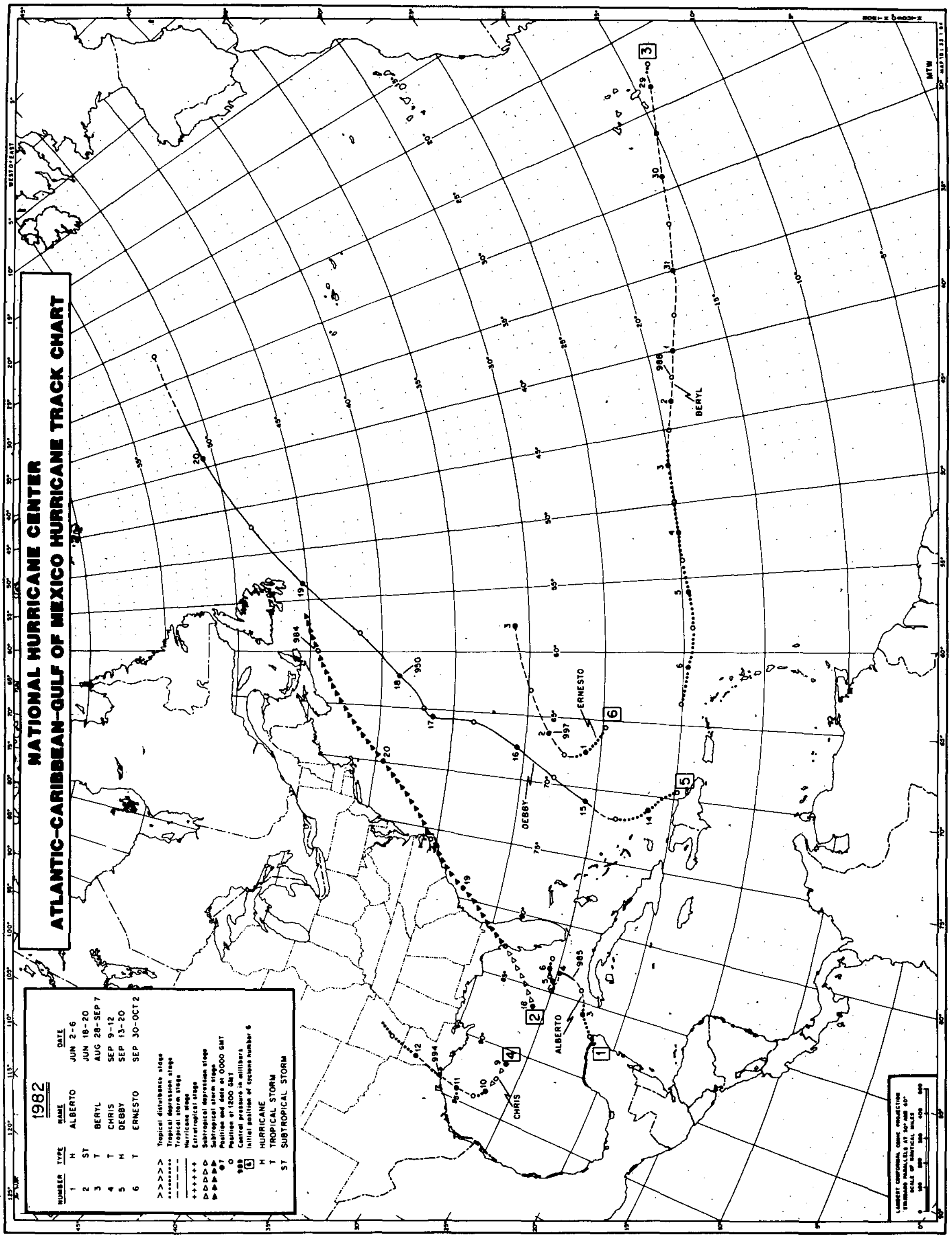

FIG. 1. Tracks of the 1982 tropical storms, hurricanes, and subtropical storms.

TABLE 1. Summary of 1982 North Atlantic tropical and subtropical cyclone statistics.

Cyclone number	Name	Class[1]	Dates	Maximum sustained winds ($m\ s^{-1}$)	Lowest pressure (kPa)	U.S. damage (millions of $)	Deaths
1	Alberto	H	2–6 Jun	38	98.5	Minor	23 (Cuba)
2	—	ST	18–20 Jun	30	98.4	10	3 (FL)
3	Beryl	T	28 Aug–6 Sep	30	98.8		
4	Chris	T	9–12 Sep	28	99.4	2	
5	Debby	H	13–20 Sep	58	95.0		
6	Ernesto	T	30 Sep–2 Oct	30	99.7		

[1] T, Tropical Storm (winds 18–32 $m\ s^{-1}$); H, Hurricane (winds 33 $m\ s^{-1}$ or higher); ST, Subtropical Storm (18–32 $m\ s^{-1}$).

