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ROYAL OBSERVATORY, HONG KONG

METEOROLOGICAL RESULTS 1986

PART III—TROPICAL CYCLONE SUMMARIES

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ROYAL OBSERVATORY HONG KONG

TRACKS OF TROPICAL CYCLONES
JANUARY - JULY, 1986

Typhoons

Tropical Storms or Tropical Depressions

Tracks Uncertain

Daily Positions at 00h UTC

Intermediate 6 hrly Positions

Mercator Projection - Natural Scale
1:15m. at 22½°N.

90° 100° 110° 120° 130° 140° 150° 160° 170° 180°

40° 30° 20° 10° 0°

NANCY Jun

SARAH(II) Aug

ROGER Jul

LOLA May

OWEN Jul

MAC May

PEGGY Jul

MAC(8604) May

(8610) SARAH(II) Aug

SARAH (I) Aug

JUDY Feb

ROGER(8608) Jul

OWEN(8606) Jun

SARAH(I)(8610) Jul

PEGGY(8607) Jul

KEN May

NANCY (8605) Jun

KEN(8602) Apr

LOLA(8603) May

JUDY(8601) Feb

90° 100° 110° 120° 130° 140° 150° 160° 170° 180°

40° 30° 20° 10° 0°

VERA Aug

TIP Aug

TD Aug

WAYNE Sep

TD Aug

WAYNE (8614) Aug

VERA (8613) Aug

GEORGETTE Aug

TIP (8612) Aug

GEORGETTE (8611) Aug

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ROYAL OBSERVATORY HONG KONG

TRACKS OF TROPICAL CYCLONES
AUGUST, 1986

Typhoons

Tropical Storms or Tropical Depressions

Tracks Uncertain

Daily Positions at 00 h UTC

Intermediate 6 hrly Positions

Mercator Projection – Natural Scale
1:15m. at 22½°N.

90° 100° 110° 120° 130° 140° 150° 160° 170° 180°

40° 30° 20° 10° 0°

TD Sep

CARMEN Oct

BEN Sep

FORREST Oct

TD(8615) Sep

ABBY Sep

JOE Nov

ELLEN Oct

IDA Nov

LEX Dec

KIM Dec

GEORGIA Oct

DOM Oct

HERBERT Nov

NORRIS Jan

DOM (8619) Oct

HERBERT (8623) Nov

MARGE Dec

TD Nov

TD Nov

JOE (8625) Nov

GEORGIA (8622) Oct

ELLEN (8620) Oct

IDA (8624) Nov

FORREST (8621) Oct

ABBY (8616) Sep

CARMEN (8618) Oct

BEN (8617) Sep

KIM (8626) Nov

NORRIS (8629) Dec

MARGE (8628) Dec

LEX (8627) Dec

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ROYAL OBSERVATORY HONG KONG

TRACKS OF TROPICAL CYCLONES
SEPTEMBER - DECEMBER, 1986

Typhoons

Tropical Storms or Tropical Depressions

Tracks Uncertain

Daily Positions at 00h UTC

Intermediate 6 hrly Positions

Mercator Projection - Natural Scale
1:15m. at 22½°N.

METEOROLOGICAL RESULTS

1986

PART III—TROPICAL CYCLONE SUMMARIES

1987

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1. INTRODUCTION

Apart from a short break 1940–1946, surface observations of meteorological elements since 1884 have been summarized and published in the Royal Observatory's Meteorological Results. Upper-air observations began in 1947 and from then onwards the annual publication was divided into two parts, namely Part I—Surface Observations and Part II—Upper-air Observations. The publication of Meteorological Results Part II was terminated in 1981. Upper-air data are now archived on magnetic tape.

During the period 1884–1939, reports on some destructive typhoons were printed as Appendices to the Meteorological Results. This practice was extended and accounts of all tropical cyclones which caused gales in Hong Kong were included in the Director's Annual Departmental Reports from 1947 until 1967 inclusive. The current series—'Meteorological Results, Part III—Tropical Cyclone Summaries' was subsequently introduced. It contains information on tropical cyclones over the western North Pacific and the South China Sea. The first issue containing reports on tropical cyclones occurring during 1968, was published in 1971. In the 1984 issue, all tropical cyclones within the area bounded by the equator, 45°N, 100°E and 160°E, were described in the publication. Satellite pictures and reconnaissance aircraft reports have facilitated the tracking of tropical cyclones over the otherwise data-sparse ocean and beginning from 1985, the area of coverage is extended east of 160°E to 180°.

Tracks of tropical cyclones in the western North Pacific and the South China Sea were published in Meteorological Results up to 1939 and in Meteorological Results, Part I from 1947 to 1967. For the period 1884–1960, only daily positions were plotted on the tracks. The time of the daily positions varied to some extent but remained fixed at 0000 UTC after 1944. Details of the variation are given in the Royal Observatory Technical Memoir No. 11, Volume 1. From 1961 onwards, 6-hourly positions were shown on the tracks of all tropical cyclones.

Provisional reports on individual tropical cyclones affecting Hong Kong have been prepared since 1960 to meet the immediate needs of the press, shipping companies and others. These reports are printed and supplied on request. Initially, reports were only written on those tropical cyclones for which gale or storm signals had been hoisted in Hong Kong, but by 1968 it had become necessary to produce a report on every tropical cyclone which necessitated the hoisting of a tropical cyclone warning signal.

In this publication, tropical cyclones are classified into the following four categories according to the maximum sustained winds near their centres:

A TROPICAL DEPRESSION (T.D.) has maximum sustained winds of less than 63 km/h and at this stage the centre is often not very clearly defined and cannot always be located precisely.

A TROPICAL STORM (T.S.) has maximum sustained winds in the range 63–87 km/h.

A SEVERE TROPICAL STORM (S.T.S.) has maximum sustained winds in the range 88–117 km/h.

A TYPHOON (T.) has maximum sustained winds of 118 km/h or more.

At the thirteenth session of the ESCAP/WMO Typhoon Committee held in December 1980, a common system for identification of tropical cyclones in the western North Pacific and the South China Sea was adopted. Since 1 January 1981, the Japan Meteorological Agency has undertaken the responsibility of assigning to each tropical cyclone of tropical storm intensity or above a common code which is composed of 4 digits. For example, the seventh tropical cyclone of tropical storm intensity or above which occurred within the area in 1986 was assigned the code (8607). The appropriate code immediately follows the name of the tropical cyclone in this publication, for example, Typhoon Peggy (8607).

Surface wind data presented in this report were obtained from a network of anemometers operated by the Royal Observatory. Instruments used in 1986 included M.O. Mark IV/V cup anemometers manufactured by R.W. Munro Ltd., WS 201 cup anemometers manufactured by Teledyne Geotech and Gill propeller anemometers manufactured by R.M. Young Co. Details of the stations are listed below:

Station	Position		Elevation of barometer above M.S.L.	Elevation of ground above M.S.L.	Head of anemometer above M.S.L.	Type of anemometer
	Latitude N	Longitude E	(m)	(m)	(m)	
Royal Observatory	22°18′	114°10′	62	32	72	Cup
Hong Kong Airport	22°20′	114°11′	24	4	14(NW)	Cup
					16(SE)‡	Cup
Waglan Island	22°11′	114°18′	62	55	75	Cup
Tate's Cairn	22°22′	114°13′	*	575	588	Cup
Cheung Chau	22°12′	114°01′	79	72	92	Cup
King's Park	22°19′	114°10′	66	65	78	Cup
Star Ferry	22°18′	114°10′	*	3	17	Cup
Green Island	22°17′	114°07′	*	76	90	Cup
Tai O	22°15′	113°51′	*	76	90	Cup
Sha Tin$^{\Delta}$	22°24′	114°12′	8	7	16	Cup
Chek Lap Kok$^{\Delta}$	22°19′	113°56′	53	51	65	Cup
Lau Fau Shan$^{\Delta}$	22°28′	113°59′	35	34	50	Cup
Ta Ku Ling$^{\Delta}$	22°32′	114°09′	13	12	28	Cup
Tai Mo Shan	22°25′	114°07′	*	950	969	Cup
Tsing Yi† (Mobil Oil Co.)	22°21′	114°06′	*	7	18	propeller

* No barometer.

‡ Anemometer located near 22°19′ 114°12′.

$^{\Delta}$ Automatic weather station: operations commencing on 10 August 1984, 7 September 1984, 16 September 1985 and 14 October 1985 respectively.

† Operations commencing on 9 September 1985.

Wind reports were also provided by Hong Kong International Terminal Ltd. at Kwai Chung and by Cable & Wireless Ltd. at Stanley.

The reports in Section 3 present a general description of the life history of each tropical cyclone which affected Hong Kong in 1986 and include the following information:—

(*a*) the effect of the tropical cyclone on Hong Kong;
(*b*) the sequence of display of tropical cyclone warning signals;
(*c*) the maximum gust peak speeds and maximum mean hourly winds recorded at selected stations in Hong Kong;
(*d*) the lowest barometric pressure recorded at the Royal Observatory;
(*e*) the daily amounts of rainfall recorded at the Royal Observatory and selected locations;
(*f*) the times and heights of the highest tides and maximum storm surges recorded in Hong Kong.

Whenever practical, radar displays and pictures received from weather satellites are included together with information and data obtained from reconnaissance aircraft. With a view to providing further information on the characteristics of tropical cyclones, 6-hourly positions together with the corresponding estimated minimum central pressures and maximum sustained surface winds for individual tropical cyclones are tabulated and presented in Section 5.

In this publication different times are used in different contexts. The reference times of tropical cyclone warnings for shipping are given in UTC Unlabelled times given in hours and minutes (e.g. 1454) on a 24-hour clock or times expressed as a.m. or p.m. are in Hong Kong Time. Hong Kong Time is 8 hours ahead of UTC. Times labelled UTC are in Co-ordinated Universal Time.

Throughout this publication, maximum sustained surface winds when used without qualification refer to wind speeds averaged over a period of ten minutes. Wind data from reconnaissance aircraft have been converted into equivalent 10-minute mean winds for comparison with reports from surface stations. Mean hourly winds were obtained by averaging the winds over a 60-minute interval ending on the hour. Daily rainfall amounts are rainfall recorded in a 24-hour period ending at midnight Hong Kong Time.

2. TROPICAL CYCLONE SUMMARIES FOR 1986

In 1986 thirty tropical cyclones developed over the western North Pacific and the South China Sea (i.e. the area between the equator and 45°N and between 100°E and 180°). Nineteen of them attained typhoon intensity, which was higher than the average number of 16 per year. Four tropical cyclones landed over China, nine crossed or passed close to the Philippines, two affected Japan, two landed over Korea, three landed over the island of Taiwan and another five landed over Viet Nam. Two tropical cyclones came close to Hong Kong.

The monthly distribution of the frequency of first occurrence of tropical cyclones is shown in Figure 1 and a brief summary is contained in Table 1. Six-hourly positions of these tropical cyclones together with their estimated minimum central pressures and maximum sustained surface winds are tabulated in Section 5. The monthly mean frequency of first occurrence of tropical cyclones during the 30 years 1951–1980 is given in Figure 2.

During the year there were sixteen tropical cyclones in Hong Kong's area of responsibility for tropical cyclone warnings for shipping, (i.e. the area bounded by 10°N, 30°N, 105°E and 125°E) compared with the 30-year annual average of seventeen. Eleven tropical cyclones moved into this area and five developed within it. Altogether 551 warnings for shipping were issued by the Royal Observatory in connection with these tropical cyclones.

Tropical cyclone warning signals were displayed in Hong Kong for four tropical cyclones. Gale signals were hoisted during the passage of Typhoon Peggy (8607) in July and Typhoon Wayne (8614) in August.

The total tropical cyclone rainfall (defined as the total rainfall recorded at the Royal Observatory, Hong Kong from the first day when a tropical cyclone was centred within 600 km of Hong Kong to the end of the third day after the tropical cyclone has dissipated or moved outside 600 km of Hong Kong) during 1986 amounted to 820.6 mm, which is 45 percent above the annual average value of 566.9 mm (1884–1939 and 1947–1970). It accounted for 35 percent of the year's total rainfall of 2338.3 mm. Six tropical cyclones came within 600 km of Hong Kong. Tropical Storm Mac (8604) and Severe Tropical Storm Ida (8624), for which no warning signals were hoisted in Hong Kong, brought 1.1 mm and 100.4 mm respectively. Rainfall figures associated with the other four tropical cyclones are given in Table 9.

There was only one tropical cyclone over the western North Pacific and the South China Sea during the first three months of the year. Judy (8601) developed as a tropical depression about 740 km southeast of Yap on 1 February and moved northwestwards. It recurved about 850 km west-northwest of Yap on the evening of 3 February and intensified into a typhoon on 4 February when it was centred about 950 km northwest of the island. Judy finally dissipated about 640 km north-northwest of Guam on 6 February.

Ken (8602) was the only tropical cyclone over the western North Pacific and the South China Sea during April. Ken formed as a tropical depression about 270 km southeast of Yap early on 26 April and drifted northwards slowly. It intensified into a typhoon on 28 April about 130 km east of Yap. Ken turned westwards gradually overnight, weakened on 29 April and eventually dissipated over the Pacific about 390 km west-northwest of the island early on 3 May.

Besides Ken, two other tropical cyclones occurred over the western North Pacific and the South China Sea in May. Lola (8603) formed about 1 780 km east-southeast of Guam early on 17 May. It moved slowly at first and intensified rapidly to a typhoon the next day. Lola took a northwesterly track on 19 May but turned northwards on 21 May over the Pacific about 800 km northeast of Guam. It turned northeastwards early on 22 May and passed about 290 km northwest of Minamitorishima on the same day. Lola became extratropical on 23 May while accelerating northeastwards towards the Aleutian Islands.

Tropical Storm Mac (8604) formed over the northern part of the South China Sea about 260 km west-southwest of Dongsha on 23 May. It moved eastwards initially but turned northeastwards over the Bashi Channel near Batan on 26 May. Mac became almost stationary in the evening of 27 May about 200 km southeast of Taibei. It then adopted an east-northeast course on 28 May. After passing to the south of the Ryukyu Islands, Mac dissipated about 240 km southeast of Okinawa on 29 May.

Two tropical cyclones developed over the western North Pacific and the South China Sea in June. Nancy (8605) developed as a tropical depression about 1 450 km east-southeast of Manila on 21 June and moved northwestwards. It passed about 180 km to the northeast of Luzon and intensified into a typhoon about 110 km southeast of Batan on 23 June. It skirted the eastern coast of the island of Taiwan and passed close to Taibei early on 24 June. In Taiwan, 1 person was missing and two others injured when their fishing boat capsized off the eastern coastal waters. Nancy recurved northeastwards on the afternoon of 24 June and accelerated rapidly to a speed of about 60 km/h that night. It crossed the southern coast of Korea about 320 km south-southeast of Seoul on the morning of 25 June and became an extratropical depression over the Sea of Japan soon after. In southern Korea, 12 people were killed and about 10 000 hectares of farmland were inundated.

Owen (8606) formed about 1 530 km east of Manila on 28 June. It became a tropical storm early on 29 June and moved generally northwestwards. Owen recurved east-northeast of Luzon on 1 July and dissipated about 140 km southeast of Okinawa on 2 July.

Altogether three tropical cyclones formed over the western North Pacific and the South China Sea during July. Peggy (8607) developed as a tropical depression over the western Pacific about 770 km east of Guam on 3 July and moved westwards. It intensified into a typhoon on 5 July and took a west-northwestward course the next day. During the morning of 9 July, Peggy crossed northern Luzon, bringing about a death toll of 93 in the Philippines. Peggy moved northwestwards over the South China Sea. In the afternoon of 11 July, Peggy crossed the China coast near Shanwei, killing about 210 people in eastern Guangdong and 13 people in the province of Fujian. In Hong Kong, a six-year-old boy was drowned. Peggy finally degenerated into an area of low pressure about 430 km west-northwest of Hong Kong late on 12 July.

Roger (8608) formed about 380 km north-northwest of Guam on 12 July. Moving northwestwards, it intensified into a typhoon about 450 km southeast of Okinawa on 15 July. It recurved northeastwards over the Ryukyus on 16 July and passed about 90 km southeast of Kagoshima early on 17 July. Roger then accelerated east-northeastwards off the coast of Japan and, moving at about 57 km/h, passed about 140 km south-southeast of Tokyo early on 18 July. Roger became extratropical about 500 km east-southeast of Tokyo that afternoon.

Sarah (8610) developed about 1 190 km east of Manila on 30 July. It moved west-northwestwards and became a tropical storm the following day.

In August, six tropical cyclones occurred over the western North Pacific and the South China Sea. Tropical Storm Sarah which moved westwards towards the Philippines late in July, remained slow-moving and weakened over Luzon on 2 August. At the same time, another centre of circulation developed over the sea about 470 km northeast of Manila. This centre subsequently became the main centre of Sarah and intensified into a severe tropical storm on 3 August. It accelerated northeastwards and became extratropical about 110 km east of Tokyo late on 4 August. Serious damage was inflicted in Japan. At least 14 people were killed and 60 others injured. About 80 houses were destroyed and 54 000 houses flooded.

A tropical depression formed near Xisha on 9 August and moved on a west-northwesterly track, crossing Hainan on 11 August. It landed about 100 km east of Hanoi early on 12 August and dissipated inland soon after. The tropical depression brought heavy rain to western Guangdong and Guangxi on 11 and 12 August. On Hainan, 2 people were drowned. In western Guangdong, about 52 000 hectares of farmland were inundated. In Guangxi, 15 counties near Nanning were affected and about 7 000 people were stranded by floods.

Georgette (8611) moved westwards across the date-line from the central Pacific on the evening of 8 August. It intensified into a typhoon on 11 August about 490 km southeast of Wake Island. Moving northwestwards, Georgette passed over Wake Island around noon on 13 August. On the same day, Tropical Storm Tip (8612) developed about 980 km west of Georgette. These two tropical cyclones then interacted with each other and Georgette finally dissipated within the circulation of Tip about 610 km south-southeast of Minamitorishima on 15 August. Tip became a typhoon on 16 August and recurved near Minamitorishima the following morning. It moved generally eastwards from 17 to 19 August and turned northwards on 20 August. Tip finally became extratropical about 1 900 km east of Tokyo on 21 August.

Vera (8613) developed about 1 020 km east-northeast of Manila on 15 August. It was slow-moving during the first two days and moved northeastwards on 17 August. Vera moved in an anticlockwise loop on 18 August about 420 km west-southwest of Iwo Jima. It moved eastwards between 19 and 21 August and intensified into a typhoon on 20 August. Vera slowed down and made a complete turn to the west while it was about 540 km southeast of Iwo Jima on 22 August. On 24 August, Vera moved west-northwestwards and passed close to Okinawa early on 26 August, killing 1 fisherman there. Vera turned northwards overnight and passed about 290 km east of Shanghai on 27 August. In Shanghai, 7 people were killed and 28 were injured. Power supply and transportation were seriously disrupted. In Shengsi Qundao off the coast of Shanghai, 1 person was killed, 7 were reported missing, and 70 fishing boats were sunk. Vera passed close to Seoul on the evening of 28 August and finally became extratropical about 420 km south-southwest of Vladivostok on 29 August. In southern Korea, 14 people were killed, 13 were reported missing and 78 others were injured. Economic loss was estimated at US$22 million. In the Soviet Far East, Vera caused severe floods near Vladivostok and about 40 000 hectares of farmland were inundated.

Wayne (8614) developed as a tropical depression over the South China Sea about 360 km west-northwest of Manila on 18 August. It moved northwestwards and intensified into a typhoon the next afternoon. It turned northeastwards and passed about 100 km southeast of Hong Kong early on 21 August. On 22 August, Wayne crossed Taiwan where at least 52 people were killed, 24 people were missing and 300 others were injured. According to the press, economic damage was estimated at about US$343 million. On 23 August, Wayne weakened and reversed its course. After skirting the southern tip of the island of Taiwan, Wayne entered the South China Sea on 25 August and moved southwestwards. During the early hours of 27 August, Wayne turned eastwards under the influence of Typhoon Vera which was centred over the East China Sea about 440 km northeast of Taibei. On 28 August Wayne moved northeastwards across the Balintang Channel. Wayne became slow-moving over the Bashi Channel near Batan between 29 and 31 August and re-intensified into a typhoon on 31 August.

Altogether four tropical cyclones occurred over the western North Pacific and the South China Sea during September. Typhoon Wayne (8614), which was slow-moving over the Bashi Channel in late August, moved southwestwards on 1 September and passed about 40 km north of Luzon during the night of 2 September. Wayne caused the death of 36 people in the Philippines and brought heavy rain to northern Luzon. About 20 000 people were affected. On 3 September, Wayne entered the South China Sea once again. It passed about 300 km south of Hong Kong on the evening of 4 September. Around noon on 5 September, Wayne passed about 20 km north of Haikou, bringing heavy rain and severe floods to Hainan and western Guangdong. On Hainan, 2 people were killed, 3 were missing and 52 injured. Damage to property, crops and public utilities was estimated at US$56 million. Early on 6 September, Wayne crossed the Viet Nam coast about 100 km southeast of Hanoi. The typhoon finally dissipated over Laos about 220 km north of Vientiane that evening. Severe damage was inflicted in Viet Nam. About 400 people were killed and 2 500 injured.

A tropical depression (8615) formed over the Pacific about 660 km south of Tokyo on 2 September. It landed over Honshu about 100 km southwest of Tokyo early on 3 September. The tropical depression turned northeastwards and passed near Tokyo around noon. It then accelerated along the east coast of Honshu and dissipated on re-entering the Pacific early on 4 September.

Abby (8616) developed over the Pacific about 240 km south-southeast of Guam on 13 September. It moved west-northwestwards and intensified to a typhoon on 17 September about 820 km southeast of Taibei. On 19 September, Abby crossed Taiwan along a northwesterly track, then recurved towards the northeast over the Taiwan Strait in the evening and weakened rapidly. It became extratropical over the East China Sea about 410 km southeast of Shanghai late on 20 September. Abby brought substantial damage to Taiwan. According to press reports, 13 people were killed, over 200 houses were damaged. Power supply to 2 million households was interrupted and traffic was disrupted on 18 and 19 September. Agricultural damage was estimated at US$81 million.

Ben (8617) originated as a tropical depression over the Pacific about 1 690 km east-southeast of Guam on the morning of 19 September. It attained typhoon intensity on the afternoon of 23 September before passing west-northwestwards over the Mariana Islands during the night. It then turned to the northwest on 25 September about 1 000 km northwest of Guam and drifted northward slowly the next day. On 26 September a fishing boat capsized about 650 km north of Guam and 13 people were missing. Ben took up a north-northeast track on 27 September, passing about 60 km west of Iwo Jima on the morning of 28 September. It accelerated north-eastwards on 29 September and became extratropical about 1 070 km east of Honshu on 30 September.

Five tropical cyclones developed over the western North Pacific during October. Carmen (8618) formed on 2 October about 910 km east-southeast of Guam. It moved northwestwards passing between Guam and Saipan on 3 October. Carmen intensified into a typhoon on 4 October and recurved to the north on 6 October. On the morning of 7 October, it passed about 230 km northwest of Iwo Jima and accelerated northeastwards. Carmen passed about 350 km southeast of Tokyo on the morning of 8 October and became extratropical early on 9 October about 950 km east-northeast of Tokyo.

Dom (8619) developed into a tropical depression about 110 km northeast of Manila early on 6 October. It moved westwards and crossed Luzon, causing extensive damage there. At least 16 people were killed. Over 30 towns in central Luzon were flooded and almost 60 000 people had to be evacuated from their homes. Five bridges were also destroyed. Property damage was estimated at US$ 4 million. Dom intensified into a tropical storm about 310 km east-southeast of Xisha on 9 October and moved west-northwestwards. After passing close to the south of Xisha on the morning of 10 October, Dom turned westwards and landed over Viet Nam about 100 km northwest of Danang on the evening of 11 October. Dom finally dissipated over central Viet Nam during the night.

Typhoon Ellen (8620) formed over the Pacific about 840 km southeast of Manila on 11 October. After crossing central Philippines, it moved slowly towards the south China coast between 13 and 18 October. Ellen passed about 150 km south-southwest of Hong Kong on the morning of 18 October. Early on 19 October, a surge of the northeast monsoon affected the south China coastal areas. With the intrusion of drier monsoon air into its centre, Ellen weakened rapidly. After crossing the Leizhou peninsula around midday, it dissipated over Beibu Wan on the evening of 19 October.

Forrest (8621) developed early on 16 October over the western Pacific about 1 000 km east-northeast of Guam. It intensified quickly into a typhoon on the same day while moving west-northwestwards. Forrest slowed down on 17 October and recurved to the northeast about 330 km south of Iwo Jima on 18 October. Forrest moved rapidly northeastwards on 19 October and weakened into a severe tropical storm the next day. It became extratropical over the Pacific about 1 530 km east of Tokyo later on the same day.

Georgia (8622) formed on 18 October about 880 km east-southeast of Manila. It intensified into a tropical storm and moved westwards across the Philippines on 19 October. Georgia continued to move westwards across the South China Sea in the next two days and landed over Viet Nam about 110 km southeast of Danang on the morning of 22 October. It finally dissipated over east Thailand early on 23 October.

Five tropical cyclones developed over the western North Pacific and the South China Sea during November. Herbert (8623) formed over the South China Sea about 230 km southwest of Manila on 8 November and intensified to a tropical storm the next day. It followed a generally westerly track, landed over Viet Nam on 12 November about 190 km south-southeast of Danang and dissipated soon after.

Ida (8624) formed over the Pacific about 630 km west-southwest of Yap on 11 November. It moved northwestwards across the central Philippines on 13 November and became a severe tropical storm over the South China Sea on the morning of 15 November when it was about 230 km east-northeast of Xisha. Ida recurved to the northeast that evening and weakened to a tropical storm early the next day. During the night of 16 November, a Lebanese cargo ship "Hymetus" sank near Dongsha and two crewmen were drowned. On 17 November, Ida degenerated to an area of low pressure about 100 km southeast of Dongsha.

Joe (8625) developed over the Pacific about 970 km east-southeast of Manila on 18 November and moved northwestwards. It then turned northwards about 370 km east of Manila on 20 November and intensified to a typhoon. Joe turned northeastwards on 22 November when it was about 560 km south-southeast of Taibei and weakened gradually. It made a sharp turn to the southeast on the evening of 24 November about 220 km south-southwest of Okinawa and dissipated early next morning.

A tropical depression formed over the South China Sea about 490 km southeast of Ho Chi Minh City on 24 November. It remained slow-moving and dissipated the next day.

Kim (8626) developed over the Pacific near the Marshall Islands on 28 November and moved west-northwestwards. It intensified into a typhoon on 29 November and moved northwestwards towards the Mariana Islands on 30 November.

Four tropical cyclones occurred over the western North Pacific and the South China Sea during December. On 3 December, Typhoon Kim passed westwards about 40 km north of Saipan. More than 1 000 homes on the island were destroyed. Damage to property was estimated at US$2.3 million. Kim continued moving generally westwards for the following four days. It weakened into a severe tropical storm under the influence of a surge of the winter monsoon on 8 December, and moved slowly in an anticlockwise loop about 1 230 km east of Manila on 8 and 9 December. Kim moved northwestwards on 10 December and dissipated over the Pacific waters about 1 130 km east-northeast of Manila on 11 December.

