

## **Tropical Cyclone Shirley 03/02/1975 – 12/02/1975**

### (i) General

In common with the preceding cyclones of the season, “Shirley” developed in the eastern Indian Ocean, an area with few observing stations. From analysis of satellite photographs its maximum wind speed was estimated at 126 km/h at 071500 GMT.

### (ii) Development

The cyclone developed from a disturbance which initially was centred close to Christmas Island. An area of enhanced cumulus activity was detected near 11°S 105°E at 030100 GMT. By 040300 GMT some organisation could be detected in the overcast area. In the next 24 hours rapid development occurred and the system was classified as a tropical low with central pressure near 999 mb. Development occurred more slowly in the next 48 hours and by 070400 GMY the central pressure of the cyclone was approximately 981 mb.

This appeared to be the maximum intensity reached by the cyclone as development seemed to be arrested by an increase in the vertical shear. This conclusion was supported by the satellite photograph of 080200 GMT in which a low cloud centre was present near the edge of the dense overcast. Upper level wind data is sparse in the area, but the available observations do not contradict the above conclusion. Wind information at 35,000 ft over this area was transmitted by several aircraft (Table 6.1.)

During the lifetime of the cyclone, it moved approximately 10 degrees poleward and 10 degrees westward. The movement over cooler oceanic waters probably affected the cyclone’s pattern of development.

The system weakened from 8<sup>th</sup> to 11<sup>th</sup> February and by 120200 GMT, only a low cloud centre could be detected.

(iii) Features of the Track (fig. 6.1)

Cyclone “Shirley” lasted approximately nine days and travelled about 2100 km. Its initial position was approximately 100 km southwest of Christmas Island at 030100 GMT. From there it moved southsouthwest at approximately 6 km/h until 06001 GMT. During the next three days its average speed was 9 km/h in a southwest direction. From 09001 GMT to 100001 GMT its speed increased temporarily to 20 km/h before slowing to 9 km/h which it maintained until its decay was complete.

(iv) Rainfall

Little rainfall data is available. Christmas Island reported daily totals of 84, 181, 66 and 24 mm in the 24 hours to 9 am on 4, 5, 6 and 7<sup>th</sup> February respectively. Only light falls were reported from Cocos Island during the cyclone’s lifeline.

(v) Winds

The maximum winds reported from ships appear in table 6.2. The maximum wind speed generated by the cyclone was estimated by satellite analysis to be 126 km/h at 071500 GMT.

(vi) Sea and Swell

Christmas Island reported moderate sea and swell on 7<sup>th</sup> and 8<sup>th</sup> February and rough seas and a moderate swell on 9<sup>th</sup> and 10<sup>th</sup> February. Cocos Island had moderate seas and swell between 7<sup>th</sup> - 9<sup>th</sup> February. Several ships reported seas between 2-5 m height and swells between 4-6mm height (Table 6.2).

The satellite analyses indicate that rough to very rough seas would have been generated near the centre of the cyclone from 6<sup>th</sup> – 8<sup>th</sup> February.

(vii) Satellite Analysis

Data from selected satellite photographs is shown in Table 6.3. In addition, night time infra-red imagery from NOAA 4 and further visual photographs from ESSA 8 were available.

On 3<sup>rd</sup> February an extensive area of cloud was noted near 11°S 105°E and 24 hours later curvature in this cloud was detected. Development proceeded typically until by 6<sup>th</sup> February a well defined low cloud centre surrounded by curved cumulus bands could be detected near a “comma-shaped” overcast area. Continued development appeared to take place over the next 24 hours and the system was classified as T number 4 by 7<sup>th</sup> February (Table 6.3). On 8<sup>th</sup> February it appeared that development had been arrested by an increase in the vertical shear. This conclusion was supported by the pressure of the low cloud centre at the edge of the dense overcast. Strong shears apparently persisted and by 10<sup>th</sup> February a well defined low cloud centre was observed to be well separated from any overcast middle and upper level cloud areas. Further weakening occurred over the next 48 hours.

Table 6.1 Aircraft Reports

Aircraft	Position/ Height	Date/Time	Bearing Distance From centre (km)	Wind (km/h)
-	14°S 99°E 32000 ft	051413	W600	W20
QF8	18°S 103°E 34000 ft	070245	SE 60	N 30
QF8	20°S 103°E 34000 ft	080237	SE 185	NW 25
QF7	20°S 103°E 32000 ft	091325	ENE 550	NNE 40

Table 6.2

## Selected Ship Reports

Ship	Position °S °E	Date/ Time (GMT)	Bearing/ Distance From centre (km)	Wind (km/h)	Sea (m)	Swell	Weather	Pressure (mb)
Dione	15.5 108.0	061500	070/500	330/18			Past Thunder storm	1011
Talamba	15.9 101.5	071200	340/250	200/81				1005
Araluck	17.5 97.0	071200	270/580	140/56	4	4.5		1009
Araluck	18.5 98.8	080001	270/330	140/46	5			1008
Araluck	18.8 99.8	080600	270/200	160/46	3	6	Rain in distance	1007
Araluck	19.5 100.5	081200	250/80	160/46	2.5	5	Moderate Drizzle	1005
British Wye	23.3 101.5	090600	140/390	110/81	5			1012
British Wye	23.3 102.4	091100	140/520	140/46	5			-

Table 6.3

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)
NOAA 4	993	030038	11.0	105.0	<1	1008
NOAA 4	1006	040139	12.0	105.0	1	1007
NOAA 4	1018	050033	13.0	105.0	2.5	999
NOAA 4	1031	060128	15.3	103.9	3	994
NOAA 4	1043	070028	17.4	102.7	4	981
	1044	070226				
NOAA 4	1056	080126	18.4	102.1	4	981
NOAA 4	1069	090221	20.3	99.8	3	994
NOAA 4	1081	100118	21.3	95.4	2	1003
NOAA 4	1094	110213	21.8	93.8	1	>1003
NOAA 4	1106	120113	22.0	92.6	<1	>1003