Puerto Rico and soon merged with a frontal-type low pressure system.

4. Storm summaries

a. Hurricane Alberto, 2–6 June

In late May, a tropical disturbance gradually developed over the northwest Caribbean Sea and drifted westward over the Yucatan Peninsula. On 1 June, satellite pictures revealed an organized cloud pattern, associated with a surface low pressure system, forming over Yucatan. This system had moved northeastward into the southeast Gulf of Mexico on 2 June. Early morning satellite pictures and surface observations suggested a tropical depression was forming. This was confirmed by an Air Force reconnaissance aircraft later that day. The system moved slowly east-northeastward and developed into Hurricane Alberto on 3 June (Fig. 4). During the afternoon a NOAA reconnaissance plane reported the highest surface winds of 38 $m\ s^{-1}$ and lowest pressure 98.5 kPa. Alberto was a hurricane for only 12 hours. It rapidly lost strength on 4 June as the upper level outflow pattern necessary to sustain a hurricane was destroyed (Fig. 5) by a high level westerly jet. The lower cloud circulation remained visible on satellite pictures as it drifted aimlessly around the southeast Gulf of Mexico before finally dissipating on 6 June.

Gale winds and heavy rains were reported in the lower Florida Keys, but damage was minor. Flash floods in western Cuba caused 23 deaths and heavy crop damage.

b. Subtropical storm, 18–20 June

In mid-June, another tropical disturbance gradually developed over the northwest Caribbean Sea and moved westward over Yucatan, in a manner similar to the system that developed into Hurricane Alberto. However, in this case, tropical cyclogenesis was thwarted by the approach of a strong upper level trough on 17 June. The disturbance interacted with the westerly trough, forming a low pressure system. This system moved rapidly northeastward across northern Florida as a developing subtropical storm

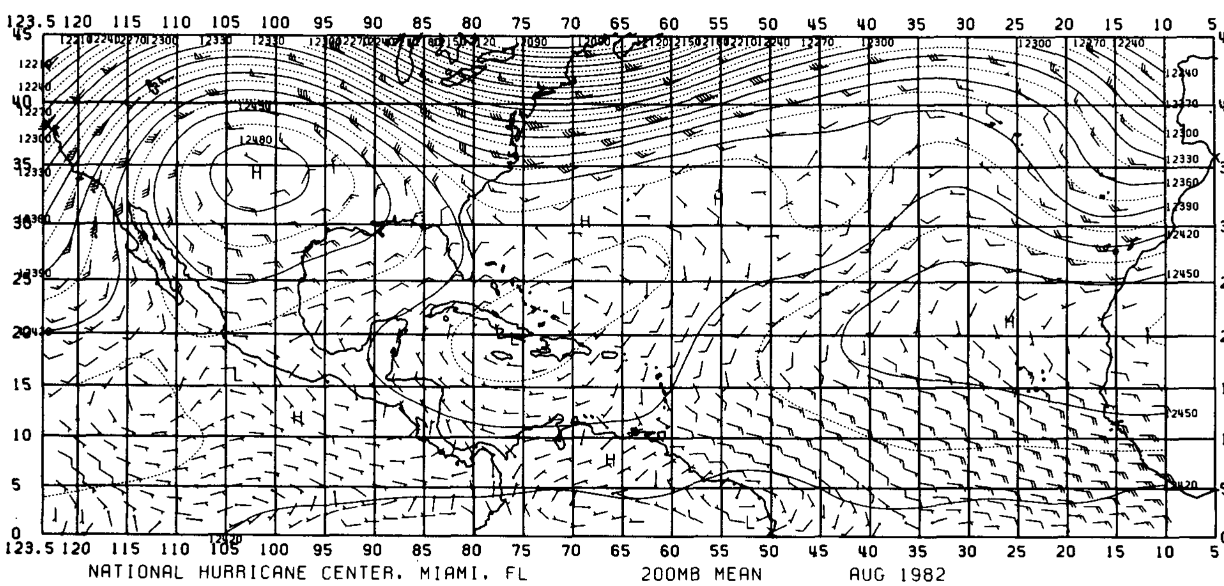

FIG. 2. Mean 20.0 kPa wind pattern for August 1982.