Lex (8627) developed near the Marshall Islands on 3 December. It became a tropical storm early on 4 December and moved west-northwestwards. It weakened into a tropical depression on 6 December and passed about 100 km northeast of Guam on 7 December. Under the influence of Typhoon Kim to its west, Lex turned northwestwards on 7 December and dissipated over the ocean about 850 km northwest of Guam on 8 December.

Marge (8628) developed as a tropical depression about 300 km east of Ponape in the Caroline Islands on 14 December. It moved generally west-northwestwards and passed about 310 km south of Guam on 17 December. It intensified into a typhoon about 620 km west-southwest of Guam on 19 December and turned southwestwards on 20 December. The typhoon took a west-northwesterly course again on 21 December and crossed the central Philippines between 21 and 22 December. Marge weakened into a tropical storm near Palawan and entered the South China Sea on 23 December. It dissipated over the sea about 320 km northwest of Nansha on 25 December.

Typhoon Norris (8629) adopted approximately the same track as Typhoon Marge about 10 days later. Norris developed near the Marshall Islands on 22 December. It moved generally westwards during the first week and passed about 210 km south of Guam early on 27 December. Norris intensified into a typhoon about 460 km west-southwest of Guam in the evening. On 29 December, Norris turned southwestwards about 780 km west of Guam. Norris weakened into a severe tropical storm about 760 km east-northeast of Mindanao on 30 December. It then took a west-northwestward course across the central Philippines the next day. Late on 31 December, Norris was centred about 440 km south-southeast of Manila, moving westwards into the Sulu Sea.

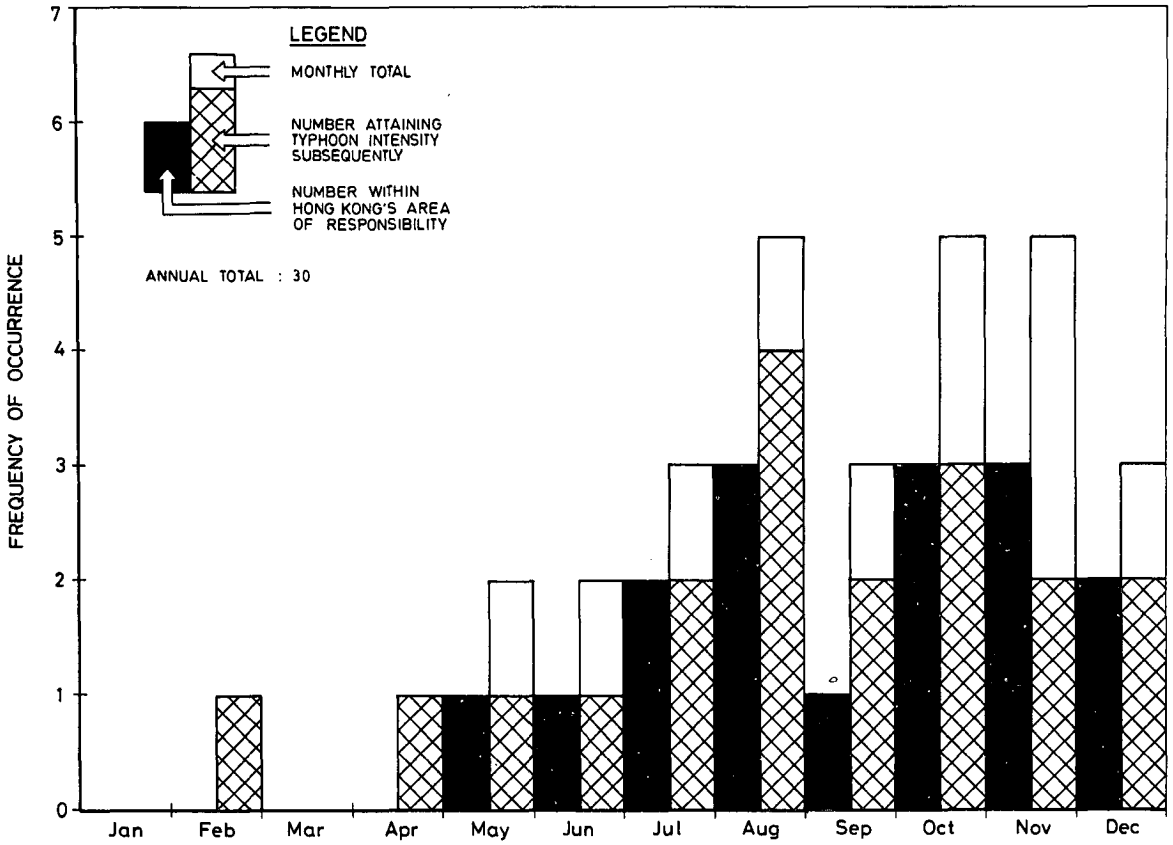


Figure 1. **Monthly distribution of the frequency of first occurrence of tropical cyclones in the western North Pacific and the South China Sea in 1986.**

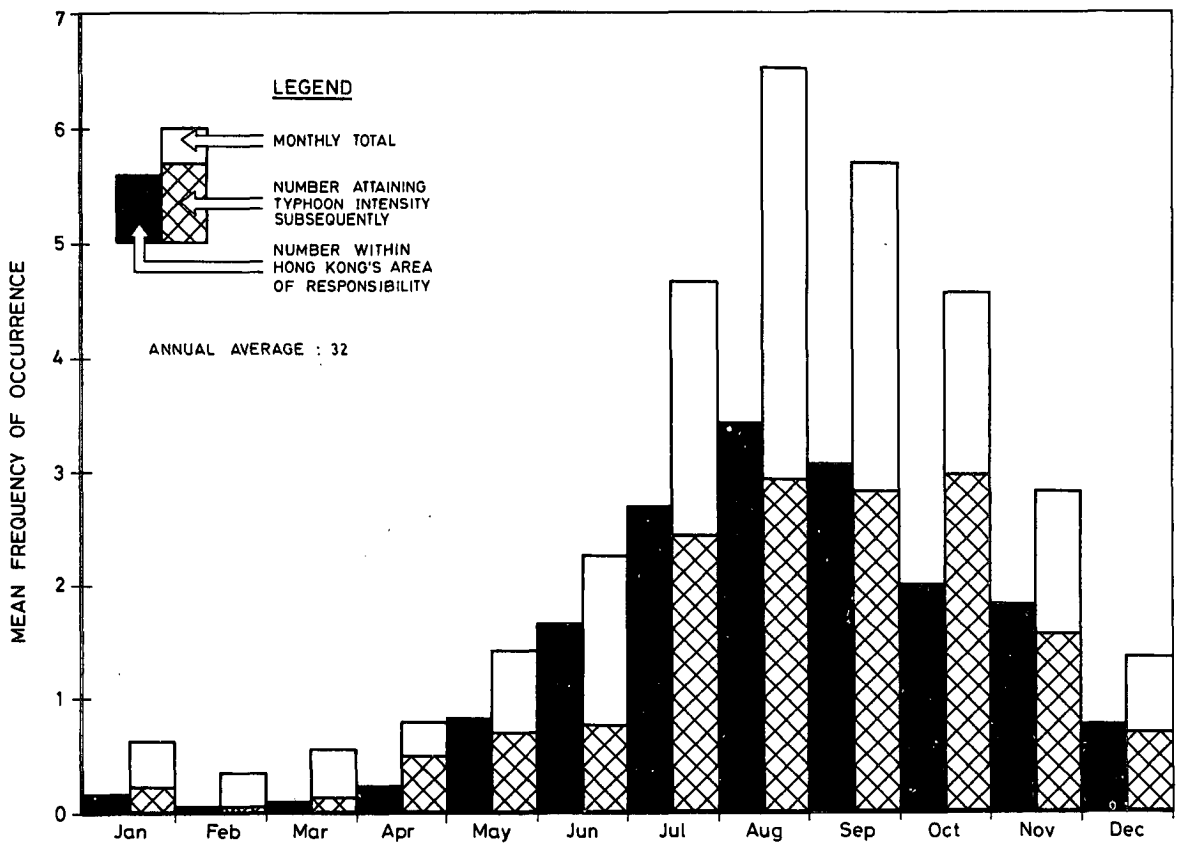


Figure 2. **Monthly distribution of the mean frequency of first occurrence of tropical cyclones in the western North Pacific and the South China Sea, 1951–1980.**

3. REPORTS ON TROPICAL CYCLONES AFFECTING HONG KONG IN 1986

(a) Typhoon Peggy (8607)

3–12 July 1986

The track of Typhoon Peggy is shown in Figure 3

Peggy developed into a tropical depression over the western Pacific about 770 km east of Guam on 3 July. It moved westwards with an average speed of 24 km/h at first and passed about 120 km north of the island on 4 July. Strengthening steadily since its inception, Peggy became a typhoon on 5 July about 380 km west-northwest of Guam. It took on a west-northwesterly course the next day and further intensified. Peggy reached its peak intensity on 7 July about 1 170 km east of Luzon when a reconnaissance aircraft reported a minimum sea-level pressure of 894 hPa near its centre and estimated the maximum sustained winds to be around 220 km/h.

During the morning of 9 July, Peggy crossed northern Luzon and passed about 90 km northeast of Vigan. Torrential rain affected several provinces in Luzon and many places in Manila were seriously flooded. Major roads to Baguio were blocked by landslips. Peggy eventually brought about a death toll of 93 and left 45 000 people homeless in the Philippines.

Peggy weakened after its passage over Luzon and soon entered the South China Sea, turning northwestwards and packing reduced maximum winds of around 130 km/h. Around 3 a.m. on 11 July, Peggy passed about 40 km northeast of Dongsha, where a sea-level pressure of 975.5 hPa was recorded. At 5.00 a.m. the M.V. 'Korrigan' reported sustained winds of 112 km/h about 80 km east of the centre.

In its traverse towards the south China coast, Peggy first accelerated to a speed of about 22 km/h during the morning of 11 July, then slowed down to a speed of about 15 km/h as it turned west-northwest on crossing the coast that afternoon. Around 4 p.m. on 11 July, Peggy passed within 10 km southwest of Shanwei, and weakened into a severe tropical storm overland about 100 km northeast of Hong Kong the same evening. It passed about 40 km north of Guangzhou in the morning of 12 July and degenerated into an area of low pressure about 430 km west-northwest of Hong Kong during the night.

According to newscuttings from Guangdong Peggy was purported to have been the most destructive typhoon in 30 years. About 210 people were killed, 1 600 injured and 264 000 houses were destroyed. There were 2 490 embankments broken, 6 370 cases of irrigation works damaged, 2 200 bridges destroyed and 540 000 hectares of farmland inundated. More than 4 000 km of electricity lines were cut. Economic loss was estimated at US$468 million. About 4 million people in 55 counties of the province were affected. Meixian and Shantou in east Guangdong suffered most damage. In Meixian, 450 000 hectares of farmland were inundated and about 330 000 people were stranded by floods for up to 2 days after the Meijiang River burst its banks early on 14 July. In the county of Shantou, 3 overflowing reservoirs triggered floods which stranded some 210 000 people. In Fujian province also, 13 people were killed, 69 people injured and 1 600 houses collapsed. Sugar-cane, banana and lychee plantations and paddy fields were severely damaged.

In Hong Kong, the Stand By Signal, No. 1, was hoisted at 11.10 p.m. on 9 July when Typhoon Peggy was centred about 750 km to the southeast. As Peggy moved northwestwards towards the south China coast, the Strong Wind Signal, No. 3, was hoisted at 2.10 a.m. on 11 July. Peggy was about 330 km to the east-southeast at the time. Winds locally commenced to freshen and became strong by the afternoon. With Peggy landing but still coming closer to Hong Kong, the Southwesterly Gale or Storm Signal, No. 8 SW, was hoisted at 3.30 p.m. on 11 July, when Peggy was about to cross the south China coast about 130 km east-northeast of Hong Kong. In late afternoon, sustained winds of 58 km/h with gusts reaching 85 km/h were recorded at Star Ferry Pier, Kowloon and winds reached gale force offshore with gusts of 128 km/h at Cheung Chau. Peggy came closest to Hong Kong around 9 p.m. when it was about 90 km to the northeast but the minimum sea-level pressure at the Royal Observatory was 984.7 hPa recorded earlier, between 6 p.m. and 7 p.m. Overnight on 11 July, gales over the Hong Kong waters subsided as Peggy moved further inland, away from Hong Kong and weakened to a severe tropical storm. The Strong Wind Signal, No. 3 replaced the Southwesterly Gale or Storm Signal No. 8 SW at 2.15 a.m. on 12 July, when Peggy was more than 100 km north of Hong Kong. Later in the morning, intense rainbands developed in the southern semicircle of Peggy giving rise to severe squalls in persistent heavy showers in Hong Kong. Gusts of 164 km/h and 118 km/h were recorded at Green Island and Stanley respectively and south to southwesterly squalls reached gale force offshore and in exposed areas. The rain became less heavy and southerly winds moderated in the afternoon. All signals were lowered at 6.40 p.m. on 12 July, when Peggy was about 330 km west-northwest of Hong Kong. The maximum mean hourly wind speeds, the maximum gust peak speeds and the associated wind directions recorded at selected locations during the passage of Typhoon Peggy were as follows:

Location	*Maximum mean hourly wind speed in km/h with direction in points*		*Maximum gust peak speed in km/h with direction in points*	
Royal Observatory	W	38	SSW	96
Hong Kong Airport (SE)	WNW	58	S	126
Hong Kong Airport (NW)	S	62	S	113
Waglan Island	S	108	S	135
Tate's Cairn	NNW	87	NNW	144
Cheung Chau	SSW	79	S	128
King's Park	S	40	S	104
Star Ferry	WNW	58	WNW	115
Green Island	S	104	S	164
Tai O	SW	58	SSW	90
Stanley	SW	96	SSW	118
Sha Tin	SSW	37	SW	80
Kwai Chung	S	56	SSE	111
Chek Lap Kok	W	76	S	111
Lau Fau Shan	WNW	67	S	106
Ta Kwu Ling	SSW	31	S	83

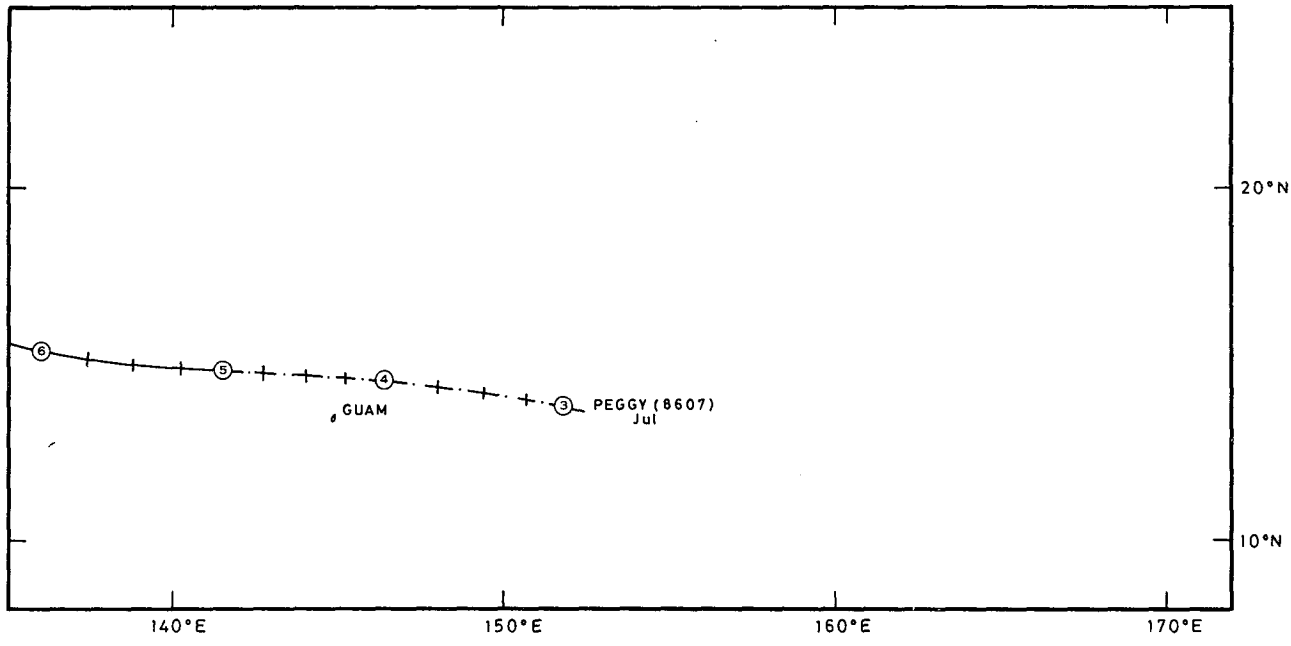
The weather was sunny and very hot on 9 and 10 July and the temperature rose to a maximum of 34.8°C on 10 July, the highest in the last 4 years. The extremely hot afternoon was followed by an evening of thunderstorms. Showers occurred in the morning of 11 July, which became more frequent in the afternoon as the typhoon came closer. However, they were not particularly heavy as the northern half of the typhoon was relatively dry. Heavy and continuous squally showers occurred in the morning of 12 July when the intense rainbands in the southern semicircle of the tropical cyclone affected the territory. Between 6 a.m. and 10 a.m., 98.6 mm of rain were recorded at the Royal Observatory. During the 24-hour period ending at 2 p.m. on 12 July, 314.5 mm of rain were recorded at Tai Mo Shan. Occasional heavy showers continued for the rest of the day. The weather remained cloudy with some showers on 13 July but improved on 14 July with sunshine in the afternoon. It continued sunny on 15 July. The daily amounts of rainfall recorded at selected locations were as follows:

Date	*Royal Observatory*	*Tai Mo Shan*	*Sha Tin*	*Tsuen Wan*	*Sai Kung*
	mm	mm	mm	mm	mm
9 July	Nil	Nil	Nil	0.5	Nil
10 July	6.8	16.0	10.5	4.5	11.5
11 July	53.2	177.5	87.0	134.5	68.5
12 July	168.9	169.5	190.0	136.5	203.5
13 July	12.2	38.0	33.5	36.5	4.5
14 July	8.2	42.0	27.5	20.5	31.5
15 July	Trace	6.0	Nil	Nil	Nil
Total	249.3	449.0	348.5	333.0	319.5

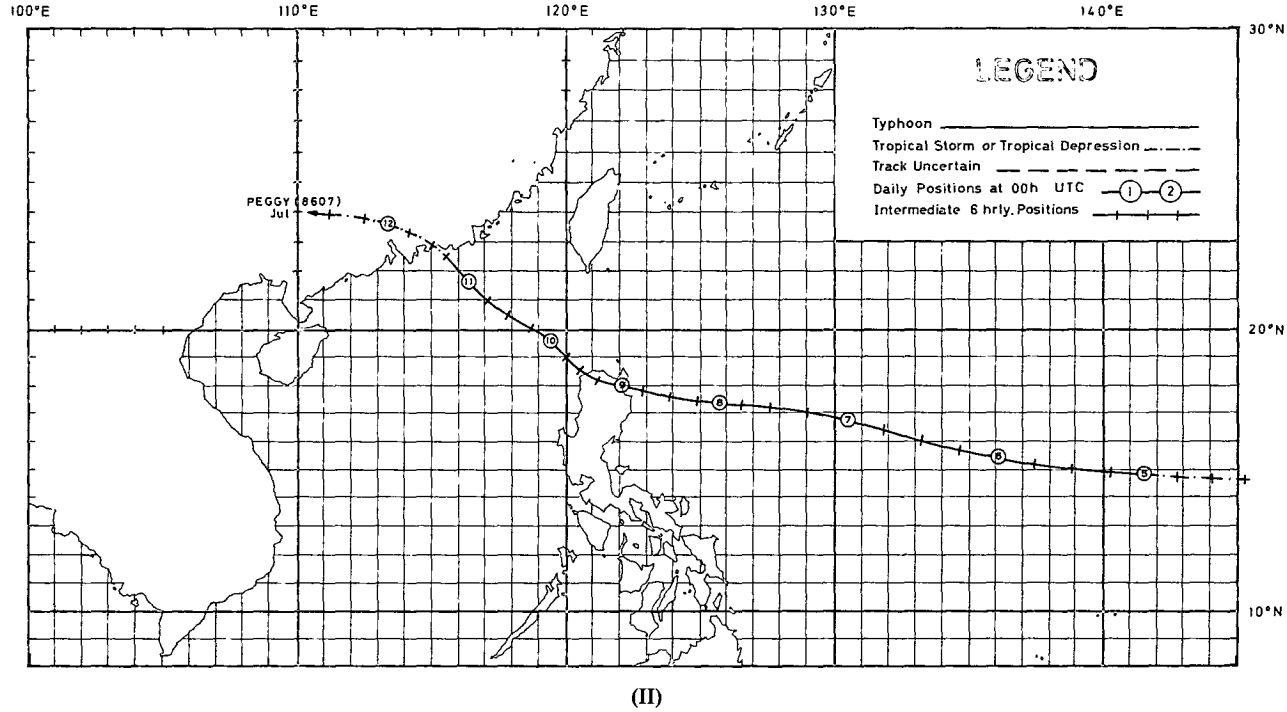
The times and heights of the highest tides and maximum storm surges recorded at various locations in Hong Kong during the passage of Peggy were as follows:

Location	Highest tide above chart datum			Maximum storm surge above astronomical tide		
	Height (m)	Date	Time	Height (m)	Date	Time
Quarry Bay	2.78	11 July	11.45 a.m.	0.72	11 July	2.00 p.m.
Tai Po Kau	2.77	11 July	1.00 p.m.	1.09	12 July	3.00 p.m.
Chi Ma Wan	2.70	11 July	2.15 p.m.	1.07	11 July	3.45 p.m.
Lok On Pai	2.77	11 July	11.15 a.m.	0.79	11 July	10.45 p.m.
Tsim Bei Tsui	3.51	12 July	12.30 p.m.	1.10	11 July	10.00 p.m.

In Hong Kong, a six-year old boy was drowned after being thrown overboard from his family boat in Ap Lei Chau. 26 people suffered injury. There were 20 cases of landslips and 78 reports of flooding over the territory on 12 July. About 70 hectares of vegetable and flower farmland were inundated in Sai Kung, Yuen Long, Tai Po and Lantau Island. Landslips were reported in Aberdeen, Wan Chai, Shek Kip Mei, Sau Mau Ping and Lei Yue Mun with the worst occurring on Route Twisk near Tai Mo Shan, where over 40 tonnes of soil and rocks collapsed from a slope around 3 a.m. on 12 July. Transport was seriously disrupted during the passage of Peggy. Ferry services came to a halt. More than 300 residents of Lantau Island were stranded on Hong Kong Island in late afternoon of 11 July. Three ferries departing between 7 a.m. and 8 a.m. in the next morning for outlying islands returned to Central after encountering high winds and rough seas near Green Island. Some 580 passengers from Hong Kong were stranded on a high-speed ferry which arrived in Macau around noon on 12 July, but was unable to berth in rough seas. At the airport, 4 flights were diverted on 11 July and 7 flights were diverted on 12 July. On 13 July, the 1 411-tonne container ship 'Hwa Lie', sailing from Taiwan to Hong Kong, sank about 110 km east of Hong Kong. All 15 crewmen were rescued. About 6.40 p.m. on 14 July, three 10-tonne boulders crashed down a steep slope on Ka Wai Man Road in Kennedy Town. A motor car was severely damaged but no one was injured.



(I)



(II)

Figure 3. Track of Typhoon Peggy (8607): 3–12 July 1986.

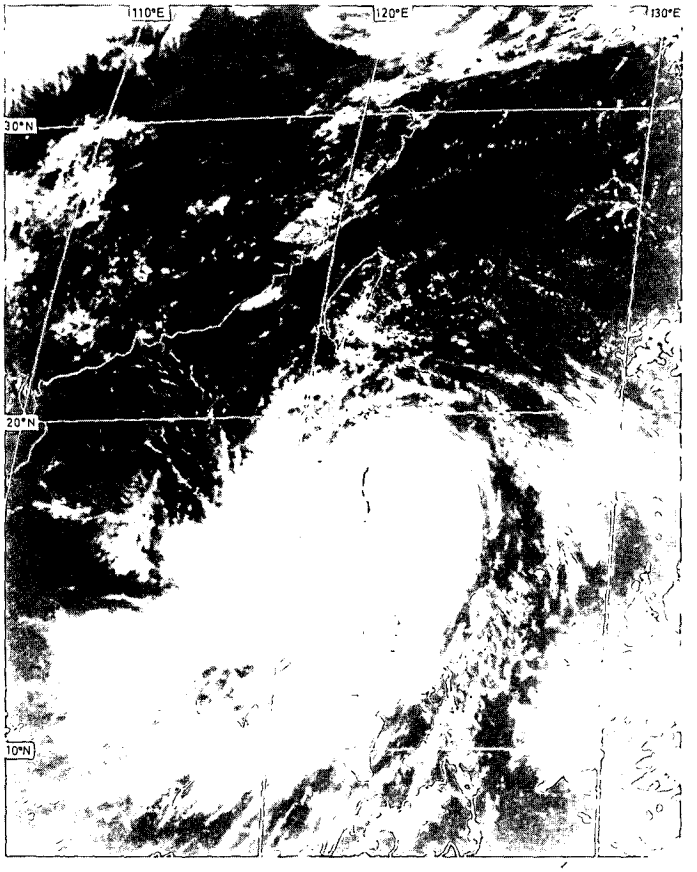


Figure 4. GMS-3 visible imagery of Typhoon Peggy (8607) around 8.00 a.m. on 9 July 1986.

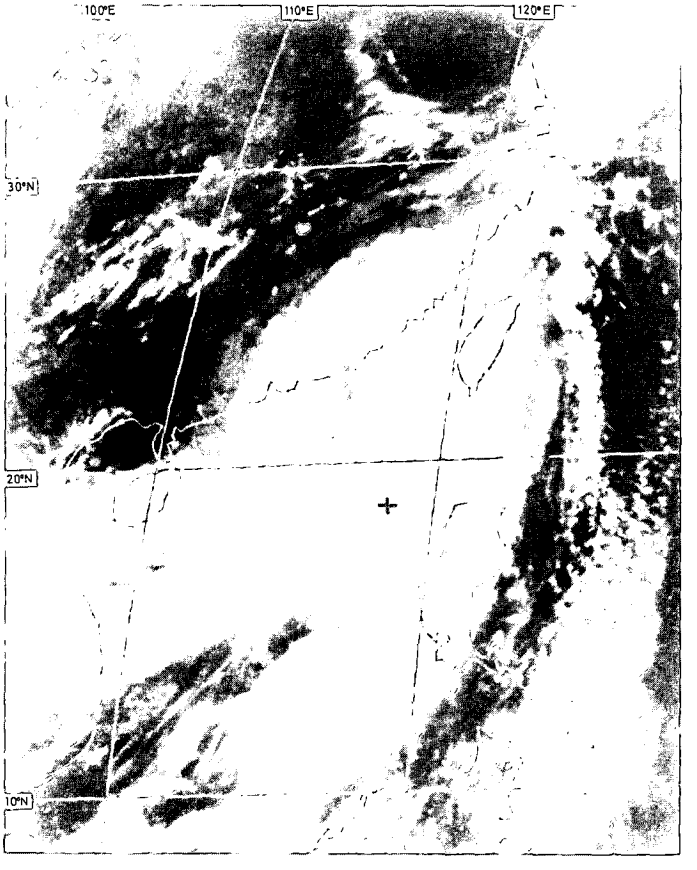


Figure 5. GMS-3 infra-red imagery of Typhoon Peggy (8607) around 2.00 p.m. on 11 July 1986.

