551.515.2:551.506.1 (512.317)

ROYAL OBSERVATORY, HONG KONG

METEOROLOGICAL RESULTS 1985

PART III—TROPICAL CYCLONE SUMMARIES

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

40° 30° 20° 10° 0°

JEFF Aug

IRMA Jul

GAY May

HAL Jun

T.D. Jul

T.D. Jun

T.D. (8504) Jun

T.D. Apr

T.D. Apr

HAL (8505) Jun

FABIAN I (8501) Jan

GAY (8503) May

FABIAN II (8501) Jan

T.D. Jul

IRMA (8506) Jun

FABIAN I Jan

JEFF (8507) Jul

ELSIE Jan

ELSIE (8502) Jan

R.O. 80A

ROYAL OBSERVATORY HONG KONG

TRACKS OF TROPICAL CYCLONES
JANUARY–JULY, 1985

Typhoons

Tropical Storms or Tropical Depressions

Tracks Uncertain

Daily Positions at 00 h G.M.T.

Intermediate 6 hrly Positions

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

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

40° 30° 20° 10° 0°

LEE Aug

MAMIE Aug

KIT Aug

PAT Sep

RUBY Sep

ODESSA Sep

KIT (8508) Aug

NELSON Aug

MAMIE (8510) Aug

LEE (8509) Aug

PAT (8513) Aug

RUBY (8514) Aug

NELSON (8511) Aug

ODESSA (8512) Aug

R.O. 80A

ROYAL OBSERVATORY HONG KONG

TRACKS OF TROPICAL CYCLONES
AUGUST, 1985

Typhoons

Tropical Storms or Tropical Depressions

Tracks Uncertain

Daily Positions at 00 h G.M.T.

Intermediate 6 hrly Positions

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

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

40° 30° 20° 10° 0°

BRENDA Oct

FAYE Nov

SKIP Sep

TESS Sep

WINONA Sep

VAL Sep

DOT 22 Oct

CECIL Oct

ANDY Oct

ANDY (8519) Sep

HOPE Dec

VAL (8517) Sep

BRENDA (8520) Oct

TESS (8516) Sep

WINONA (8518) Sep

FAYE (8524) Oct

CECIL (8521) Oct

GORDON Nov

GORDON (8525) Nov

IRVING Dec

IRVING (8527) Dec

ELLIS Oct

HOPE (8526) Dec

DOT (8522) Oct

ELLIS (8523) Oct

SKIP (8515) Aug

R.O. 80A

ROYAL OBSERVATORY HONG KONG

TRACKS OF TROPICAL CYCLONES
SEPTEMBER–DECEMBER, 1985

Typhoons

Tropical Storms or Tropical Depressions

Tracks Uncertain

Daily Positions at 00 h G.M.T. (1) (2) (3)

Intermediate 6 hrly Positions

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

METEOROLOGICAL RESULTS

1985

PART III—TROPICAL CYCLONE SUMMARIES

With the Compliments
of the
Director of the Royal Observatory,
Hong Kong.

1986

CONTENTS

FIGURES

TABLES

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 G.M.T. 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 cyclostyled 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 34 knots 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 34–37 knots.

A SEVERE TROPICAL STORM (S.T.S.) has maximum sustained winds in the range 48–63 knots.

A TYPHOON (T.) has maximum sustained winds of 64 knots 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 fifth tropical cyclone of tropical storm intensity or above which occurred within the area in 1985 was assigned the code (8505). The appropriate code immediately follows the name of the tropical cyclone in this publication, for example, Typhoon Hal (8505).

The Royal Observatory has a network of anemographs to record surface winds in Hong Kong. The instruments used in 1985 were either Dines pressure-tube anemographs or M.O. Mark IV cup-generator type anemographs manufactured by R.W. Munro Ltd. Quick-run mechanisms were also fitted to the anemographs at Waglan Island, Tate's Cairn, and Cheung Chau for recording the fine structure of the wind flow in typhoons for research purposes. Details of these stations are given 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 (Southeast)	22°20′	114°11′	24	4	16	Cup
Hong Kong Airport (Northwest)	22°20′	114°11′	24	4	14	Cup
Waglan Island	22°11′	114°18′	62	55	75	Dines, Cup
Tate's Cairn	22°22′	114°13′	*	575†	588	Dines
Cheung Chau	22°12′	114°01′	79	72	92	Dines
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
Tsim Bei Tsui	22°29′	114°00′	*	26	44	Dines
Tai O	22°15′	113°51′	*	76	90	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
Sha Tin$^{\Delta}$	22°24′	114°12′	8	7	16	Cup

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

* No barometer.

† Level of the ground floor of the building of the Radar Station.

Royal Observatory wind data presented in this report were obtained from an anemometer installed on top of a mast which is about 93 metres west-southwest of the previous location on top of the 1883 building. It became operational on 1 June 1982. At the Hong Kong Airport, cup anemometers replaced Dines anemometers on 1 February 1985. Wind measurements were also made by Hong Kong International Terminals Ltd. using a cup anemometer at Kwai Chung. Wind speed measurements have not been corrected for the reduced density of the air for Dines anemometers but in most cases this would increase the figures in the tables by less than 5 per cent.

The reports in Section 3 present a general description of the life history of each tropical cyclone which affected Hong Kong in 1985 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 various 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, Cheung Chau and Tate's Cairn;
(*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 G.M.T. 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 G.M.T. Times labelled 'G.M.T.' are in Greenwich Mean Time. For most practical purposes, the difference between Greenwich Mean Time and Co-ordinated Universal Time may be neglected.

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 1985

In 1985 twenty-nine tropical cyclones formed 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°). Sixteen of them attained typhoon intensity, which was slightly above the average number of 15 per year. Ten tropical cyclones landed over China, six crossed or passed close to the Philippines, four landed over Japan, seven affected Korea, four affected Taiwan and another three 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 years 1946–1984 is given in Figure 2.

During the year there were fifteen 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 an annual average of seventeen over the past 39 years. Ten tropical cyclones moved into this area and five developed within it. Altogether 371 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 five tropical cyclones. Gale signals were hoisted during the passage of Typhoon Hal (8505) in June and Typhoon Tess (8516) in September.

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 300 nautical miles of Hong Kong to the end of the third day after the tropical cyclone has dissipated or moved outside 300 nautical miles of Hong Kong) during the year 1985 amounted to 875.6 mm, which is 54 per cent above the annual average value of 566.9 mm (1884–1939 and 1947–1970). It accounted for 40 per cent of the year's total rainfall of 2 191.4 mm. Typhoon Nelson (8511), Tropical Storm Winona (8518) and Typhoon Andy (8519), for which no warning signals were hoisted in Hong Kong, brought 210.0 mm, 76.1 mm and 49.3 mm respectively.

In January, two tropical cyclones occurred over the western North Pacific. Tropical Storm Fabian (8501) developed about 600 nautical miles west of Guam on 6 January and remained slow-moving. Tropical Storm Elsie (8502) formed near the Caroline Islands on 7 January. It moved northwestwards and passed close to Guam during the evening of 9 January. Under the influence of Elsie, Fabian moved southeastwards on 9 January. Elsie recurved northeastwards away from Fabian and dissipated about 560 nautical miles northeast of Guam on 11 January. Fabian then weakened into an area of low pressure when it moved near Yap on 13 January but re-intensified into a tropical depression later in the same day. It then remained almost stationary about 650 nautical miles southeast of Manila and finally dissipated early on 14 January.

There were no tropical cyclones over the western North Pacific during February and March. Only one tropical cyclone occurred during April. A tropical depression formed about 460 nautical miles east of Luzon on 22 April. It moved east-northeastwards and dissipated about 480 nautical miles north-northwest of Guam on 24 April.

Typhoon Gay (8503) was the only tropical cyclone over the western North Pacific during May. It formed about 630 nautical miles east-southeast of Manila on 21 May. It moved north-northwestwards for the next three days and then recurved near the Ryukyu Islands on 24 May. Gay finally became an extratropical cyclone about 280 nautical miles south of Tokyo on 26 May.

In June, three tropical cyclones developed. A tropical depression formed over the South China Sea about 40 nautical miles southeast of Xisha on 17 June. It remained almost stationary for the first two days and landed over Hainan early on 20 June. It dissipated about 60 nautical miles southwest of Haikou the same day.

Typhoon Hal (8505) formed about 860 nautical miles east of Manila on 19 June. It moved west-northwestwards and passed close to the north of Luzon on 22 June. It crossed the northern part of the South China Sea and turned north-northwestwards early on 24 June. Hal landed near Shanwei, about 65 nautical miles east-northeast of Hong Kong around 2 p.m. on 24 June. It finally dissipated about 140 nautical miles north of Hong Kong on 25 June. Hal caused widespread damage in the central and northern Philippines, Taiwan, Guangdong and Fujian.