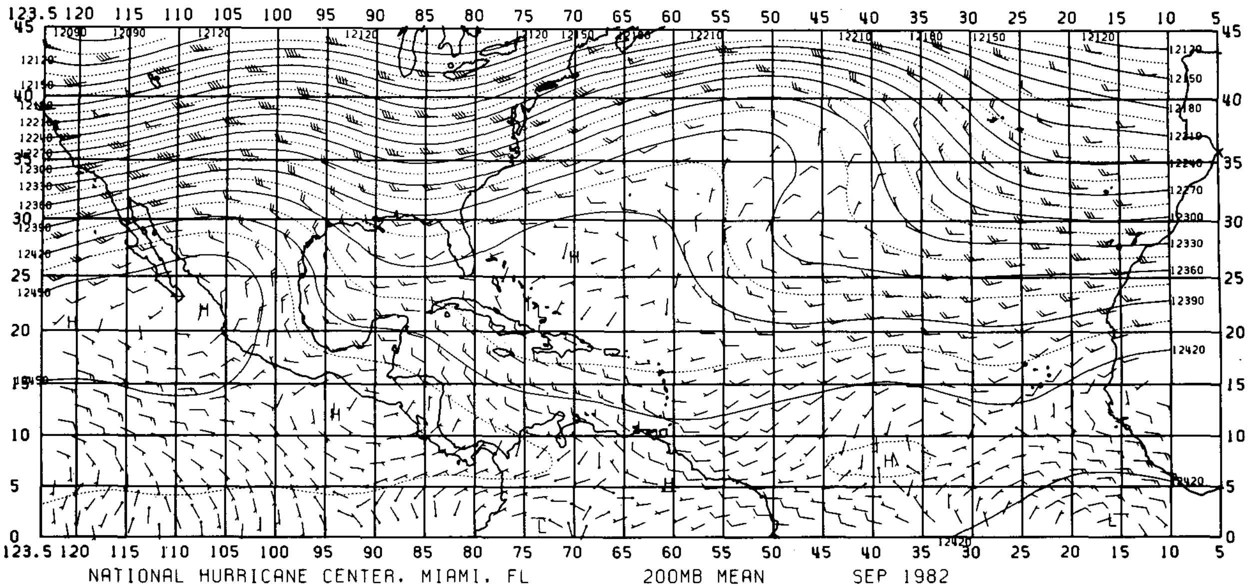

FIG. 3. Mean 20.0 kPa wind pattern for September 1982.

on the morning of 18 June. The storm skirted the United States mid-Atlantic coastline on 19 June (Fig. 6) and raced northeastward, passing south of Nova Scotia on 20 June. The lowest pressure, 98.4 kPa, was reported by reconnaissance aircraft that day. Peak surface winds of 30 m s^{-1} were reported by ships on the 18th, 19th, and 20th. Similar subtropical storms, following close to the same track and with equal intensity, occurred in June 1959 and 1974 which also were years with minimal tropical cyclone activity.

Severe thunderstorms triggered several tornadoes and produced heavy rains resulting in three deaths

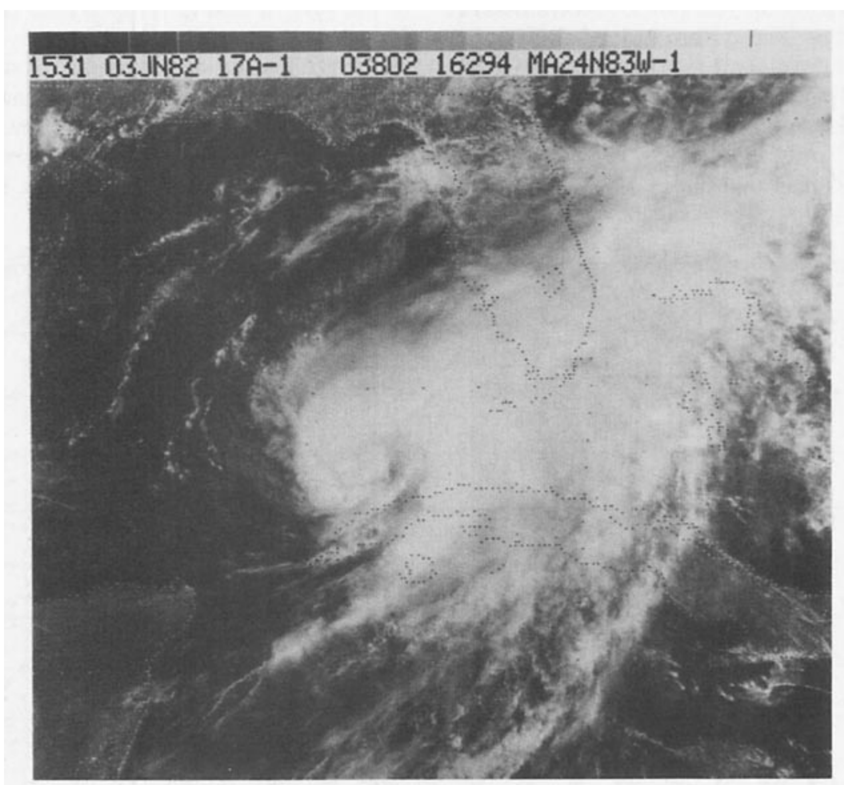

FIG. 4. GOES-East visible satellite picture of Hurricane Alberto at 1531 GMT 3 June 1982.