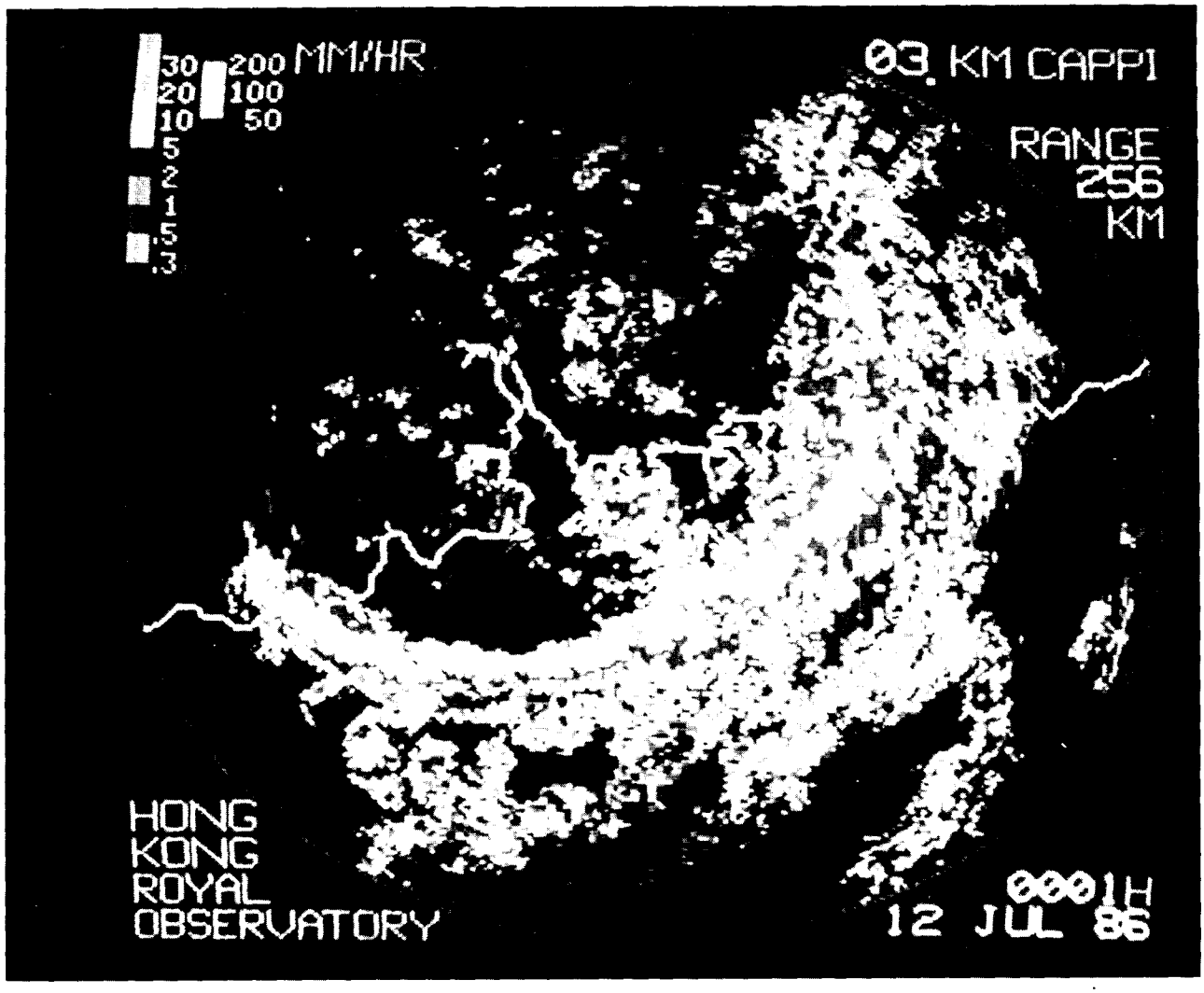


Figure 6. **Radar display of the intense rainbands of Typhoon Peggy (8607) at 00.01 a.m. on 12 July 1986.**

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Figure 7. **Landslip in Wan Chai after the heavy downpour on 12 July 1986 (By courtesy of Hong Kong Standard).**

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Figure 8. **Three 10-tonne boulders crashed down a steep slope on Ka Wai Man Road in Kennedy Town on 14 July 1986 (By courtesy of South China Morning Post).**

(b) Tropical Depression

9–12 August 1986

The track of this tropical depression is shown in Figure 9

An area of low pressure over the northern part of the South China Sea developed into a tropical depression on 9 August about 120 km northeast of Xisha. Although the maximum sustained winds near the centre were only about 45 km/h, the tropical depression had a large circulation with bands of intense convection. As the tropical depression moved west-northwestwards at about 13 km/h towards Hainan on 10 August, its rainbands to the north began to affect the coastal areas of Guangdong. Around midnight on 10 August, the tropical depression made landfall on Hainan about 100 km south of Haikou. It crossed the island during the morning of 11 August along a generally westward track. During its passage over the island, satellite pictures showed that the centre of the tropical depression was ill-defined with the associated clouds concentrated in two areas: one over Beibu Wan and the other over the coastal waters of western Guangdong.

In the afternoon of 11 August, the tropical depression entered Beibu Wan. It subsequently reorganised itself over water and turned northwestwards at a speed of about 18 km/h. The tropical depression landed about 100 km east of Hanoi around 3 a.m. on 12 August and then accelerated northwards at about 30 km/h before finally dissipating about 130 km north-northeast of Hanoi later that morning. The tropical depression brought heavy rain to western Guangdong and Guangxi on 11 and 12 August. On Hainan, 2 people were drowned. In western Guangdong, about 52 000 hectares of farmland were inundated. In Guangxi, 15 counties near Nanning were affected and about 7 000 people were stranded by floods.

In Hong Kong, the Stand By Signal, No. 1, was hoisted at 9.45 p.m. on 9 August, when the tropical depression was about 560 km south-southwest of Hong Kong. Local winds became fresh gusty easterly and squally showers and thunderstorms affected the territory overnight. As the tropical depression was expected to move closer and cause strong winds over Hong Kong, the Strong Wind Signal, No. 3, was hoisted at 10.30 a.m. on 10 August. By late afternoon on the same day, winds turned east-southeasterly and became generally strong over the territory. At 5 p.m., the lowest sea-level pressure of 1002.5 hPa was recorded at the Royal Observatory and the tropical depression was closest around 10 p.m. when it was about 510 km southwest of Hong Kong. Winds were strongest overnight on 10 August. Inside the harbour, mean winds of 51 km/h and gusts up to 90 km/h were recorded at Star Ferry Pier, Kowloon. Winds moderated later in the next morning and all signals were lowered at 3.15 p.m. on 11 August when the tropical depression was over Beibu Wan about 730 km west-southwest of Hong Kong. The maximum mean hourly wind speeds, the maximum gust peak speeds and the associated wind directions recorded at selected locations during the passage of the tropical depression were as follows:

Location	*Maximum mean hourly wind speed in km/h with direction in points*		*Maximum gust peak speed in km/h with direction in points*	
Royal Observatory	E	38	E	87
Hong Kong Airport (SE)	ESE	47	E & ESE	90
Hong Kong Airport (NW)	ESE & SE	43	SE	85
Waglan Island	ESE & SE	65	E & ESE	108
Tate's Cairn	ESE	72	ESE	130
Cheung Chau	ESE	65	ESE	106
King's Park	SE	36	SE	94
Star Ferry	ESE	51	ESE	90
Green Island	ESE	58	ESE	128
Tai O	ESE	43	ESE	101
Sha Tin	ESE	22	SSW	75
Kwai Chung	ESE	36	ESE	76
Chek Lap Kok	E	63	E	94
Lau Fau Shan	E	31	E	62
Ta Kwu Ling	SE	32	SE	83
Tai Mo Shan	ESE & SE	87	SE	130

The weather was cloudy and hot on 9 August with some squally thunderstorms around midnight. Frequent heavy squally showers persisted throughout 10 and 11 August. Thunderstorms occurred again late on 11 August but the weather improved on 12 August with occasional showers. The daily amounts of rainfall recorded at selected locations were as follows:

Date	*Royal Observatory*	*Tai Po*	*Sha Tau Kok*	*Sai Kung*	*Central*
	mm	mm	mm	mm	mm
9 August	8.2	4.5	8.0	Nil	14.0
10 August	98.5	158.0	94.0	87.0	132.0
11 August	93.4	171.0	220.0	233.5	107.5
12 August	4.6	9.5	9.0	1.5	1.5
Total:	204.7	343.0	331.0	322.0	255.0

The times and heights of the highest tides and maximum storm surges recorded at various locations in Hong Kong during the passage of the tropical depression were as follows:

Location	Highest tide above chart datum			Maximum storm surge above astronomical tide		
	Height (m)	Date	Time	Height (m)	Date	Time
Quarry Bay	2.42	10 Aug	12.30 p.m.	0.58	10 Aug	2.45 p.m.
Tai Po Kau	2.48	10 Aug	1.00 p.m.	0.73	10 Aug	8.30 a.m.
Lok On Pai	2.55	10 Aug	12.45 p.m.	0.65	10 Aug	3.15 p.m.
Tsim Bei Tsui	2.94	10 Aug	1.00 p.m.	1.40	9 Aug	9.00 p.m.

In Hong Kong, three people suffered minor injury when strong winds brought down a make-shift stage in Ngau Tau Kok on 10 August. A Chinese junk sank in rough seas off Tai Long Wan in Sai Kung and six fishermen were rescued. Three canoeists in Clear Water Bay and Cheung Chau and a wind-surfer near Castle Peak Bay had to be rescued. Minor floodings were reported in Yuen Long and Tai Po. Transportation was slightly affected. Ferry services on 6 China-bound routes were cancelled on 10 August. At the airport, 2 aircraft were diverted. Heavy rain on 11 August brought about a total of 67 cases of flooding and 5 minor landslips, none of which caused any casualties. Landslips occurred in Ngau Chi Wan, Lai Chi Kok and Sha Tin on 11 August and at Mui Wo and Lei Yue Mun on 12 August. All kindergartens were closed on 11 August. There were also some reports of collapsed scaffoldings, fallen trees and broken signboards during the passage of the tropical depression.

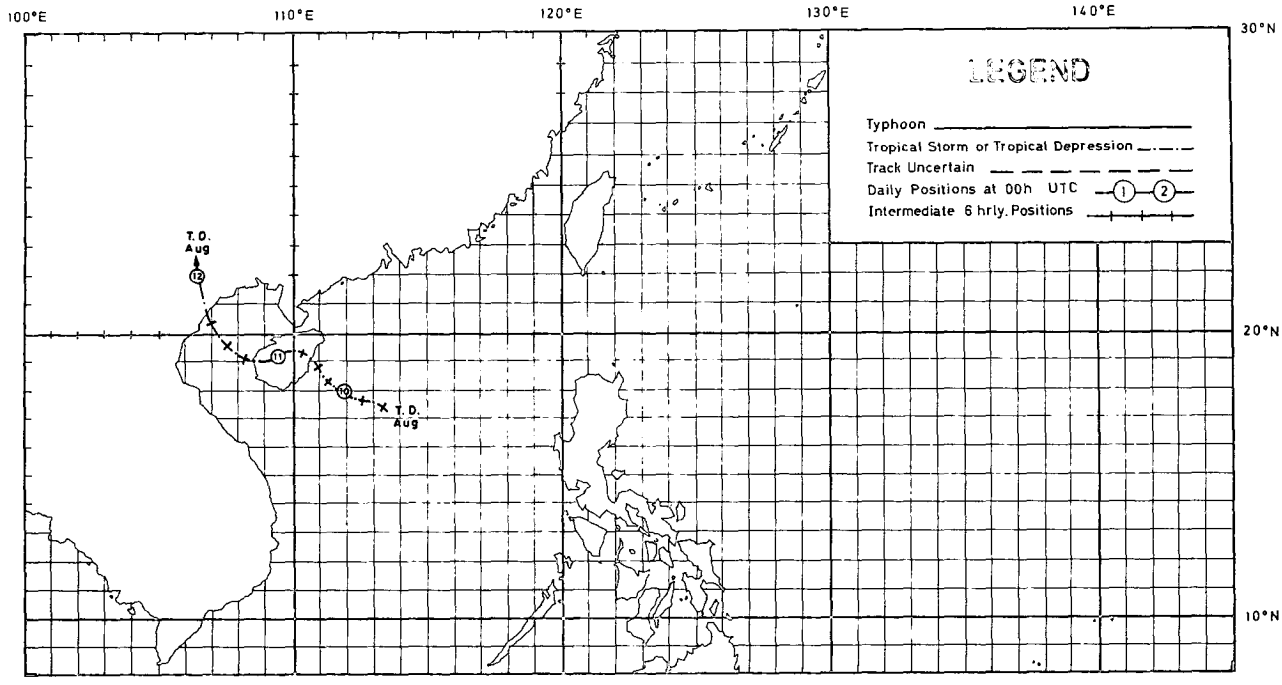

Figure 9. Track of the Tropical Depression of 9–12 August 1986.

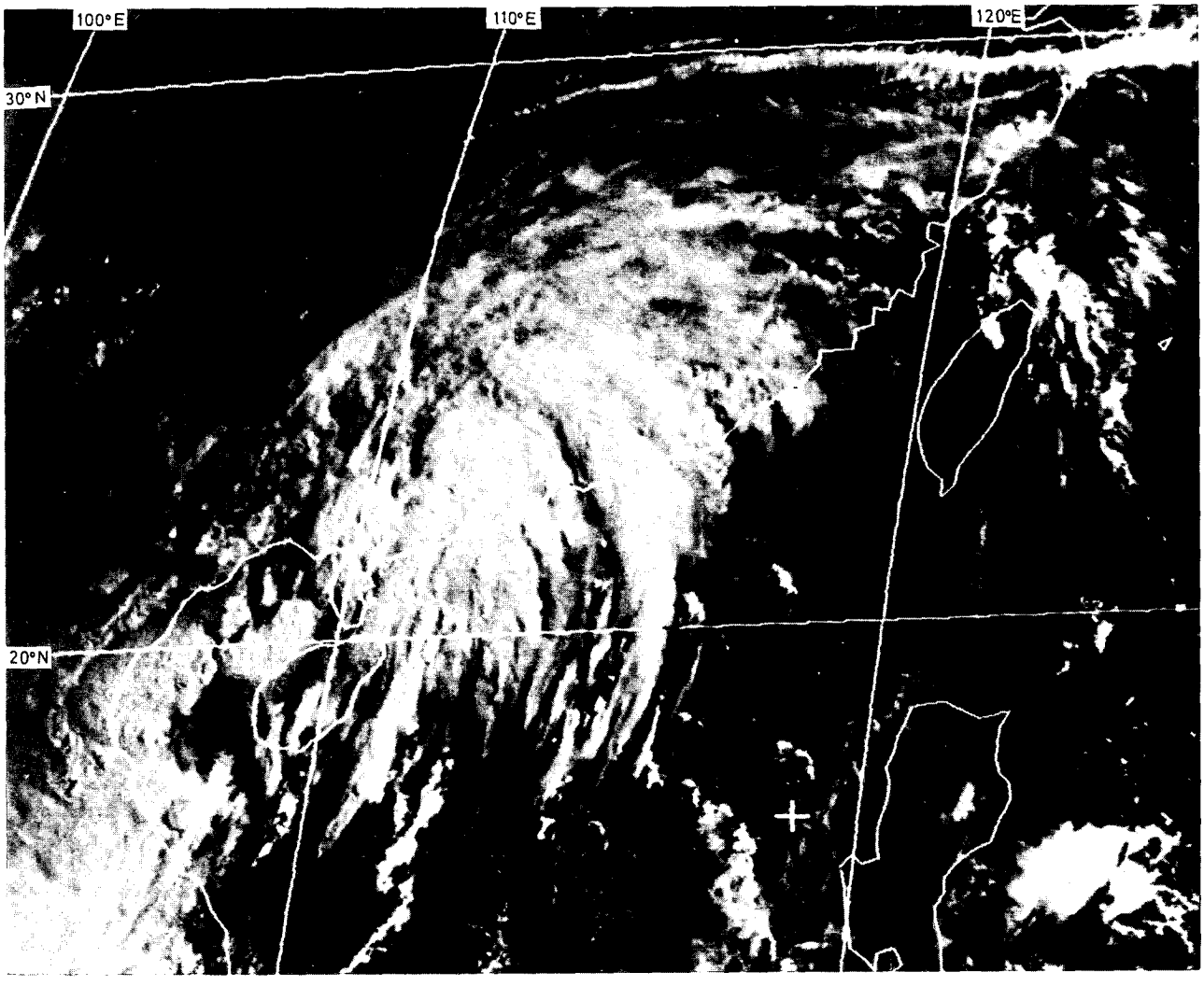

Figure 10. GMS-3 visible imagery of the Tropical Depression around 8.00 a.m. on 11 August 1986.

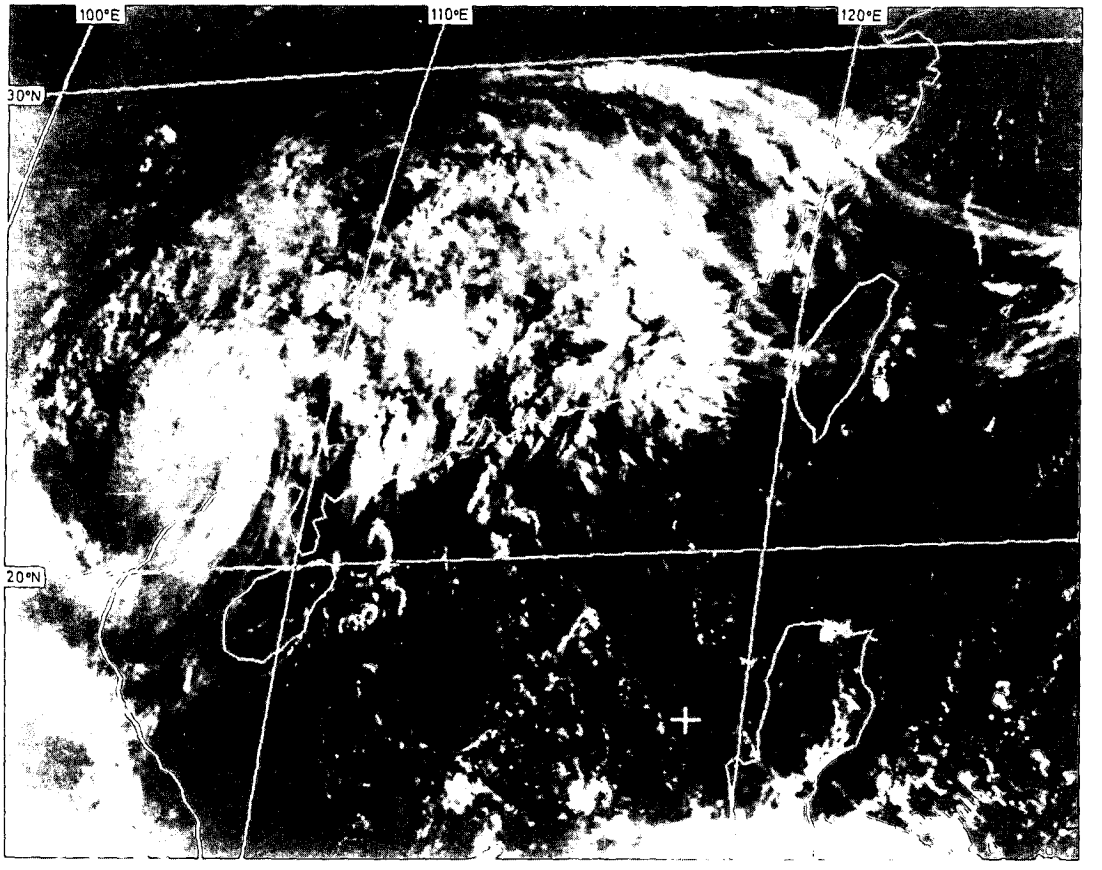

Figure 11. GMS-3 visible imagery of the Tropical Depression around 8.00 a.m. on 12 August 1986.

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Figure 12. Strong winds brought down a make-shift opera stage in Ngau Tau Kok on 10 August 1986 (By courtesy of Hong Kong Standard).

(c) Typhoon Wayne (8614)

18 August–6 September 1986

The track of Typhoon Wayne is shown in Figure 13

Typhoon Wayne was an unusual tropical cyclone. Wayne's track was unique compared to tropical cyclone tracks on record since 1884. It is the only tropical cyclone that traversed the South China Sea three times and necessitated the hoisting of warning signals in Hong Kong on three separate occasions before it finally crossed the Viet Nam coast and dissipated over northern Laos. Its life-span of slightly over 19 days ranked the longest for tropical cyclones which developed over the South China Sea and second longest to Typhoon Rita for all tropical cyclones which formed over the western North Pacific including the South China Sea. Typhoon Rita developed to the east of the Philippines in July 1972 and lasted for 20 days.

Wayne developed as a tropical depression over the South China Sea about 360 km west-northwest of Manila on 18 August. It moved northwestwards at about 14 km/h and intensified rapidly into a typhoon the next afternoon. At 2.00 p.m. on 19 August, the M. V. 'Fossarus' reported sustained winds of 144 km/h about 20 km west of the centre. Wayne adopted a northerly course in the morning of 20 August and weakened to a severe tropical storm in the afternoon. Wayne turned northeastwards moving at about 18 km/h, and passed about 100 km southeast of Hong Kong early on 21 August. It then re-intensified to a typhoon and tracked east-northeastwards over the coastal waters of south China. On 22 August, Wayne crossed the island of Taiwan where 63 people were killed and 300 others injured. About 12 000 houses collapsed and more than 1 000 fishing vessels were destroyed or damaged. 32 000 hectares of farmland were also ruined. Power supply and telephone service were seriously disrupted. According to the press, economic damage was estimated at about US$360 million.

On 23 August, Wayne weakened into a tropical storm over the Pacific and reversed its course when centred about 320 km east of Taibei. It then moved southwestwards under the combined steering of an anticyclone over China and the circulation of Typhoon Vera over the Pacific to the east of Wayne. Around midnight on 24 August, Wayne passed about 30 km off the southern tip of Taiwan and re-entered the South China Sea.

Wayne moved westwards on entering the South China Sea, but turned southwestwards in the afternoon of 25 August, passing close to Dongsha in the evening. In the afternoon of 26 August, Wayne further weakened into a tropical depression about 390 km south of Hong Kong. Under the influence of the circulation of Typhoon Vera, Wayne turned eastwards during the early hours of 27 August and moved northeastwards on 28 August across the Balintang and Bashi Channels as Vera adopted a northerly track over the East China Sea towards the Korean peninsula. Wayne became slow-moving over the Bashi Channel for the next three days as the distance of separation between Vera and Wayne increased and the influence of Vera on Wayne's movement decreased. Wayne intensified to a typhoon for the third time on 31 August and moved southwestwards on 1 September. With sustained winds of 140 km/h near the centre, Wayne approached Luzon on 2 September and passed about 40 km north of the island during the night. Wayne caused the death of 36 people in the Philippines and brought heavy rain to northern Luzon. About 20 000 people were affected.

On 3 September, Wayne entered the South China Sea once again, moving westwards at about 17 km/h. At 7.39 a.m. on 4 September, a reconnaissance aircraft reported sustained surface winds of about 160 km/h near the centre of the typhoon. Wayne accelerated west-northwestwards to about 28 km/h during the day and passed about 300 km south of Hong Kong in the evening. Around noon on 5 September, Wayne passed about 20 km north of Haikou, where a sea-level pressure of 970.1 hPa was reported. Wayne brought heavy rain and severe floods to Hainan and western Guangdong. On Hainan, 2 people were killed, 3 were missing and 52 injured. Several embankments were broken. Paddy fields, sugar-cane and rubber plantations suffered severe damage. In Zhanjiang, many places were flooded with water one metre deep. A total of 10 000 people were marooned by floods in the affected areas. Damage to property, crops and public utilities was estimated at US$56 million.

In the afternoon on 5 September, Wayne moved westwards at about 28 km/h across Beibu Wan. Around 11 p.m., Wayne passed about 40 km north of Bach Longvi, an island station in Beibu Wan, where sustained winds of 144 km/h and a sea-level pressure of 984.5 hPa were reported. Around 2 a.m. on 6 September, Wayne crossed the Viet Nam coast about 100 km southeast of Hanoi. The typhoon finally dissipated over Laos about 220 km north of Vientiane that evening. Severe damage was inflicted in Viet Nam. Almost 400 people were killed and 2 500 injured. Hundreds of thousands of people were left homeless and more than 650 000 homes were destroyed or damaged. About 30 000 hectares of rice fields were inundated in torrential rain.

In Hong Kong, the Stand By Signal, No. 1, was hoisted at 11.30 a.m. on 19 August when Wayne was centred about 530 km south of Hong Kong. With the typhoon moving closer to Hong Kong, the Strong Wind Signal, No. 3, was hoisted at 11.00 a.m. on 20 August when Wayne was about 270 km to the south-southwest. Fresh easterly winds affected the territory in the afternoon and strong northeasterlies set in during the evening. As Wayne continued to edge closer, the Northeasterly Gale or Storm Signal, No. 8 NE, was hoisted at 10.00 p.m. on 20 August. Winds strengthened further and reached gale force for a brief period offshore and in exposed places around midnight. At about this time, Wayne was closest to Hong Kong when it was about 100 km to the southeast. The Northeasterly Gale or Storm Signal, No. 8 NE, was replaced by the Strong Wind Signal, No. 3, at 2.00 a.m. on 21 August. Winds backed to northwesterly and subsided as Wayne moved away from Hong Kong. All signals were lowered at 5.00 a.m. on 21 August when Wayne was about 150 km east-southeast of Hong Kong. Winds became moderate westerly during the day. The lowest sea-level pressure at the Royal Observatory was 996.8 hPa recorded at 8.00 a.m. on 21 August.

With Wayne returning to the South China Sea after crossing Taiwan, the Stand By Signal, No. 1, was again hoisted at 11.45 a.m. on 25 August when the tropical storm was about 430 km to the east-southeast of Hong Kong. Winds were moderate to fresh north to northeasterly. They turned easterly on 26 August and abated as Wayne weakened while moving west-southwestwards away from Hong Kong. All signals were lowered at 2.35 p.m. on 26 August when Wayne was 390 km south of Hong Kong.