Typhoon Irma (8506) developed about 880 nautical miles southeast of Manila on 25 June. It moved northwestwards at first but turned northwards on 27 June over the Pacific to the east of the Philippines. Irma brought active southwest monsoon winds heavy rain and floods to the Philippines. 65 people were reported dead or missing and about half a million people were affected. Damage to property was estimated at US$19 million. Irma took a more northeasterly track near the Ryukyus on 29 June and skirted the coast of southern Honshu on 30 June. It passed over Tokyo early on 1 July and became an extratropical cyclone to the southeast of Hokkaido later in the day. Irma left 22 persons dead or missing in Japan. 56 persons were injured. More than 20 000 houses were damaged or destroyed and about 50 000 hectares of farmland were devastated. Many roads, river embankments, bridges, railway lines and telecommunication lines were damaged. Property damage was estimated to be more than US$61 million.

Altogether three tropical cyclones occurred over the western North Pacific and the South China Sea during July. A tropical depression formed about 650 nautical miles east-southeast of Manila on 4 July. It moved west-northwestwards and crossed the central Philippines on 5 July. The tropical depression entered the South China Sea on 6 July. It turned northwards in the evening of 7 July and dissipated on reaching the south China coast about 110 nautical miles east-northeast of Hong Kong late on 8 July.

Typhoon Jeff (8507) developed about 450 nautical miles north of Guam on 22 July and moved north-northeastwards. It turned west-southwestwards on 24 July when it was centred about 560 nautical miles southwest of Tokyo. Jeff crossed the Ryukyus on 29 July and passed about 110 nautical miles northeast of Taibei early on 30 July. It turned northwestwards and crossed the China coast about 180 nautical miles south of Shanghai late on 30 July. Jeff weakened into a tropical storm and recurved about 50 nautical miles west of Shanghai late on 31 July. Jeff entered the Yellow Sea on 1 August and moved north-northeastwards. It crossed the China coast again close to Dandong, near Korea, on 2 August and dissipated overland the same day. Jeff caused extensive damage in Zhejiang and the northeastern provinces of China and in the Soviet Far East. In Zhejiang, 177 people were killed and about 1 400 others were injured. In Shanghai, Jeff brought the heaviest rain in 23 Years, flooding 50 000 houses and killing 4 people. In Dandong, Jeff left 64 people dead in the worst flood in 25 years.

During August, altogether nine tropical cyclones occurred over the western North Pacific but none affected the South China Sea. Tropical Depression Kit (8508) formed about 290 nautical miles south-southeast of Kagoshima on 4 August and intensified to a typhoon on 6 August. It remained slow-moving at first but later tracked west-northwestwards and passed about 50 nautical miles south-southwest of Kagoshima on 8 August. Kit recurved near Cheju and moved across southern Korea on 10 August, where 12 people were missing or killed. Property damage was estimated at US$2.2 million. Kit also affected Japan with damage to property estimated at US$1.5 million. Kit finally became an extratropical cyclone over the Sea of Japan west of Hokkaido on 11 August.

Severe Tropical Storm Lee (8509) formed about 290 nautical miles south-southeast of Okinawa on 11 August. It moved north-northwestwards and passed about 40 nautical miles east-northeast of Okinawa on 12 August. It took a northerly course over the Yellow Sea west of Korea on 14 August and passed about 90 nautical miles west of Seoul the same day. Lee finally became an extratropical cyclone over Heilongjiang Province on 15 August. In southern Korea, 26 people were killed or missing during the passage of Lee. 71 ships were damaged or lost. property damage was estimated at about US$3.9 million.

Tropical Storm Mamie (8510) developed about 90 nautical miles west of Okinawa on 16 August and intensified into a severe tropical storm on 17 August. It moved northwestwards and skirted the China coast from Shanghai to Shandong on 18 August. Mamie crossed Shandong Peninsula on 19 August and passed close to Dalian. It weakened into an area of low pressure overland in Liaoning Province early on 20 August. Heavy damage was inflicted in Shandong. In Qingdao, 19 people died and about 200 people were injured. 5 300 houses were damaged. In Yantai in the northern part of Shandong Peninsula, 16 people were killed and about 120 000 houses were destroyed. More than 200 ships were damaged or sunk. Heavy rain brought by Mamie inundated 300 000 hectares of farmland in Liaoning and affected 38 counties in Jilin. In southern Korea, Mamie left 9 people dead or missing. More than 50 000 people were affected. Many river embankments and irrigation facilities were damaged and numerous landslips occurred. Property damage was estimated at about US$13.7 million.

Typhoon Nelson (8511) formed about 450 nautical miles north-northwest of Guam on 18 August. It moved west-northwestwards and passed about 30 nautical miles north of Taibei on 23 August. Nelson, which killed at least 7 people in Taiwan, was the strongest typhoon to hit the island since Typhoon Vera in 1977. Nelson crossed the China coast close to the city of Fuzhou late on 23 August and dissipated about 160 nautical miles west of Fuzhou on 24 August. Nelson was the worst typhoon to hit the Fujian Province in 16 years. 48 people were killed and more than 300 people were injured. 6 000 houses were seriously damaged or collapsed. Heavy rain associated with the remnant of Nelson caused severe flooding in Hunan Province and killed at least 147 people.

Typhoon Odessa (8512) developed about 210 nautical miles north-northwest of Guam on 24 August. It moved northwards and passed about 70 nautical miles east of Iwo Jima on 26 August. It took a westerly track near the Ogasawara Islands on 27 August and moved towards the East China Sea.

Typhoon Pat (8513) developed about 320 nautical miles south-southwest of Okinawa on 27 August. It moved northeastwards during the first two days but changed to a northerly course on 29 August. Pat passed about 20 nautical miles west of Kagoshima early on 31 August and then turned northeastwards over the Sea of Japan. It crossed southern Hokkaido on 1 September and became an extratropical cyclone just east of Hokkaido in the evening.

Under the influence of Pat, Odessa moved west-northwestwards south of Kyushu on 29 August. Odessa made a sharp turn towards the northeast on 31 August when it was centred about 210 nautical miles east-southeast of Shanghai. It passed about 40 nautical miles northwest of Nagasaki late on 31 August. Odessa moved over the Sea of Japan on 1 September and dissipated about 110 nautical miles north of Tokyo early on 2 September.

Severe Tropical Storm Ruby (8514) formed about 200 nautical miles south-southeast of Iwo Jima on 28 August. It moved north-northwestwards, recurved south of Honshu and passed about 10 nautical miles east of Tokyo on 30 August. It moved north-northeastwards over the eastern part of Honshu and re-entered the Pacific Ocean about 10 nautical miles southeast of Sendai on 31 August. Ruby became an extratropical cyclone on 1 September about 480 nautical miles east of Hokkaido. The three tropical cyclones, Odessa, Pat and Ruby, caused extensive damage in Japan. 29 people were reported killed or missing, 177 people were injured. 9 700 houses were damaged or destroyed. 1 645 ships were damaged or sunk. Many roads, river embankments, telecommunication lines were also damaged. Property damage was estimated at US$14 million.

Severe Tropical Storm Skip (8515) formed near the date-line east of the Marshall Islands on 31 August and moved northwestwards.

There were nine tropical cyclones in September. Skip (8515) recurved about 740 nautical miles southwest of Midway Island on 4 September. It became a typhoon three days later and continued moving northeastwards. On 8 September, Skip crossed the date-line into the central Pacific about 540 nautical miles north of Midway Island.

Tess (8516) developed as a tropical depression about 690 nautical miles east of Manila on 1 September. It moved west-northwestwards across Luzon on 3 September, bringing floods to highways and villages. Tess intensified into a typhoon over the South China Sea on 5 September. It crossed the China coast near Yangjiang early on 6 September and caused extensive damage in western Guangdong. Tess dissipated near Nanning on 7 September.

Tropical Storm Val (8517) formed about 780 nautical miles southeast of Taibei on 15 September. It moved northwestwards and then westwards through the Bashi Channel on 17 September. In Taiwan, 2 people were missing in floods caused by the tropical storm. Val dissipated about 110 nautical miles east-northeast of Dongsha early on 18 September.

Winona (8518) formed about 480 nautical miles south-southeast of Hong Kong over the South China Sea on 19 September. It intensified into a tropical storm the next day and moved north-northwestwards. On 21 September, Winona skirted the coast of northeastern Hainan. It landed close to Zhanjiang in the morning of 22 September and dissipated about 100 nautical miles north of Zhanjiang late on the same day. Leizhou Peninsula was badly hit by the tropical storm. More than 15 000 houses collapsed. About 100 fishing vessels were sunk. 5 embankments were broken. Paddy and vegetable fields were inundated. Sugar-cane plantations were devastated. Heavy rain affected Hainan, western Guangdong and Guangxi. A total of 57 000 people were marooned by floods. In Guangxi, about 7 500 houses were damaged.

