

Tropical Cyclone Trudy 10/01/1978 to 20/01/1978

(i) General

"Trudy" was the second tropical cyclone of the season to develop in the northwestern Australian Region. This cyclone also spent its entire life over the tropical waters of the eastern Indian Ocean. "Trudy" was an intense cyclone with an estimated central pressure of about 955 mb on 16 January. At that time winds near the centre were estimated to have been about 160 km/h and gale force winds occurred over 700 km from the centre. No damage to shipping was reported.

(ii) Development

Most of the information relating to the development of cyclone "Trudy" was obtained from meteorological satellites. The cyclone developed from a depression which was located over the Timor Sea northwest of Darwin. As it developed "Trudy" moved westward into the eastern Indian Ocean and passed 275 km to the south of Christmas Island. At 121830 GMT the pressure at Christmas Island was 1003.6 mb which was the lowest reported by any station to that time. The pressure at Christmas Island continued to fall as "Trudy" moved further to the southwest. At 130930 GMT the pressure reported from Christmas Island was 1001.4 mb when the centre was 400 km to the southwest. This fall in pressure supported the continued deepening evident in the satellite photographs. According to the satellite data deepening continued until 16 January although there was a temporary reversal of this trend on 15 January.

At maturity the estimated central pressure of the cyclone was 955 mb. Thereafter "Trudy" weakened steadily and by 20 January had almost completely degenerated.

(iii) Features of the Track (Fig. 2.1)

"Trudy" travelled about 5500 km during its ten day lifetime. For most of the period its path was generally westerly but on 17 January the cyclone re- curved to the south before dissipating on 20 January while over subtropical waters.

During its early developmental stages "Trudy" travelled rapidly westward at about 35 km/h. From 13 to 16 January its direction of movement was westsouthwesterly but at the slower rate of about 20 km/h. On 16 January the speed of the cyclone decreased further to 16 km/h and then on 17 January its direction of motion became southerly at that same speed. As the system degenerated it slowed markedly and averaged only 7 km/h in the 24 hours to 200100 GMT.

While "Trudy" was developing the main features of the synoptic situation were an intense high pressure system centred in the Great Australian Bight and another weaker high centred in the Indian Ocean. Between these two systems a low pressure trough existed near the west coast of Australia. On 13 January this trough moved eastward ahead of a cold front moving towards the southwest corner of Western Australia. On 14 January the front had moved over Western Australia and an intense high developed in its wake in the eastern Indian Ocean. This system slowly moved eastward and on 17 January another cold front moved eastward from the Amsterdam Island area. This coincided with the recurvature

of "Trudy" to the south. Late in "Trudy's" lifetime tropical cyclone "Fleur" developed in the central Indian Ocean south of the Chagos Archipelago.

(iv) Rainfall

Christmas Island was the only land station near the cyclone track to report rainfall. 29 mm fell in the 24 hours to 0830 am local time 14 January. 13 mm fell in the following 24 hours.

(v) Seas and Swell

From the time that "Trudy" became a tropical cyclone rough seas and a heavy swell were generated. Details of sea and swell conditions from selected ship reports near the centre are listed in Table 2.1. The first report of significant sea conditions was from the "Strathmore" at 140500 GMT when 3 m seas and a 5 m swell were reported. From that time until 160000 GMT when the "Aurora" moved away from the cyclone, rough seas and heavy swells were frequently reported.

(vi) Winds

"Trudy" was a severe storm and from satellite evidence it is likely that winds of 160 km/h would have been generated near the centre on 16 and 17 January. Wind reports from selected ships are included in Table 2.1 and these indicate that winds of over 100 km/h were reported at 140500 GMT. This was the first report of winds exceeding gale force and it was also the maximum reported wind. Gales probably first occurred on 12 January and would probably have persisted until 19 January. The last such report was from the ship "Aurora" at 160000 GMT.

