

Preliminary Report  
Hurricane Lisa  
05-09 October 1998

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Lisa briefly reached hurricane force in the central North Atlantic Ocean and did not affect land.

a. Synoptic History

Lisa originated from a tropical wave which moved westward from Africa into the eastern tropical Atlantic Ocean on 29 September. The associated cloudiness was fairly well organized and centered at about 10° N latitude. By the next day, it was an almost indistinguishable part of the Intertropical Convergence Zone (ITCZ) which was active across the entire tropical Atlantic. By 3 October, the system became better defined as its convection increased and the ITCZ cloudiness dissipated to its east and west. On the 4th, midway between Africa and the Lesser Antilles, there were signs of a low level circulation and it is estimated that a tropical depression formed at 0000 UTC on the 5th. The best track of Lisa begins at this time as plotted in Fig. 1 and listed in Table 1.

The depression strengthened into Tropical Storm Lisa on the 5th, although it was in an environment of strong vertical shear, as evidenced by the low-level center being exposed to the west of the associated deep convection. This shear was caused by an upper level low located to the northwest of the storm. The presence of this low also weakened the ridge to the north, causing the storm's motion to begin a turn toward the north. During the next two days, a strong baroclinic trough in the westerlies evolved into a deep low in the central North Atlantic. This resulted in an acceleration toward the northeast. The forward speed reached in excess of 50 knots by the afternoon of the 9th. The vertical shear relaxed over the storm and it gradually strengthened. Lisa turned northward on the 9th, steered by the deep low to its west and a 1032 mb high to its east. This strong east-west pressure gradient also resulted in increasing the surface winds well to the east of the center and Lisa briefly strengthened to a 65-knot hurricane on the 9th, before merging with an extratropical frontal system in the far North Atlantic. On the 10th, it was no longer possible to identify a well-defined circulation on satellite imagery.

b. Meteorological statistics

Figs. 2 and 3 show plots of satellite-based pressure and wind estimates and the best-track pressure and wind curves. Dvorak estimates were provided by the U.S. Air Force Weather Agency (AFGWC), the Tropical Analysis and Forecast Branch (TAFB) of the Tropical Prediction Center, NWS and the Synoptic Analysis Branch (SAB) of NESDIS.

A NOAA drifting buoy (16.6N, 46.9W) in the central tropical Atlantic provided a wind observation of 35 knots at 0850 UTC on the 5th and another of 36 knots at 2138 UTC. These observations were essential in determining that Lisa had become a tropical storm, as satellite-based intensity estimates were well below storm strength at these times. The estimate that Lisa acquired 65-knot hurricane-force winds on the 9th was based on satellite intensity estimates and on a report of 61 knots from the ship ZCBD9 located at 46.9N, 33.3W at 1800 UTC (approximately 240 n n mi east of the center). The system was rapidly transforming into an extratropical system during this time and it is not certain that the strongest winds were near the center.

c. Casualty and damage statistics

There were no reports of casualties or damage received.

d. Forecast and warning critique

The average official track forecast errors for Lisa were 89 (15 cases), 200 (13 cases), 265 (11 cases), 314 (9 cases), and 417 n mi (5 cases), respectively, for the 12-, 24-, 36-, 48-, and 72-hour forecast periods. These are all larger than the 1988-1997 average official errors of 47, 88, 127, 166, and 248 n mi for the same forecast periods. The GFDL and UKMET track guidance models had slightly smaller errors than the official forecasts, but it is understandable that a forward speed in excess of 50 knots could result in rather large track errors. The CLIPER average errors for Lisa exceeded 1000 n mi at 72 hours.

The official intensity forecast errors showed a negative bias. It was not anticipated that Lisa would become a hurricane under the vertical wind shear that characterized the environmental conditions during much of the storm's existence.

There were no watches or warnings issued.

**Table 1. Best track, Hurricane Lisa, 05-09 October 1998.**

<b>Date/Time (UTC)</b>	<b>Latitude (°N)</b>	<b>Longitude (°W)</b>	<b>Pressure (mb)</b>	<b>Wind Speed(kt)</b>	<b>Stage</b>
05/0000	13.9	46.4	1008	30	tropical depression
0600	14.2	47.1	1007	35	tropical storm
1200	14.8	47.8	1007	35	“
1800	15.7	48.5	1006	40	“
06/0000	16.5	49.2	1006	40	“
0600	17.1	49.3	1005	45	“
1200	17.6	48.9	1005	45	“
1800	18.2	48.5	1005	45	“
07/0000	18.9	48.0	1004	50	“
0600	19.6	47.5	1003	50	“
1200	20.4	46.6	1002	50	“
1800	21.5	45.3	1001	50	“
08/0000	22.9	43.9	1000	55	“
0600	24.6	42.1	999	55	“
1200	26.9	40.1	999	55	“
1800	29.6	38.6	999	60	“
09/0000	32.9	37.8	999	60	“
0600	36.8	37.9	997	60	“
1200	41.6	38.7	995	65	hurricane
1800	47.1	39.3	997	65	“
10/0000	52.1	32.0	999	60	extratropical
09/1200	41.6	38.7	995	65	minimum pressure