Andy (8519) developed as a tropical depression about 120 nautical miles south of Dongsha on 27 September and moved westwards. It intensified into a typhoon on 29 September and crossed the southern tip of Hainan. It landed over Viet Nam about 200 nautical miles south of Hanoi in the evening of 1 October and dissipated overland the following morning. Central Viet Nam was seriously affected by the typhoon. 46 people were killed and 25 000 hectares of paddy fields were destroyed. Rivers overflowed, disrupting transportation between Hanoi and Ho Chi Minh City for a few days.

Tropical Storm Brenda (8520) developed about 580 nautical miles east-northeast of Manila on 30 September and was slow-moving for the first 2 days.

In October, altogether six tropical cyclones occurred over the western North Pacific and the South China Sea. Brenda (8520) moved northwestwards on 2 October and intensified into a typhoon on 3 October about 440 nautical miles southeast of Taibei. It turned northwards early on 4 October and passed about 60 nautical miles east-northeast of Taibei around noon. Typhoon Brenda recurved in the afternoon and took a northeasterly course over the East China Sea. On 5 October, it passed about 50 nautical miles southeast of Cheju and skirted the southern coast of Korea during the evening. Brenda finally became an extratropical cyclone over the Sea of Japan about 240 nautical miles east-southeast of Seoul the same night. Brenda left a trail of damage in Taiwan, Japan, China and southern Korea. In Taiwan, 2 people were injured. Landslips were reported in the eastern and northern parts of the island where traffic was seriously disrupted. A Japanese cargo ship was partly damaged south of Okinawa and one crew member was killed. In Japan, 35 people were injured and property damage was estimated at US$5 million. In Shanghai, a house under construction was blown down, killing 1 person and injuring 3 others. In southern Korea, 69 people were killed or missing and 13 others were injured. 484 people were made homeless, 254 houses and 857 vessels were damaged. About 3 000 hectares of farmland were inundated. Property damage was estimated at US$10 million.

Cecil (8521) developed as a tropical depression over the Sulu Sea about 250 nautical miles south of Manila on 12 October. It destroyed or sank 70 fishing boats in the Illoilo area of the Philippines. Cecil moved northwestwards over the South China Sea and intensified to a typhoon on 14 October about 210 nautical miles southeast of Xisha. Early on 16 October, it crossed the Viet Nam coast about 80 nautical miles northwest of Danang. Cecil brought heavy damage to central Viet Nam. 769 people were killed, 128 people were missing and about 200 others were injured. 130 000 houses were damaged or collapsed. About 70 000 hectares of crops were devastated. During the evening of 16 October, Cecil moved westwards across Laos into Thailand where it dissipated. Cecil brought heavy rain to northern and northeastern Thailand and caused the death of 1 person.

Dot (8522) originated about 290 nautical miles southeast of Guam on 13 October. It moved west-northwestwards and intensified into a typhoon about 410 nautical miles west of Guam on 15 October. Typhoon Dot crossed Luzon early on 19 October, passing about 50 nautical miles north of Manila, and brought a death toll of 81 in the Philippines. Dot crossed the South China Sea and passed close to Yulin on the southern tip of Hainan on 21 October. It crossed the coast of Viet Nam that evening about 150 nautical miles south of Hanoi and dissipated over Laos on 22 October. Details of damage caused by Dot is contained in the report on the typhoon on page 30.

Ellis (8523) formed about 460 nautical miles east-southeast of Guam on 16 October. It remained slow-moving and intensified into a severe tropical storm on 18 October. It moved southwestwards on 18 and 19 October and then turned west-northwestwards on 20 October. It dissipated over the ocean about 110 nautical miles west of Yap early on 22 October.

Tropical Depression Faye (8524) formed about 300 nautical miles east-southeast of Manila on 23 October. It moved northwestwards across Luzon during the day. It moved in a loop about 250 nautical miles north-northwest of Manila on 25 October and then tracked east-northeastwards. Faye remained almost stationary over the Balintang Channel on 27 and 28 October. It then moved northeastwards on 29 October and became a typhoon that afternoon when it was centred about 280 nautical miles southeast of Taibei. Faye passed about 110 nautical miles southeast of Okinawa early on 31 October. It weakened to a tropical storm while moving east-northeastwards.

Two tropical cyclones occurred over the western North Pacific and the South China Sea during November. Tropical Storm Faye (8524), which moved east-northeastwards over the ocean to the east of the Ryukyu Islands late in October, dissipated over the Pacific about 420 nautical miles south of Tokyo in the evening of 1 November.

Tropical Depression Gordon (8525) formed over the South China Sea about 120 nautical miles southwest of Nansha on 23 November. It moved in a generally northwestward direction at first, turning southwestwards on 25 November near the Viet Nam coast and dissipated about 140 nautical miles east of Ho Chi Minh City in the evening.

In December, two tropical cyclones developed over the western North Pacific and the South China Sea. Tropical Depression Hope (8526) formed about 80 nautical miles east of Yap on 17 December. It moved northwestwards and became a typhoon about 220 nautical miles northwest of Yap two days later. Hope turned westwards on 20 December and recurved northeastwards about 280 nautical miles east-northeast of Manila on 22 December. It weakened on encountering the northeast monsoon and dissipated over the ocean about 610 nautical miles east-northeast of Manila on 24 December.

Irving (8527) formed over the South China Sea about 210 nautical miles south of Nansha on 17 December. It was slow-moving at first and intensified into a tropical storm on 18 December. It took a northwesterly course on 19 December. Influenced by the northeast monsoon, Irving turned southwestwards on 20 December about 110 nautical miles off the Viet Nam coast. It dissipated about 260 nautical miles south of Ho Chi Minh City early on 22 December.

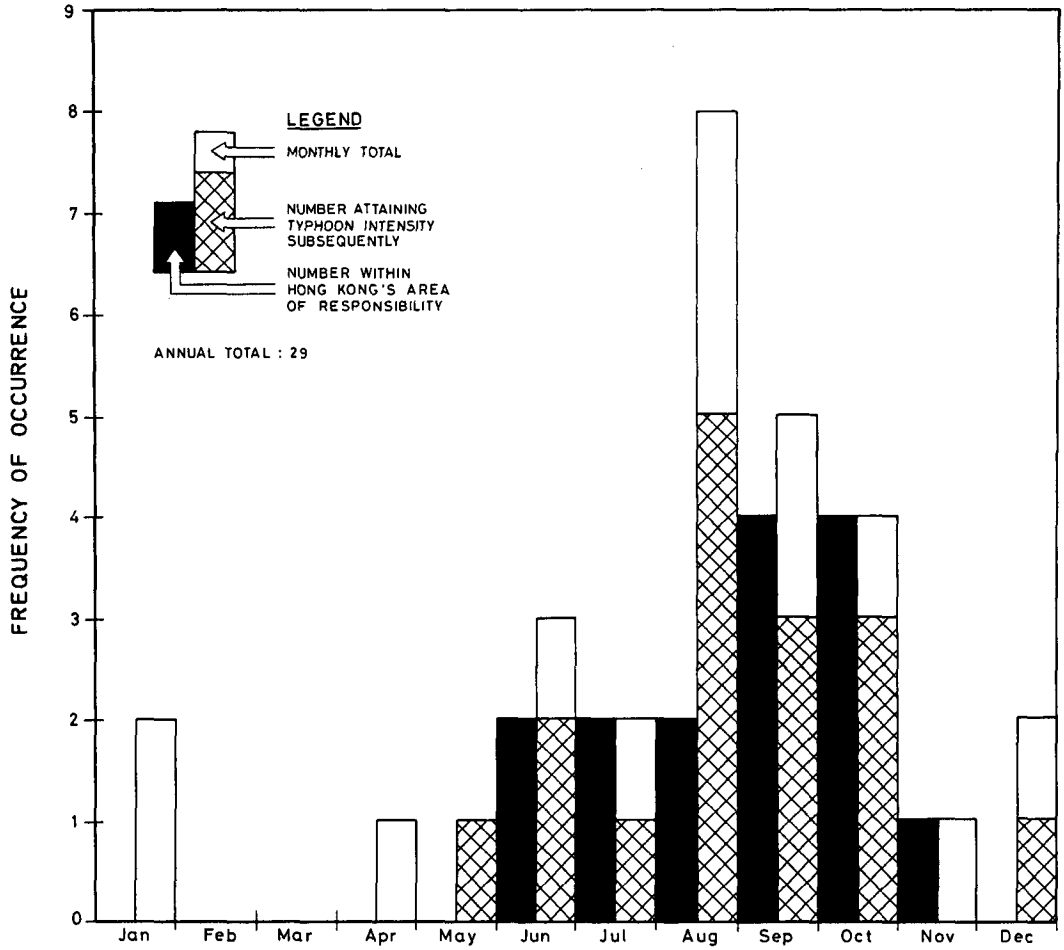

Figure 1. **Monthly distribution of the frequency of first occurrence of tropical cyclones in the western North Pacific and the South China Sea in 1985.**