Table 2.1

Selected Ship Reports

Ship	Position °S °E		Date/ Time (GMT)	Bearing/ Distance from Centre (km)	Wind Direction/ Speed (km/h)	Sea (m)	Swell (m)	Weather	Pressure (mb)
Strathmore	16.4	98.8	140500	230/190	150/102	3	ENE 5		996.2
Strathmore	16.2	98.4	140600	240/230	150/106	4	E 5		995.9
Strathmore	15.0	97.3	141200	310/260	210/93	5	E 10	Heavy continuous rain	992.8
Aurora	20.6	94.2	141200	220/680	130/63	2.5	SE 3		1009.4
Aurora	20.6	94.7	141500	230/620	130/63	3.5			1009.6
Strathmore	14.2	97.5	141500	330/300	260/56	4	SW 10	Moderate continuous rain	995.6
Baron Pentland	19.1	101.5	141500	130/470	090/56		SE/NE 6	Frequent moderate showers	1012
Aurora	20.6	95.4	150000	200/410	130/63	5	ESE 4	Slight continuous drizzle	1007.7
Costis	19	92	150100	250/560	135/56	Rough- very rough			1006
Aurora	20.6	95.6	150300	190/400	130/63	5	E 4	Slight intermittent drizzle	1007.8
Aurora	20.6	95.9	150600	180/380	120/65	4.5	E 4	Recent rain	1006.6
Costis	20	91.5	150600	240/500	135/69	Rough- very rough			1006.5
Costis	20.5	91.7	150900	230/520	135/69	Very rough			1007
Aurora	20.5	96.1	150900	160/390	110/65	4.5	E 4.5	Moderate intermittent rain	1006.2
Aurora	20.5	96.3	151200	150/400	120/76	7	ESE 7	Moderate continuous rain	1006.9
Aurora	20.7	96.7	151500	130/500	090/76	7			109.9
Aurora	20.8	97.0	151800	130/550	090/74	6			1010.5
Aurora	21.0	97.3	152100	130/660	090/65	5			1010.0
Aurora	21.2	97.5	160000	130/710	090/63	4	ESE 4		1012.8

(vii) Satellite Analysis

Data from selected satellite photographs relative to "Trudy" are given in Table 2.2. On 10 January a mass of convective cloud located north of Joseph Bonaparte Gulf appeared to possess a centre of circulation near 10.5°S 129°E.

In the NOAA 5 photograph orbit 6564 110029 GMT considerable organisation about a centre was evident and the system was designated T 2 with ongoing development predicted. Steady deepening occurred during the next three days as the CDO became larger and the outer banding encircled more of the CDO. On 14 January the system had reached T 5 in the Dvorak classification, however the upper level flow across the cyclone appeared to be more unidirectional than previously. Further deepening did not seem likely in the next 24 hours and in the photograph of 150126 GMT orbit 6614, the system appeared to have weakened. This change was to be only temporary as the high level flow lost its unidirectional appearance and evidence of increased convective activity occurred to the northeast of the centre. On 16 January an eye was clearly visible. "Trudy" was then estimated to be T 5.5. During the next 24 hours the system weakened again as it approached a broad field of stratocumulus. Over the next three days the system degenerated with the upper level cloud being sheared rapidly away from the low level circulation which remained visible until 20 January.

Satellite Name	Orbit Number	Date/Time (GMT)	Estimated posn. of centre		Final T No.	Min. Sea Level Pressure (mb)
			°S	°E		
NOAA 5	6551	092320	10.5	129.0	1	1007
	6564	110029	11.8	121.4	2	1003
	6577	120033	14.0	112.0	3	995
	6589	130057	12.8	104.5	4	985
	6602	140210	15.0	100.9	5	965
	6614	150126	17.1	96.1	4.5	975
	6627	160241	17.6	91.4	5.5	955
	6639	170154	19.0	88.4	5	965
	6652	180313	22.2	88.1	4	985
	6664	190222	24.1	88.7	2.5	1000
	6676	200139	25.1	89.2	1.5	1005