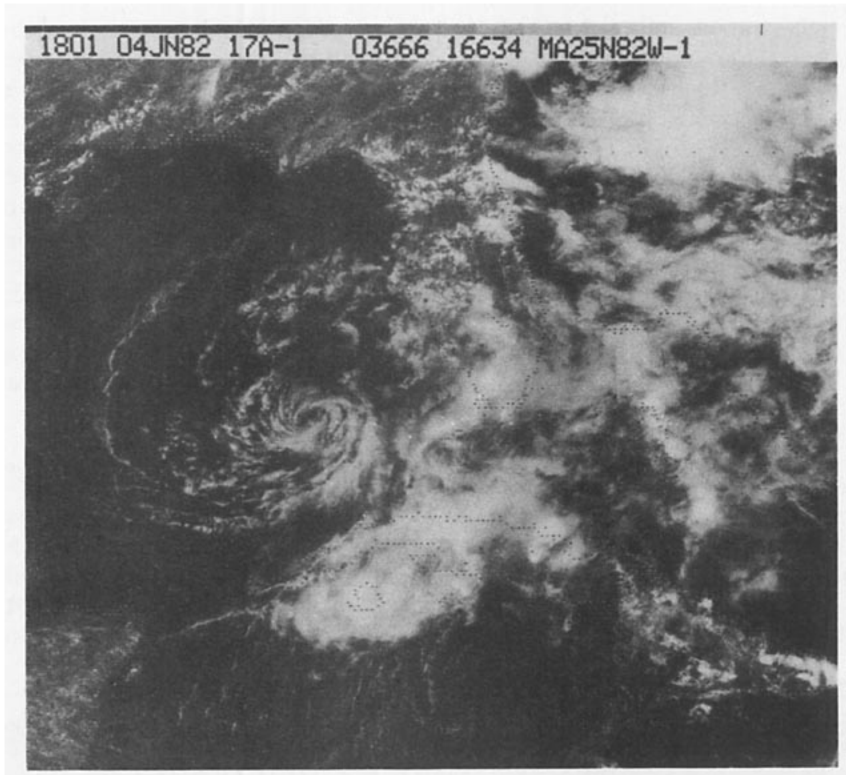

FIG. 5. GOES-East visible satellite picture of Hurricane Alberto at 1801 GMT 4 June 1982.

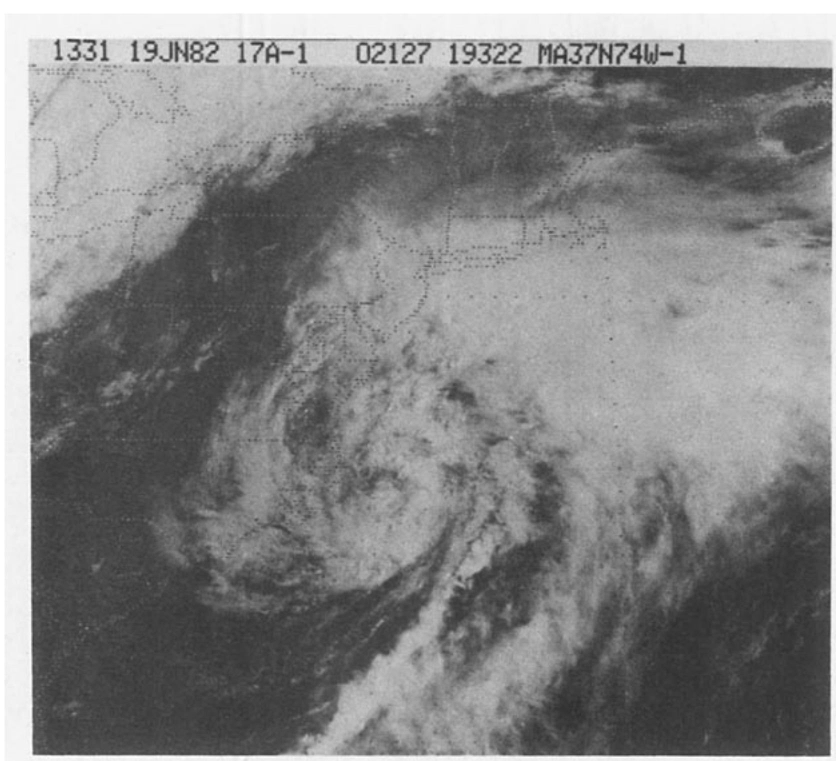

FIG. 6. GOES-East visible satellite picture of subtropical storm at 1331 GMT 19 June 1982.

in central Florida. High tides combined with large waves to cause beach erosion and damage to waterfront buildings along the Florida west coast from Naples to Tampa. The storm's effects on coastal areas north of Florida were relatively minor. The total damage estimate is ten million dollars.