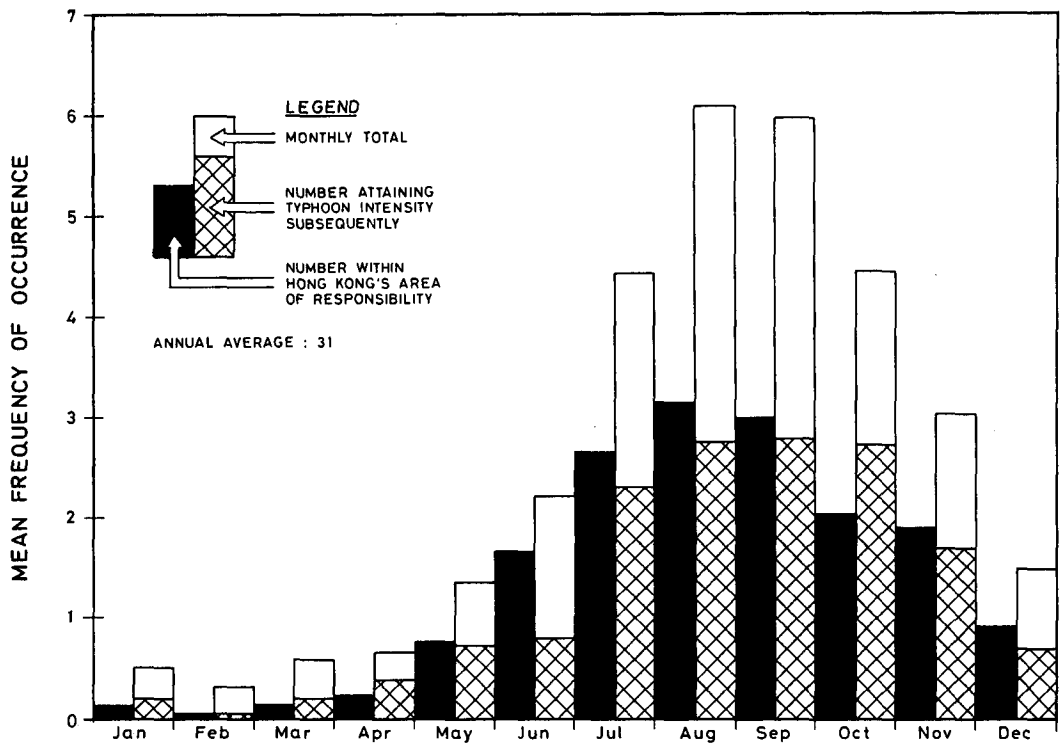

Figure 2. **Monthly distribution of the mean frequency of first occurrence of tropical cyclones in the western North Pacific and the South China Sea, 1946–1984.**

3. REPORTS ON TROPICAL CYCLONES AFFECTING HONG KONG IN 1985

(a) Typhoon Hal (8505)

19–25 June 1985

The track of Typhoon Hal is shown in Figure 3

Typhoon Hal developed as a tropical depression over the western North Pacific about 860 nautical miles east of Manila on 19 June. It started moving west-northwestwards and intensified into a typhoon about 360 nautical miles east-northeast of Manila on 21 June. Sustained surface winds of 80 knots and a sea-level pressure of 964 millibars were reported by a reconnaissance aircraft near the centre of the typhoon at 5.00 p.m. The eye of the typhoon, about 80 nautical miles in diameter, was also discernable on satellite pictures received by the Royal Observatory. The typhoon accelerated to 16 knots and passed about 35 nautical miles to the north of Luzon early on 22 June. In the central and northern Philippines, 59 people were killed or missing and 11 000 were left homeless. Hal also sank a boat, caused floods and landslips and disrupted the power supply to many areas. About 60 000 hectares of farmland were destroyed. Damage in the Philippines was estimated at US$12.3 million. Hal entered the South China Sea during the afternoon of 22 June and slowed down to about 9 knots. At 8.00 p.m. on 22 June, it passed about 170 nautical miles to the southwest of Lan Yu, Taiwan, where sustained winds of 48 knots and a sea-level pressure of 994.1 millibars were reported. In Taiwan, 2 people were killed, 5 were missing, and 18 others were injured. About 5 000 hectares of farmland were destroyed.

Hal maintained a west-northwestward course at about 11 knots over the South China Sea in the morning of 23 June. At 2.00 p.m., the M.V. 'Chevalier Roze' reported sustained winds of 55 knots and a sea-level pressure of 988.5 millibars about 110 nautical miles south of the centre. In the afternoon, Hal passed about 40 nautical miles north of Dongsha, where a minimum sea-level pressure of 974.6 millibars and maximum sustained winds of 54 knots were recorded. Hal decelerated to about 5 knots and turned north-northwestwards during the night of 23 June. Around noon on 24 June, Hal passed about 6 nautical miles west of Shanwei, where a minimum sea-level pressure of 976.4 millibars was recorded. Hal crossed the China coast around 2.00 p.m. and weakened into a tropical storm in the evening. It continued moving north-northwestwards slowly and dissipated about 140 nautical miles north of Hong Kong on 25 June. 2 people were killed nd 2 others were injured in southern Guangdong. Nearly 40 000 homes and more than 130 000 hectares of crops were damaged. In Haifeng, a coastal county of Guangdong, there was widespread damage to embankments, bridges, roads and hydro-electric facilities. A boat with a cargo of chemical fertiliser sank in Shanwei Bay on 24 June, but all the 10 people on board were rescued.

Heavy rain associated with the remnant of Hal affected various counties in southern Fujian as it moved further inland. 11 people were injured or killed. More than 100 000 others were stranded and vast areas of farmland were inundated.

In Hong Kong, the Stand By Signal, No. 1, was hoisted at 10.00 a.m. on 22 June, when Hal was about 400 nautical miles east-southeast of Hong Kong. Winds locally were light to moderate westerly. As Hal continued on a west-northwestward track towards Hong Kong, the Strong Wind Signal, No. 3, was hoisted at 12.40 a.m. on 23 June when Hal was about 310 nautical miles east-southeast of Hong Kong. During the day, winds gradually became fresh northwesterly, strong at times offshore. However winds remained moderate inside the harbour due to the sheltering effect of the surrounding hills. As Hal came closer to Hong Kong, winds strengthened and the Northwesterly Gale or Storm Signal, No. 8 NW, was hoisted at 4.15 a.m. on 24 June when Hal was about 80 nautical miles east-southeast of Hong Kong. Northwesterly winds reached gale force offshore. A maximum hourly mean wind of 40 knots and a maximum gust of 74 knots were recorded at Kwai Chung around 2.00 p.m. and 8.00 a.m. respectively. Inside the harbour, winds were generally strong during the afternoon. Gusts of more than 50 knots were recorded at the airport earlier in the morning. Gale-force winds gradually subsided in the evening and the No. 8 NW Signal was replaced by the Strong Wind Signal, No. 3, at 8.00 p.m. on 24 June. Winds further turned southwesterly but remained strong at times early on 25 June while Hal continued to move inland. Around 2.00 a.m. on 25 June a gust of 56 knots was recorded at Star Ferry Pier, Kowloon during a squally thunderstorm. Southwesterly winds moderated later in the morning and all signals were lowered at 10.45 a.m. on 25 June when Hal was dissipating about 140 nautical miles north of Hong Kong. Typhoon Hal was closest to Hong Kong around noon on 24 June when it was about 60 nautical miles to the east-northeast. The minimum sea-level pressure at the Royal Observatory was 985.5 millibars recorded at 5.00 a.m. when Hal was about 80 nautical miles to the east-southeast. The maximum hourly mean wind speeds and maximum gust peak speeds together with associated wind directions recorded at selected locations during the display of signals were as follows:

