

Tropical Cyclone Nellie 13/03/1973 – 23/03/1973

(i) General

“Nellie”, the eight tropical cyclone of the season, developed from a low pressure system centred in the Timor Sea. It moved in a generally westsouthwestward direction without crossing land, and degenerated over the tropical waters of the Central Indian Ocean.

(ii) Development

On 12th March 1973 when tropical cyclone “Madge” was located northwest of NW cape and near its peak intensity another cloud mass was evident on satellite photographs of the Timor Sea north of Wyndham. This cloud mass was displaced southward to the main intertropic cloud band. A cell of low pressure with a central pressure of about 1006 mb could be distinguished on the 120100 GMT MSL analysis. During the next 24 hours this system drifted slowly westward and deepened slightly to about 1003 mb. By 140100 GMT winds at the automatic weather station on Browse Island were exceeding 25 km/h. The first cyclone warning was issued at 140230 GMT. Satellite photographic evidence indicates that “Nellie” continued to develop until 16th march 1973 when it apparently attained its maximum intensity. At that time the central pressure is estimated to have been about 964 mb using Dvorak’s scale. During the next 24 hours a similar pressure was maintained. About 170400 GMT the ship “Malaysia” passed very close to the centre of the tropical cyclone. A barograph on the ship recorded a minimum pressure below 979 mb and the wind for several hours about that time consistently exceeded 93 km/h.

After maintaining its peak intensity for over 24 hours tropical cyclone “Nellie” began to weaken. Satellite photographic evidence indicated that the weakening occurred steadily And the low finally dissipated completely on 23rd March 1973 while still over the tropical waters in the central Indian Ocean.

The first anticyclonically curved isobar the system at maturity was 1008 mb on 16th March 1973.

(iii) Features of the Track (fig. 8.1)

During the 11 days that “Nellie” was active it travelled a distance of 3700 km in a generally westsouthwestward direction. The track showed no unusual features.

For the first 72 hours, 13th-15th March, “Nellie” travelled at a relatively constant speed of about 25 km/h in a westsouthwestward direction. The tropical cyclone reached maturity on 16th March and at the same time its speed of movement decreased markedly to about 6 km/h. Its direction of movement also became more westerly. On 17th march it turned westnorthwesterly moving at about 6 km/h. This direction of movement persisted until 19th March when the tropical cyclone again turned westerly and eventually westsouthwesterly. From 18th March “Nellie’s forward speed increased gradually to about 17 km/h, and, with only minor variations, this speed was maintained until the system had filled completely.

The failure of “Nellie” to recurve towards the southwest is of interest and it is noted that a moderate redevelopment of the subtropical ridge over the southern half of Western Australia began on 15th March. Although a rapidly moving middle and upper tropospheric trough moved over the tropical cyclone location on 16th March the only effect appears to have been the marked decrease in the westward speed of movement. From the time of the development of the upper ridge in the wake of the trough on 18th March the tropical cyclone’s rate of movement to the west increased to 17 km/h.

(iv) Rainfall and Flooding

Cyclone “Nellie” remained over the sea throughout its lifetime and no rainfall reports close to the centre are available. During the tropical cyclone’s developing stage some falls of rain were reported from stations in the Kimberley; the highest falls in 24 hours to 0900 WST being 49 mm at Troughton Island on 14th March, 28 mm at Kalumburu on 14th March and 29 mm at Mitchell Plateau on 15th March. No flooding was reported from the Kimberley.

From 16th March to 21st March widespread heavy rains caused flooding in the Pilbara. Satellite photographic evidence however confirms that this rain area was attributable to the upper trough moving through the area rather than to cyclone “Nellie”.

(v) Winds

Apart from Cape Leveque no continental station reported winds exceeding 46 km/h while cyclone “Nellie” was affecting the area. At 140700 GMT and 141000 GMT Cape Leveque reported winds of 56 km/h. All reports of winds exceeding gale force were from ships or offshore automatic weather stations. Ship reports in which the winds are of at least gale force are shown in Table 8.1.

