

PRELIMINARY REPORT

HURRICANE GRETA

( & HURRICANE OLIVIA)

SEPTEMBER 13-23, 1978

The African wave from which Greta developed passed Dakar, Senegal on September 7th. The first signs of development began late on September 10 when the wave was midway between Africa and the Windward Islands. Convection increased and became better organized during the next 48 hours. The strong tropical wave passed through the Windward Islands on September 13 producing wind gusts of 35 to 45 knots at Barbados.

Ship and coastal reports indicate that a circulation had formed about 75 miles west northwest of Port-of-Spain, Trinidad by mid-afternoon of September 13. Although the southeastern Caribbean Sea is a climatologically unfavorable area for tropical storm development, steady intensification continued that night. An Air Force reconnaissance flight confirmed that Greta had developed about 50 miles north of the Netherlands Antilles during the morning of September 14. These islands experienced some heavy showers but the strong winds were mainly north of the storm's center.

Greta continued towards the west at an average speed of 11 knots during the next 48 hours, reaching hurricane intensity about 275 miles south of Kingston, Jamaica around 1200 GMT on September 16. The hurricane turned to the west northwest at 10 knots shortly thereafter, strengthening steadily until mid-afternoon of September 17. The presence of a broad, moderately strong 200 mb trough ahead of Greta from September 14 until the 17th is believed to be the reason for Greta's relatively slow rate of intensification. This trough weakened considerably during the 17th.

Air Force reconnaissance reports indicated that the central pressure in

Greta fell rapidly from 968 mb at 1822 GMT to 952 mb at 2302 GMT, and satellite pictures showed an increasingly distinct eye on infrared depictions. During the same time Greta slowed and turned to the west allowing the eyewall of the hurricane to bring hurricane force winds to the northeast coast of Honduras from about 0000 GMT to 0800 GMT September 18. Puerto Lempira on the east side of Laguna de Caratasca reported winds from the north northwest at 70 knots with gusts to 100 knots at 0000 GMT, and three hours later was reporting southwest winds of 50 knots with gusts to 70 knots and a pressure of 990 mb.

Movie loops made from satellite pictures indicate that the eye of Greta literally ricocheted off of the protruding northeast coast of Honduras, and by 1000 GMT was far enough offshore to spare the remaining northern coastline of Honduras from the devastating eyewall of the hurricane.

An Air Force plane reported the lowest central pressure measured in Greta of 947 mb at 0710 GMT September 18. The maximum sustained winds of 115 knots were also estimated to have occurred at this time based on pressure-wind relationships and satellite cloud classifications. However, a minimum central pressure several millibars lower may have occurred during the eight hours between aircraft fixes.

Greta strengthened in a manner very similar to Edith of 1971 as each storm approached Cape Gracias, Nicaragua. This leads to speculation on the possible influence of the particular topography of this coastline on the strengthening of these hurricanes. However, as the inflow trajectories increased from the land to the south, the expected weakening of Greta occurred. The central pressure rose to 963 mb just before the eye reached the Bay Islands off the north coast of Honduras, essentially maintaining that pressure until landfall near Stann Creek, Belize about 0000 GMT September 19.

The hurricane weakened rapidly after moving inland and decreased to tropical depression strength over northwestern Guatemala by 1200 GMT September 19. A large high pressure ridge extending from the Carolinas southwestward to the western Gulf of Mexico forced the depression southwestward into the Pacific Ocean where it quickly regenerated into Tropical Storm Olivia and 36 hours later to Hurricane Olivia. Olivia made a tight loop about 100 miles south of Tehautepec on the Mexican coast and moved back inland about 1800 GMT on September 22. Olivia turned northwest and weakened rapidly but produced winds of 35 knots at Vera Cruz at 1200 GMT September 23 while the remnants passed about 60 miles to the southwest.

Thus far, one death has been reported in Honduras and four in Belize, and three people are missing in Belize. The Belize government estimates damage at U.S. \$25 million, mainly to crops and utilities. No damage estimates are available from Honduras but it appears that the main damage occurred along the northeast coast of Honduras and in the Bay Islands.

Highest winds reported from Belize thus far are 48 knots with gusts to 68 knots at Belize City and 80 knots at Stann Creek. Tides reached 6 to 7 feet above MSL in the north part of Stann Creek with little or no flooding in the south part of town, and 2 to 4 feet about MSL in Belize City.

While locally heavy rains occurred over portions of Nicaragua, Honduras, Belize, Guatemala, and southeast Mexico, Greta failed to re-produce the devastating river floods which occurred with Hurricane Fifi exactly four years earlier. This circumstance is undoubtedly responsible for the low loss of life. However, warnings issued by the governments of Nicaragua, Honduras, Guatemala, Belize, and Mexico probably prevented more deaths along the coasts than the four recorded, as Greta was a much more severe hurricane than Fifi.

Official forecast errors were much smaller than average, especially for longer forecast periods, as the presence of the very strong high pressure area to the northwest of Greta gave a high degree of confidence to a fairly slow and generally westward forecast track.