Location	*Maximum mean hourly wind speed in knots with direction in points*		*Maximum gust peak seed in knots with direction in points*	
Royal Observatory	WNW	22	SW	49
Hong Kong Airport (SE)	WNW	25	WNW & WSW	50
Hong Kong Airport (NW)	NNW	25	NNW	54
Waglan Island	WSW	36	WNW	55
Tate's Cairn	N	36	NNW	62
Cheung Chau	WNW	38	WNW	65
King's Park	N & WSW	18	N	45
Star Ferry	WNW	31	WSW	56
Green Island	WNW	28	W	50
Tsim Bei Tsui	WNW	31	WNW	45
Chek Lap Kok	WNW	38	WNW	49
Tai O	NW	22	NW	33
Kwai Chung	WNW	40	NNW	74
Sha Tin	N	13	N	36

The weather was fine and very hot in Hong Kong on 22 June. The temperature rose to a maximum of 32.2°C at the Royal Observatory which was the highest of the month. The weather became cloudy on 23 June with squally showers. On 24 June the showers became more frequet. Squally thunderstorms and heavy downpour occurred early on 25 June as Hal moved inland. During the one-hour period between 2.00 a.m. and 3.00 a.m., 63.9 mm of rainfall were recorded at the Royal Observatory and between midnight and 8.00 a.m., a total of 185.2 mm were recorded there. Periods of rain persisted during the day and thunderstorms and heavy rain occurred early the next morning. Between midnight and 9.00 a.m. on 26 June, 74 mm, 97 mm and 132 mm of rainfall were recorded at stations in North Point, Kwun Tong and Sai Kung respectively. The weather improved later in the morning but it remained cloudy with a few isolated showers for the rest of the day. More scattered showers occurred on 27 June but the weather gradually improved on 28 June. The daily amounts of rainfall recorded were as follows:

	Royal Observatory	*Cheung Chau*	*Tate's Cairn*
22 June	Nil	Nil	Nil
23 June	7.1 mm	3.0 mm	5.7 mm
24 June	17.5 mm	41.2 mm	55.9 mm
25 June	208.1 mm	51.7 mm	137.8 mm
26 June	42.2 mm	2.8 mm	76.8 mm
27 June	6.0 mm	0.1 mm	9.3 mm
Total:	280.9 mm	98.8 mm	285.5 mm

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

Location	Highest tide above chart datum			Maximum storm surge above astronomical tide		
	Height (m)	Date	Time	Height (m)	Date	Time
North Point	2.54	23 June	12.15 p.m.	0.75	25 June	11.30 p.m.
Tai Po Kau	2.80	23 June	1.30 p.m.	0.93	23 June	1.30 p.m.
Lok On Pai	2.68	23 June	1.45 p.m.	0.70	23 June	10.15 p.m.
Tsim Bei Tsui	2.76	24 June	2.00 p.m.	0.77	23 June	11.30 p.m.

In Hong Kong, an 18-year-old youth was missing while he was swimming in Big Wave Bay, Shek O around 3.00 p.m. on 23 June. 13 other people were injured on 24 and 25 June. Most of those hurt were struck by flying pieces of broken glass or falling objects. On 24 June, minor damage was reported in various places over the territory. Some signboards were blown loose on Gloucester Road in Wan Chai and Ma Tau Wai Road in Kowloon City. Scaffolding was blown down on Tai Nam Street in Sham Shui Po. In the harbour, a fishing junk and a barge sank at their moorings. The 10-metre fishing junk, 'Wai Tung', sank off Hoi An Street in Shau Kei Wan around 3.00

a.m. on 24 June. The barge capsized off Des Voeux Road West in Western. A pilot boat, 'Bamboo No. 1' went adrift around 2.15 p.m. near where the barge capsized. There were minor flooding and landslips in the New Territories. There were no damage reports from vegetable and fish farmers on 24 June. Schools were closed on 24 and 25 June and many scheduled examinations and social activities were either cancelled or postponed. Public transport was seriously affected from the evening of 23 June until the afternoon of 24 June. Trams, buses, all ferries, jetfoils and hover-ferries were suspended and the Mass Transit Railway and Kowloon Canton Railway maintained limited services. At the airport, 11 flights were cancelled, 26 delayed, and one diverted.

Thunderstorms and heavy rain in the wake of Typhoon Hal early on 25 June and 26 June caused numerous landslips in Hong Kong. During the 3-day period from 25 to 27 June, more than 30 landslips were reported. Nearly 200 squatters were made homeless on 25 June. The worst-affected area was Lam Tin in Kwun Tong, where 47 families were evacuated between 2.00 a.m. and 3.00 a.m. At 7.50 a.m. on 25 June, heavy rainfall caused about 70 cubic metres of rock and soil to slip from a slope at King's Road near Tsing Fung Street. In another smaller landslip on King's Road near Oil Street, three people were slightly injured. There were about 180 reports of flooding in various places on 25 June. Heavy rainstorms early on 26 June caused a landslip at the junction of Smithfield and Pokfield Roads in Kennedy Town. 25 squatter families comprising 100 people were evacuated, but no one was injured. Between midnight and 3.00 a.m. on 26 June, floods were reported in Kwun Tong, San Po Kong, and Kowloon City. In the New Territories, floods were reported in Tsuen Wan and Kwai Chung. A landslip occurred around 5.00 a.m. on Clear Water Bay Road, near Ta Kwu Ling San Tsuen, Sai Kung. Around 1.30 p.m., a retention wall near a school for the deaf in Fu Shan Road in Hung Hom collapsed. Minor landslips also occurred in Ngau Chi Wan and Lam Tin on 27 June. No one was injured in these incidents.

Typhoon Hal brought about 10 million cubic metres of water to the reservoirs of Hong Kong.

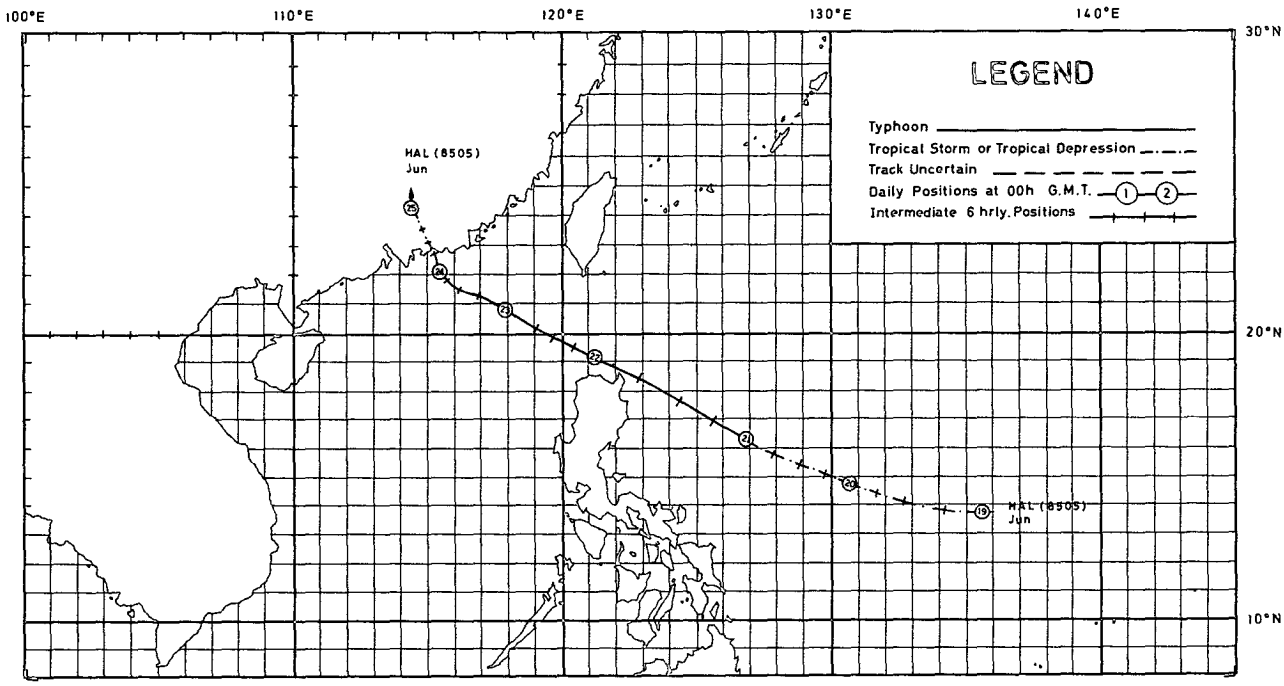

Figure 3. Track of Typhoon Hal (8505): 19–25 June.