After leaving the South China Sea, Wayne remained slow-moving over the Bashi Channel and intensified into a typhoon on 31 August. It started to move southwestwards on 1 September and re-entered the South China Sea on 3 September after skirting northern Luzon. The Stand By Signal, No. 1, was hoisted for the third time at 1.30 a.m. on 4 September, when the typhoon was centred about 560 km to the southeast of Hong Kong. As Wayne accelerated west-northwestwards and came closer to Hong Kong, the Strong Wind Signal, No. 3, was hoisted at 3.00 p.m. on 4 September when the centre of Wayne was about 340 km to the south-southeast. Winds freshened and became generally strong easterly over the territory in the evening. Winds remained strong until the next morning, reaching gale force at times offshore and turning further to east-southeasterly. Strong winds subsided in the afternoon and all signals were lowered at 2.10 p.m. on 5 September when Wayne was moving into Beibu Wan about 520 km west-southwest of Hong Kong. During the third passage, Wayne was closest to Hong Kong around 8 p.m. on 4 September when it was about 300 km to the south.

The sequence of Tropical Cyclone Warning Signals displayed during the passages of Typhoon Wayne was as follows:

Signal	Date and Time of Hoisting		Date and Time of Lowering	
1	19 August	11.30 a.m.	20 August	11.00 a.m.
3	20 August	11.00 a.m.	20 August	10.00 p.m.
8NE	20 August	10.00 p.m.	21 August	2.00 a.m.
3	21 August	2.00 a.m.	21 August	5.00 a.m.
1	25 August	11.45 a.m.	26 August	2.35 p.m.
1	4 September	1.30 a.m.	4 September	3.00 p.m.
3	4 September	3.00 p.m.	5 September	2.10 p.m.

The maximum mean hourly wind speeds, the maximum gust peak speeds and the assoicated wind directions recorded at selected locations during the passages of Typhoon Wayne were shown in the following table.

Location	Maximum mean hourly wind speed in km/h with direction in points			Maximum gust peak speed in km/h with direction in points		
	First Passage (19–21 August)	Second Passage (25–26 August)	Third Passage (4–5 September)	First Passage (19–21 August)	Second Passage (25–26 August)	Third Passage (4–5 September)
Royal Observatory	ENE 30	ENE 19	ESE 40	ENE 83	ENE 47	ESE 83
Hong Kong Airport (SE)	ENE 38	ENE 25	E 47	ENE 83	ENE 62	ENE 87
Hong Kong Airport (NW)	NNE 47	ESE 25	E 41	NE 99	ENE 77	ENE 96
Waglan Island	NE 68	E 47	E 72	NNE 104	ESE 79	E 112
Tate's Cairn	ENE 83	ENE 51	ESE 79	ENE 144	ENE 83	E 137
Cheung Chau	NNE 45	NNE 31	ESE 68	ENE 94	E 59	ESE 96
King's Park	NE 30	ENE 22	ESE 36	NE 68	ENE 51	ESE 76
Star Ferry	E 30	ESE 27	ESE 51	E 63	E 51	ESE 96
Green Island	NE 65	NE 47	NE 70	NE 94	NE 72	E 118
Stanley	NE 72	—	—	NE 111	—	—
Tai O	N 47	NE 19	ESE 54	NNW 62	NE 54	ESE 96
Sha Tin	NE 22	N 14	ENE 23	NNE 52	NE 47	NE 70
Kwai Chung	N 25	SE 23	ESE 34	NE 51	NE 43	E 67
Tsing Yi	ENE 25	ENE 22	—	ENE 56	ENE 45	—
Chek Lap Kok	NW 41	NW 27	E 68	WNW 103	NE 58	E 96
Lau Fau Shan	NW 36	NE 20	E 34	N 58	NE 47	E 63
Ta Kwu Ling	E 23	NE 23	ESE 36	ENE 72	NE 58	ESE 88
Tai Mo Shan	ENE 76	E 54	ESE 94	ENE 108	NE 79	ESE 137

Apart from some morning showers, the weather was fine and very hot on 19 August. The rainbands of Wayne affected Hong Kong early on 20 August and there were frequent showers, which were heavy and squally at times, during the day and overnight. On 21 August, after a very hot and sunny day, squally thunderstorms developed overland and moved southeastwards to affect Hong Kong in the evening. A waterspout was reported in Kau Lau Wan south of Tap Mun around 9 p.m. A tornado was also reported in Aberdeen around the same time. Squally thunderstorms recurred in the mornings of 22 and 23 August. The weather improved with plenty of sunshine on 24 August. Conditions turned cloudy on 25 August and there were a few showers. It became sunny and hot again the next day. The weather remained very hot from 27 August until 2 September with the temperature rising to a maximum of 34.1°C on 27 August. Apart from some morning showers on 30 and 31 August and a few evening thunderstorms on 1 September, the weather was generally fine during the period.

More thunderstorms occurred in the evening of 3 September and early on 4 September. Frequent squally showers accompanied the third passage of Typhoon Wayne on 4 and 5 September. Occasional heavy showers persisted on 6 and 7 September with some thunderstorms in the evening of 6 September. The weather improved with abundant sunshine on 8 September.

The daily amounts of rainfall recorded at selected locations during the 3 passages of Wayne were as follows:—

Date	*Royal Observatory* mm	*Quarry Bay* mm	*Tuen Mun* mm	*Tsuen Wan* mm	*Sha Tin* mm	*Sai Kung* mm
First passage						
19 August	0.1	Nil	Nil	Nil	0.5	Nil
20 August	29.2	33.5	13.5	27.0	29.0	20.5
21 August	12.7	10.0	9.0	29.5	32.0	15.5
22 August	Trace	Nil	Nil	Nil	3.0	56.5
23 August	6.2	10.0	27.0	26.0	54.0	87.5
Sub-total	48.2	53.5	49.5	82.5	118.5	180.0
Second passage						
25 August	Trace	Nil	Nil	Nil	Nil	Nil
26 August	Nil	Nil	Nil	Nil	Nil	Nil
27 August	Nil	Nil	0.5	Nil	Nil	Nil
28 August	Nil	Nil	Nil	Nil	0.5	0.5
29 August	Nil	Nil	Nil	Nil	Nil	Nil
Sub-total	Trace	Nil	0.5	Nil	0.5	0.5
Third passage						
4 September	29.0	51.0	17.0	30.0	29.5	25.5
5 September	19.2	10.0	28.0	21.5	29.0	9.0
6 September	47.9	71.5	5.0	41.0	52.0	43.0
7 September	65.4	70.5	8.5	45.0	51.0	24.0
8 September	1.0	3.5	Nil	1.5	0.5	13.0
Sub-total	162.5	206.5	58.5	139.0	162.0	114.5
Total	210.7	260.0	108.5	221.5	281.0	295.0

The times and heights of the highest tides and maximum storm surges recorded at various locations in Hong Kong during the 3 passages of Wayne were as follows:

First passage:

Location	Highest tide above chart datum			Maximum storm surge above astronomical tide		
	Height (m)	Date	Time	Height (m)	Date	Time
Quarry Bay	2.61	20 Aug	8.45 a.m.	0.35	20 Aug	7.00 a.m.
Tai Po Kau	2.61	20 Aug	10.30 a.m.	0.65	20 Aug	6.00 a.m.
Chi Ma Wan	2.68	20 Aug	9.30 a.m.	0.28	19 Aug	11.15 a.m.
Lok On Pai	2.86	20 Aug	9.30 a.m.	0.53	19 Aug	11.30 a.m.
Tsim Bei Tsui	3.31	20 Aug	10.30 a.m.	1.11	19 Aug	12.00 noon

Second passage:

Location	Highest tide above chart datum			Maximum storm surge above astronomical tide		
	Height (m)	Date	Time	Height (m)	Date	Time
Quarry Bay	2.16	26 Aug	1.00 a.m.	0.45	25 Aug	9.00 p.m.
Tai Po Kau	2.05	25 Aug	9.30 p.m.	0.67	25 Aug	9.00 p.m.
Chi Ma Wan	2.16	26 Aug	1.30 a.m.	0.37	25 Aug	9.15 p.m.
Lok On Pai	2.26	26 Aug	1.45 a.m.	0.47	25 Aug	9.30 p.m.
Tsim Bei Tsui	2.59	26 Aug	1.30 a.m.	0.85	26 Aug	3.15 p.m.

Third passage:

Location	Highest tide above chart datum			Maximum storm surge above astronomical tide		
	Height (m)	Date	Time	Height (m)	Date	Time
Quarry Bay	2.60	4 Sep	9.45 a.m.	0.56	5 Sep	6.30 a.m.
Tai Po Kau	2.72	5 Sep	7.30 a.m.	0.81	5 Sep	7.30 a.m.
Chi Ma Wan	2.53	4 Sep	7.45 a.m.	0.63	5 Sep	7.15 a.m.
Lok On Pai	2.73	4 Sep	10.15 a.m.	0.62	5 Sep	0.15 a.m.
Tsim Bei Tsui	3.20	5 Sep	10.00 a.m.	0.81	5 Sep	2.15 p.m.

In Hong Kong, damage was slight. During the first passage of Wayne, a scaffolding collapsed in Kwai Chung and a minor ground subsidence occurred in Tsuen Wan. Traffic was considerably disrupted. On 20 August, outlying island ferries, jetfoils to Macau, and ferries between Hong Kong and south China ports were suspended in the afternoon and all harbour ferry services halted at 9 p.m. At the airport, 3 flights were delayed and 2 flights were cancelled. All kindergartens and evening schools were closed on 20 August. Some examinations and community activities were postponed. However, casualties occurred in severe thunderstorms in the wake of the tropical cyclone. 3 people were drowned and 1 man was missing when two fishing junks capsized in a waterspout in Kau Lau Wan near Tap Mun around 9 p.m. on 21 August. A tornado in Aberdeen reportedly damaged a 7-metre-tall tree about the same time. During the severe thunderstorms in the morning of 23 August, a total of 15 people were struck by lightning at three separate locations in Sai Kung and Tsuen Wan.

On 4 September when Wayne affected Hong Kong for the third time, a family of 3 was evacuated from a squatter hut in Sau Mau Ping which was in danger of collapsing. Around 9.20 p.m., a 4-metre by 8-metre advertising board was blown down on Kennedy Road in Wan Chai. Hydrofoil services to Macau and some ferry services to China were suspended from the evening of 4 September to 5 September.

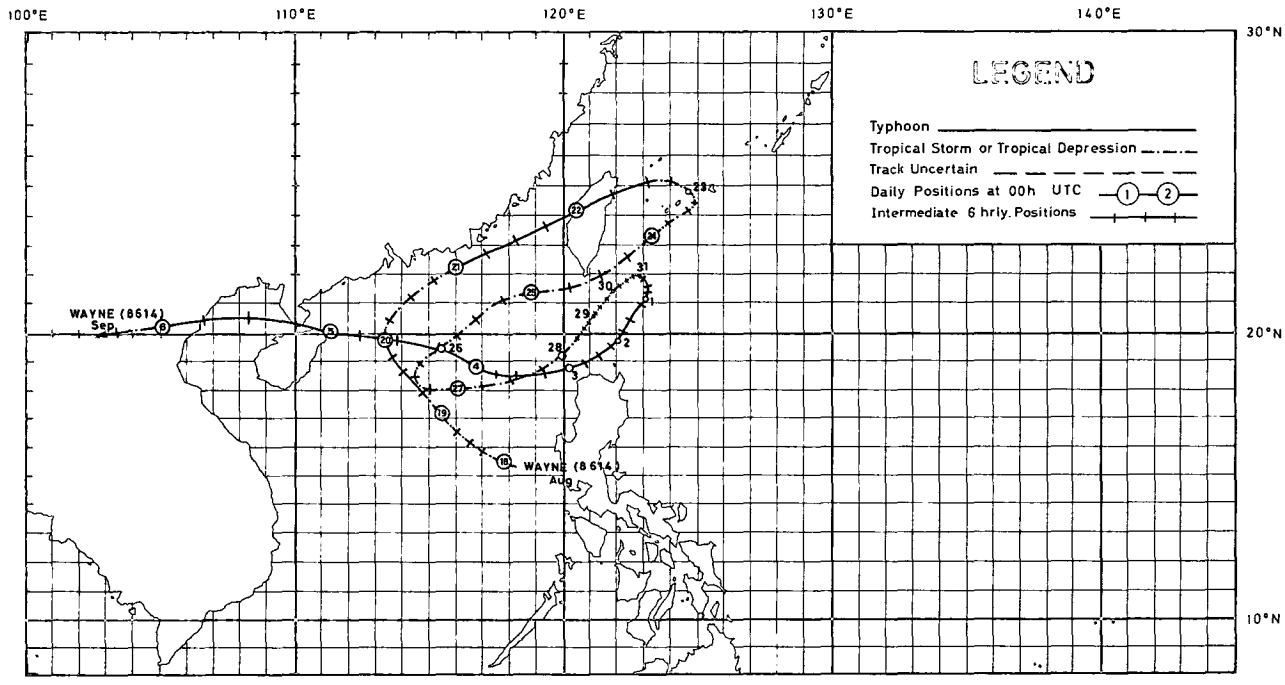
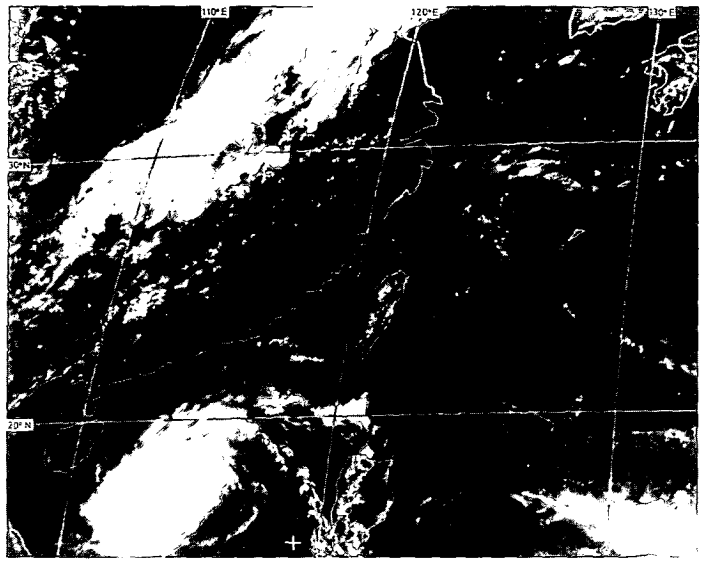
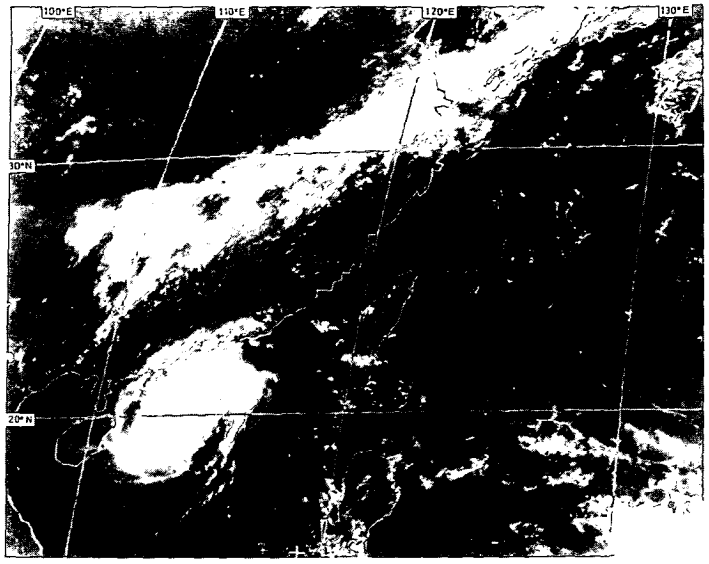


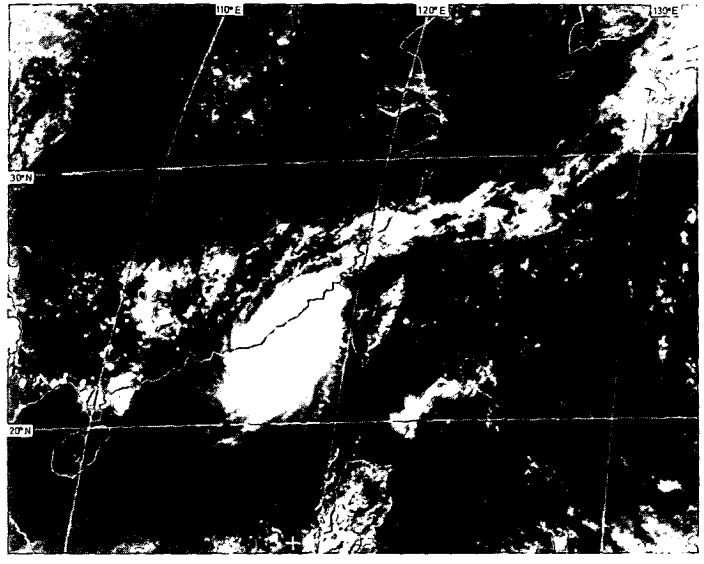
Figure 13. Track of Typhoon Wayne (8614): 18 August–6 September 1986.



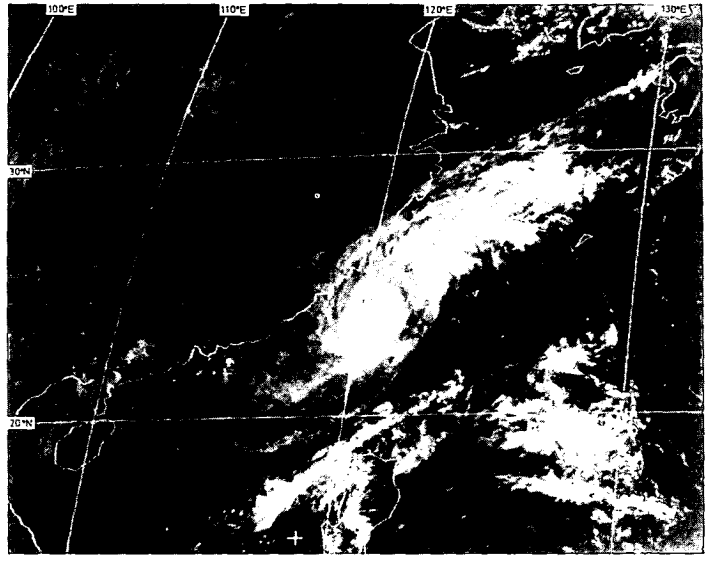
(a) 2.00 p.m. on 19 August 1986.



(b) 11.00 a.m. on 20 August 1986.

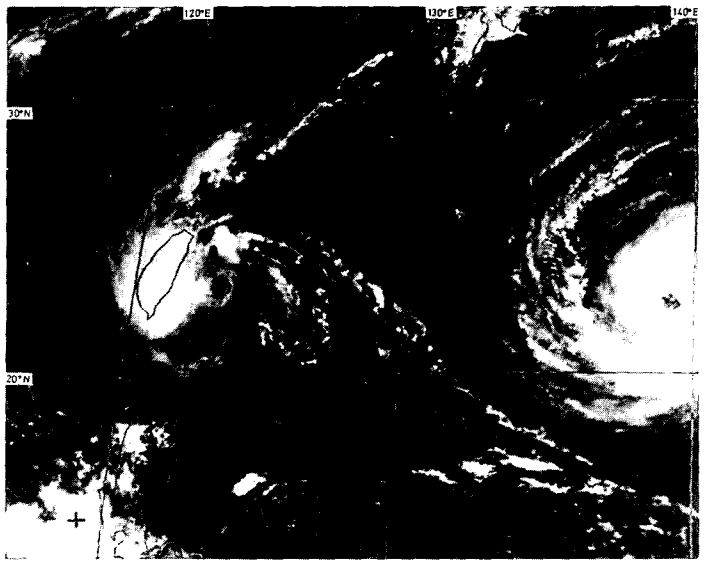


(c) 2.00 p.m. on 21 August 1986.

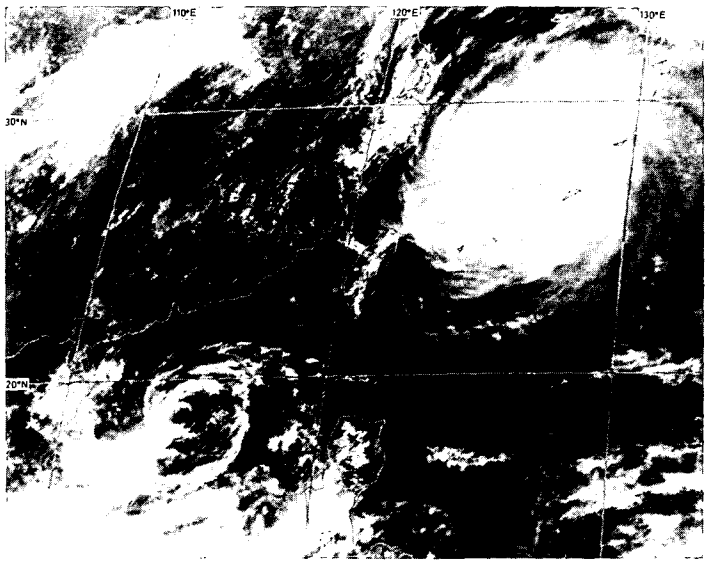


(d) 8.00 a.m. on 22 August 1986.

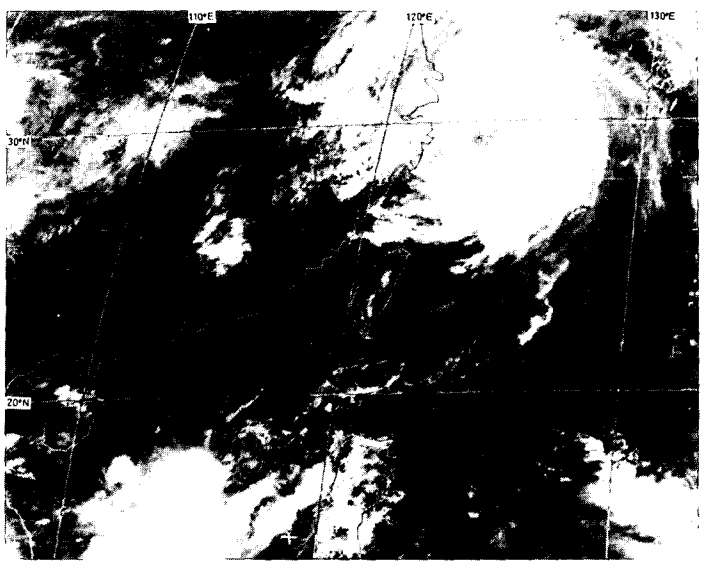
Figure 14. *GMS-3 visible imagery of Typhoon Wayne (8614).*



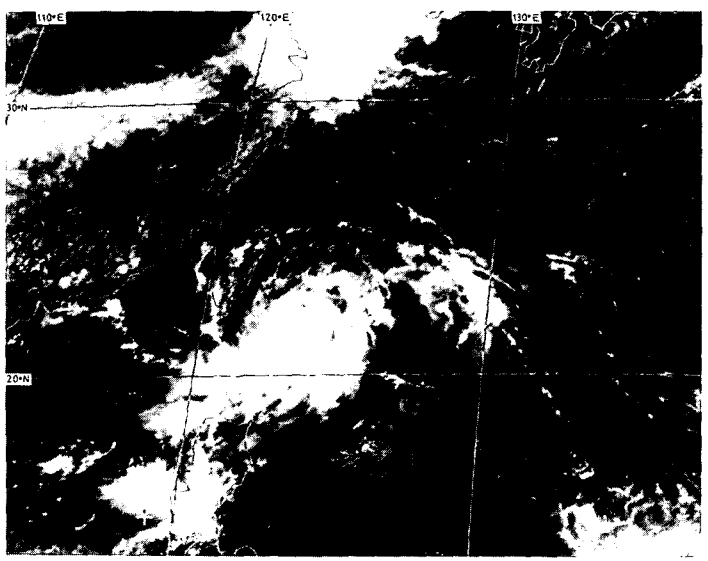
(a) 11.00 a.m. on 24 August 1986.



(b) 2.00 p.m. on 26 August 1986.

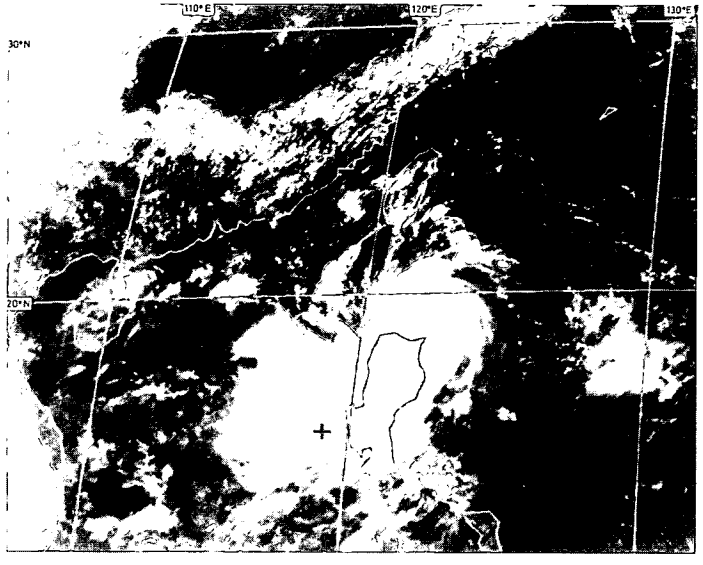


(c) 11.00 a.m. on 27 August 1986.

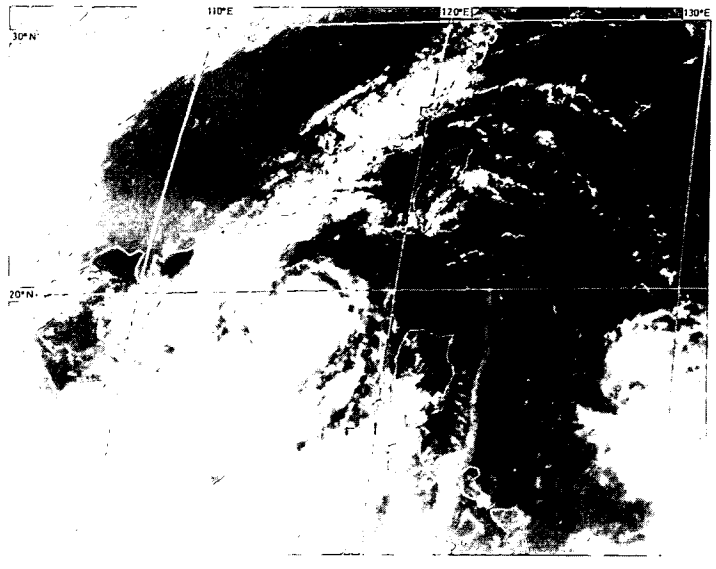


(d) 11.00 a.m. on 31 August 1986.