The bi-annual Newport, Rhode Island, to Bermuda sailboat race was postponed for an unprecedented two consecutive days because of the storm's forecast track. Subsequent reports from other sailboats in the projected course of the race indicated that a potential marine disaster was prevented by the delay in the race.

c. Tropical Storm Beryl, 28 August–6 September

A well-organized tropical weather system moved westward into the Atlantic from northwest Africa on 27 August. Satellite pictures indicated that Tropical Storm Beryl had formed by the evening of 28 August. This storm passed just south of the Cape Verde Islands on 29 August and continued westward into the North Atlantic (Fig. 7). Beryl reached it's maximum strength of 20 m s^{-1}, based on satellite intensity estimates, midway between Africa and the Lesser Antilles on 1 September. As the storm continued westward, it encountered the persistent high level westerlies which caused its deep convective clouds to be sheared off in the vertical and dissipate. The remaining low level circulation was downgraded to tropical depression status on 2 September (Fig. 8). As the depression approached the Leeward Islands on 6 September, an Air Force reconnaissance plane found that all signs of the circulation had disappeared. It is quite likely that Beryl would have gone undetected in presatellite days.

d. Tropical Storm Chris, 9–12 September

An upper-level low pressure system began developing over the northwest Gulf of Mexico on 6 September with the circulation gradually working downward as it drifted westward. Reports from ships and NOAA buoys indicated a surface low had developed

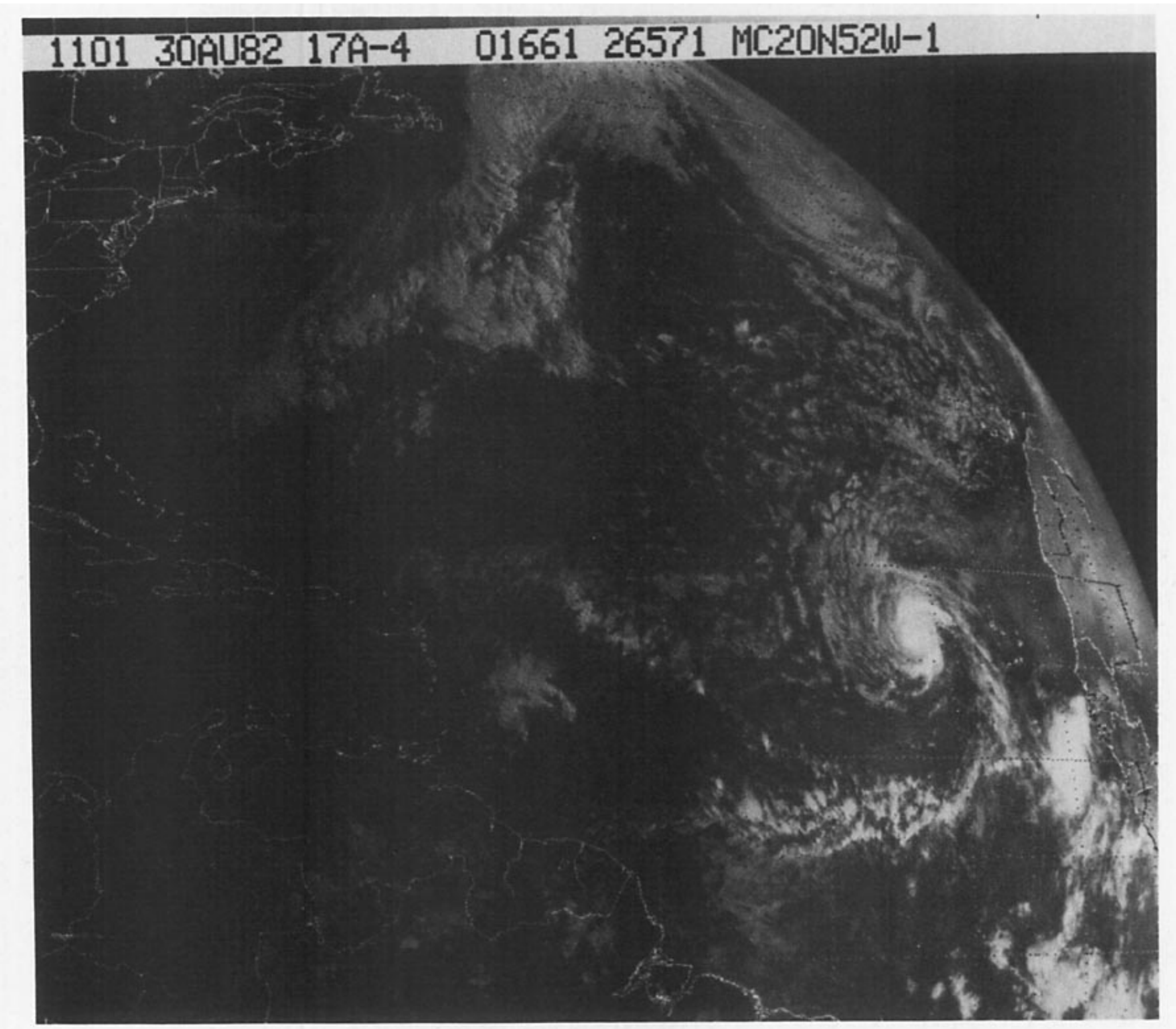

FIG. 7. GOES-East visible satellite picture of Tropical Storm Beryl at 1101 GMT 30 August 1982.