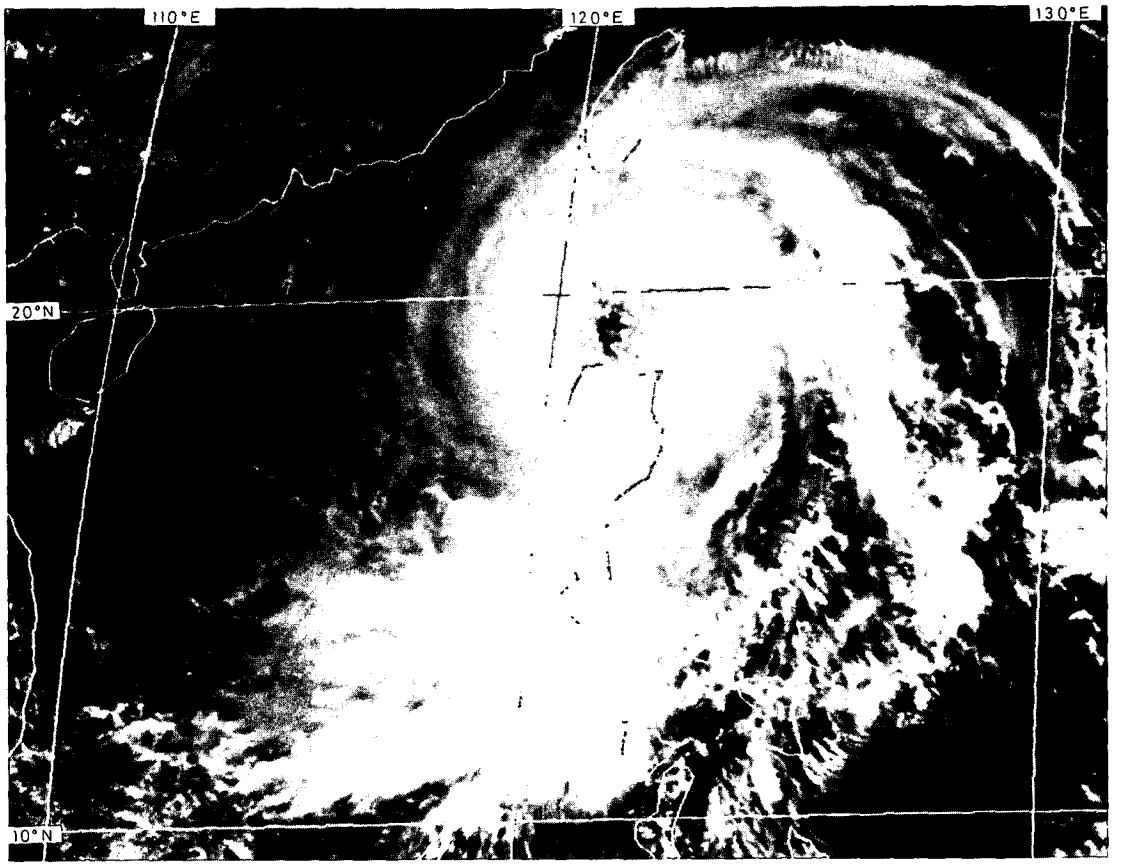

Figure 4. GMS-3 visible imagery of Typhoon Hal (8505) around 8.00 a.m. on 22 June 1985.

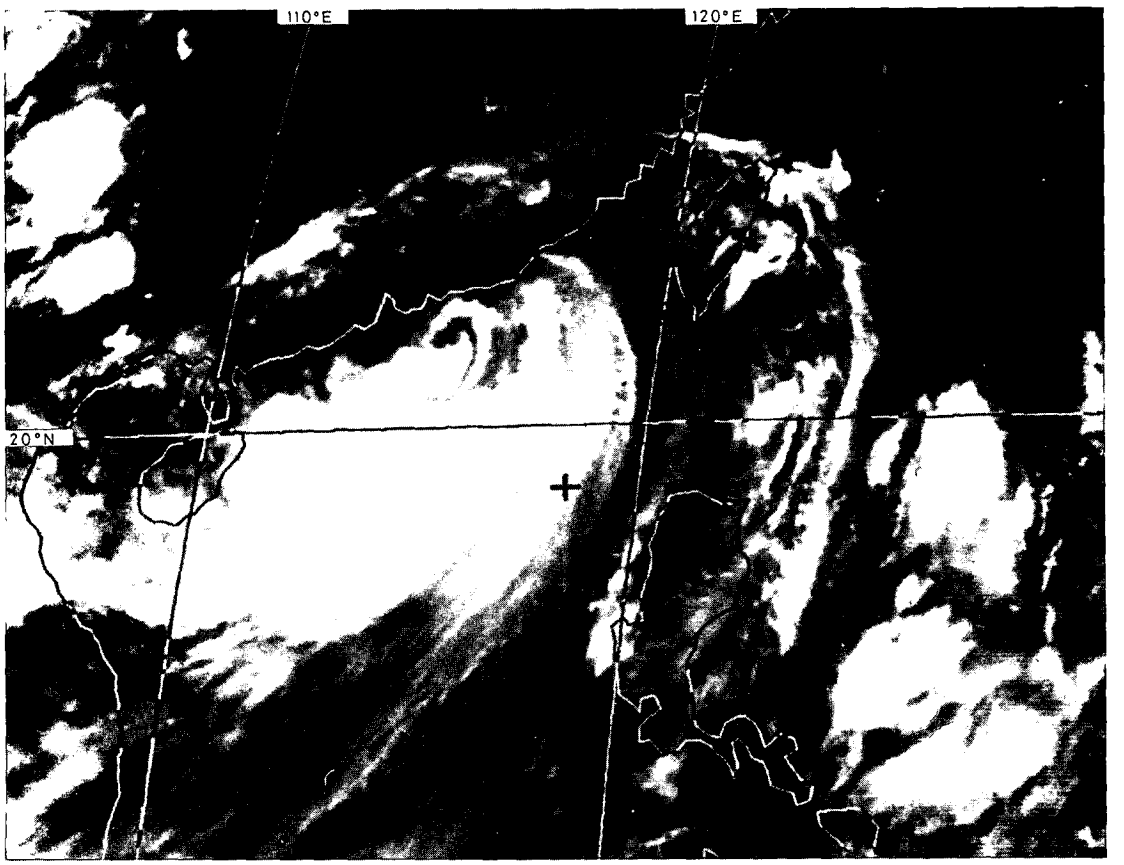

Figure 5. GMS-3 infra-red imagery of Typhoon Hal (8505) around 5.00 a.m. on 24 June 1985.

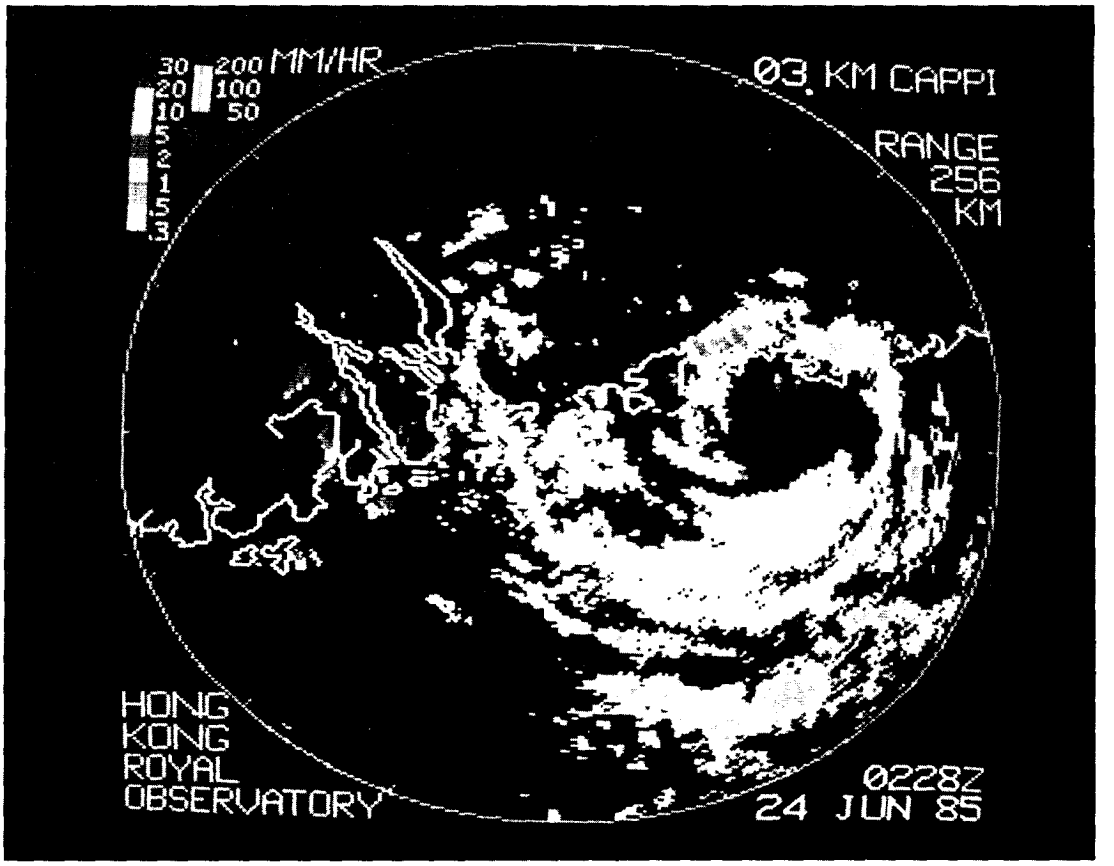

Figure 6. Radar display of Typhoon Hal (8505) at 10.28 a.m. on 24 June 1985.