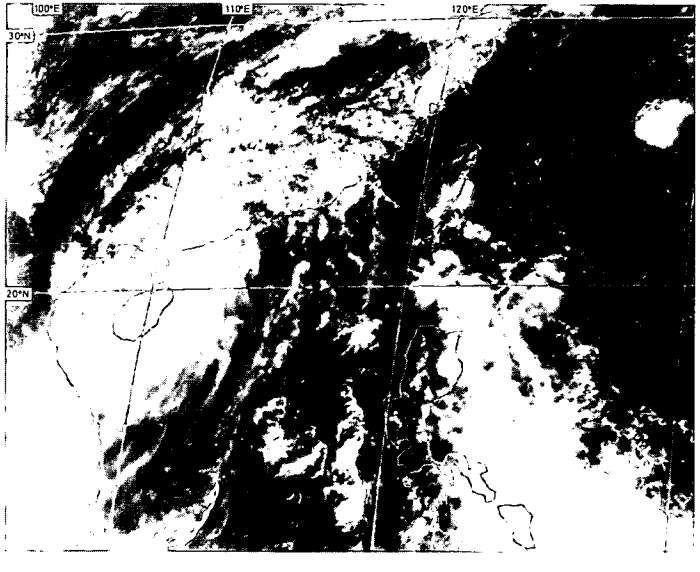
Figure 15. GMS-3 visible imagery of Typhoon Wayne (8614).



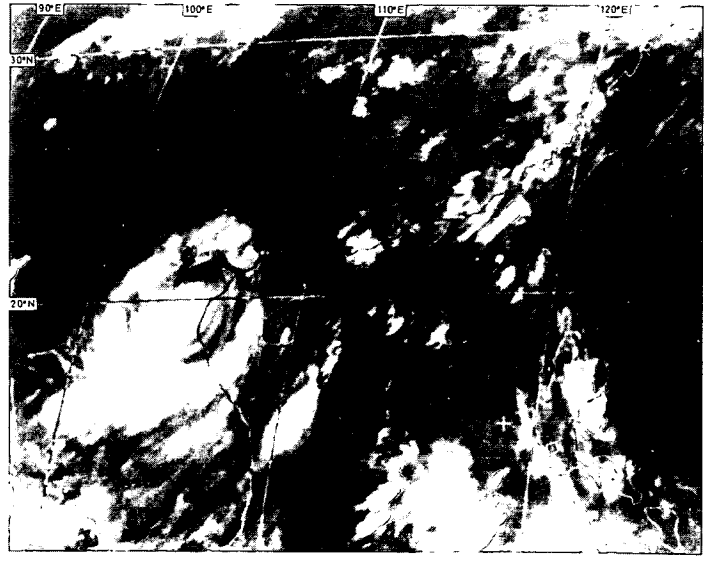
(a) 11.00 a.m. on 2 September 1986 (visible imagery).



(b) 11.00 a.m. on 4 September 1986 (visible imagery).



(c) 11.00 a.m. on 5 September 1986 (visible imagery).



(d) 8.00 a.m. on 6 September 1986 (infra-red imagery).

Figure 16. GMS-3 visible and infra-red imageries of Typhoon Wayne (8614).

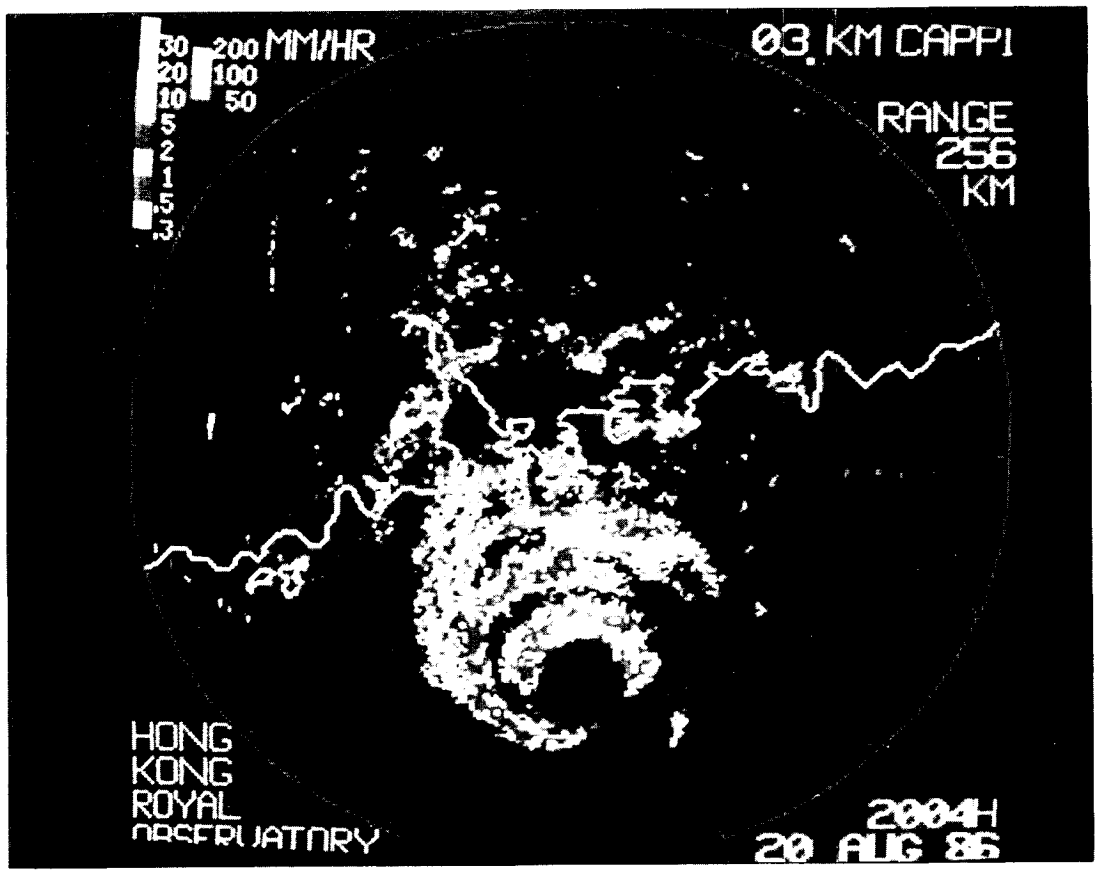


Figure 17. Radar display of Typhoon Wayne (8614) at 8.04 p.m. on 20 August 1986.

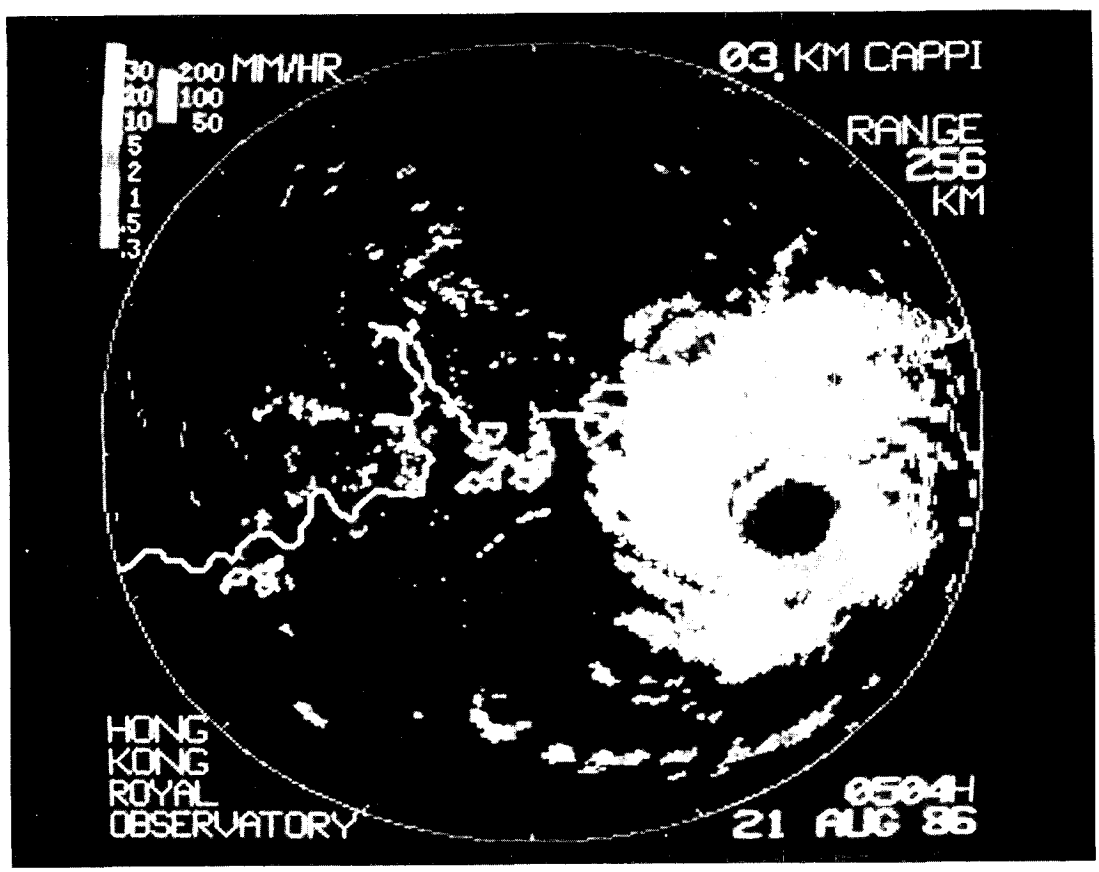


Figure 18. Radar display of Typhoon Wayne (8614) at 5.04 a.m. on 21 August 1986.

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http://www.weather.gov.hk/education/edu04other/edu04_rcentre_c.htm
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Website of the Observatory Resource Centre:
http://www.weather.gov.hk/education/edu04other/edu04_rcentre_e.htm
(Tel.: 2926 8250)

Figure 19. **On 21 August 1986, a tornado in Aberdeen was reported to have damaged a 7-metre-tall tree around 9.00 p.m. (By courtesy of Oriental Daily News).**

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Website of the Observatory Resource Centre:
http://www.weather.gov.hk/education/edu04other/edu04_rcentre_e.htm
(Tel.: 2926 8250)

Figure 20. **A squatter hut in Sau Mau Ping was in danger of collapsing on 4 September 1986 when Typhoon *Wayne* affected Hong Kong for *the third time* (By courtesy of Oriental Daily News).**

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天文台資源中心網址：
http://www.weather.gov.hk/education/edu04other/edu04_rcentre_c.htm
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Website of the Observatory Resource Centre:
http://www.weather.gov.hk/education/edu04other/edu04_rcentre_e.htm
(Tel.: 2926 8250)

Figure 21. **Policemen helped erect a huge advertising board blown down on Kennedy Road in Wan Chai on 4 September 1986 (By courtesy of Oriental Daily News).**

(d) Typhoon Ellen (8620)

11–19 October 1986

The track of Typhoon Ellen is shown in Figure 22

Ellen developed as a tropical depression over the western North Pacific about 840 km southeast of Manila in the morning of 11 October. It intensified rapidly into a tropical storm in the afternoon and crossed the central Philippines while moving west-northwestwards at about 25 km/h. On entering the South China Sea, Ellen turned northwestwards and slowed down to about 13 km/h. It intensified further into a severe tropical storm on 13 October and moved slowly northwards about 250 km off the west coast of Luzon. At 5 p.m. M. V. 'Hual Trapper' reported sustained winds of 112 km/h about 100 km northeast of its centre.

Ellen attained typhoon intensity in the afternoon of 14 October when it was centred about 440 km northwest of Manila. It then turned onto a northwesterly track and slowed down to 6 km/h. In the morning of 15 October, Ellen reached its maximum intensity with sustained surface winds of 157 km/h near its centre. Ellen continued to move northwestwards at about 12 km/h and passed about 160 km southwest of Dongsha in the evening of 16 October. On approaching the south China coast in the morning of 18 October, Ellen weakened into a severe tropical storm about 150 km south-southwest of Hong Kong and adopted a westerly track. Early on 19 October, a surge of the northeast monsoon began to affect the south China coastal areas. With the intrusion of drier monsoon air into its centre, Ellen weakened rapidly. After crossing the Leizhou peninsula around midday, it dissipated over Beibu Wan in the evening of 19 October.

The Stand By Signal, No. 1, was hoisted at 2.15 p.m. on 15 October when Typhoon Ellen was centred about 570 km to the southeast of Hong Kong. As Ellen moved closer to the south China coast, the Strong Wind Signal, No. 3, was hoisted at 11.10 p.m. on 16 October when Ellen was about 370 km to the south-southeast. Winds became generally strong the next day, reaching gale force offshore. The minimum sea-level pressure recorded at the Royal Observatory was 1 006.8 hPa registered at around 4.00 p.m. on 17 October. Overnight, gusts of 140 km/h and 112 km/h were recorded at Tate's Cairn and Waglan Island respectively. In the western harbour approaches, hourly mean winds of 81 km/h and gusts up to 131 km/h were recorded at Green Island early on 18 October. Ellen came closest to Hong Kong around this time when it was about 150 km south-southwest of Hong Kong. As Ellen weakened and moved along a more westerly track away from Hong Kong, the territory came increasingly under the influence of the northeast monsoon which had been spreading southwards from China. In the morning of 19 October, when Ellen was about 370 km west-southwest of Hong Kong and weakened to a tropical depression, the Strong Wind Signal, No. 3, was lowered at 9.15 a.m. The Strong Monsoon Signal was hoisted at the same time as strong winds associated with the northeast monsoon continued to affect the territory.

The maximum mean hourly wind speeds, the maximum gust peak speeds and the associated wind directions recorded at selected locations during the passage of Typhoon Ellen were as follows:

Location	*Maximum mean hourly wind speed in km/h with direction in points*		*Maximum gust peak speed in km/h with direction in points*	
Royal Observatory	ENE	43	E	94
Hong Kong Airport (SE)	E	47	ENE	94
Hong Kong Airport (NW)	ENE	45	ENE	115
Waglan Island	E	81	E	112
Tate's Cairn	E	79	E	140
Cheung Chau	E	67	E	110
King's Park	E	36	E	92
Star Ferry	E	47	E	94
Green Island	ENE	81	ENE	131
Tai O	E	47	E	99
Sha Tin	E	26	E	75
Kwai Chung	ENE	31	ENE	77
Tsing Yi	E	34	ESE	76
Chek Lap Kok	—	69	—	96
Lau Fau Shan	E	41	NE	79
Ta Kwu Ling	E	35	E	81
Tai Mo Shan	E	94	E	144

On 15 and 16 October, the weather was fine and sunny except for some brief showers in the afternoon of 16 October. It became cloudy on 17 October and continuous rain began to affect the territory in the evening. The rain was occasionally heavy in the morning of 18 October when Ellen was about 150 km south-southwest of Hong Kong. Rain died out in the next morning and the weather improved with sunny intervals in the afternoon. Ellen was a comparatively dry typhoon and the daily amounts of rainfall recorded at selected locations were as follows:

Date	*Royal Observatory*	*Repulse Bay*	*Victoria Peak*	*Sha Tin*	*West Lantau*
	mm	mm	mm	mm	mm
15 October	Nil	Nil	Nil	Nil	Nil
16 October	Trace	Nil	0.5	Nil	Nil
17 October	3.3	5.0	6.0	5.0	6.5
18 October	25.4	52.0	53.0	27.5	41.0
19 October	Trace	Nil	Nil	Nil	Nil
Total	28.7	57.0	59.5	32.5	47.5

The times and heights of the highest tides and maximum storm surges recorded at various locations in Hong Kong during the passage of Ellen were as follows:

Location	Highest tide above chart datum			Maximum storm surge above astronomical tide		
	Height (m)	Date	Time	Height (m)	Date	Time
Quarry Bay	2.31	16 Oct	8.30 a.m.	0.34	17 Oct	5.45 p.m.
Tai Po Kau	2.45	17 Oct	10.30 p.m.	0.57	17 Oct	6.00 p.m.
Lok On Pai	2.42	17 Oct	9.30 a.m.	0.33	16 Oct	11.15 p.m.

In Hong Kong, there was only minor damage during the passage of Typhoon Ellen. A scaffolding collapsed in Kwai Chung and 2 people were injured. Another 2 pedestrians were injured by flying pieces of glass from broken windows in North Point. Public transport in the urban areas was not affected but ferry services to the outlying islands were suspended in the evening of 17 October. Ferry services to Macau and China were also suspended. At the airport, 4 incoming and 3 outgoing flights were cancelled.

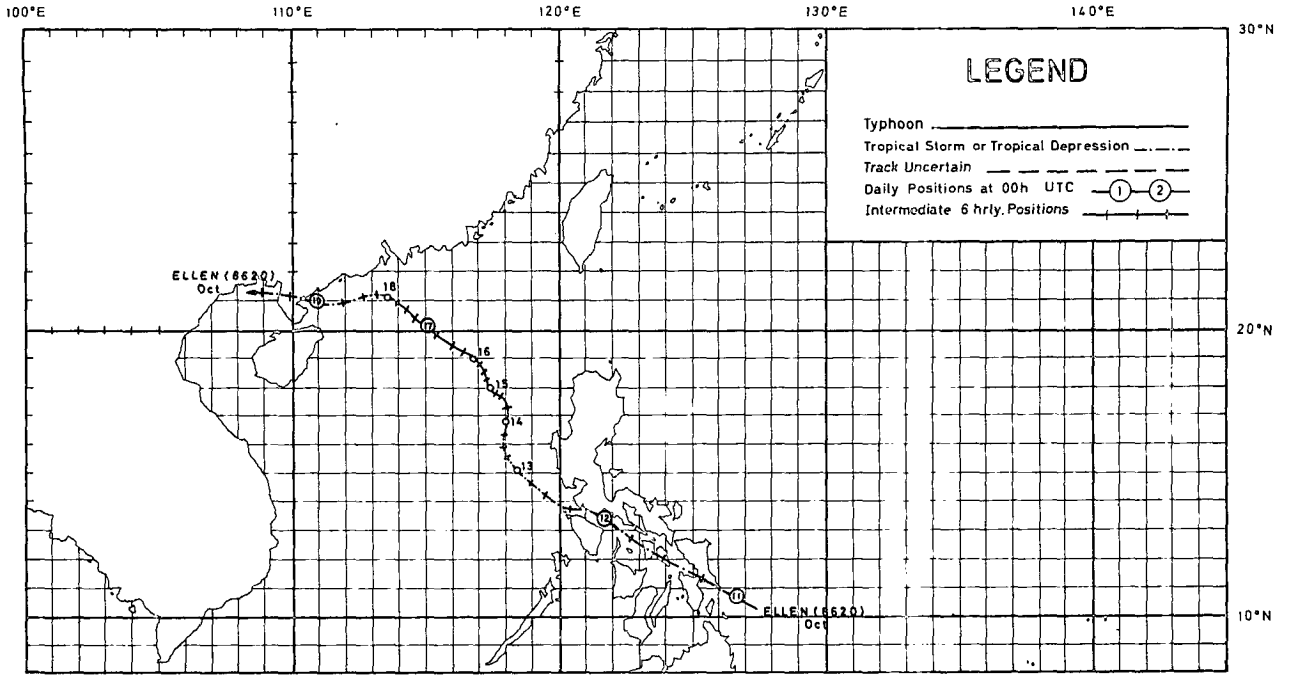

Figure 22. **Track of Typhoon Ellen (8620): 11–19 October 1986.**

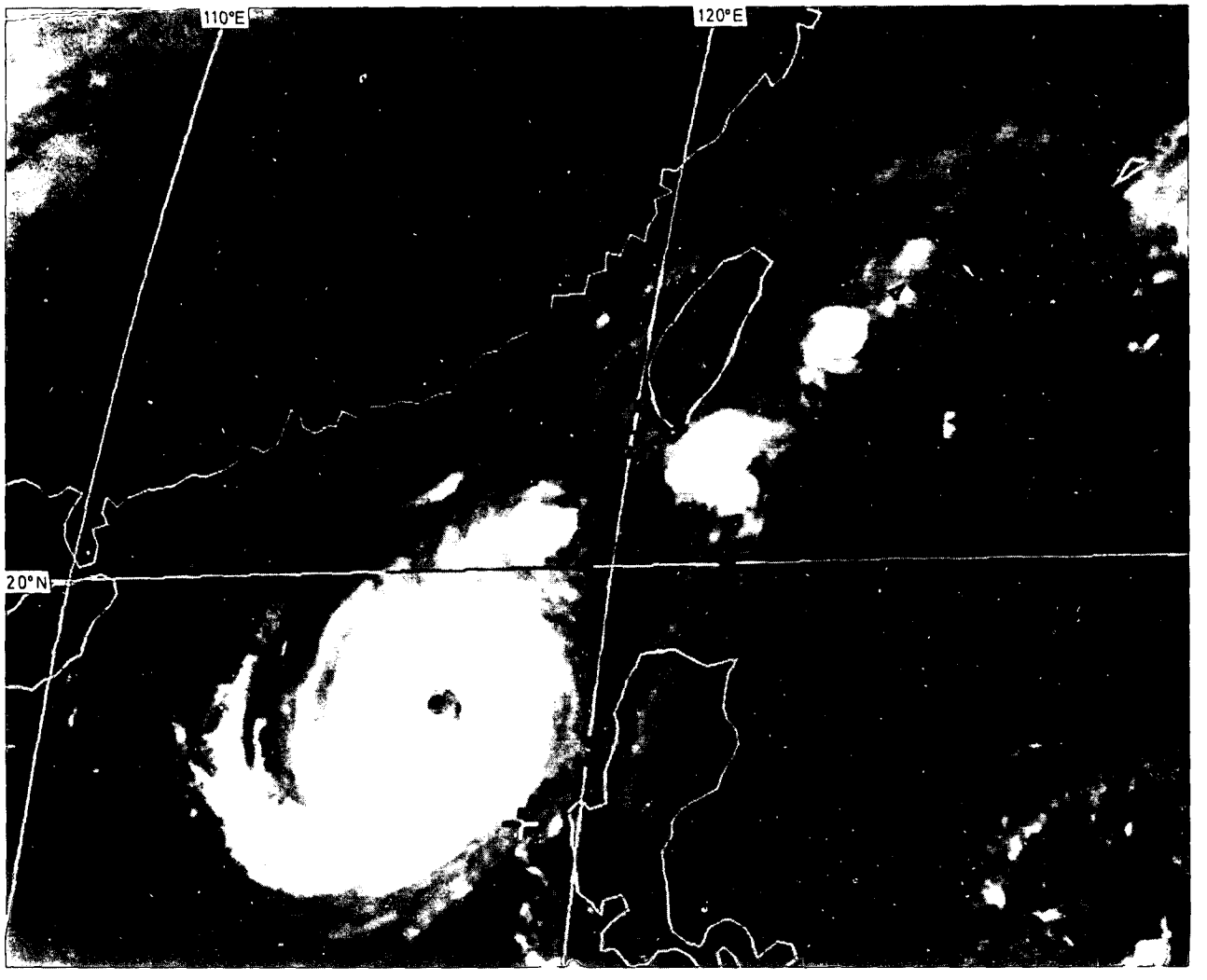

Figure 23. **GMS-3 infra-red imagery of Typhoon Ellen (8620) around 8.00 a.m. on 15 October 1986.**

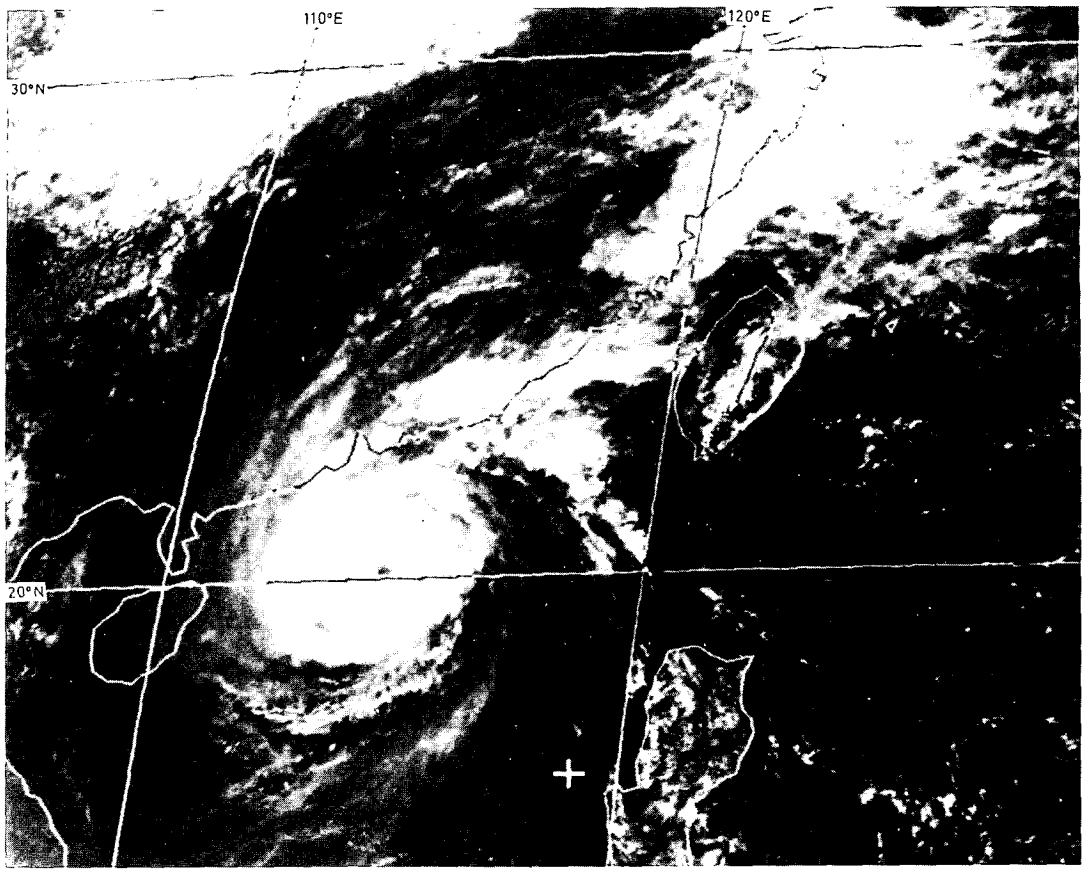

Figure 24. GMS-3 visible imagery of Typhoon Ellen (8620) around 11.00 a.m. on 17 October 1986.