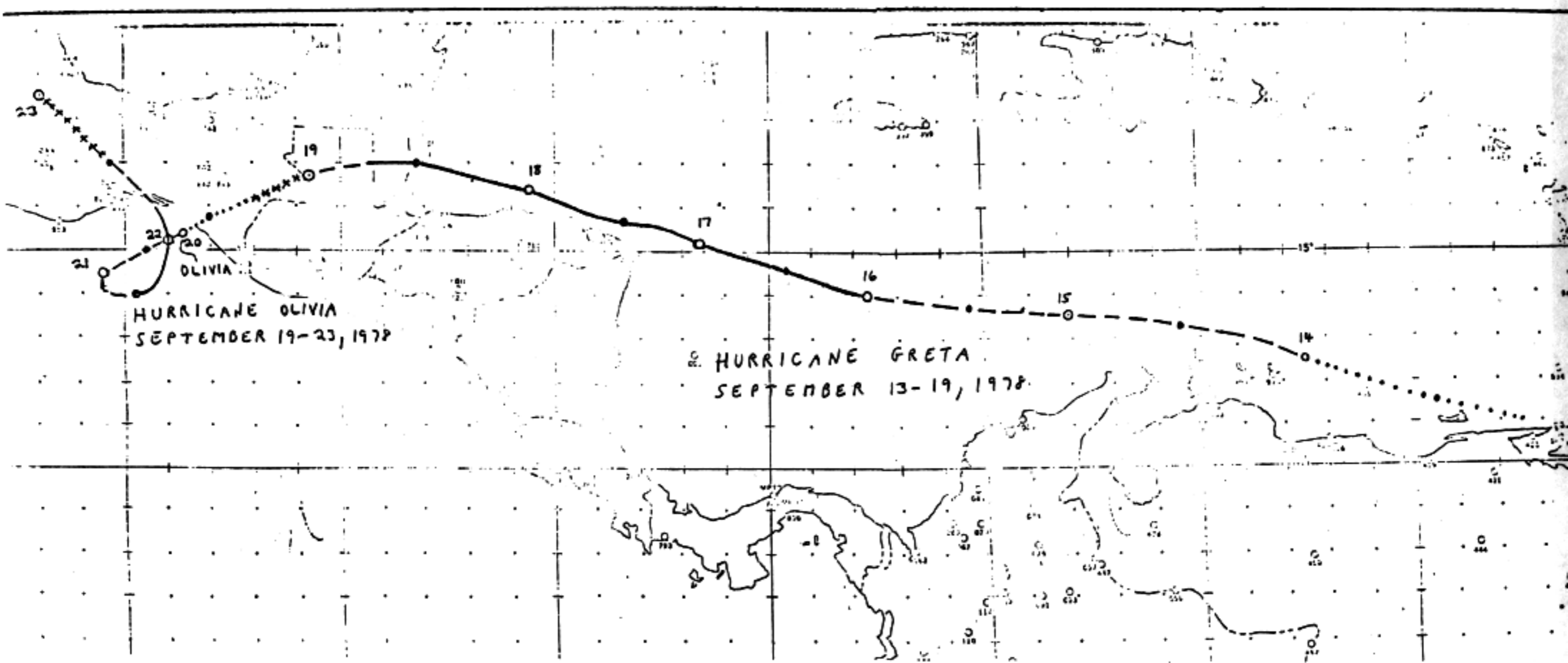
## PRELIMINARY BEST TRACK

## HURRICANE GRETA

(&amp; HURRICANE OLIVIA)

September 13-23, 1978

DATE	TIME (GMT)	POSITION		WIND (KT)	PRESSURE (MB)	STAGE
		LATITUDE	LONGITUDE			
9/13	1800	11.0	62.5	25		TROPICAL DEPRESSION
9/14	0000	11.5	64.5			
	0600	12.0	66.0	30		
	1200	12.5	67.5	35		TROPICAL STORM
9/15	1800	13.0	69.0	35	1004	
	0000	13.3	70.4	40		
	0600	13.4	71.7	40		
	1200	13.5	73.1	45		
	1800	13.7	74.2	50	1000	
9/16	0000	13.8	75.3	55	995	
	0600	13.8	76.7	60		
	1200	14.0	77.7	70	989	HURRICANE
	1800	14.3	78.7	75		
9/17	0000	14.6	79.6	80	982	
	0600	14.9	80.5	85		
	1200	15.2	81.6	90	974	
	1800	15.5	82.6	95	968	
	9/18	0000	15.6	83.4	110	952
0600		15.8	84.3	115	947	
1200		16.4	85.6	105	957	
1800		16.6	86.9	100	964	
9/19	0000	17.0	88.2	95	964	
	0600	17.0	89.4	50		TROPICAL STORM
	1200	16.7	90.7	30		TROPICAL DEPRESSION
	1800	16.0	92.0			
9/20	0000	15.7	93.0			
	0600	15.5	93.4			
	1200	15.3	93.8	35		TROPICAL STORM OLIVIA
	1800	15.2	94.0			
9/21	0000	15.0	94.5			
	0600	14.8	95.0			
	1200	14.5	95.5			
	1800	14.0	95.5			
9/22	0000	14.0	94.8	65		HURRICANE OLIVIA
	0600	14.5	94.2			
	1200	15.2	94.0			
9/23	1800	16.2	94.5	50		TROPICAL STORM OLIVIA
	0000	17.0	95.3	30		TROPICAL DEPRESSION
	0600	17.8	96.0			
	1200	18.5	97.0			



HURRICANE OLIVIA  
SEPTEMBER 19-23, 1978

HURRICANE GRETA  
SEPTEMBER 13-19, 1978

p  
(mb)

V  
(KT)

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# HURRICANE GRETA SEPTEMBER 3-19, 1978