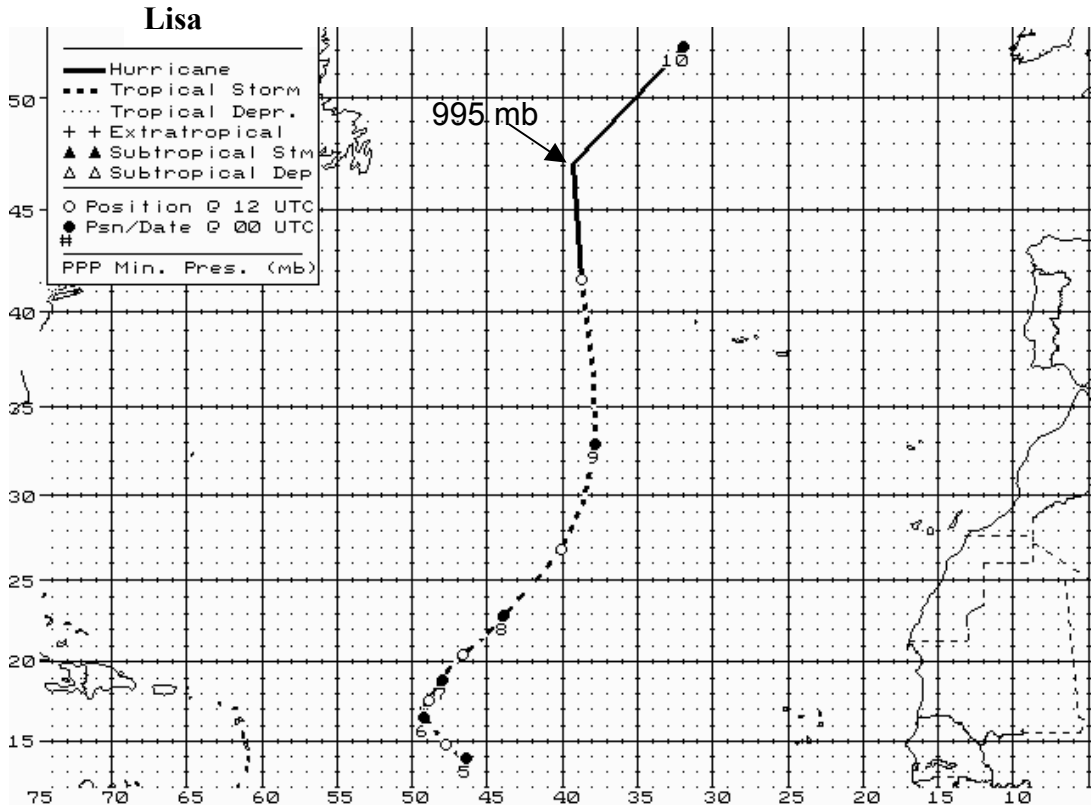


Fig. 1. Best track positions for Hurricane Lisa, 05-09 October 1998

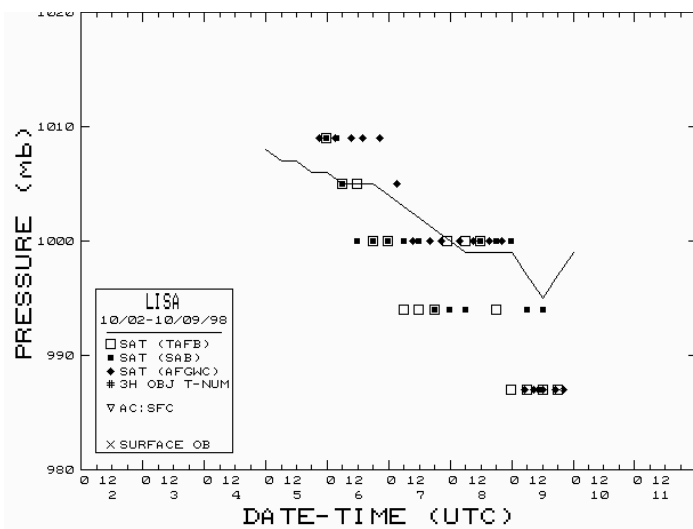


Fig. 2. Best track minimum central pressure curve for Hurricane Lisa.

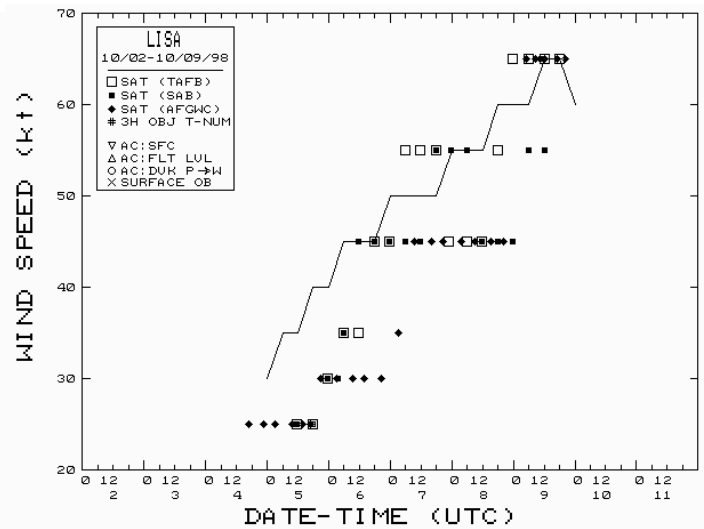


Fig. 3. Best track maximum sustained wind speed curve for Hurricane Lisa.