

PRELIMINARY REPORT

Hurricane Nicole
24 November -1 December 1998

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Late season Hurricane Nicole was a tenacious tropical cyclone that persisted for several days over the northeast Atlantic.

a. Synoptic History

Nicole developed from a nearly stationary and strong frontal low which persisted for several days over the northeast Atlantic, centered a few hundred miles south of the Canary Islands. Satellite imagery suggested that the frontal low acquired tropical characteristics when a tightly-wrapped convective band developed around the center of circulation. It is estimated that the system reached tropical storm status at 0600 UTC 24 November. Later on, a ship with call sign *PFSJ* confirmed that the system had acquired tropical characteristics when reported 36 knots at 1200 UTC 24 November just to the north of the center of the tropical storm. The tropical cyclone was then located in the central portion of a larger upper-level low where the vertical wind shear was relatively weak. This is typical for these late-season developments in the subtropics. Nicole continued to become organized while an intermittent eye-feature was observed on satellite images. Maximum winds increased to 60 knots as indicated by reports from the same ship.

Nicole moved toward the west-southwest for the next few days while located south of a strong mid-level high pressure ridge. An upper-level trough moved rapidly eastward over the system, producing a strong wind shear. The shear removed most of the convection associated with the tropical cyclone which weakened to tropical depression status on 26 November. In fact, the system became so weak that advisories were discontinued. However, the ridge which followed the upper-level trough became superimposed over the system, decreasing the shear. Deep convection regenerated and unexpectedly, the system reacquired tropical storm strength by the 27th.

Nicole then began to move on a west-northwest track. Thereafter, it turned toward the northeast ahead of another strong approaching cold front. Nicole intensified further and reached hurricane status with peak winds of 75 knots and a minimum pressure of 979 mb at 0000 UTC 1 December. These estimates were based on satellite images which revealed the formation of an eye, resulting in objective T-numbers oscillating around 4.5 on the Dvorak scale. In

addition, data from the Defense Military Satellite Program (DMSP) 85 GHz sensor showed an almost complete eyewall. During that period, Nicole was moving over a region of anomalously warm sea surface temperatures of the order of 2 or 3 degrees. This anomalous feature was probably partially responsible for the intensification of the system. Nicole moved rapidly northward and north-northwestward around the periphery of a large deep-layer cyclonic circulation and became extratropical by 1800 UTC 1 December.

Nicole's track is shown in Fig. 1. Table 1 is a listing, at six-hourly intervals, of the best-track position, estimated minimum central pressure and maximum 1-minute surface wind speed.

b. Meteorological Statistics

The best track pressure and wind curves as a function of time are shown in Figs. 2 and 3 and are primarily based on data from satellite intensity estimates from the Tropical Analysis and Forecast Branch (TAFB), the Satellite Analysis Branch (SAB) and the Air Force Weather Agency, (AFGWC in figures). Observations from the ship *PSFJ* were crucial to determine the structure and the intensity of Nicole. In fact, the storm's intensity was operationally increased to 60 knots based on a 58-knot wind report from that vessel at 1800 UTC 24 November.

c. Casualty and Damage Statistics

There are no reports of casualty and damage from Nicole.

d. Forecast and Warning Critique

The NHC average official track errors in n mi for Nicole (excluding the tropical depression and extratropical stages) were 51 (23 cases), 117 (21 cases), 183 (18 cases), 252 (15 cases) and 377 (14 cases), respectively, for the 12-, 24-, 36-, 48-, and 72-hour forecast periods. These numbers are larger than the 1988-1997 average errors of 47, 88, 127, 166 and 248 n mi for the same time periods. The errors produced by the track models were also large, primarily beyond the 48-hour period.

Nicole was forecast to dissipate after being hit by strong shear. Instead, Nicole regenerated and reached hurricane status. This reflects once again the uncertainties in intensity forecasting, particularly at higher latitudes whose development is associated with extratropical sources.