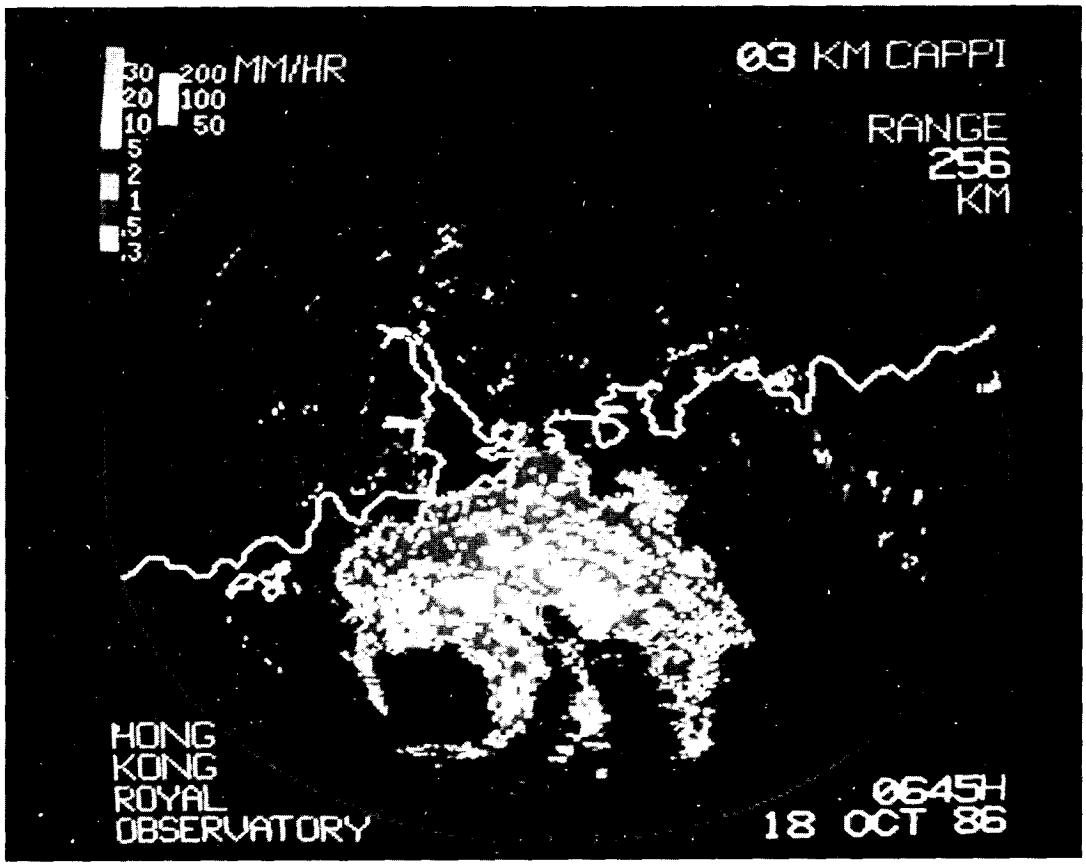

Figure 25. Radar display of Typhoon Ellen (8620) at 6.45 a.m. on 18 October 1986.

4. DESCRIPTION OF TABLES

TABLE 1 is a list of tropical cyclones in 1986 in the western North Pacific and the South China Sea (i.e. in the area bounded by the Equator, 45°N, 100°E and 180°). The names of these tropical cyclones are those used by the U.S. Naval Oceanography Command Center/Joint Typhoon Warning Center in Guam. The four-digit numbers in parentheses are numbers assigned to each tropical cyclone of tropical storm intensity or above by the Japan Meteorological Agency. The dates cited cover the period during which the track of each tropical cyclone lay within the above-mentioned region and might not cover its full life-span. This limitation applies to all other elements in the table.

TABLE 2 gives the number of tropical cyclone warnings for shipping issued by the Royal Observatory, Hong Kong in 1986, the duration of these warnings and the time of issue of the first and last warnings for all tropical cyclones in Hong Kong's area of responsibility (i.e. the area bounded by 10°N, 30°N, 105°E and 125°E). Times are given in hours UTC.

TABLE 3 presents a summary of the occasions on which tropical cyclone warning signals were hoisted during 1986. The sequence of the signals displayed and the number of tropical cyclone warning bulletins issued for each tropical cyclone are also given. Times are given in hours and minutes in Hong Kong Time.

TABLE 4 presents a summary of the occasions on which tropical cyclone warning signals were hoisted between 1946 and 1986. Between 1946 and 1955 the Stand By Signal, No. 1, was also used to warn strong winds. A Strong Wind Signal was introduced in 1950 to warn the onset of strong winds which were not expected to reach gale force (the symbol used was a black ball). The figures in the column under the No. 3 Signal for the years between 1950 and 1955 refer to occasions for which Strong Wind Signals were hoisted due to tropical cyclones. The Strong Wind Signal, No. 3, (represented by the symbol ⊥) was introduced in 1956 and the Stand By Signal, No. 1, was redefined the same year. At the same time the black ball symbol was utilized to warn strong or gale monsoon winds and was named the Strong Monsoon Signal. With effect from 1 January 1973 the Gale or Storm Signals 5, 6, 7 and 8 were renumbered as 8 NW, 8 SW, 8 NE and 8 SE respectively.

TABLE 5 gives the annual number of tropical cyclones in Hong Kong's area of responsibility between 1946 and 1986. The annual number of tropical cyclones which caused tropical cyclone warning signals to be raised in Hong Kong is also included.

TABLE 6 shows the maximum, mean and minimum duration of display of each tropical cyclone warning signal during the period 1946–1986.

TABLE 7 presents the casualties and damage figures associated with tropical cyclones in Hong Kong for the period 1937–1986. The information is compiled from local newspaper reports and from the Marine Department's records.

TABLE 8 contains the particulars of ships damaged by tropical cyclones in 1986. The information is compiled from local newspapers and from Marine Department's records.

TABLE 9 presents the maximum storm surge (the excess, in metres, of the actual water level over that predicted in the Tide Tables) for each tropical cyclone affecting Hong Kong in 1986. Information on the nearest approach, the maximum winds at the Royal Observatory and Waglan Island, the minimum mean sea-level pressure and the total rainfall recorded at the Royal Observatory are also included together with an estimate of the minimum central pressure of each tropical cyclone during its closest approach.

TABLE 10 provides some meteorological information for those typhoons which required the hoisting of the Hurricane Signal, No. 10, in Hong Kong since 1946. The information presented includes the distances and the bearings of nearest approach, the minimum mean sea-level pressures recorded at the Royal Observatory and the maximum 60-minute mean winds and maximum gust peak speeds recorded at some selected stations in Hong Kong.

TABLE 1. LIST OF TROPICAL CYCLONES IN THE WESTERN NORTH PACIFIC AND THE SOUTH CHINA SEA IN 1986

Name of tropical cyclone		Beginning of track				First day circle	Last day circle	End of track				Remarks
		Date	Time U.T.C.	Position °N	Position °E	Date	Date	Date	Time U.T.C.	Position °N	Position °E	
Typhoon Judy	(8601)	1 Feb	0000	4.0	142.0	1	6	6 Feb	0000	18.7	141.7	dissipated
Typhoon Ken	(8602)	26 Apr	1800	7.3	139.7	27	2	2 May	1800	10.3	134.6	dissipated
Typhoon Lola	(8603)	17 May	0000	7.9	160.2	17	23	23 May	0600	35.2	164.3	became extratropical
Tropical Storm Mac	(8604)	23 May	0000	19.6	114.6	23	29	29 May	0600	24.4	129.4	dissipated
Typhoon Nancy	(8605)	21 Jun	0000	10.6	133.7	21	25	25 Jun	0000	35.1	128.8	became extratropical
Tropical Storm Owen	(8606)	28 Jun	0000	15.5	135.5	28	2	2 Jul	0000	25.3	128.7	dissipated
Typhoon Peggy	(8607)	3 Jul	0000	13.8	151.8	3	12	12 Jul	1200	23.9	111.2	dissipated
Typhoon Roger	(8608)	12 Jul	1200	16.2	142.8	13	18	18 Jul	0600	34.4	145.0	became extratropical
Severe Tropical Storm Sarah (I)	(8610)	30 Jul	0600	14.5	131.9	31	1	1 Aug	1800	17.3	121.5	dissipated
(II)		2 Aug	0000	17.8	123.9	2	4	4 Aug	1200	33.7	139.5	became extratropical
Typhoon Georgette	(8611)	8 Aug	1200	14.2	179.9	9	15	15 Aug	1200	18.8	155.5	dissipated
Tropical Depression		9 Aug	1200	17.4	113.3	10	12	12 Aug	0000	22.0	106.5	dissipated
Typhoon Tip	(8612)	13 Aug	0000	18.5	157.2	13	21	21 Aug	0600	37.7	161.0	became extratropical
Typhoon Vera	(8613)	15 Aug	0600	18.4	129.9	16	28	28 Aug	1800	39.0	128.3	became extratropical
Typhoon Wayne	(8614)	18 Aug	0000	15.5	117.7	18	6	6 Sep	0600	20.0	103.4	dissipated
Tropical Depression	(8615)	2 Sep	0000	30.0	140.0	2	3	3 Sep	1800	40.4	142.3	became extratropical
Typhoon Abby	(8616)	13 Sep	0600	11.8	145.5	14	20	20 Sep	0600	27.1	122.7	became extratropical
Typhoon Ben	(8617)	19 Sep	0000	10.0	160.1	19	30	30 Sep	0600	39.2	153.9	became extratropical
Typhoon Carmen	(8618)	2 Oct	0000	10.9	153.2	2	8	8 Oct	1800	39.1	149.2	became extratropical
Tropical Storm Dom	(8619)	5 Oct	1800	15.2	121.8	6	11	11 Oct	1800	16.8	106.2	dissipated
Typhoon Ellen	(8620)	11 Oct	0000	10.7	126.7	11	19	19 Oct	1200	21.3	108.9	dissipated
Typhoon Forrest	(8621)	15 Oct	1800	15.7	154.0	16	20	20 Oct	0600	34.2	156.6	became extratropical
Tropical Storm Georgia	(8622)	18 Oct	0000	11.2	128.5	18	22	22 Oct	1800	16.0	104.6	dissipated
Tropical Storm Herbert	(8623)	8 Nov	0600	13.4	119.1	9	12	12 Nov	0000	14.6	109.0	dissipated
Severe Tropical Storm Ida	(8624)	11 Nov	0000	6.8	132.9	11	16	16 Nov	1800	20.0	117.2	dissipated
Typhoon Joe	(8625)	18 Nov	0600	12.4	129.7	19	24	24 Nov	1800	24.1	127.3	dissipated
Tropical Depression		24 Nov	0000	8.1	110.3	24	25	25 Nov	0000	9.3	110.0	dissipated
Typhoon Kim	(8626)	28 Nov	0000	7.3	163.6	28	11	11 Dec	0000	17.9	131.1	dissipated
Tropical Storm Lex	(8627)	3 Dec	0000	7.1	164.9	3	8	8 Dec	0000	20.0	140.3	dissipated
Typhoon Marge	(8628)	14 Dec	0600	7.4	160.8	15	25	25 Dec	0000	12.0	111.8	dissipated
Typhoon Norris	(8629)	21 Dec	1800	8.5	166.5	22	1	1 Jan	1800	13.2	116.0	dissipated

TABLE 2. TROPICAL CYCLONE WARNINGS FOR SHIPPING ISSUED IN 1986

Tropical cyclone	No. of warnings issued	Date and time+ of issue of		Duration of warnings (hours)
		First warning	Last warning	
Tropical Storm Mac	42	23 May 0900	28 May 1200	123
Typhoon Nancy	18	22 Jun 1200	24 Jun 1200	48
* Typhoon Peggy	29	8 Jul 0600	11 Jul 1800	84
Severe Tropical Storm Sarah	19	31 Jul 1800	3 Aug 0000	54
* Tropical Depression	20	9 Aug 1200	11 Aug 2100	57
* Typhoon Wayne	152	18 Aug 0300	6 Sep 0000	453
Typhoon Vera	5	26 Aug 2100	27 Aug 0900	12
Typhoon Abby	21	18 Sep 0000	20 Sep 1200	60
Tropical Storm Dom	29	8 Oct 0300	11 Oct 1500	84
* Typhoon Ellen	68	11 Oct 0900	19 Oct 1800	201
Tropical Storm Georgia	27	19 Oct 0000	22 Oct 0600	78
Tropical Storm Herbert	33	8 Nov 0300	12 Nov 0300	96
Severe Tropical Storm Ida	32	13 Nov 0000	16 Nov 2100	93
Typhoon Joe	27	19 Nov 1800	23 Nov 0000	78
Typhoon Marge	27	21 Dec 1800	25 Dec 0000	78
Typhoon Norris #	2	31 Dec 1200	31 Dec 1500	3
Total	551			1 602

Typhoon Norris dissipated on 2 January 1987. 11 more warnings were issued.

* Tropical cyclones for which tropical cyclone warning signals were hoisted in H.K.

+ Times are given in hours U.T.C.

TABLE 3. TROPICAL CYCLONE WARNING SIGNALS HOISTED IN HONG KONG AND NUMBER OF WARNING BULLETINS ISSUED IN 1986

SUMMARY

Signal	No. of occasions	Total duration
1	6	136 h 30 min
3	7	153 h 45 min
8 NORTHWEST	-	-
8 SOUTHWEST	1	10 h 45 min
8 NORTHEAST	1	4 h 00 min
8 SOUTHEAST	-	-
9	-	-
10	-	-
Total	15	305 h 00 min

DETAILS

Tropical cyclone	No. of warning bulletins issued	Signal	Hoisted		Lowered	
			Date	Time*	Date	Time*
Typhoon Peggy	39	1	9 Jul	2310	11 Jul	0210
		3	11 Jul	0210	11 Jul	1530
		8 SW	11 Jul	1530	12 Jul	0215
		3	12 Jul	0215	12 Jul	1840
Tropical Depression	21	1	9 Aug	2145	10 Aug	1030
		3	10 Aug	1030	11 Aug	1515
Typhoon Wayne	59	1	19 Aug	1130	20 Aug	1100
		3	20 Aug	1100	20 Aug	2200
		8 NE	20 Aug	2200	21 Aug	0200
		3	21 Aug	0200	21 Aug	0500
		1	25 Aug	1145	26 Aug	1435
		1	4 Sep	0130	4 Sep	1500
		3	4 Sep	1500	5 Sep	1410
Typhoon Ellen	43	1	15 Oct	1415	16 Oct	2310
		3	16 Oct	2310	19 Oct	0915

* Hong Kong Time (U.T.C. + 8)

TABLE 4. FREQUENCY AND TOTAL DURATION OF DISPLAY OF TROPICAL CYCLONE WARNING SIGNALS : 1946-1986

Year \ Signals	1*	3*	8 NW+	8 SW+	8 NE+	8 SE+	9	10	Total	Total duration (hours)
1946	7	-	1	0	1	2	1	1	13	154.2
1947	6	-	1	0	1	0	0	0	8	124.2
1948	5	-	1	1	3	2	0	0	12	111.5
1949	4	-	0	0	1	1	1	0	7	67.1
1950	2	3	0	0	1	1	1	0	5	153.8
1951	4	3	0	0	2	3	1	0	10	182.8
1952	2	7	0	0	1	1	0	0	4	212.7
1953	2	4	1	1	2	1	1	0	8	251.2
1954	5	4	0	0	3	2	2	0	12	210.7
1955	0	3	0	0	0	0	0	0	0	100.8
1956	5	4	0	0	0	0	0	0	9	191.4
1957	4	9	1	1	2	2	0	1	20	295.8
1958	4	5	0	0	1	0	0	0	10	214.1
1959	1	1	0	0	0	0	0	0	2	36.6
1960	11	7	0	2	2	2	1	1	26	432.6
1961	6	7	1	2	1	0	1	1	19	192.9
1962	4	3	0	1	1	0	1	1	11	158.2
1963	4	5	0	0	1	0	0	0	10	175.8
1964	11	14	1	3	5	3	3	2	42	570.3
1965	7	6	0	0	1	1	0	0	15	239.7
1966	6	5	0	0	2	2	0	0	15	284.7
1967	8	6	0	0	2	1	0	0	17	339.2
1968	7	7	0	1	1	0	1	1	18	290.2
1969	4	2	0	0	0	0	0	0	6	110.3
1970	6	8	2	1	2	0	0	0	19	286.8
1971	9	10	1	3	2	2	1	1	29	323.4
1972	8	6	0	0	1	1	0	0	16	288.3
1973	8	6	1	1	1	0	1	0	18	416.8
1974	12	10	0	0	2	1	1	0	26	525.3
1975	8	6	1	0	0	1	1	1	18	292.3
1976	6	6	0	0	1	2	0	0	15	351.5
1977	8	6	0	0	1	0	0	0	15	395.2
1978	8	9	1	1	3	2	0	0	24	462.2
1979	5	5	1	0	2	2	1	1	17	281.3
1980	10	8	0	0	1	1	0	0	20	414.1
1981	5	4	0	0	1	1	0	0	11	202.3
1982	7	4	0	0	0	0	0	0	11	247.6
1983	8	7	0	1	2	2	1	1	22	289.7
1984	6	6	0	0	1	0	0	0	13	280.0
1985	5	4	1	0	0	1	0	0	11	193.6
1986	6	7	0	1	1	0	0	0	15	305.0
Total △	207	193	15	20	55	40	20	12	599	10 655.6
Mean △	6.7	6.2	0.4	0.5	1.3	1.0	0.5	0.3	14.6	259.9

* Figures in the columns under Signals No. 1 and No. 3 have different meanings prior to 1956 and care is required in interpreting these figures. Reference may be made to paragraph 4 on page

\+ Gale or Storm Signals, 5, 6, 7 and 8 were renumbered as 8 NW, 8 SW, 8 NE, 8 SE respectively with effect from 1 January 1973.

△ The total and annual mean values for the frequency of display of Stand By Signal No. 1 and the Strong Wind Signal No. 3 are calculated for the period 1956-1986. The corresponding values for higher signals and the total duration are calculated for the period 1946-1986.

TABLE 5. NUMBER OF TROPICAL CYCLONES IN HONG KONG'S AREA OF RESPONSIBILITY AND THE NUMBER THAT NECESSITATED THE DISPLAY OF TROPICAL CYCLONE WARNING SIGNALS IN HONG KONG : 1946-1986

Year	Number in Hong Kong's Area of responsibility	Number necessitating the display of signals in Hong Kong
1946	13	6
1947	21	6
1948	15	4
1949	17	4
1950	14	5
1951	13	7
1952	21	9
1953	19	6
1954	18	7
1955	14	3
1956	23	5
1957	12	6
1958	15	5
1959	18	2
1960	18	9
1961	24	6
1962	20	4
1963	13	4
1964	26	10
1965	16	6
1966	17	6
1967	17	8
1968	12	6
1969	11	4
1970	21	6
1971	20	9
1972	15	5
1973	17	9
1974	21	11
1975	12	7
1976	10	5
1977	10	8
1978	20	8
1979	18	6
1980	17	10
1981	15	5
1982	16	5
1983	15	7
1984	14	5
1985	15	5
1986	16	4
Total	679	253
Mean	16.6	6.2

TABLE 6. DURATION OF DISPLAY OF TROPICAL CYCLONE WARNING SIGNALS IN HONG KONG : 1946 - 1986

Signal	Duration of each occasion						Duration per year					
	Mean		Maximum		Minimum		Mean		Maximum		Minimum	
1*	20 h	46 min	124 h	40 min	1 h	20 min	138 h	43 min	273 h	15 min	12 h	40 min
3*	20	31	71	45	1	00	127	43	267	45	23	55
8 NW+	7	15	15	45	1	30	2	39	15	45	0	0
8 SW+	5	31	11	10	2	30	2	42	16	10	0	0
8 NE+	10	33	35	35	2	15	14	10	61	45	0	0
8 SE+	7	37	21	45	0	20	7	26	31	15	0	0
Gale or Storm Signals	16	15	55	17	2	40	26	57	82	25	0	0
9	3	31	6	30	0	25	1	43	11	00	0	0
10	6	03	9	10	2	30	1	46	12	10	0	0

* 1956 - 1986

+ Gale or Storm Signals, 5, 6, 7, and 8 were renumbered as 8 NW, 8 SW, 8 NE, 8 SE respectively with effect from 1 January 1973.

TABLE 7. CASUALTIES AND DAMAGE CAUSED BY TROPICAL CYCLONES IN HONG KONG : 1937 - 1986

Year	Date	Name of tropical cyclone	Ocean-going vessels in trouble	Small craft sunk or wrecked	Small craft damaged	Persons dead	Persons missing	Persons injured
1937	1 - 2 Sep	Typhoon	28	1 255	600	11 000	*	*
1957	20 - 23 Sep	T. Gloria	5	2	Several	8	*	111
1960	4 - 12 Jun	T. Mary	6	352	462	45	11	127
1961	17 - 21 May	T. Alice	*	*	*	4	0	20
	7 - 10 Sep	S.T.S. Olga	0	1	0	7	0	0
1962	28 Aug - 2 Sep	T. Wanda	36	1 297	756	130	53	*
1963	1 - 9 Sep	T. Faye	0	2	0	3	0	51
1964	26 - 28 May	T. Viola	5	18	18	0	0	41
	2 - 9 Aug	T. Ida	3	7	60	5	4	56
	2 - 6 Sep	T. Ruby	20	32	282	38	6	300
	4 - 10 Sep	T. Sally	0	0	0	9	0	24
	7 - 13 Oct	T. Dot	2	31	59	26	10	85
1965	6 - 16 Jul	T. Freda	0	1	0	2	0	16
	25 - 28 Sep	T.S. Agnes	0	0	0	5	0	3
1966	12 - 14 Jul	S.T.S. Lola	0	*	6	1	0	6
1967	19 - 22 Aug	S.T.S. Kate	3	1	0	0	0	3
1968	17 - 22 Aug	T. Shirley	1	*	3	0	0	4
1969	22 - 29 Jul	T. Viola	0	3	0	0	0	0
1970	1 - 3 Aug	T. D.	0	0	0	2+	0	0
	8 - 14 Sep	T. Georgia	2	0	*	0	0	0
1971	15 - 18 Jun	T. Freda	8	0	0	2	0	30
	16 - 22 Jul	T. Lucy	10	2	13	0	0	38
	10 - 17 Aug	T. Rose	34	303	*	110	5	286
1972	4 - 9 Nov	T. Pamela	3	0	0	1	0	8
1973	14 - 20 Jul	T. Dot	14	*	*	1	0	38
1974	7 - 14 Jun	T. Dinah	1	*	*	0	0	0
	18 - 22 Jul	T. Ivy	2	*	*	0	0	0
	15 - 19 Oct	T. Carmen	5	*	*	1	0	0
	21 - 27 Oct	T. Della	2	*	*	0	0	0
1975	10 - 14 Aug	T. D.	3	1	*	2	1	0
	9 - 14 Oct	T. Elsie	7	2	1	0	0	46
	16 - 23 Oct	S.T.S. Flossie	1	*	*	0	0	0
1976	22 Jun - 4 Jul	T. Ruby	0	0	0	3	2	2
	21 - 26 Jul	S.T.S. Violet	0	0	0	2	1	1
	5 - 6 Aug	S.T.S. Clara	0	0	0	0	0	4
	21 - 24 Aug	T.S. Ellen	0	4	7	27	3	65
	15 - 21 Sep	T. Iris	6	0	1	0	0	27
1977	4 - 6 Jul	T.D.	0	0	0	0	0	2
	3 - 5 Sep	T.S. Carla	1	0	0	0	0	1
	22 - 25 Sep	S.T.S. Freda	2	0	0	1	0	37
1978	24 - 30 Jul	S.T.S. Agnes	0	25	42	3	0	134
	9 - 12 Aug	T.S. Bonnie	2	0	0	0	0	0
	23 - 28 Aug	S.T.S. Elaine	8	5	8	1	0	51
	22 - 26 Sep	S.T.S. Kit	0	1	0	0	7	0
	7 - 16 Oct	S.T.S. Nina	0	0	0	0	0	2
	17 - 29 Oct	T. Rita	1	5	0	0	0	3
1979	1 - 6 Jul	T. Ellis	0	2	0	0	0	0
	26 - 30 Jul	T.S. Gordon	0	2	0	0	0	0
	28 Jul - 3 Aug	T. Hope	29	167	207	12	0	260
	6 - 9 Aug	T.D.	0	3	0	0	0	0
	16 - 24 Sep	S.T.S. Mac	2	12	0	1	0	67
1980	5 - 12 Jul	S.T.S. Ida	1	0	0	0	0	0
	18 - 23 Jul	T. Joe	4	0	1	2	1	59
	20 - 28 Jul	T. Kim	0	2	1	0	0	0
	29 Oct - 2 Nov	T.S. Cary	0	0	2	0	0	0
1981	3 - 7 Jul	S.T.S. Lynn	0	0	3	0	0	32
1982	27 Jun - 2 Jul	T.S. Tess	0	1	0	0	0	16
	22 - 30 Jul	T. Andy	0	0	1	0	0	0
	5 - 16 Sep	T. Irving	0	0	2	0	0	0
1983	12 - 19 Jul	T. Vera	0	1	0	0	0	0
	29 Aug - 9 Sep	T. Ellen	44	135	225	10	12	333
	10 - 14 Oct	T. Joe	2	0	3	0	0	58
	20 - 26 Oct	S.T.S. Lex	0	0	1	0	0	0
1984	27 Aug - 7 Sep	T. Ike	0	0	0	0	0	1
1985	19 - 25 Jun	T. Hal	0	4	2	0	1	13
	1 - 7 Sep	T. Tess	6	1	3	2	0	12
	13 - 22 Oct	T. Dot	0	0	0	0	0	1
1986	3 - 12 Jul	T. Peggy	3	0	3	1	0	26
	9 - 12 Aug	T.D.	0	1	5	0	0	3
	18 Aug - 6 Sep	T. Wayne	0	3	0	3	1	15+
	11 - 19 Oct	T. Ellen	1	2	1	0	0	4

N.B. Information compiled from Hong Kong newspapers and from Marine Department's records

* Data unavailable

+ Struck by lightning

TABLE 8. SHIPS DAMAGED BY TROPICAL CYCLONES IN HONG KONG, 1986

Year	Date	Name of tropical cyclone	Name of ship	Location of incident	Nature of incident
1986	11 - 13 Jul	T. Peggy	M.V. Etharickers	near Yau Ma Tei	Adrift
			M.V. Andhika-Wanasatya	off Kennedy Town	Adrift
			M.V. Hwa Lie	110 km east of Hong Kong	Sunk
	17 - 18 Oct	T. Ellen	M.V. Dai Yun Shan	near Yau Ma Tei	Adrift

TABLE 9. A SUMMARY OF METEOROLOGICAL OBSERVATIONS RECORDED IN HONG KONG DURING THE PASSAGES OF TROPICAL CYCLONES IN 1986

(a)

Name of tropical cyclone	Month	Nearest approach to Hong Kong						Minimum hourly M.S.L. pressure at the Royal Observatory			Maximum storm surge				
		Day	Time*	Direction	Distance	Movement	Estimated minimum central pressure	Day	Time*	Pressure	Quarry Bay	Tai Po Kau	Chi Ma Wan	Lok On Pai	Tsim Bei Tsui
					km	km/h	hPa			hPa	m	m	m	m	m
T. Peggy	Jul	11	2100	NE	90	WNW 13	980	11	1900	984.7	0.7	1.1	1.1	0.8	1.1
T.D.	Aug	10	2200	SW	510	NW 15	996	10	1700	1 002.5	0.6	0.7	-	0.7	1.4
T. Wayne (First passage)	Aug	20	2200	SE	100	NE 17	980	21	0000	996.8	0.4	0.7	0.3	0.5	1.1
T. Wayne (Second Passage)	Aug	26	0100	SE	325	SW 17	995	26	1500	1 000.5	0.5	0.7	0.4	0.5	0.9
T. Wayne (Third Passage)	Sep	4	2000	S	300	W 24	950	4	1600	999.2	0.6	0.8	0.6	0.6	0.8
T. Ellen	Oct	18	0700	SSW	150	WNW 6	975	17	1600	1 006.8	0.3	0.6	-	0.3	-

* Hong Kong Time (U.T.C. + 8)

(b)