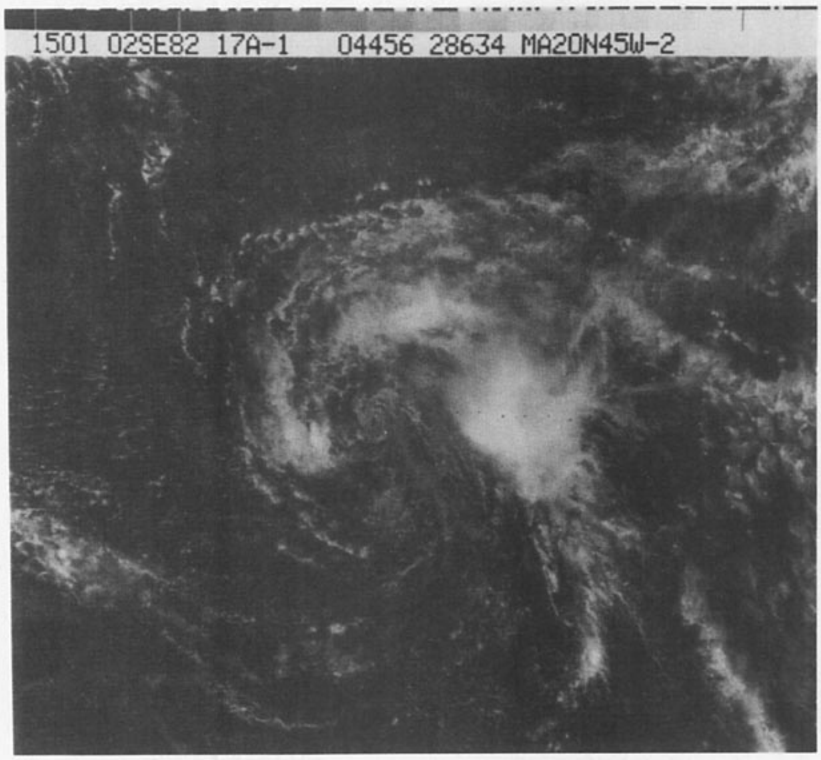

FIG. 8. GOES-East visible satellite picture of Tropical Storm Beryl at 1501 GMT 2 September 1982.

over the north central Gulf of Mexico by the evening of 8 September. The system began to develop tropical characteristics on the 9th as widespread convection north and east of the low warmed the atmosphere. On 10 September, increasing winds on the offshore oil rigs, convection becoming organized in bands on National Weather Service radars (Fig. 9) and reconnaissance aircraft reports indicated that Chris had formed.

Tropical Storm Chris began moving northward almost immediately under the influence of a low pressure trough moving eastward from the southwestern United States. The storm reached maximum strength near the coast as it moved inland near the Texas–Louisiana border on the morning of 11 September (Fig. 10). Offshore oil rigs measured wind gusts up to 35 m s^{-1} shortly before the center moved inland. Highest sustained winds were estimated to be 28 m s^{-1} and lowest pressure 99.4 kPa.

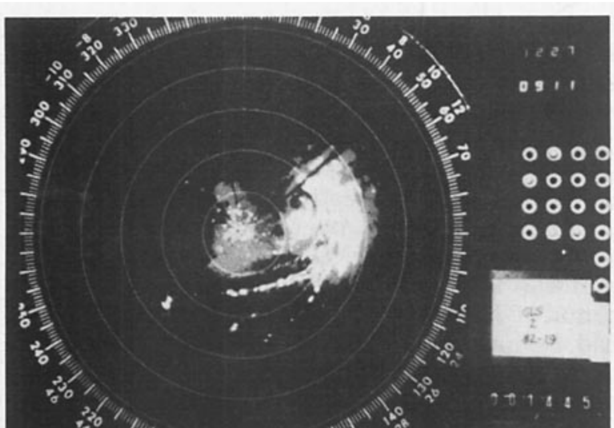

FIG. 9. Galveston, Texas, radarscope at 1227 GMT 11 September 1982, showing Tropical Storm Chris's developing center.

Chris weakened rapidly while moving north-northeastward through western Louisiana. It reached eastern Arkansas on 12 September where the low pressure center associated with Chris lost all identity.