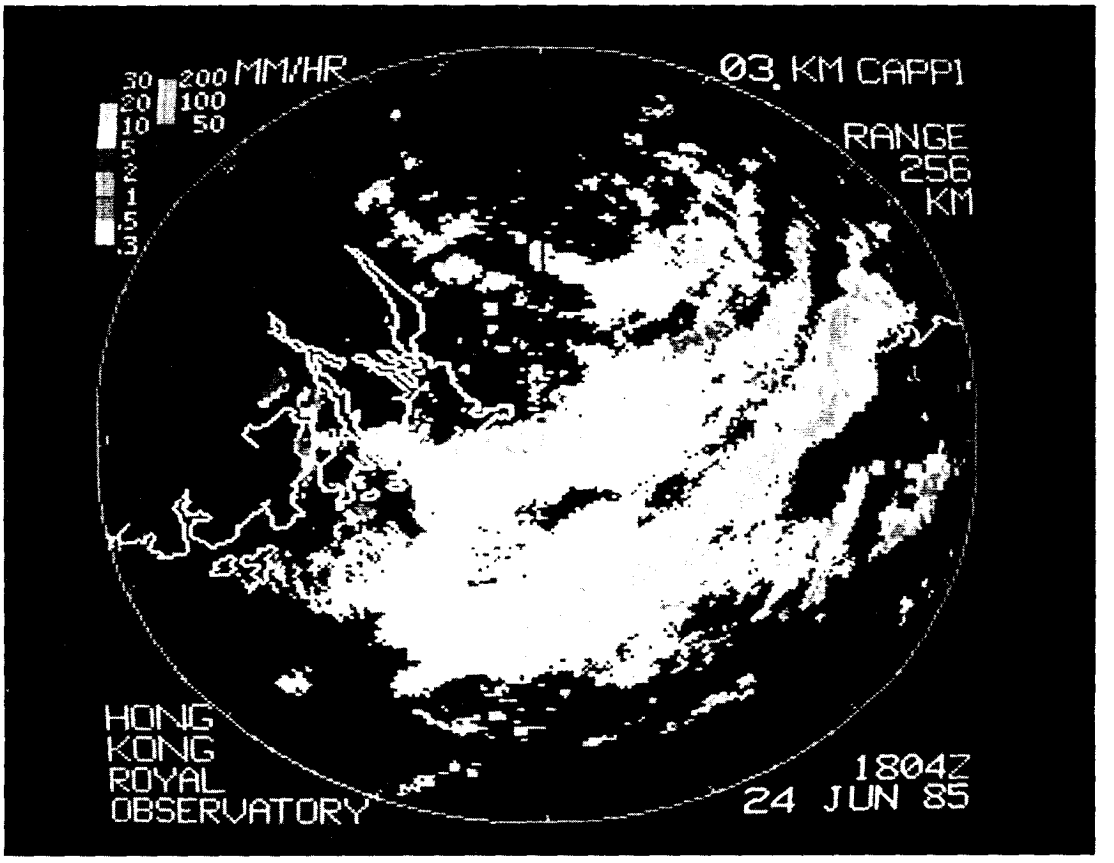

Figure 7. Radar display of Typhoon Hal (8505) at 2.04 a.m. on 25 June 1985.

(b) Tropical Depression

4–8 July 1985

The track of this tropical depression is shown in figure 8

A tropical depression formed over the western North Pacific about 650 nautical miles east-southeast of Manila on 4 July. It moved west-northwestwards at about 18 knots at first and slowed down to about 11 knots as it crossed the central Philippines. On 5 July, the tropical depression weakened and turned northwestwards. On entering the South China Sea in the afternoon of 6 July the tropical depression resumed its west-northwestward course and intensified slightly. At 2.00 p.m. on 7 July, the M.V. 'Lng Aries' reported sustained winds of 27 knots and a sea-level pressure of 999.2 millibars about 70 nautical miles east-southeast of the centre. The tropical depression decelerated to 7 knots and turned northwards in the evening of 7 July when it was centred about 250 nautical miles south-southeast of Hong Kong. In the afternoon of 8 July, the tropical depression passed about 50 nautical miles west of Dongsha, where sustained winds of 28 knots and a sea-level pressure of 999.4 millibars were reported. It then accelerated to 14 knots and dissipated near the south China coast late on 8 July about 110 nautical miles east-northeast of Hong Kong.

In Hong Kong, the Stand By Signal, No. 1, was hoisted at 1.30 a.m. on 8 July when the tropical depression was centred about 220 nautical miles south-southeast of Hong Kong. Winds locally were light to moderate northerly at first and became westerly in the afternoon. The tropical depression came closest to Hong Kong around 8.00 p.m. on 8 July when it was about 100 nautical miles to the east. The lowest sea-level pressure at the Royal Observatory was 1 001.7 millibars recorded at 5.00 p.m. on 8 July. All signals were lowered at 11.00 p.m. on 8 July when the tropical depression weakened into an area of low pressure near the south China coast in the vicinity of Shanwei. Winds freshened locally from the southwest early on 9 July and became strong offshore for a brief period. Winds moderated later in the morning and turned south-easterly in the afternoon. The maximum hourly mean winds and maximum gust peak speeds together with associated wind directions at selected locations during the passage of the tropical depression were as follows:

Location	*Maximum mean hourly wind speed in knots with direction in points*		*Maximum gust peak speed in knots with direction in points*	
Royal Observatory	SSW	15	SSW	31
Hong Kong Airport (SE)	SSW	14	SE	35
Hong Kong Airport (NW)	NW	12	S	31
Waglan Island	SSW	29	SSW	37
Tate's Cairn	SSW	16	NNW	47
Cheung Chau	SSW	24	SSW	42
Star Ferry	SSW	15	WSW	36
Green Island	S	30	S	43
Tsim Bei Tsui	N	17	S	46
Chek Lap Kok	N	16	SW	28
Tai O	SSW	20	NNE	34
Kwai Chung	SSW	12	SSW	25
Sha Tin	SSW	12	SSW	34

In Hong Kong, it was sunny and hot on 7 July. Some squally thunderstorms occurred in the early morning of 8 July and there were scattered showers during the day. More squally thunderstorms occurred overnight as the remnant of the tropical depression moved inland. During the one-hour period between 5.00 a.m. and 6.00 a.m. on 9 July, rain was heaviest in Sha Tin where 125 mm of rainfall were recorded. Between midnight and 7.00 a.m., a total of 226 mm were recorded there. In Sham Shui Po, 176 mm of rainfall were recorded during the same 7-hour period. The weather improved in the afternoon and there were sunny intervals. Apart from a few isolated showers, the weather became fine again on 10 July. The daily amounts of rainfall recorded were as follows:

	Royal Observatory	*Cheung Chau*	*Tate's Cairn**
7 July	Nil	Nil	Nil
8 July	18.0 mm	34.9 mm	10.5 mm
9 July	18.9 mm	11.0 mm	102.0 mm
10 July	0.4 mm	Nil	1.6 mm
11 July	Nil	Nil	Nil
Total:	37.3 mm	45.9 mm	114.1 mm

*Daily rainfall ending at 3 p.m.

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
North Point	1.91	8 July	11.15 a.m.	0.04	8 July	9.45 a.m.
Tai Po Kau	1.92	8 July	11.30 a.m.	0.32	8 July	3.30 p.m.
Lok On Pai	2.11	8 July	12.45 p.m.	0.19	8 July	4.15 p.m.
Tsim Bei Tsui	2.28	8 July	2.00 p.m.	0.33	8 July	12.00 a.m.

Damage in Hong Kong was slight. Severe thunderstorms early on 9 July damaged the signal system of the Kowloon-Canton Railway and caused delays in the train service, which returned to normal in the afternoon. Heavy rain in the same morning caused flooding and minor landslips in various places in the territory, but there were no casualties. The most serious flood occurred near the Lion Rock Tunnel entrance in Sha Tin, disrupting traffic there for more than an hour. Flooding was also reported in 7 other localities in the New Territories and in Lai Chi Kok, Sham Shui Po, Kowloon City and Diamond Hill. Minor landslips occurred in Shek Kip Mei, Lai Chi Kok and Kwai Chung. A road subsidence occurred on Castle Peak Road in Cheung Sha Wan.