Table 1. Best track, Hurricane Nicole, 24 November- 1 December, 1998

Date/Time (UTC)	Position		Pressure (mb)	Wind Speed (kt)	Stage
	Lat. (°N)	Lon. (°W)			
24/0000	28.3	28.0	1010	30	tropical depression
0600	27.9	29.1	1005	35	tropical storm
1200	27.5	30.1	1000	45	“
1800	27.2	31.1	997	60	“
25/0000	26.9	32.0	995	60	“
0600	26.6	32.9	994	60	“
1200	26.3	33.7	994	55	“
1800	26.0	34.6	994	50	“
26/0000	25.7	35.4	998	40	“
0600	25.5	36.4	1000	35	“
1200	25.3	37.3	1007	30	tropical depression
1800	25.2	38.3	1009	25	“
27/0000	25.2	39.2	1009	25	“
0600	25.3	40.3	1009	25	“
1200	25.4	41.7	1009	30	“
1800	25.6	43.0	1005	40	tropical storm
28/0000	25.8	44.1	1001	50	“
0600	26.3	45.3	1000	50	“
1200	27.1	46.2	1000	50	“
1800	28.0	46.6	1000	50	“
29/0000	28.8	46.5	1000	45	“
0600	30.0	45.9	1000	45	“
1200	31.0	44.9	1000	55	“
1800	31.8	43.8	995	60	“
30/0000	32.6	42.6	992	65	hurricane
0600	33.1	41.7	992	65	“
1200	33.8	40.5	987	65	“
1800	34.3	39.3	984	70	“
01/0000	35.1	37.9	979	75	“
0600	37.0	35.5	980	70	“
1200	40.4	34.0	982	60	tropical storm
1800	43.0	34.0	985	60	extratropical
02/0000	47.0	34.5	988	50	“
0600	49.5	35.5	990	50	“
1200	52.0	37.0	990	50	“
01/0000	35.1	37.9	979	75	minimum pressure

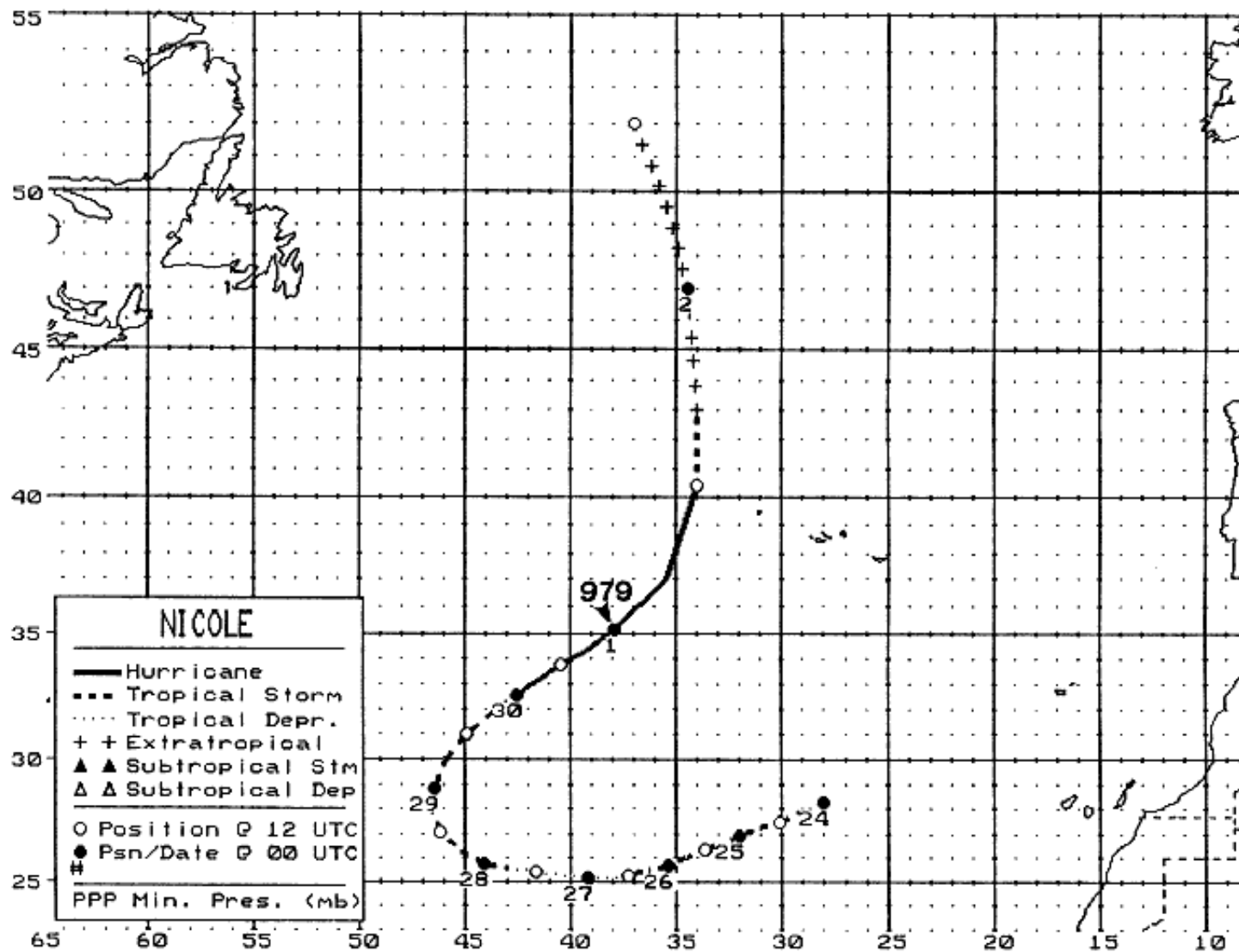


Fig. 1. Best track positions for Hurricane Nicole, 24 November -1 December 1998.

