

## **Tropical Cyclone Erica 29/12/1973 to 05/01/1974**

### (i) General

The sixth cyclone of the season was "Erica". This revolving storm developed in an extensive low pressure area which had persisted off the Pilbara coast for some days. It travelled between Barrow Island and Onslow and then passed across the peninsula south of Learmonth to the eastern Indian Ocean where it decayed over tropical waters.

"Erica" was a storm of only moderate intensity but because of the location of its development it caused considerable concern though only minor damage resulted.

### (ii) Development

For several days prior to the development of "Erica" pressures over Western Australia were generally low and an active complex low pressure area was present off the Pilbara coast. On 29 December a new high pressure ridge quickly became established over the southern half of the State. This caused a strengthening of southeasterly winds as far north as the Pilbara coast and increased low level winds in the vicinity of the depression offshore. Increased convergence probably aided the organisation and deepening of this system which by 30 December was causing winds approaching gale force near the centre.

This cyclone reached its peak intensity comparatively quickly. On 31 December the lowest recorded pressure was reported, 980 mb at the "Ocean Digger" oil rig operating on the Northwest Shelf near 19.2°S 118.1°E. This pressure is not really consistent with the wind speeds experienced at that platform as they at no time exceeded 75 km/h. Satellite photographs taken the same day indicated however that the system would soon begin to weaken.

"Erica" had already weakened when it moved inland near Onslow at 312100 GMT as the maximum wind gust recorded at this station was only 48 km/h. This decline was halted as the cyclone again moved over the open sea. However the fluctuation was only temporary and the system weakened further over the next two days. By 5 January it had dissipated.

The first anti-cyclonically curved isobar outside the mature system was 1004 mb.

### (iii) Features of the Track (Fig. 6.1)

"Erica" was active in the region for seven days and in that time travelled about 3000 km. In its development stage "Erica" moved slowly and erratically but, by 31 December, it had established a southwesterly track which persisted until landfall. After crossing the coast and then moving over the ocean again the cyclone travelled consistently in a westnorthwestward direction, a trajectory sometimes followed by decaying tropical cyclones in the eastern Indian Ocean.

The synoptic pattern to the south of "Erica" consisted of a high pressure cell in the Bight. This high retreated slowly eastward and on 1 January a new ridge began to develop rapidly across the lower west coast of Western Australia.

A series of anticyclones centred about 20°S dominated the upper wind pattern in the Australian longitudes.

(iv) Rainfall, Flooding and Flood Damage

During the period that "Erica" affected the Pilbara coast some heavy falls of rain were reported. These were confined to the coast with only very isolated heavy falls inland. In the 24 hours ending at 9 am WST the heaviest falls on 31 December 1973 and 1 January 1974 are shown in Table 6.1. On 2 January 1974 falls were generally less than 5 mm in the Fortescue and West Gascoyne. Of the stations noted in Table 6.1 only Lalla Rookh is not coastal. Lalla Rookh is about 110 km southeast of Port Hedland.

The only report of damage associated with rainfall from "Erica" was a breakdown of the water supply, sewerage treatment and aireconditioning at Shay Gap.

Tale 6.1 24 Hour Rainfall Ending 9 am WST at Selected Stations (mm)

Station	31/12/73	1/1/74
Mandora	57	0
Port Hedland Aerodrome	42	66
Lalla Rookh	59	43
Roebourne	8	55
Cape Lambert	19	22
Dampier	29	40
Mardie	19	77
Barrow Island	14	28
Onalow	0	29
Exmouth	0	6

(v) Wind and Wind Damage

The first indication that winds associated with the developing cyclone had reached gale force was provided by the automatic weather station at Rowley Shoals. At 300900 GMT the wind at that station was westerly at 65 km/h after being easterly at 45 km/h three hours previously.

Even during this cyclone's most intense phase gale force winds extended not more than 150 km from the centre of the system. This was established from reports received from the oil rigs operating on the Northwest Shelf, the "Glomar Tasman", "Ocean Digger" and "Big John", and from their tenders, "Lady Sarah", "Lady Vilma" and "Lady Rachel". The "Ocean Digger" reported gale force winds from 310500 GMT to 310800 GMT (Table 6.2).