Name of tropical cyclone	Month	Maximum 60-min mean wind in points and km/h		Maximum 10-min mean wind in points and km/h		Maximum gust peak speed in km/h with direction in points		Rainfall at the Royal Observatory (mm)				
		Royal Observatory	Waglan Island	Royal Observatory	Waglan Island	Royal Observatory	Waglan Island	(i) 600 km	(ii) 24 hours	(iii) 48 hours	(iv) 72 hours	(i)+(iv)
T. Peggy	Jul	W 40	S 108	WNW 52	S 115	SSW 96	S 135	228.9	11.9	20.4	20.4	249.3
T.D.	Aug	E 38	ESE SE 65	E 47	ESE 90	E 87	E ESE 108	142.4	58.3	62.3	62.3	204.7
T. Wayne (First passage)	Aug	ENE 31	NNE 72	E 34	NE 76	ENE 83	NNE 104	41.9	NIL	6.2	6.2	48.1
T. Wayne (Second passage)	Aug	ENE 20	E 51	ENE 25	ESE 58	ENE 47	ESE 79	TRACE	NIL	NIL	2.8	2.8
T. Wayne (Third passage)	Sep	ESE 41	E 72	ESE 49	E 87	ESE 83	E 112	71.2	22.9	108.2	114.3	185.5
T. Ellen	Oct	ENE 43	E 81	ENE 51	E 90	E 94	E 112	28.7	NIL	NIL	NIL	28.7

N.B. (i) during the period when the tropical cyclone was centred within 600 km of Hong Kong
(ii) during the 24-hour period after the tropical cyclone moved outside (or dissipated within) the 600 km radius
(iii) during the 48-hour period after the tropical cyclone moved outside (or dissipated within) the 600 km radius
(iv) during the 72-hour period after the tropical cyclone moved outside (or dissipated within) the 600 km radius

TABLE 10. TYPHOONS WHICH REQUIRED THE HOISTING OF THE HURRICANE SIGNAL NO. 10 DURING THE PERIOD 1946–1986

Name of typhoon	Date	Nearest approach to Royal Observatory km	Minimum M.S.L. pressure (hPa)		Maximum 60-min mean winds in points and km/h								Maximum gust peak speed in km/h with direction in points							
			Hourly	Inst.	Royal Observatory	Hong Kong Airport	Waglan Island	Cheung Chau	Tate's Cairn	Cape Collinson	Green Island	Castle Peak	Royal Observatory	Hong Kong Airport	Waglan Island	Cheung Chau	Tate's Cairn	Cape Collinson	Green Island	Castle Peak
-	18 Jul 1946	S 70	985.7	-	NE -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gloria	22 Sep 1957	SW 55	986.2	984.3	ESE 115	ESE 72	E 113	-	-	-	-	-	E 187	ENE 158	ENE 185	-	-	-	-	-
Mary	9 Jun 1960	WNW 10	974.3	973.8	SSE 96	SSE 92	SSW 112	-	-	-	-	-	SSE 191	SE 164	SSW 194	-	-	-	-	-
Alice	19 May 1961	0	981.6	981.1	ENE 83	E 70	ESE 90	ENE 76	-	-	-	-	E 166	ENE 139	SW 128	ENE 135	-	-	-	-
Wanda	1 Sep 1962	SSW 20	955.1	953.2	N 133	N 108	NW 148	NW 118	SE 189	-	-	-	N 259	N 229	NNW 216	NW 232	ESE 284	-	-	-
Ruby	5 Sep 1964	SW 30	971.0	968.2	E 110	N 118	ENE 148	NE 113	ESE 167	SSE 153	-	-	NNE 227	NW 203	E 230	NNE 216	E 268	S 221	-	-
Dot	13 Oct 1964	E 35	978.9	977.3	NNW 88	N 67	N 117	NNW 96	NNE 157	N 101	-	-	N 175	N 198	N 184	WNW 205	NE 220	NNE 187	-	-
Shirley	21 Aug 1968	0	968.7	968.6	N 68	N 75	NNE 124	SSW 90	NNE 126	SSW 85	-	-	N 133	N 151	NE 209	SSW 167	NNE 203	N 173	-	-
Rose	17 Aug 1971	WSW 20	984.5	982.8	SE 103	SE 122	ESE 140	SE 131	S 148	SSW 137	-	-	ESE 224	ESE 211	ESE 189	SE 194	S 221	S 191	-	-
Elsie	14 Oct 1975	S 50	996.4	996.2	ENE 58	NNW 67	NNE 118	N 106	NE 130	-	NNW 118	N 65	NE 140	N 140	ENE 176	NE 158	NNE 180	-	NE 167	N 121
Hope	2 Aug 1979	NNW 10	961.8	961.6	W 75	W 115	SW 144	SSW 117	NW 115	-	W 108	- 96	W 175	WNW 182	SW 198	WSW 185	WNW 229	-	W 167	- 173
Ellen	9 Sep 1983	SW 45	983.9	983.1	E 92	E 112	ESE 169	ESE 171	E 126	-	S 137	SE 94	E 185	E 203	E 227	SSE 238	ENE 218	-	S 220*	SE 171

* estimated, exceeding upper limit of anemogram.

5. TROPICAL CYCLONE POSITION AND INTENSITY DATA, 1986

Six-hourly position and intensity data are tabulated for the following tropical cyclones in 1986 in the western North Pacific and the South China Sea (i.e. the area between the equator and 45°N, and between 100°E and 180°).

Surface winds in this section refer to wind speeds averaged over a period of 10 minutes.

SIX-HOURLY POSITION AND INTENSITY DATA OF
TYPHOON JUDY (8601)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface wind (m/s)	Lat. °N	Long. °E
Feb	1	0000	T.D.	1000	13	4.0	142.0
		0600	T.D.	998	16	4.4	141.0
		1200	T.D.	997	16	5.0	140.0
		1800	T.S.	996	18	5.8	138.8
	2	0000	T.S.	995	21	6.7	137.6
		0600	T.S.	993	23	7.8	136.2
		1200	S.T.S.	991	25	8.8	134.8
		1800	S.T.S.	990	25	9.7	133.4
	3	0000	S.T.S.	988	25	10.5	132.4
		0600	S.T.S.	983	28	11.4	131.7
		1200	S.T.S.	981	28	12.4	131.1
		1800	S.T.S.	980	31	13.6	130.8
	4	0000	S.T.S.	975	31	14.9	131.4
		0600	T.	970	36	16.0	132.3
		1200	T.	975	36	17.1	133.5
		1800	T.	975	36	18.1	135.2
	5	0000	T.	980	33	18.5	136.7
		0600	S.T.S.	995	28	18.6	138.0
		1200	T.S.	1000	21	18.7	139.3
		1800	T.D.	1005	13	18.7	140.5
	6	0000	T.D.	1010	13	18.7	141.7

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF
TYPHOON KEN (8602)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface wind (m/s)	Lat. °N	Long. °E
Apr	26	1800	T.D.	995	16	7.3	139.7
	27	0000	T.S.	990	21	7.6	139.6
		0600	S.T.S.	983	28	8.0	139.4
		1200	S.T.S.	981	29	8.3	139.3
		1800	S.T.S.	980	32	8.9	139.3
	28	0000	T.	980	36	9.7	139.3
		0600	T.	980	36	10.0	139.2
		1200	T.	983	35	10.2	139.0
		1800	S.T.S.	986	31	10.3	138.9
	29	0000	S.T.S.	990	25	10.3	138.7
		0600	T.S.	994	23	10.4	138.5
		1200	T.S.	997	22	10.5	138.1
		1800	T.S.	998	20	10.5	137.9
	30	0000	T.S.	999	18	10.4	137.6
		0600	T.S.	999	18	10.3	137.3
		1200	T.D.	999	17	10.3	137.0
		1800	T.D.	999	16	10.0	136.3
May	1	0000	T.D.	1000	14	9.4	135.7
		0600	T.D.	1000	13	9.2	135.4
		1200	T.D.	1000	13	9.3	135.1
		1800	T.D.	1000	13	9.4	134.9
	2	0000	T.D.	1000	13	9.7	134.7
		0600	T.D.	1000	13	10.0	134.7
		1200	T.D.	1000	11	10.2	134.6
		1800	T.D.	1001	11	10.3	134.6

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF
TYPHOON LOLA (8603)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface wind (m/s)	Lat. °N	Long. °E
May	17	0000	T.D.	990	16	7.9	160.2
		0600	T.S.	981	21	7.9	159.6
		1200	T.S.	980	23	7.9	159.2
		1800	S.T.S.	975	31	8.0	159.0
	18	0000	T.	975	33	8.2	158.9
		0600	T.	970	36	8.7	158.9
		1200	T.	960	41	9.2	158.9
		1800	T.	945	46	9.8	158.6
	19	0000	T.	930	51	10.3	158.0
		0600	T.	915	57	11.0	157.0
		1200	T.	910	61	11.6	156.2
		1800	T.	915	61	12.3	155.3
	20	0000	T.	915	61	13.3	154.1
		0600	T.	910	61	14.3	153.1
		1200	T.	915	61	15.2	152.2
		1800	T.	920	59	16.3	151.4
	21	0000	T.	920	57	17.5	150.8
		0600	T.	920	54	18.9	150.4
		1200	T.	930	51	20.5	150.2
		1800	T.	935	46	22.0	150.4
	22	0000	T.	940	41	23.8	150.8
		0600	T.	950	39	25.9	151.9
		1200	T.	960	36	28.0	153.7
		1800	S.T.S.	970	31	30.3	156.5
	23	0000	S.T.S.	980	25	32.7	160.0
		0600	T.S.	980	23	35.2	164.3

Became extratropical

SIX-HOURLY POSITION AND INTENSITY DATA OF
TROPICAL STORM MAC (8604)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface wind (m/s)	Lat. °N	Long. °E
May	23	0000	T.D.	999	13	19.6	114.6
		0600	T.D.	999	16	19.6	115.1
		1200	T.D.	999	16	19.7	115.6
		1800	T.D.	998	16	20.0	116.1
	24	0000	T.D.	998	16	20.2	116.6
		0600	T.D.	996	16	20.3	117.2
		1200	T.D.	996	16	20.2	117.8
		1800	T.D.	996	16	20.1	118.4
	25	0000	T.S.	996	18	20.0	119.0
		0600	T.S.	996	18	19.9	119.7
		1200	T.S.	996	18	19.9	120.2
		1800	T.S.	996	18	20.0	120.7
	26	0000	T.S.	994	21	20.5	121.1
		0600	T.S.	994	21	21.2	121.6
		1200	T.S.	994	21	21.8	122.1
		1800	T.S.	996	18	22.4	122.7
	27	0000	T.S.	996	18	23.0	122.9
		0600	T.S.	996	18	23.4	123.0
		1200	T.S.	996	18	23.4	122.7
		1800	T.S.	996	18	23.3	123.1
	28	0000	T.S.	998	18	23.3	123.5
		0600	T.D.	998	16	23.3	124.0
		1200	T.D.	1000	13	23.4	125.0
		1800	T.D.	1000	13	23.6	126.2
	29	0000	T.D.	1000	13	23.8	127.5
		0600	T.D.	1000	13	24.4	129.4

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF
TYPHOON NANCY (8605)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface wind (m/s)	Lat. °N	Long. °E
Jun	21	0000	T.D.	1004	13	10.6	133.7
		0600	T.D.	1000	16	12.0	131.9
		1200	T.D.	995	16	13.1	130.4
		1800	T.S.	990	21	14.2	129.2
	22	0000	T.S.	985	23	15.3	128.0
		0600	T.S.	985	23	16.7	126.5
		1200	S.T.S.	980	25	17.9	125.1
		1800	S.T.S.	975	31	18.9	124.0
	23	0000	T.	970	36	20.0	123.0
		0600	T.	960	39	21.3	122.2
		1200	T.	955	39	22.4	121.8
		1800	T.	965	36	23.6	121.8
	24	0000	S.T.S.	970	31	25.6	121.9
		0600	T.S.	980	23	28.0	121.9
		1200	T.S.	985	21	30.1	123.3
		1800	T.S.	995	18	32.0	125.5
	25	0000	T.S.	997	18	35.1	128.8

Became extratropical

SIX-HOURLY POSITION AND INTENSITY DATA OF TROPICAL STORM OWEN (8606)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface wind (m/s)	Lat. °N	Long. °E
Jun	28	0000	T.D.	1001	16	15.5	135.5
		0600	T.D.	1001	16	15.4	133.9
		1200	T.D.	1000	16	15.7	132.6
		1800	T.S.	999	18	16.0	131.8
	29	0000	T.S.	998	18	16.2	131.2
		0600	T.S.	993	18	16.4	130.6
		1200	T.S.	992	21	16.5	130.1
		1800	T.S.	992	21	16.7	129.4
	30	0000	T.S.	990	23	17.2	128.6
		0600	T.S.	991	23	18.1	128.0
		1200	T.S.	992	23	18.8	127.5
		1800	T.S.	994	21	19.4	127.1
Jul	1	0000	T.S.	995	18	20.1	126.9
		0600	T.D.	995	16	21.8	127.2
		1200	T.D.	995	16	23.4	127.7
		1800	T.D.	997	13	24.4	128.2
	2	0000	T.D.	1000	13	25.3	128.7

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON PEGGY (8607)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface wind (m/s)	Lat. °N	Long. °E
Jul	3	0000	T.D.	1003	13	13.8	151.8
		0600	T.D.	1001	13	14.0	150.7
		1200	T.D.	1000	16	14.2	149.4
		1800	T.S.	998	18	14.4	148.0
	4	0000	T.S.	995	21	14.5	146.4
		0600	T.S.	988	23	14.6	145.2
		1200	S.T.S.	982	25	14.7	144.0
		1800	S.T.S.	975	28	14.8	142.7
	5	0000	T.	970	33	14.9	141.5
		0600	T.	955	39	14.9	140.2
		1200	T.	940	43	15.0	138.8
		1800	T.	935	46	15.2	137.4
	6	0000	T.	935	49	15.4	136.0
		0600	T.	920	54	15.7	134.6
		1200	T.	910	57	16.0	133.2
		1800	T.	894	61	16.4	131.8
	7	0000	T.	905	61	16.7	130.4
		0600	T.	910	57	17.0	129.0
		1200	T.	920	54	17.2	127.6
		1800	T.	925	51	17.3	126.5
	8	0000	T.	930	51	17.3	125.7
		0600	T.	920	54	17.4	124.8
		1200	T.	920	54	17.6	123.8
		1800	T.	925	51	17.8	122.8
	9	0000	T.	930	49	17.9	122.0
		0600	T.	945	46	18.1	121.1
		1200	T.	965	41	18.5	120.5
		1800	T.	975	36	19.0	120.0
	10	0000	T.	975	33	19.5	119.4
		0600	T.	975	33	20.0	118.6
		1200	T.	970	36	20.4	117.8
		1800	T.	970	36	20.9	117.1
	11	0000	T.	970	36	21.6	116.3
		0600	T.	975	36	22.5	115.5
		1200	S.T.S.	980	31	23.0	114.8
		1800	S.T.S.	985	28	23.3	114.1
	12	0000	S.T.S.	985	28	23.6	113.3
		0600	S.T.S.	990	25	23.8	112.5
		1200	T.D.	996	13	23.9	111.2

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF
TYPHOON ROGER (8608)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface wind (m/s)	Lat. °N	Long. °E
Jul	12	1200	T.D.	1006	13	16.2	142.8
		1800	T.D.	1004	16	16.4	141.1
	13	0000	T.S.	998	18	16.7	139.4
		0600	T.S.	994	21	17.5	138.2
		1200	T.S.	990	23	18.5	137.3
		1800	T.S.	986	23	19.6	136.4
	14	0000	S.T.S.	984	25	20.5	135.3
		0600	S.T.S.	984	25	21.3	134.1
		1200	S.T.S.	981	25	22.1	133.0
		1800	S.T.S.	975	28	23.0	132.1
	15	0000	T.	965	33	23.9	131.2
		0600	T.	960	39	24.6	130.5
		1200	T.	955	39	25.2	129.9
		1800	T.	960	36	25.8	129.3
	16	0000	T.	970	33	26.3	129.0
		0600	S.T.S.	981	31	27.2	128.9
		1200	S.T.S.	982	28	28.2	129.1
		1800	T.S.	983	23	29.2	129.7
	17	0000	T.S.	984	23	30.6	130.8
		0600	T.S.	989	21	31.9	132.4
		1200	T.S.	993	21	32.8	134.8
		1800	T.S.	994	21	33.6	137.6
	18	0000	T.S.	996	21	34.6	141.2
		0600	T.D.	998	16	34.4	145.0

Became extratropical

SIX-HOURLY POSITION AND INTENSITY DATA OF SEVERE TROPICAL STORM SARAH (I) (8610)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface wind (m/s)	Lat. °N	Long. °E
Jul	30	0600	T.D.	1000	13	14.5	131.9
		1200	T.D.	1000	13	14.8	130.6
		1800	T.D.	999	16	15.1	129.3
	31	0000	T.D.	998	16	15.5	128.1
		0600	T.D.	996	16	15.9	127.0
		1200	T.S.	994	21	16.3	126.0
		1800	T.S.	991	23	16.6	125.1
Aug	1	0000	T.S.	993	23	16.9	124.3
		0600	T.S.	993	23	17.2	123.3
		1200	T.S.	994	21	17.3	122.2
		1800	T.S.	996	18	17.3	121.5

Dissipated

SEVERE TROPICAL STORM SARAH (II) (8610)

Aug	2	0000	T.S.	986	21	17.8	123.9
		0600	T.S.	986	21	18.4	124.5
		1200	T.S.	986	21	19.1	125.4
		1800	T.S.	984	23	19.9	126.3
	3	0000	S.T.S.	983	25	20.7	127.3
		0600	S.T.S.	983	25	21.8	128.6
		1200	S.T.S.	982	25	23.2	130.1
		1800	T.S.	982	23	25.2	132.2
	4	0000	T.S.	982	23	27.8	134.6
		0600	T.S.	982	23	30.8	137.1
		1200	T.S.	982	21	33.7	139.5

Became extratropical

SIX-HOURLY POSITION AND INTENSITY DATA OF
TYPHOON GEORGETTE (8611)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface wind (m/s)	Lat. °N	Long. °E
Aug	8	1200	T.D.	1000	13	14.2	179.9
		1800	T.D.	1000	13	14.3	178.7
	9	0000	T.D.	1000	16	14.5	177.4
		0600	T.S.	998	18	14.7	176.2
		1200	T.S.	996	21	14.9	175.0
		1800	T.S.	993	23	15.2	173.8
	10	0000	T.S.	990	23	15.4	172.5
		0600	S.T.S.	988	25	15.5	171.8
		1200	S.T.S.	985	25	15.6	171.2
		1800	S.T.S.	983	31	15.7	170.5
	11	0000	S.T.S.	980	31	15.9	169.9
		0600	T.	980	33	16.0	169.6
		1200	T.	975	33	16.1	169.4
		1800	T.	975	33	16.4	169.2
	12	0000	T.	970	36	16.7	169.2
		0600	T.	975	33	17.2	168.9
		1200	S.T.S.	980	31	17.7	168.5
		1800	S.T.S.	985	28	18.3	167.9
	13	0000	S.T.S.	988	25	19.0	167.2
		0600	T.S.	990	23	19.8	165.7
		1200	T.S.	992	21	20.6	164.0
		1800	T.S.	995	21	21.1	162.1
	14	0000	T.S.	997	18	21.0	160.1
		0600	T.S.	997	18	21.6	157.6
		1200	T.S.	995	18	22.4	155.0
		1800	T.S.	990	18	21.9	152.0
	15	0000	T.S.	985	18	20.1	151.9
		0600	T.D.	985	16	18.9	153.1
		1200	T.D.	990	16	18.8	155.5

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF
THE TROPICAL DEPRESSION OF 9-12 AUGUST 1986

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface wind (m/s)	Lat. °N	Long. °E
Aug	9	1200	T.D.	998	13	17.4	113.3
		1800	T.D.	998	13	17.7	112.6
	10	0000	T.D.	998	13	17.9	111.9
		0600	T.D.	997	13	18.3	111.3
		1200	T.D.	996	13	18.8	111.0
		1800	T.D.	996	13	19.3	110.4
	11	0000	T.D.	995	13	19.2	109.5
		0600	T.D.	994	16	19.1	108.3
		1200	T.D.	994	16	19.6	107.6
		1800	T.D.	996	16	20.4	107.0
	12	0000	T.D.	997	13	22.0	106.5

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON TIP (8612)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface wind (m/s)	Lat. °N	Long. °E
Aug	13	0000	T.S.	992	16	18.5	157.2
		0600	T.S.	992	23	18.7	156.7
		1200	T.S.	992	23	18.7	156.2
		1800	S.T.S.	990	25	18.7	155.9
	14	0000	S.T.S.	990	25	18.7	155.6
		0600	S.T.S.	990	25	19.2	155.9
		1200	S.T.S.	985	25	19.5	156.4
		1800	S.T.S.	982	25	19.8	156.3
	15	0000	S.T.S.	980	28	20.2	156.3
		0600	S.T.S.	980	28	21.2	156.2
		1200	S.T.S.	980	28	22.5	156.0
		1800	S.T.S.	975	31	23.6	154.8
	16	0000	T.	970	33	24.5	153.8
		0600	T.	965	33	24.9	153.4
		1200	T.	965	36	25.2	153.1
		1800	T.	965	33	25.4	152.9
	17	0000	T.	970	33	25.6	152.8
		0600	T.	975	33	26.2	153.6
		1200	S.T.S.	975	31	26.4	154.7
		1800	S.T.S.	975	31	26.7	155.9
	18	0000	S.T.S.	975	31	27.0	156.9
		0600	S.T.S.	975	28	27.1	157.8
		1200	S.T.S.	975	28	27.0	158.7
		1800	S.T.S.	975	28	27.0	159.8
	19	0000	S.T.S.	975	28	27.0	161.2
		0600	S.T.S.	975	28	27.1	162.6
		1200	S.T.S.	975	25	27.7	163.8
		1800	S.T.S.	975	25	29.0	164.8
	20	0000	S.T.S.	975	25	30.6	164.9
		0600	S.T.S.	975	25	32.1	164.9
		1200	S.T.S.	980	25	33.6	164.7
		1800	S.T.S.	980	25	35.2	164.1
	21	0000	T.S.	980	23	36.6	163.0
		0600	T.S.	980	23	37.7	161.0

Became extratropical

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON VERA (8613)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface wind (m/s)	Lat. °N	Long. °E
Aug	15	0600	T.D.	995	13	18.4	129.9
		1200	T.D.	993	16	18.6	129.9
		1800	T.D.	992	16	18.8	129.9
	16	0000	T.S.	990	18	19.0	129.7
		0600	T.S.	990	18	19.1	129.4
		1200	T.S.	990	18	18.8	129.1
		1800	T.S.	990	21	18.2	129.3
	17	0000	T.S.	990	21	18.1	131.4
		0600	T.S.	990	21	18.7	133.3
		1200	T.S.	989	21	19.9	135.1
		1800	T.S.	988	21	21.0	136.5
	18	0000	T.S.	986	21	22.1	137.3
		0600	T.S.	985	23	23.0	137.9
		1200	T.S.	984	23	23.5	137.9
		1800	T.S.	984	23	23.2	137.4
	19	0000	T.S.	982	23	22.6	137.9
		0600	T.S.	980	23	22.4	138.4
		1200	T.S.	975	23	22.0	139.1
		1800	S.T.S.	970	28	21.6	140.2
	20	0000	T.	970	33	21.4	141.3
		0600	T.	965	33	21.4	141.9
		1200	T.	965	33	21.3	142.4
		1800	T.	960	36	21.3	142.9
	21	0000	T.	955	39	21.4	143.5
		0600	T.	950	41	21.5	144.2
		1200	T.	945	43	21.6	144.7
		1800	T.	935	46	21.8	145.2
	22	0000	T.	923	51	21.9	145.7
		0600	T.	925	51	22.0	145.7
		1200	T.	930	49	22.1	145.5
		1800	T.	935	46	22.1	145.2
	23	0000	T.	940	46	22.2	144.5
		0600	T.	945	43	22.2	143.6
		1200	T.	945	43	22.2	142.5
		1800	T.	945	43	22.2	141.0
	24	0000	T.	945	43	22.2	139.9
		0600	T.	940	46	22.6	138.6
		1200	T.	940	46	23.0	136.9
		1800	T.	945	43	23.4	135.2
	25	0000	T.	950	43	24.0	133.5
		0600	T.	950	43	24.5	131.9
		1200	T.	950	41	25.0	130.2
		1800	T.	950	41	25.6	128.8
	26	0000	T.	950	41	26.1	127.3
		0600	T.	955	41	26.7	126.2
		1200	T.	955	41	27.4	125.4
		1800	T.	955	41	28.1	124.7
	27	0000	T.	960	39	29.0	124.4
		0600	T.	960	39	29.8	124.3
		1200	T.	960	39	30.8	124.3
		1800	T.	960	36	32.0	124.5
	28	0000	T.	965	33	33.9	125.1
		0600	T.	965	33	35.8	125.8
		1200	S.T.S.	970	28	37.7	127.1
		1800	T.S.	975	23	39.0	128.3

Became extratropical

SIX-HOURLY POSITION AND INTENSITY DATA OF
TYPHOON WAYNE (8614)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface wind (m/s)	Lat. °N	Long. °E
Aug	18	0000	T.D.	997	13	15.5	117.7
		0600	T.D.	995	16	15.8	117.0
		1200	T.S.	990	18	16.1	116.5
		1800	T.S.	985	23	16.5	116.0
	19	0000	S.T.S.	980	31	17.1	115.4
		0600	T.	970	33	17.9	114.7
		1200	T.	970	33	18.6	114.0
		1800	T.	970	33	19.1	113.6
	20	0000	T.	970	33	19.7	113.3
		0600	S.T.S.	980	31	20.4	113.5
		1200	S.T.S.	980	31	21.2	114.3
		1800	S.T.S.	980	28	21.7	115.1
	21	0000	T.	965	33	22.2	116.0
		0600	T.	960	39	22.7	117.1
		1200	T.	960	39	23.1	118.2
		1800	T.	970	36	23.6	119.3
	22	0000	T.	970	36	24.1	120.5
		0600	T.	975	33	24.7	121.8
		1200	T.	975	33	25.1	123.1
		1800	S.T.S.	980	28	25.1	124.0
	23	0000	T.S.	985	23	24.8	124.6
		0600	T.S.	990	23	24.4	124.9
		1200	T.S.	990	21	24.2	124.6
		1800	T.S.	985	21	23.7	123.9
	24	0000	T.S.	985	21	23.4	123.4
		0600	T.S.	990	21	22.6	122.4
		1200	T.S.	990	21	21.9	121.4
		1800	T.S.	990	21	21.5	120.2
	25	0000	T.S.	992	21	21.3	118.8
		0600	T.S.	995	21	21.1	117.7
		1200	T.S.	995	18	20.4	116.7
		1800	T.S.	995	18	19.9	116.0
	26	0000	T.S.	995	18	19.4	115.3
		0600	T.D.	995	16	18.9	114.6
		1200	T.D.	995	16	18.4	114.4
		1800	T.D.	995	16	18.0	115.0
	27	0000	T.D.	995	16	18.0	116.0
		0600	T.D.	995	16	18.1	117.0
		1200	T.D.	995	16	18.3	118.1
		1800	T.D.	995	16	18.7	119.2
	28	0000	T.D.	995	16	19.2	120.0
		0600	T.D.	995	16	19.8	120.5
		1200	T.D.	995	16	20.2	120.8
		1800	T.D.	995	16	20.4	121.0