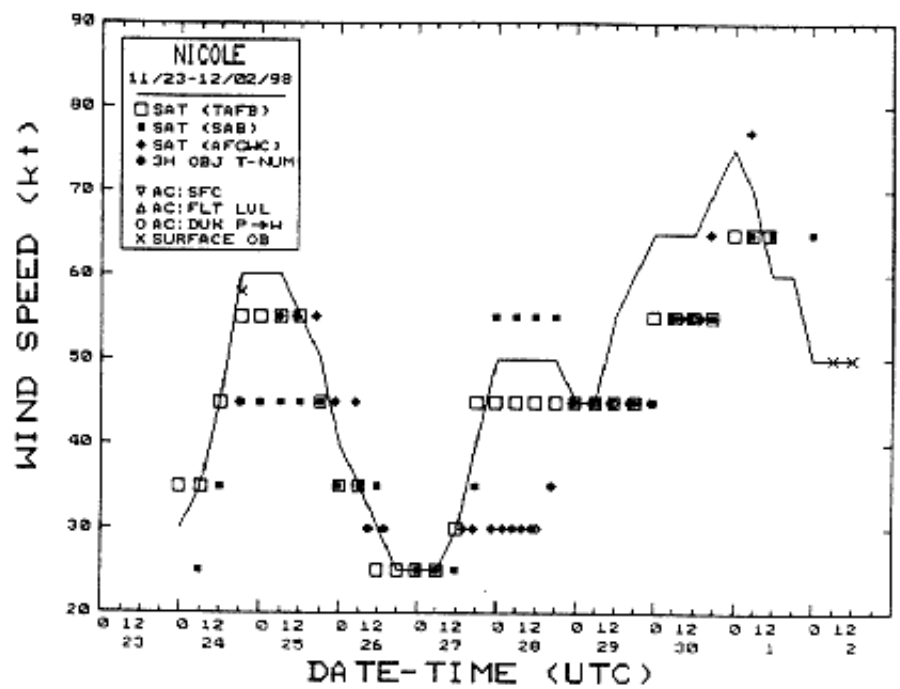


Fig. 2. Best track one-minute surface wind speed curve for Hurricane Nicole

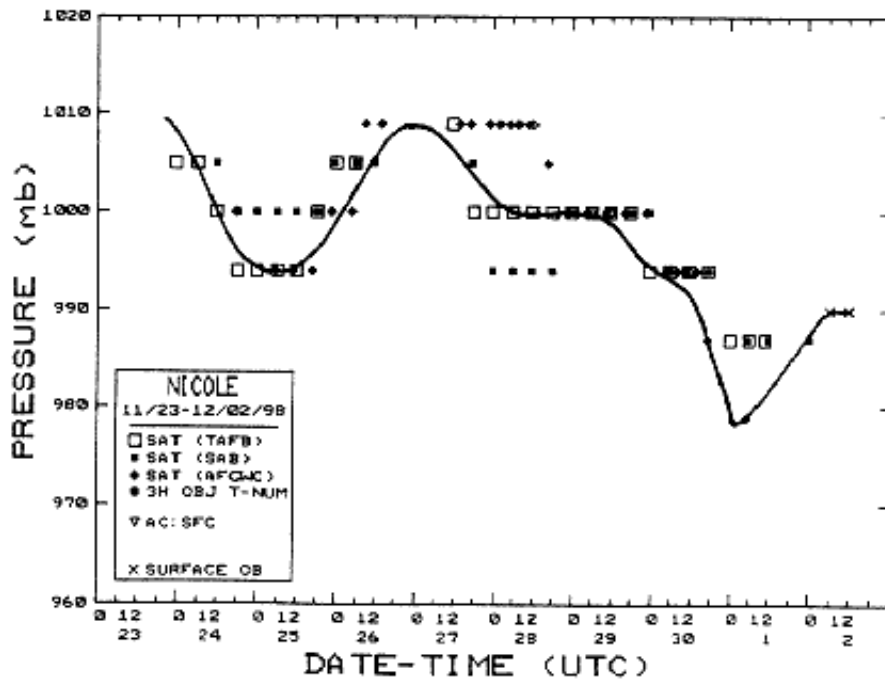


Fig. 3. Best track minimum central pressure curve for Hurricane Nicole.