Reports from the ship “Malaysia” indicated that winds exceeded storm force near the centre. Gale force winds were still being experienced when this ship was 530 km from the centre. If the 110700 GMT observations from the oil rig “Ocean Digger” is accurate gale force winds extended more than 550 km from the centre of the storm at maturity.

There were no reports of damage caused by wind.

(vi) Seas and Swell

Table 8.1 also shows the sea and swells experienced by the ships. Seas reported were mostly moderate but swells both on the northern side and the southern side of cyclone “Nellie” were heavy to very heavy.

No damage resulting from the sea wave action was reported but the crew of the oil drilling rig “Big John” operating over the Northwest Shelf were evacuated for some 15 hours on 16th March.

(vii) Satellite Analysis

Again information gleaned from the photographs taken by the ESSA 8, NOAA 2 and NOAA 3 satellites provided valuable assistance in describing the development, track and behaviour of tropical cyclone “Nellie”. Data from the ESSA 8 photographs are displayed in Table 8.2.

On 12th March 1973 an area of enticed cumulus activity was evident in the Timor Sea North of Wyndham. This system had drifted westward by 13th March and had become slightly more organised. In Dvorak’s classification its final T number was estimated to be 2 with ongoing development predicted. This occurred in the next 24 hours and continued steadily for a further 48 hours. In the ESSA 8 photographs of 160212 GMT the final T number was 5. By 18th March the cloud system had begun to degenerate and progressive weakening continued. By 22^{ns} March the final T number was less than 2. A weak circulation located further to the west was still visible on the ESSA 8 photograph of 230338 GMT.

Table 8.1 Selected Ship Reports

Ship	Position °S °E	Date/ Time (GMT)	Bearing/ Distance From centre (km)	Wind (km/h)	Sea (m)	Swell	Weather	Pressure (mb)
Jajaka	115.2 119.8	14090 0	180/09 0	120/ 83	14		Heavy Rain	1001.2
Ocean Digger	19.5 115.5	16070 0	120/55 0	090/ 80	E2	ENE6		999.0
Malaysi a	16.7 109.1	17000 1	340/08 5	250/ 93	WSW 2	WSW 5		985.5
Malaysi a	17.7 108.8	17060 0	210/06 5	140/ 93	SE2	SE6		991.7
Zenkore n Maru No. 2	14.8 108.4	17060 0	350/28 0	260/ 63	WSW 5	WSW 5	Recent Rain	1000.0
Malaysi a	18.7 109.1	17120 0	170/17 5	160/10 2	SSE2	SSE6	Heavy Rain	999.2
Malaysi a	19.4 109.5	17150 0	170/23 5	160/10 2	SSE2	SSE6	Rain	1002.4
Malaysi a	19.7 129.6	17180 0	160/30 0	150/ 93	SSE2	SSE5		1001.9
Malaysi a	20.7 110.1	18000 1	160/45 0	150/ 82	SSE2	SSE5	Drizzle	1004.4
Malaysi a	21.2 110.1	18060 0	160/53 0	140/ 65	SE2	SSE5		1005.9

Table 8.2 Data from Satellite Photographs

Satellite Name	Orbit Number	Date/Time (GMT)	Estimated posn. of centre °S	Estimated posn. of centre °E	Final T No.	Min. Sea Level Pressure (mb)
ESSA 8	19438	130133	13.5	124	2	1001
	19451	140224	14.5	121.2	3	992
	19463	150120	16	116	4	982
	19476	160212	18	110	5	964
	18489	170303	17.5	108	5	964
	19501	180202	16.5	109.5	4	964
	19514	190253	17	106	3.5	982
		20	No	Photo		
	19539	210241	20	99.5	2.5	992
	19552	220332	19.7	95.5	1.5	997
	19564	230228	20.5	94.5	1.5	1004