The only other reports of gale force winds at sea were also in the northnortheasterlies. These reports were received from the ship "Lady Rachel" which was some 70 km southeast of "Ocean Digger". A summary of the reports from "Lady Rachel" is given in Table 6.3.

Of the land stations only Cape Lambert experienced winds greater than gale force as the cyclone moved past. The half-hourly records of the winds noted by the observer at Cliffs Robe River Iron Associates located at Cape Lambert are given in Table 6.4. At its closest approach "Erica" was probably about 60 km from Cape Lambert.

"Erica" also passed very close to Onslow but mean winds at that station were never more than 35 km/h.

(vi) Seas and Swell

Both Table 6.1 and Table 6.2 give indications of the seas and swell generated by "Erica". The highest sea waves reported were 3 m by the "Lady Rachel" at 310600. At the same time that ship reported a swell approaching 6 m. The swell later increased to 7 m temporarily.

After the cyclone had passed overland and was again off the coast moderate seas and swell were reported from Cape Cuvier on 2 January.

(vii) Satellite Photograph Analysis

While "Erica" was operating cloud photographs were received once daily from the ESSA 8 satellite and twice daily from NOAA 2.

The photographs for some days prior to 29 December clearly showed the broad area of cumulonimbus activity off the Pilbara coast. On 29 December some cyclonic organisation was evident and this was even more striking on 30 December (ESSA 8 300156 GMT) when the T-number in Dvorak's scheme was estimated to be 2.5. Twenty four hours later the cyclone was a T 3.5 system but unidirectional upper level cirrus indicated that the system should begin weakening. Synoptic evidence supported the contention that this weakening occurred.

Although it appears that a small relative intensification took place when "Erica" again moved out over tropical waters (ESSA 8 020235 GMT) this was a temporary phenomenon only. The cyclone continued to weaken while travelling in a westnorthwestward direction until by 5 January it was no longer identifiable.

A summary of the satellite data is given in Table 6.5.

Table 6.2 Selected Reports from Oil Rig “Ocean Digger”

Position °S°E		Date/ Time (GMT)	Direction/ Distance from centre (km)	Wind (km/h)	Sea (m)	Swell (m)	Weather	Pressure (mb)
19.2	118.1	310400	140/25	020/41	2	NNE 2-3	-	997.0
		310500	130/20	020/65/72	2	NNE 3-4	Light showers	980
		310600	110/15	020/65/80	2	NNE 3-4	Light showers	980
		310700	090/10	360/65/80	2	NNE 2-4	Light showers	980.5
		310800	060/25	360/48/65 Max. 72	2	NNE 2-4	Rain squalls	981
		310900	404/48	340/48/56 Max. 65	2	N 3-4	-	981.5

Table 6.3 Selected Reports from Ship “Lady Rachel”

Position °S	°E	Date/ Time (GMT)	Direction/ Distance from centre (km)	Wind (km/h)	Sea (m)	Swell (m)	Weather	Pressure (mb)
19.5	118.8	310045	200/125	360/65 Max 74	2	NE 3-5	-	1000
19.5	118.8	310600	110/95	360/74 Max 102	3	N 4-6	Frequent rain squalls	1000
19.4	118.8	310700	100/90	360/74 Max 102	-	N 6-7	-	-
19.3	118.8	310800	090/90	360/82	2	NNW 3	-	-

Table 6.4 Wind Recorded at Cape Lambert During the Passage of Tropical Cyclone “Erica” 31 December 1973

GMT	Wind Direction	Wind Speed (km/h) (including max. gust)
1030	ESE	46
1200	ESE	74/83
1230	ENE	65/93
1300	ENE	74/93
1330	NNE	56/85
1400	NNE	43/74
1500	NNE	28/46

Table 6.5 Data from Satellite Photographs

Satellite Name	Orbit Number	Date/Time (GMT)	Estimated posn. of centre		Final T No.	Min Sea Level Pressure (mb)
ESSA 8	23091	290105	18.0	119.0	1.5	1001
	23104	300156	17.0	119.5	2.5	999
	23116	310052	19.0	117.0	3.5	988
	23129	010143	22.5	114.5	-	988
	23142	020235	24.0	110.7	3	994
	23155	030326	22.0	106.0	2	1003
	23167	040222	19.5	102.0	1	1008
	23180	050313	18.0	96.5	1	-