Highest tides were near two meters in southwestern Louisiana just east of the center. Rainfall totals up to 250 mm were observed in western Louisiana. Damage was less than two million dollars, and there were no casualties.

e. Hurricane Debby, 13–20 September

A tropical disturbance moved off the northwest Africa coast in early September and was tracked by satellite across the Atlantic as an active tropical wave. Reconnaissance aircraft found indications that the system was attempting to develop a weak circulation prior to reaching the Lesser Antilles, but conditions remained unfavorable for development.

During September, the only area in the Atlantic where atmospheric conditions (light vertical wind shear) appeared to be favorable for tropical cyclone

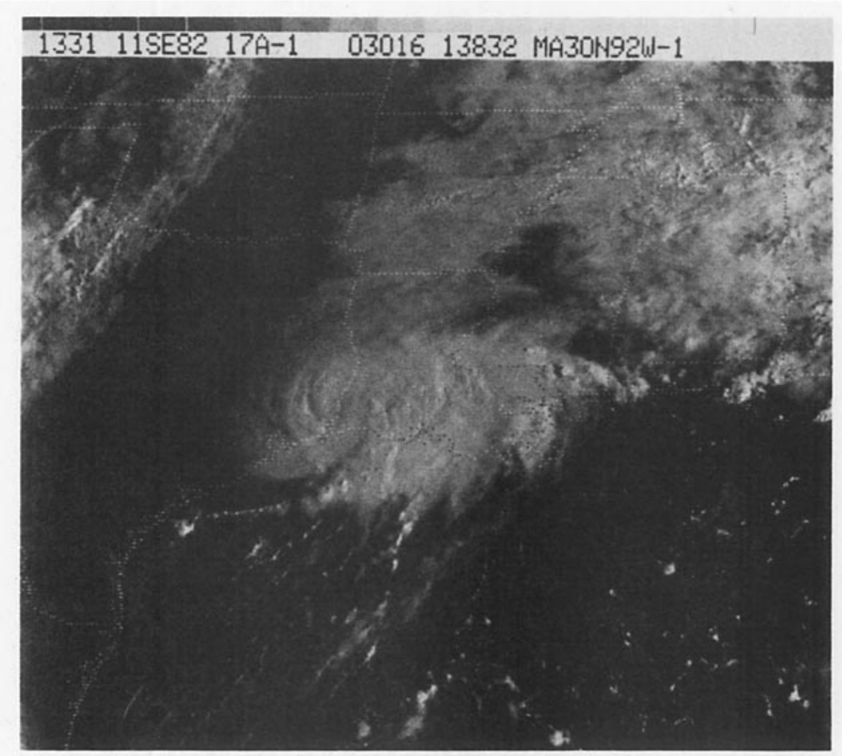

FIG. 10. GOES-East visible satellite picture of Tropical Storm Chris at 1331 GMT 11 September 1982.

development was north of the Caribbean between the Bahamas and Bermuda (Fig. 3). On 13 September an organized center appeared to be forming along the wave crest just north of the Dominican Republic and this was confirmed by aircraft. The light vertical wind shear present over the area allowed a steady development to occur and the depression was upgraded to Tropical Storm Debby on the morning of 14 September. Debby became a hurricane by nightfall as it moved slowly northward away from the Bahamas.

There was some doubt as to whether Debby would be picked up by an approaching trough in the westerlies or come under the influence of a ridge of high pressure over the southeastern United States. On 14 September, there were sufficient upper air data available over western portions of the North Atlantic Ocean for an analysis that indicated the hurricane had already been picked up by the trough and would turn away from the mainland. A complete upper air analysis was made possible by two new programs initiated this year:

1) A dropwindsonde field program, using the OMEGA windfinding systems, (Govind, 1975), was conducted by the Hurricane Research Division of Atlantic Oceanographic and Meteorological Laboratories (AOML), (Burpee, 1981). Two NOAA WP-3 aircraft made multiple OMEGA dropwindsonde releases from 40.0 kPa to observe the hurricane environment 150–1500 km from the storm center; and

2) The visible IR spin-scan radiometer atmospheric sounder (VAS), an atmospheric sounding instrument placed in geostationary orbit (Menzel *et al.*, 1981), provided sounding data over the tropical and subtropical North Atlantic Ocean.

The hurricane continued to strengthen on 15 September (Fig. 11) with aircraft estimating surface winds of 48 m s^{-1} and a minimum pressure of 96.6 kPa. A sequence of fixes on the center by Air Force reconnaissance planes indicated that Debby was now moving toward the northeast and becoming a threat to Bermuda. However, the threat eased on 16 September as Debby returned to a more northerly course, allowing the center to pass some 130 km west of the island. Fortunately, Bermuda experienced only minor damage from winds gusting up to 30 m s^{-1}.