SIX-HOURLY POSITION AND INTENSITY DATA OF
TYPHOON WAYNE (8614)
(cont'd)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface wind (m/s)	Lat. °N	Long. °E
Aug	29	0000	T.S.	993	21	20.5	121.1
		0600	T.S.	991	23	20.6	121.2
		1200	S.T.S.	990	25	20.8	121.4
		1800	S.T.S.	987	28	21.1	121.6
	30	0000	S.T.S.	984	28	21.4	121.8
		0600	S.T.S.	980	28	21.6	122.1
		1200	S.T.S.	975	31	21.8	122.4
		1800	S.T.S.	965	31	21.9	122.6
	31	0000	T.	955	33	21.9	122.8
		0600	T.	960	33	21.8	123.0
		1200	T.	965	33	21.6	123.2
		1800	T.	970	33	21.4	123.2
Sep	1	0000	T.	975	33	21.1	123.1
		0600	T.	970	36	20.9	122.9
		1200	T.	965	36	20.4	122.5
		1800	T.	965	36	20.0	122.2
	2	0000	T.	960	39	19.7	122.0
		0600	T.	960	39	19.4	121.8
		1200	T.	965	39	19.2	121.4
		1800	T.	970	36	18.9	120.8
	3	0000	T.	970	36	18.8	120.2
		0600	T.	970	33	18.5	119.3
		1200	T.	970	33	18.4	118.3
		1800	T.	965	36	18.5	117.5
	4	0000	T.	955	39	18.8	116.7
		0600	T.	950	41	19.4	115.3
		1200	T.	950	41	19.7	113.7
		1800	T.	955	41	19.9	112.4
	5	0000	T.	960	39	20.1	111.2
		0600	T.	965	39	20.3	109.8
		1200	T.	970	39	20.5	108.3
		1800	T.	970	36	20.4	106.6
	6	0000	T.	980	33	20.2	105.0
		0600	T.S.	990	21	20.0	103.4

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF
THE TROPICAL DEPRESSION (8615)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface wind (m/s)	Lat. °N	Long. °E
Sep	02	0000	T.D.	992	16	30.0	140.0
		0600	T.D.	992	16	30.9	139.3
		1200	T.D.	992	16	32.1	138.6
		1800	T.D.	993	16	33.7	138.3
	03	0000	T.D.	996	16	35.1	139.0
		0600	T.D.	997	16	36.1	139.9
		1200	T.D.	998	14	38.0	141.0
		1800	T.D.	998	13	40.4	142.3

Became extratropical

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON ABBY (8616)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface wind (m/s)	Lat. °N	Long. °E
Sep	13	0600	T.D.	997	13	11.8	145.5
		1200	T.D.	997	13	12.6	144.4
		1800	T.D.	995	16	13.3	142.8
	14	0000	T.D.	995	16	14.1	140.5
		0600	T.D.	992	16	14.8	138.3
		1200	T.D.	992	16	15.2	136.2
		1800	T.S.	990	18	15.6	134.9
	15	0000	T.S.	990	21	16.6	134.1
		0600	T.S.	987	23	17.6	133.5
		1200	T.S.	985	23	17.9	132.1
		1800	S.T.S.	982	25	18.6	131.2
	16	0000	S.T.S.	980	25	19.0	130.4
		0600	S.T.S.	975	28	19.2	129.5
		1200	S.T.S.	975	31	19.3	128.6
		1800	S.T.S.	970	31	19.4	127.8
	17	0000	T.	965	36	19.7	127.1
		0600	T.	960	39	20.3	126.6
		1200	T.	955	41	20.7	126.0
		1800	T.	950	43	21.0	125.3
	18	0000	T.	940	43	21.3	124.5
		0600	T.	935	49	21.8	123.6
		1200	T.	935	51	22.2	122.9
		1800	T.	935	54	22.7	122.1
	19	0000	T.	945	49	23.3	121.5
		0600	T.	960	41	23.9	120.6
		1200	T.	970	33	24.7	120.6
		1800	S.T.S.	980	28	25.5	121.0
	20	0000	S.T.S.	985	25	26.2	121.6
		0600	T.S.	990	21	27.1	122.7

Became extratropical

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON BEN (8617)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface wind (m/s)	Lat. °N	Long. °E
Sep	19	0000	T.D.	1002	16	10.0	160.1
		0600	T.D.	1002	16	10.6	159.7
		1200	T.S.	1001	18	11.0	159.2
		1800	T.S.	1000	18	12.4	158.9
	20	0000	T.S.	999	21	13.9	158.7
		0600	T.S.	997	21	15.2	157.8
		1200	T.S.	995	23	15.9	156.2
		1800	T.S.	992	23	16.2	154.9
	21	0000	S.T.S.	988	25	16.3	154.0
		0600	S.T.S.	985	28	16.3	153.4
		1200	S.T.S.	985	31	16.4	152.8
		1800	S.T.S.	987	31	16.5	152.3
	22	0000	S.T.S.	989	28	16.6	151.7
		0600	S.T.S.	990	25	16.7	151.1
		1200	S.T.S.	990	25	16.8	150.5
		1800	S.T.S.	988	28	17.0	149.5
	23	0000	S.T.S.	985	31	17.2	148.4
		0600	T.	980	33	17.6	147.0
		1200	T.	970	36	17.9	145.6
		1800	T.	960	39	18.1	144.6
	24	0000	T.	950	41	18.4	143.6
		0600	T.	940	43	18.7	142.6
		1200	T.	925	49	19.0	141.6
		1800	T.	918	51	19.3	140.7
	25	0000	T.	918	57	19.6	140.1
		0600	T.	925	54	20.0	139.6
		1200	T.	930	51	20.5	139.1
		1800	T.	935	49	20.8	138.9
	26	0000	T.	935	49	21.1	138.7
		0600	T.	940	46	21.3	138.7
		1200	T.	945	43	21.6	138.7
		1800	T.	950	43	21.9	138.8
	27	0000	T.	950	43	22.2	139.1
		0600	T.	950	41	22.6	139.5
		1200	T.	950	41	23.1	139.9
		1800	T.	950	39	24.0	140.4
	28	0000	T.	950	39	24.9	140.8
		0600	T.	955	39	25.9	141.2
		1200	T.	955	36	27.2	142.2
		1800	T.	955	36	28.8	142.8
	29	0000	T.	960	36	30.5	143.1
		0600	T.	960	33	32.5	144.8
		1200	T.	960	33	34.9	146.7
		1800	S.T.S.	965	31	36.4	149.1
	30	0000	S.T.S.	970	28	37.8	151.5
		0600	T.S.	975	25	39.2	153.9

Became extratropical

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON CARMEN (8618)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface wind (m/s)	Lat. °N	Long. °E
Oct	2	0000	T.D.	1000	16	10.9	153.2
		0600	T.S.	1000	18	11.2	151.7
		1200	T.S.	1000	21	11.9	150.4
		1800	T.S.	1000	21	12.8	149.2
	3	0000	T.S.	998	21	13.4	148.1
		0600	T.S.	996	23	13.9	146.9
		1200	S.T.S.	994	25	14.5	145.6
		1800	S.T.S.	990	28	15.0	144.4
	4	0000	S.T.S.	990	28	15.6	143.4
		0600	S.T.S.	990	31	16.2	142.4
		1200	T.	985	33	16.7	141.7
		1800	T.	975	36	17.3	140.9
	5	0000	T.	965	39	17.9	140.1
		0600	T.	955	41	18.5	139.5
		1200	T.	945	43	19.0	139.0
		1800	T.	935	46	19.5	138.5
	6	0000	T.	945	46	20.3	138.0
		0600	T.	950	43	21.4	137.7
		1200	T.	960	41	22.5	137.6
		1800	T.	965	36	23.6	137.9
	7	0000	T.	965	36	24.7	138.5
		0600	T.	960	36	26.7	139.8
		1200	T.	960	36	28.9	140.8
		1800	T.	960	36	31.1	141.7
	8	0000	T.	955	33	33.4	142.8
		0600	T.	955	33	35.6	144.4
		1200	S.T.S.	960	33	37.6	146.4
		1800	S.T.S.	965	33	39.1	149.2

Became extratropical

SIX-HOURLY POSITION AND INTENSITY DATA OF
TROPICAL STORM DOM (8619)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface wind (m/s)	Lat. °N	Long. °E
Oct	5	1800	T.D.	1004	13	15.2	121.8
	6	0000	T.D.	1004	13	15.1	121.3
		0600	T.D.	1006	13	15.0	120.7
		1200	T.D.	1006	13	14.9	120.0
		1800	T.D.	1006	13	14.9	119.4
	7	0000	T.D.	1006	13	14.9	119.0
		0600	T.D.	1006	13	14.9	118.7
		1200	T.D.	1006	13	14.9	118.5
		1800	T.D.	1006	13	14.9	118.3
	8	0000	T.D.	1004	16	15.0	118.1
		0600	T.D.	1004	16	15.0	117.7
		1200	T.D.	1004	16	15.2	116.8
		1800	T.D.	1004	16	15.4	115.9
	9	0000	T.S.	1002	18	15.5	115.0
		0600	T.S.	998	21	15.7	114.2
		1200	T.S.	996	23	16.1	113.5
		1800	T.S.	996	23	16.6	112.7
	10	0000	T.S.	998	21	16.7	111.8
		0600	T.S.	1000	21	16.7	111.0
		1200	T.S.	1000	18	17.1	110.1
		1800	T.S.	1002	18	17.2	109.3
	11	0000	T.S.	1002	18	16.9	108.4
		0600	T.S.	1002	18	16.6	107.7
		1200	T.D.	1004	16	16.5	107.0
		1800	T.D.	1004	13	16.8	106.2

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF
TYPHOON ELLEN (8620)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface wind (m/s)	Lat. °N	Long. °E
Oct	11	0000	T.D.	1000	16	10.7	126.7
		0600	T.S.	995	18	11.3	125.3
		1200	T.S.	992	21	12.0	123.8
		1800	T.S.	990	21	12.7	122.7
	12	0000	T.S.	990	21	13.4	121.6
		0600	T.S.	990	21	13.7	120.4
		1200	T.S.	990	21	14.2	119.5
		1800	T.S.	987	23	14.7	119.0
	13	0000	T.S.	987	23	15.1	118.4
		0600	S.T.S.	982	25	15.6	118.0
		1200	S.T.S.	980	28	15.9	117.9
		1800	S.T.S.	975	31	16.4	117.9
	14	0000	S.T.S.	975	31	16.8	118.0
		0600	T.	970	36	17.3	118.0
		1200	T.	970	39	17.7	117.8
		1800	T.	970	41	17.8	117.6
	15	0000	T.	965	43	18.0	117.4
		0600	T.	970	41	18.3	117.3
		1200	T.	975	36	18.6	117.2
		1800	T.	975	36	18.8	117.0
	16	0000	T.	975	33	19.0	116.8
		0600	T.	975	33	19.2	116.4
		1200	T.	975	33	19.4	116.0
		1800	T.	975	33	19.8	115.4
	17	0000	T.	975	36	20.1	115.0
		0600	T.	975	36	20.4	114.6
		1200	T.	975	36	20.7	114.3
		1800	T.	975	33	21.0	113.9
	18	0000	S.T.S.	975	31	21.1	113.6
		0600	S.T.S.	980	31	21.2	113.2
		1200	S.T.S.	985	28	21.1	112.6
		1800	T.S.	990	21	20.9	111.9
	19	0000	T.D.	994	18	21.0	110.9
		0600	T.D.	998	16	21.2	109.9
		1200	T.D.	1000	13	21.3	108.9

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF
TYPHOON FORREST (8621)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface wind (m/s)	Lat. °N	Long. °E
Oct	15	1800	T.D.	990	16	15.7	154.0
	16	0000	T.S.	987	23	16.2	151.8
		0600	S.T.S.	985	28	16.8	150.0
		1200	T.	975	33	17.5	148.1
		1800	T.	960	39	18.1	146.7
	17	0000	T.	945	43	18.8	145.4
		0600	T.	930	46	19.4	144.2
		1200	T.	930	46	20.0	143.3
		1800	T.	950	43	20.5	142.7
	18	0000	T.	960	41	21.0	142.3
		0600	T.	960	41	21.5	142.1
		1200	T.	960	39	22.1	142.2
		1800	T.	960	39	22.7	142.6
	19	0000	T.	960	39	23.4	143.3
		0600	T.	965	36	24.5	144.9
		1200	T.	975	36	25.9	146.8
		1800	S.T.S.	980	31	27.9	149.8
	20	0000	S.T.S.	985	31	31.0	153.0
		0600	S.T.S.	990	28	34.2	156.6

Became extratropical

SIX-HOURLY POSITION AND INTENSITY DATA OF
TROPICAL STORM GEORGIA (8622)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface wind (m/s)	Lat. °N	Long. °E
Oct	18	0000	T.D.	995	16	11.2	128.5
		0600	T.S.	990	18	11.7	127.4
		1200	T.S.	990	21	12.1	126.2
		1800	T.S.	993	21	12.3	125.1
	19	0000	T.S.	995	21	12.6	124.0
		0600	T.S.	995	18	12.9	122.7
		1200	T.S.	995	18	13.1	121.1
		1800	T.S.	995	18	13.2	119.8
	20	0000	T.S.	995	18	13.3	118.5
		0600	T.S.	995	21	13.6	117.5
		1200	T.S.	993	21	13.8	116.2
		1800	T.S.	993	21	14.0	114.8
	21	0000	T.S.	990	21	14.1	113.3
		0600	T.S.	990	21	14.2	111.9
		1200	T.S.	990	21	14.4	110.8
		1800	T.S.	990	21	14.7	109.9
	22	0000	T.S.	993	21	15.1	109.0
		0600	T.S.	995	18	15.4	107.4
		1200	T.D.	1000	16	15.6	105.7
		1800	T.D.	1002	13	16.0	104.6

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF
TROPICAL STORM HERBERT (8623)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface wind (m/s)	Lat. °N	Long. °E
Nov	8	0600	T.D.	996	16	13.4	119.1
		1200	T.D.	992	16	14.1	118.3
		1800	T.S.	990	18	14.4	117.5
	9	0000	T.S.	987	21	14.0	116.9
		0600	T.S.	985	23	13.7	116.6
		1200	T.S.	988	23	13.5	116.2
		1800	T.S.	992	23	13.4	115.3
	10	0000	T.S.	992	23	13.6	114.3
		0600	T.S.	990	23	13.9	113.6
		1200	T.S.	990	23	14.1	112.9
		1800	T.S.	996	21	13.6	112.1
	11	0000	T.S.	999	18	13.4	111.2
		0600	T.D.	1000	16	13.9	110.6
		1200	T.D.	1000	16	14.2	110.0
		1800	T.D.	1001	16	14.4	109.5
	12	0000	T.D.	1003	16	14.6	109.0

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF
SEVERE TROPICAL STORM IDA (8624)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface wind (m/s)	Lat. °N	Long. °E
Nov	11	0000	T.D.	1004	13	6.8	132.9
		0600	T.D.	1002	13	7.0	131.8
		1200	T.D.	999	16	7.3	130.6
		1800	T.D.	995	18	7.9	129.3
	12	0000	T.S.	990	21	8.5	128.1
		0600	T.S.	988	23	9.0	127.3
		1200	T.S.	988	23	9.6	126.4
		1800	T.S.	990	23	10.7	125.2
	13	0000	T.S.	990	21	12.0	123.5
		0600	T.S.	993	21	12.5	121.8
		1200	T.S.	995	18	13.3	120.3
		1800	T.S.	995	18	13.6	119.3
	14	0000	T.S.	995	21	13.9	118.3
		0600	T.S.	995	21	14.4	117.1
		1200	T.S.	993	21	15.4	116.1
		1800	T.S.	990	23	16.7	115.2
	15	0000	S.T.S.	985	25	17.8	114.3
		0600	S.T.S.	985	25	18.3	113.9
		1200	S.T.S.	985	25	18.7	113.8
		1800	T.S.	988	23	19.1	114.2
	16	0000	T.S.	990	23	19.3	114.8
		0600	T.S.	996	21	19.6	115.5
		1200	T.S.	998	18	20.0	116.3
		1800	T.D.	998	16	20.0	117.2

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF
TYPHOON JOE (8625)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface wind (m/s)	Lat. °N	Long. °E
Nov	18	0600	T.D.	1000	16	12.4	129.7
		1200	T.D.	998	16	12.9	128.8
		1800	T.D.	995	16	13.3	127.9
	19	0000	T.S.	990	18	13.5	126.9
		0600	S.T.S.	985	25	13.8	126.0
		1200	S.T.S.	985	25	14.2	125.3
		1800	S.T.S.	980	28	14.7	124.7
	20	0000	S.T.S.	975	31	15.3	124.3
		0600	T.	965	33	15.9	124.2
		1200	T.	960	36	16.7	124.1
		1800	T.	945	41	17.5	124.0
	21	0000	T.	940	43	18.2	124.0
		0600	T.	940	49	18.9	124.0
		1200	T.	945	46	19.5	124.0
		1800	T.	950	41	20.1	124.0
	22	0000	T.	950	41	20.6	124.0
		0600	T.	960	39	21.1	124.1
		1200	T.	970	39	21.6	124.4
		1800	T.	975	36	22.1	124.6
	23	0000	T.	980	33	22.5	124.9
		0600	S.T.S.	990	31	22.9	125.2
		1200	S.T.S.	993	28	23.3	125.6
		1800	S.T.S.	995	25	23.6	126.0
	24	0000	T.S.	995	23	24.0	126.4
		0600	T.S.	1000	21	24.4	126.6
		1200	T.D.	1005	16	24.4	127.1
		1800	T.D.	1005	16	24.1	127.3

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF
THE TROPICAL DEPRESSION OF 24-25 NOVEMBER 1986

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface wind (m/s)	Lat. °N	Long. °E
Nov	24	0000	T.D.	1002	16	8.1	110.3
		0600	T.D.	1002	16	8.3	110.0
		1200	T.D.	1002	16	8.6	109.8
		1800	T.D.	1002	16	9.0	109.8
	25	0000	T.D.	1002	16	9.3	110.0

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF
TYPHOON KIM (8626)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface wind (m/s)	Lat. °N	Long. °E
Nov	28	0000	T.D.	1002	13	7.3	163.6
		0600	T.D.	998	16	7.8	162.7
		1200	T.S.	995	18	8.3	161.7
		1800	T.S.	990	23	8.7	160.6
	29	0000	S.T.S.	985	28	9.0	159.4
		0600	T.	980	33	9.2	158.4
		1200	T.	975	36	9.4	157.4
		1800	T.	970	36	9.7	156.6
	30	0000	T.	965	39	10.2	155.8
		0600	T.	965	39	10.7	155.0
		1200	T.	970	41	11.4	154.2
		1800	T.	965	41	12.2	153.6
Dec	1	0000	T.	960	41	13.2	152.9
		0600	T.	945	43	14.0	152.1
		1200	T.	930	43	14.6	151.4
		1800	T.	925	46	15.1	150.6
	2	0000	T.	920	51	15.4	149.8
		0600	T.	915	54	15.5	149.1
		1200	T.	910	57	15.5	148.3
		1800	T.	905	57	15.5	147.5
	3	0000	T.	910	57	15.5	146.6
		0600	T.	925	54	15.5	145.4
		1200	T.	930	54	15.5	144.1
		1800	T.	925	51	15.7	142.9
	4	0000	T.	920	51	16.0	142.0
		0600	T.	920	51	16.3	141.4
		1200	T.	920	51	16.7	140.9
		1800	T.	930	49	17.0	140.5
	5	0000	T.	940	46	17.3	140.2
		0600	T.	945	46	17.5	139.9
		1200	T.	955	41	17.5	139.4
		1800	T.	960	39	17.3	138.8
	6	0000	T.	965	36	17.2	138.1
		0600	T.	960	39	17.1	137.2
		1200	T.	955	41	17.1	136.1
		1800	T.	945	43	17.2	135.1
	7	0000	T.	940	46	17.3	134.2
		0600	T.	945	46	17.4	133.5
		1200	T.	955	43	17.3	132.9
		1800	T.	960	39	17.1	132.7
	8	0000	S.T.S.	970	31	16.9	132.5
		0600	S.T.S.	975	31	16.5	132.3
		1200	S.T.S.	980	31	16.2	132.3
		1800	S.T.S.	980	28	16.0	132.3
	9	0000	S.T.S.	980	28	16.0	132.5
		0600	S.T.S.	980	28	16.1	132.6
		1200	S.T.S.	982	28	16.3	132.6
		1800	S.T.S.	988	25	16.5	132.5
	10	0000	S.T.S.	992	25	16.8	132.3
		0600	S.T.S.	995	25	17.1	132.1
		1200	T.S.	997	23	17.4	131.9
		1800	T.S.	1000	21	17.7	131.5
	11	0000	T.D.	1004	16	17.9	131.1

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF TROPICAL STORM LEX (8627)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface wind (m/s)	Lat. °N	Long. °E
Dec	3	0000	T.D.	1002	16	7.1	164.9
		0600	T.D.	1002	16	7.2	164.0
		1200	T.D.	1002	16	7.4	163.2
		1800	T.S.	999	18	7.6	162.6
	4	0000	T.S.	992	21	7.8	162.0
		0600	T.S.	985	23	8.1	161.4
		1200	T.S.	985	23	8.5	160.7
		1800	T.S.	986	21	9.2	159.8
	5	0000	T.S.	987	21	9.9	158.6
		0600	T.S.	988	21	10.5	157.1
		1200	T.S.	990	18	11.1	155.5
		1800	T.S.	992	18	11.5	153.9
	6	0000	T.S.	995	18	11.8	152.3
		0600	T.D.	999	16	12.2	150.6
		1200	T.D.	1000	16	12.7	148.9
		1800	T.D.	1000	16	13.3	147.1
	7	0000	T.D.	1000	16	14.1	145.5
		0600	T.D.	1000	16	15.1	143.9
		1200	T.D.	1000	16	16.6	142.4
		1800	T.D.	1000	16	18.2	141.2
	8	0000	T.D.	1002	16	20.0	140.3

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF
TYPHOON MARGE (8628)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface wind (m/s)	Lat. °N	Long. °E
Dec	14	0600	T.D.	1002	16	7.4	160.8
		1200	T.D.	1002	16	7.2	159.6
		1800	T.D.	1002	16	7.2	158.3
	15	0000	T.D.	1002	16	7.2	156.9
		0600	T.D.	1000	16	7.4	155.4
		1200	T.S.	1000	18	7.8	153.8
		1800	T.S.	996	18	8.3	152.3
	16	0000	T.S.	995	21	8.8	150.8
		0600	S.T.S.	992	25	9.3	149.4
		1200	S.T.S.	989	28	9.7	148.2
		1800	S.T.S.	987	28	10.2	147.1
	17	0000	S.T.S.	987	31	10.5	146.2
		0600	S.T.S.	985	31	10.7	145.3
		1200	S.T.S.	985	31	10.7	144.4
		1800	S.T.S.	984	31	10.6	143.8
	18	0000	S.T.S.	984	31	10.5	143.1
		0600	S.T.S.	983	31	10.4	142.1
		1200	S.T.S.	982	31	10.3	141.0
		1800	T.	980	33	10.5	140.0
	19	0000	T.	975	33	10.9	139.1
		0600	T.	970	33	11.6	138.2
		1200	T.	965	36	11.8	137.0
		1800	T.	960	36	11.7	135.9
	20	0000	T.	955	39	11.4	134.6
		0600	T.	955	41	10.8	133.0
		1200	T.	950	41	10.1	131.3
		1800	T.	950	41	9.6	129.8
	21	0000	T.	950	41	9.1	128.4
		0600	T.	955	39	9.3	127.0
		1200	T.	965	36	9.8	125.5
		1800	S.T.S.	975	31	10.3	124.0
	22	0000	S.T.S.	980	28	10.5	122.6
		0600	S.T.S.	980	25	10.6	121.3
		1200	T.S.	985	23	10.7	120.3
		1800	T.S.	990	21	11.0	119.4
	23	0000	T.S.	995	18	11.6	118.8
		0600	T.S.	990	21	12.4	118.0
		1200	T.S.	990	21	12.7	116.9
		1800	T.S.	990	21	12.6	115.8
	24	0000	T.D.	995	16	12.5	114.8
		0600	T.D.	998	16	12.4	114.1
		1200	T.D.	1000	16	12.4	113.5
		1800	T.D.	1000	16	12.4	112.8
	25	0000	T.D.	1002	13	12.0	111.8

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON NORRIS (8629)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface wind (m/s)	Lat. °N	Long. °E
Dec	21	1800	T.D.	1002	13	8.5	166.5
	22	0000	T.D.	1000	13	8.7	165.8
		0600	T.D.	1000	16	8.9	165.1
		1200	T.D.	1000	16	9.3	164.2
		1800	T.D.	1000	16	9.8	163.3
	23	0000	T.S.	999	18	10.4	162.5
		0600	T.S.	999	18	11.0	161.4
		1200	T.S.	998	18	11.3	160.2
		1800	T.S.	998	18	11.3	159.1
	24	0000	T.S.	998	18	11.3	157.9
		0600	T.S.	998	21	11.4	156.6
		1200	T.S.	998	21	11.5	155.3
		1800	T.S.	998	21	11.2	154.1
	25	0000	T.S.	998	21	10.7	153.0
		0600	T.S.	998	21	10.2	151.8
		1200	T.S.	996	23	9.9	150.4
		1800	T.S.	995	23	10.2	149.3
	26	0000	T.S.	993	23	10.5	148.3
		0600	S.T.S.	991	25	11.0	147.2
		1200	S.T.S.	990	25	11.4	146.1
		1800	S.T.S.	988	28	11.6	144.8
	27	0000	S.T.S.	987	31	11.7	143.3
		0600	S.T.S.	985	31	11.8	141.9
		1200	T.	983	33	12.2	140.7
		1800	T.	980	33	12.6	139.8
	28	0000	T.	975	36	13.1	139.0
		0600	T.	970	36	13.5	138.3
		1200	T.	960	41	13.8	137.9
		1800	T.	955	43	13.8	137.7
	29	0000	T.	955	43	13.6	137.4
		0600	T.	965	41	13.4	137.2
		1200	T.	970	39	12.6	136.4
		1800	T.	975	36	11.9	135.5
	30	0000	T.	980	33	11.2	134.4
		0600	S.T.S.	985	31	10.5	133.1
		1200	S.T.S.	990	28	9.8	131.7
		1800	S.T.S.	991	25	9.7	130.0
	31	0000	S.T.S.	992	25	9.9	128.2
		0600	S.T.S.	992	25	10.3	126.4
		1200	T.S.	992	23	10.9	124.3
		1800	T.S.	992	23	11.2	122.3
	1	0000	T.S.	992	21	11.2	120.5
		0600	T.S.	994	18	11.5	119.0
		1200	T.D.	996	16	12.2	117.4
		1800	T.D.	1000	13	13.2	116.0

Dissipated