

## **Tropical Cyclone Harry 15/12/1976-21/12/1976**

### (i) General

Cyclone “Harry” was the first of the 1976/77 season. It was a storm of moderate intensity which commenced its life as a weak tropical low eastnortheast of the Cocos Island. It then drifted in a general westsouthwest direction into the central Indian Ocean where it dissipated. During its mature stage the central pressure was estimated to be about 988 mb and the maximum wind about 100 km/h.

### (ii) Development

The first evidence of the development of cyclone “Harry” occurred on the morning of 15<sup>th</sup> December when satellite imagery obtained from NOAA 5 showed a cloud mass with curved banding, the centre of which was located about 800 km eastnortheast of Cocos Island. On the surface of a tropical low was analysed in the area with a central pressure of 1004 mb. On 16<sup>th</sup> December the diameter of the cloud mass near the centre had become larger and the central pressure of the system was estimated to be 1000 mb.

On the morning of 17<sup>th</sup> December cyclone “Harry” reached maturity and was located about 290 km north of Cocos Island. Satellite photographs showed that the system has intensified, the feeder bands were sharply curved and the cloud system showed the characteristic “comma” shape of a well developed tropical cyclone.

A cirrus canopy was evident in the IR pictures. The central pressure was estimated to be 988 mb. The lowest pressure reported during the life of cyclone “Harry” was 999 mb by a ship at 170900 GMT when it was located about 110 km southsoutheast of the centre.

On 18<sup>th</sup> December satellite imagery showed that the central overcast was an irregular shape but the feeder bands were still tightly curved. The central pressure of the storm was estimated to be 990 mb.

On 19<sup>th</sup> December the centre of the storm had moved outside the dense overcast indicating that the storm was weakening rapidly and the central pressure was estimated to be about 995 mb. During 20<sup>th</sup> December it continued to weaken and finally dissipated during 21<sup>st</sup> December as it passed out of the Region.

### (iii) Features of the Track (fig. 3.1)

The track of cyclone “Harry” is shown in Fig 1.1. It remained over tropical waters throughout its life of approximately six days and travelled a distance of about 2700 km.

From its initial position about 800 km eastnortheast of Cocos Island on the morning of 15<sup>th</sup> December it moved westsouthwest during the next two days at a steady speed of about 14 km/h.

Early on 17<sup>th</sup> December the storm had reached its maturity and was located about 290 km north of Cocos Island. During 17<sup>th</sup> December it curved to the southwest and slowed to a speed of about 11 km/h.

Late on 18<sup>th</sup> December it recurved to the westsouthwest and accelerated to a speed of about 19 km/h. It maintained this speed and direction during the next two days as the storm weakened. "Harry" finally dissipated on 21<sup>st</sup> December in the central Indian Ocean as it passed out of the Region.

(iv) Rainfall

The only land station affected by cyclone "Harry" was Cocos Island. The rainfall recorded for the 24 hours ending 0630 local time on 17<sup>th</sup> December was 4 mm and on 18<sup>th</sup> December 47 mm.

A ship reported heavy rain at 200300 GMT when it was about 180 km southsoutheast of the centre.

(v) Winds

The estimated maximum wind near the centre of cyclone "Harry" was 100 km/h when it reached maturity on 17<sup>th</sup> December. Winds were estimated to have exceeded gale force during the period from 18<sup>th</sup> to 20<sup>th</sup> December.

The highest wind recorded at Cocos Island was 63 km/h at 171015 GMT when the centre was 260 km northnorthwest. The highest gust was 78 km/h also recorded at this time.

Reports by ships close to the cyclone centre are shown in Table 1.1.

A ship reported a force 9 easterly wind and gusts to force 10 at 170900 GMT when it was 110 km southsoutheast of the centre. Another ship reported force 9 southeast winds with gusts to force 10 at 200300 GMT when it was 180 km southsoutheast of the centre.