After passing Bermuda, Hurricane Debby's forward movement was slowed, with the storm becoming almost stationary early on 17 September. The approach of an active trough in the westerlies during the day caused the hurricane to accelerate toward the northeast that afternoon and, concurrently, a second period of deepening took place. By that night, Debby had attained maximum strength with peak surface winds estimated to be 58 m s^{-1} and a minimum pressure of 95.0 kPa measured by reconnaissance aircraft.

Debby passed just southeast of Cape Race, Newfoundland, on the evening of 18 September. Wind gusts to 19 m s^{-1} were recorded at Cape Race, and

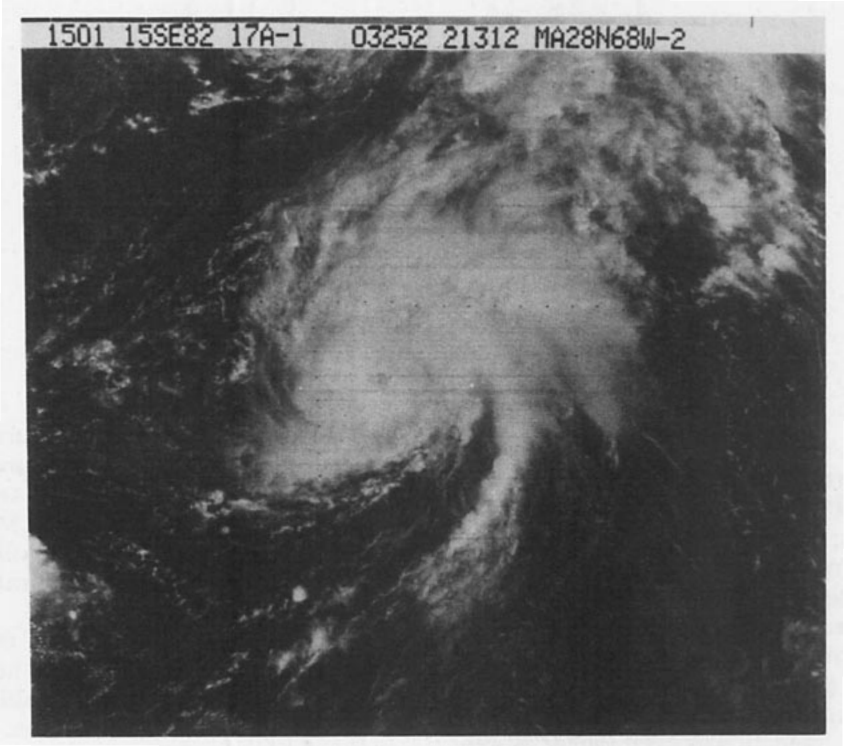

FIG. 11. GOES-East visible satellite picture of Hurricane Debby at 1501 GMT 15 September 1982.

heavy rains fell across southeastern Newfoundland for several hours. Subsequently, Debby moved rapidly eastward toward Europe and was enveloped by a major storm system over the British Isles on 20 September.

f. Tropical Storm Ernesto, 30 September–2 October

During the last week in September, satellite pictures indicated that the intertropical convergence zone (ITCZ) was becoming more active in the central Atlantic. By 27 September an organized tropical disturbance developed on the ITCZ several hundred kilometers east of the Lesser Antilles and was observed to be moving toward the west-northwest.

On 29 September, the system began merging with an upper-level cyclonic circulation some 650 km northeast of Puerto Rico. By 30 September early morning visible satellite pictures showed a low level cloud center located about midway between Bermuda and Puerto Rico. That afternoon a reconnaissance aircraft confirmed the presence of a tropical depression with lowest observed pressure of 100.5 kPa. The intensifying system was designated Tropical Storm Ernesto early on 1 October as it turned sharply northeastward under the influence of an approaching westerly trough. During the late afternoon an aircraft reported peak surface winds of 30 m s^{-1} and a minimum sea level pressure of 99.7 kPa. It is believed that these values represent the maximum strength of the storm.

Ernesto accelerated toward the east-northeast during the next 24 hours and slowly weakened until finally merging with a developing frontal low on the evening of 2 October.

g. Late season Atlantic Storms, October–November

There were several large low pressure systems that formed in the western Atlantic during October and November that caused beach erosion and coastal flooding along the United States mid-Atlantic coast. These systems had some of the characteristics of subtropical storms. However, their development appeared to be similar to occluding low pressure systems.

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REFERENCES

Govind, P. K., 1975: OMEGA Windfinding Systems. *J. Appl. Meteor.*, **14**, 1503–1511.

Burpee, R. W., 1981: Hurricane Field Program. *Bull. Amer. Meterol. Soc.*, **62**, 1678.

Menzel, W. P., W. L. Smith and L. D. Herman, 1981: Visible Infrared Spin-Scan Radiometer Atmospheric Sounder radiometric calibration: An inflight evaluation from intercomparisons with HIRS and radiosonde measurements. *Appl. Opt.*, **20**, 3641.