

Tropical Cyclone Ray 17/11/1975 to 25/11/1975

(i) General

The first tropical cyclone of the 1975/76 season was code named "Ray". It developed from a low pressure system located west of Java and moved firstly in a generally southwestward direction and then to the southeast after recurving on 24 November. At no time was "Ray" located over land; however for two days while in its developing stage "Ray" threatened Cocos Island. The system degenerated over the subtropical waters of the Central Indian Ocean.

(ii) Development

Mean sea level pressures were relatively high in the vicinity of cyclone "Ray" during its developing stages. If satellite evidence had not been available it is doubtful whether the cyclone's existence would have been suspected before 21 November when pressures at Cocos Island had fallen about 4 mb in 24 hours to 1005 mb. By that date however, the cyclone had deepened steadily to an estimated 981 mb and was some 230 km to the northwest of Cocos Island.

Cyclone "Ray" developed at a slow rate reaching a minimum central pressure of about 973 mb on 22 November. Thereafter it began weakening rapidly as it interacted with an environmentally unfavourable airmass associated with a stratocumulus field.

The prevailing synoptic pattern during the lifetime of cyclone "Ray" included a moderately intense ridge of high pressure south of the cyclone centred along 30°S. By 24 November the ridge had been eroded at the longitude of "Ray" (about 90°E) by a southern cold front. The remnants of "Ray" became attached to the northernmost part of the cold front on 25 November.

The first anticyclonically curved isobar outside the system at maturity was 1012 mb on 22 November.

(iii) Features of the Track (Fig. 1.1)

"Ray" was an active disturbance for eight days and in that time travelled a distance of about 2700 km. For the first three days "Ray" developed outside the Northwestern Region. Only on the fourth day, 20 November, did the cyclone move south of 10°S at about longitude 97°E. In its southwestward, southerly and later southeasterly trajectory "Ray" showed no unusual features.

When it was first detected as an entity separate from the Intertropic Cloud Band (ITCB) the system which developed into tropical cyclone "Ray" was moving westward at about 16 km/h. On 17 November this speed of movement was maintained while its direction of motion became more southwesterly. By 18 November cyclone "Ray" had decelerated to about 11 km/h. The cyclone continued to move at this reduced speed for the next 48 hours during which period its central pressure fell to 981 mb. On 21 November "Ray" began moving more rapidly, still in a southwesterly direction. By 22 November its speed of movement was about 24 km/h and this was maintained until the system weakened on 25 November. During these last three days the cyclone recurved

with its southwesterly trajectory becoming southerly and eventually southeasterly as it moved into higher latitudes.

(iv) Rainfall

Throughout its life cyclone "Ray" remained over the sea. The only rainfall reports available are those from Cocos Island where the heaviest falls were measured on 20 November (46 mm), 21 November (20 mm) and 22 November (54 mm). On those days the cyclone was at its closest approach to Cocos Island but at no time was its centre nearer than 200 km to the Island.

(v) Winds

No winds exceeding gale force were reported from Cocos Island or from ships at sea within the area affected by cyclone "Ray". Using the Dvorak technique, however, it is estimated that sustained winds of over 100 km/h would have been generated near the cyclone's centre during its mature stage.

There were no reports of damage.

(vi) Seas and Swell

In the 2101:0 GTE and 210600 GMT observations taken at Cocos Island "rough seas" were mentioned. However, at all other times only slight or moderate sea waves were experienced. Although reports were received from Cocos Island and from ships within a few hundred kilometres of the cyclone centre no swell greater than "moderate" was experienced.

(vii) Satellite Analysis

The NOAA 4 satellite provided a regular surveillance of cyclone "Ray" during the whole of its lifetime. In most of the photographs received the disturbance is reasonably well centred. On 21 November the cyclone image appeared near the edges of two photographs making satisfactory interpretation more difficult.

In the photograph NOAA 4 orbit 4574 160021 GMT a cumulonimbus cloud cluster appeared to have become detached from the main ITCB which had persisted in the vicinity of Indonesia for some time. This cloud cluster was centred about 350 km to the west of Java. On the next day some development seemed to have occurred and continued development was anticipated. In Dvorak's classification the system was assessed as T1. In the night time photograph NOAA 4 orbit 4593 171324 GMT the cloud appeared to be well organised with a definite overall comma shape and a fuzziness about the Cloud System Centre (CSC) indicating multidirectional cirrus outflow. Twelve hours later the system was classified as T3 and further intensification was forecast.

"Ray" intensified only slowly over the next four days reaching a maximum T 4.5 on 22 November. In the NOAA 4 photograph orbit 4663 230259 GMT an eye was clearly visible but the ongoing change characteristics were indicative of weakening. The cirrus outflow had become unidirectional and the CSC was approaching an extensive stratocumulus field. Rapid weakening occurred over the next 48 hours as the system lost

all its middle and upper level cloud. It appeared on the photograph NOAA 4 orbit 4688 250254 GMT as a partly organised patch of low level stratocumulus. By the next satellite pass over the area this organisation had disappeared.

A summary of the data from the satellite photographs is given in Table 1.1.

Table 1.1 Data from Satellite Photographs

Satellite Name	Orbit Number	Date/Time (GMT)	Estimated posn. of centre		Final T No.	Min. Sea Level pressure (mb)
			°S	°E		
NOAA 4	4587	170116	7.0	102.0	1	
	4600	180211	8.5	99.2	2	1003
	4612	190111	9.0	97.5	3	994
	4625	200206	10.0	97.0	3.5	988
	4637	210105	10.0	94.3	4	981
	4650	220201	12.0	93.3	4.5	973
	4663	230259	16.0	90.0	4	981
	4675	240156	20.0	88.0	2.5	999
	4683	250254	24	93	1	1006