(vi) Seas

Cocos Island reported rough seas and moderate long swell from the southeast as cyclone "Harry" passed close to the Island during 147<sup>th</sup> December. Other reported sea and swell data as shown in Table 1.1

(vii) Damage

No damage reported.

(viii) Satellite Data

Both the visual and the IR satellite imagery were available daily from the NOAA 5 satellite throughout the lifetime of cyclone “Harry”.

Details of the data are displayed in Table 1.2.

The storm began its life with an estimated CI number (Current Intensity number) of 1.5 under the Dvorak system, early on 15<sup>th</sup> December. The storm reached maturity early on 17<sup>th</sup> December with an estimated CI number of 4. The central pressure was estimated to be 988 mb with an estimated maximum wind of 100 km/h. The storm then weakened slowly during the next few days until early on 21<sup>st</sup> December when the CI number was estimated to be 1.

Table 1.1 Selected Ship Reports

| Position<br>°S °E | Date/<br>Time<br>(GMT) | Bearing/<br>Distance<br>From<br>centre<br>(km) | Wind<br>(km/h)                     | Sea<br>(m) | Swell<br>(m)                     | Weather          | Pressure<br>(mb) |
|-------------------|------------------------|--|------------------------------------|------------|----------------------------------|------------------|------------------|
| 10.7<br>96.8      | 170900                 | SSE/110  | E Force 9                          | -          | -                                | -                | 999              |
| 14.6<br>89.5      | 190600                 | SSW/93   | VRB 59                             |            | SE 3.5 &<br>E 3.5                | Light<br>drizzle | 1006.5           |
| 14.3<br>88.9      | 190900                 | S/93   | SSW 56                             | 3.5        | SSW 5                            | Light<br>drizzle | 1000.7           |
| 15.7<br>85.5      | 200000                 | SSW/110  | SE 41                              | 2.5        | E 3.5                            | Light<br>showers | 1008.7           |
| 16.2<br>86.1      | 200300                 | SSE/180  | SE Force 9<br>Gusts to<br>Force 10 |            | SE<br>Heavy                      | Heavy<br>Rain    | 1007.3           |
| 16.9<br>88.0      | 200900                 | ESE/480  | ENE Force<br>5                     |            | Moderate<br>To heavy<br>Easterly |                  | 1009.3           |

Table 1.2

## Data from Satellite Photographs

| Satellite Name | Orbit Number | Date/Time (GMT) | Estimated posn. of centre<br>°S °E | Final T No. | Min. Sea Level Pressure (mb) | Est. Max Wind (km/h) |
|----------------|--------------|-----------------|------------------------------------|-------------|------------------------------|----------------------|
| NOAA 5         | 1712         | 150045          | 8.4 103.0                          | 1.5         | 1004                         | -                    |
|                | 1718         | 151302          | 8.6 101.3                          | 2           | 1002                         | 45                   |
|                | 1725         | 160158          | 8.8 100.2                          | 2.5         | 1000                         | 55                   |
|                | 1731         | 161417          | 9.0 89.9                           | 3           | 995                          | 65                   |
|                | 1737         | 170114          | 9.5 97.1                           | 4           | 985                          | 95                   |
|                | 1742         | 171329          | 10.1 95.9                          | 4           | 985                          | 95                   |
|                | 1750         | 180226          | 11.2 95.1                          | 4           | 985                          | 95                   |
|                | 1756         | 181442          | 13.0 93.6                          | 3           | 995                          | 65                   |
|                | 1762         | 190145          | 13.3 90.7                          | 2.5         | 1000                         | 55                   |
|                | 1775         | 200258          | 14.6 85.8                          | 2.5         | 1000                         | 55                   |
|                | 1781         | 201511          | 16.0 82.5                          | 2           | 1002                         | 45                   |
|                | 1787         | 210210          | 17.1 80.2                          | 1           | 1009                         | -                    |