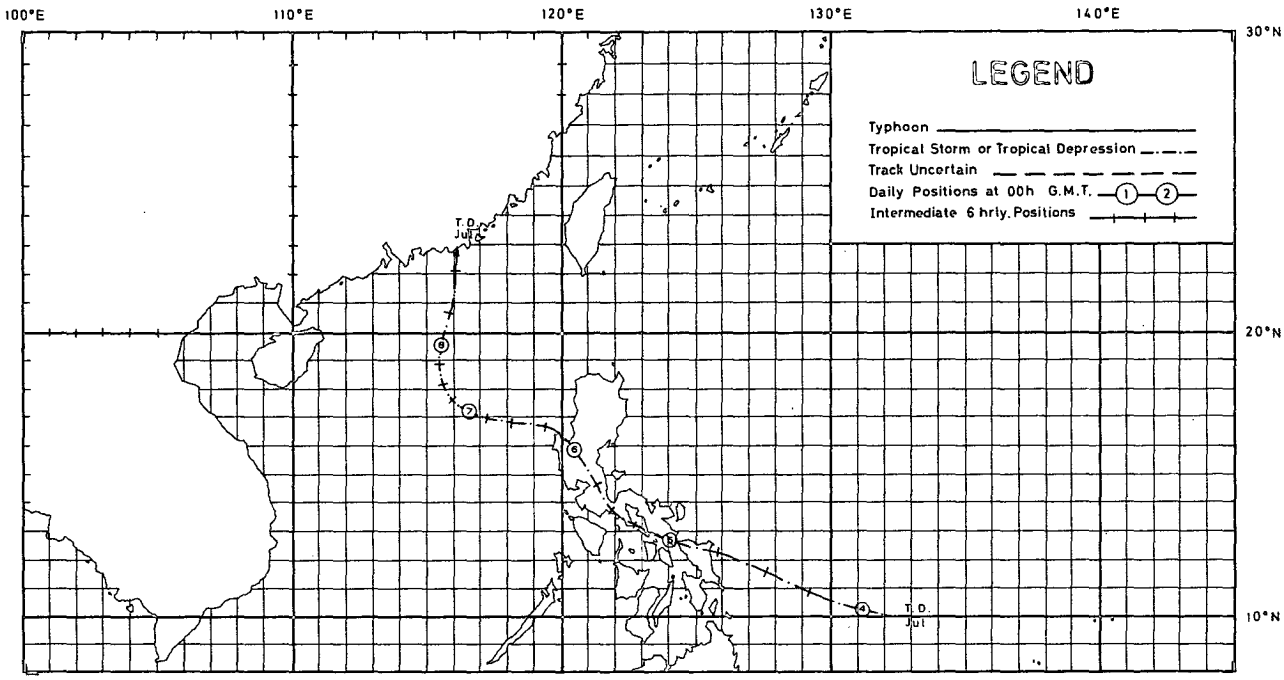

Figure 8. Track of the Tropical Depression of 4–8 July 1985.

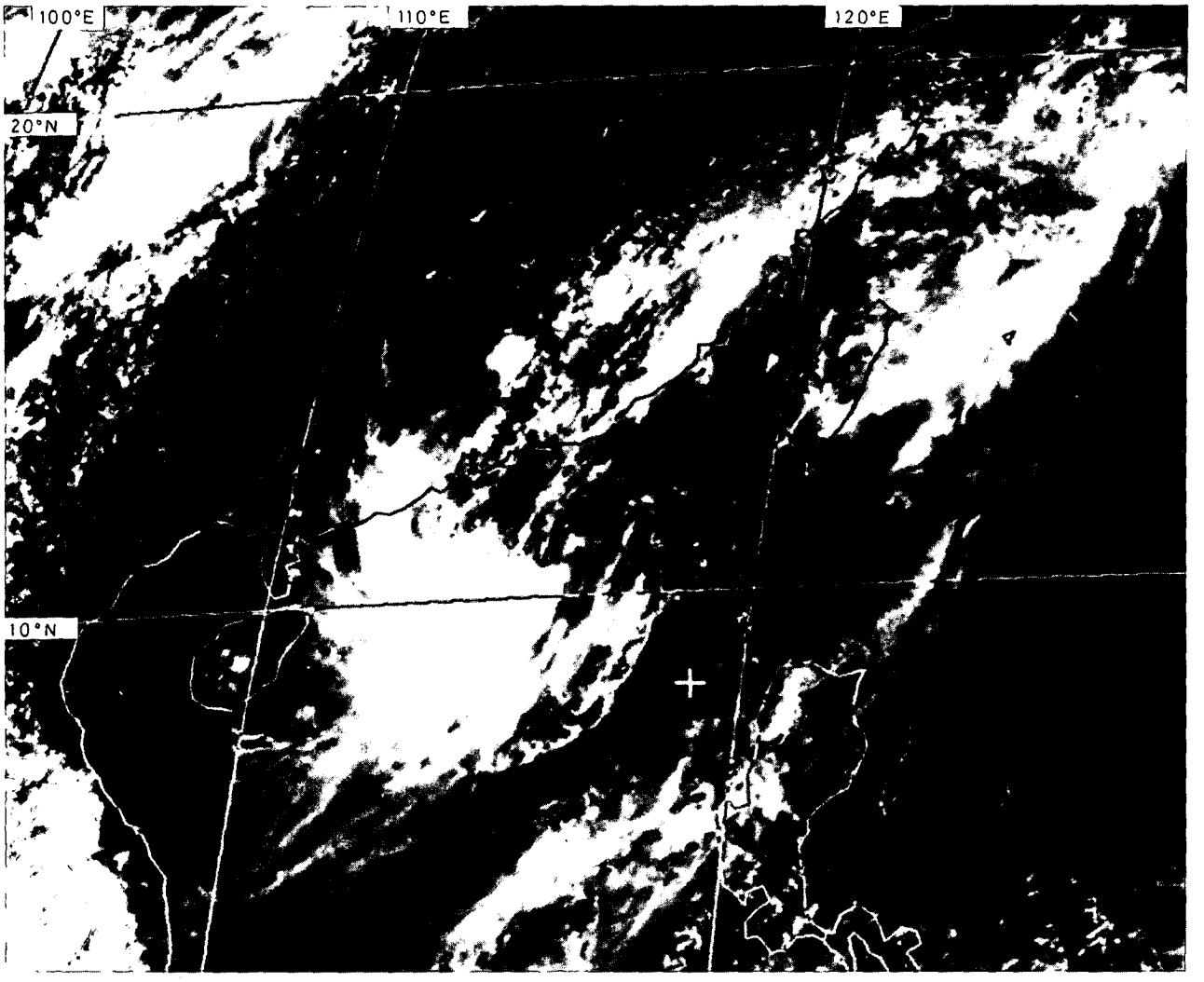

Figure 9. GMS-3 visible imagery of the Tropical Depression around 2.00 p.m. on 8 July 1985.

(c) Typhoon Tess (8516)

1–7 September 1985

The track of Typhoon Tess is shown in Figure 10

Tess developed as a tropical depression over the western North Pacific about 690 nautical miles east of Manila on 1 September. It moved westwards at first and became a tropical storm the next day. Tess further intensified into a severe tropical storm early on 3 September and turned northwestwards. It crossed Luzon during the day, bringing floods to highways and villages. 5 people were reported killed in the Philippines. In Batangas province, southeast of Manila, a 5-year-old boy was killed in a tornado spawned by the severe tropical storm. 7 other people were injured. Tess weakened slightly over Luzon and then entered the South China Sea on 4 September, moving west-northwestwards at about 13 knots. During the morning of 5 September, Tess intensified into a typhoon about 180 nautical miles south of Hong Kong. It slowed down to 9 knots and turned northwestwards in the afternoon. Tess moved on a north-northwesterly course in the evening and came closer to Hong Kong. Tess was most intense during the night when maximum sustained winds and minimum sea-level pressure near the centre were estimated at 75 knots and 965 millibars respectively. Around 11.00 p.m. on 5 September, the M.V. 'Jacek Malczewski' reported sustained winds of 52 knots about 170 nautical miles east-northeast of the centre. Overnight, sustained winds of over 60 knots were reported at Huangmao Zhou about 80 nautical miles northeast of the centre. During the early morning on 6 September, Tess passed about 20 nautical miles southwest of Shangchuan Dao, where sustained winds of 56 knots were recorded. Around 6.00 a.m. on 6 September, Tess crossed the China coast near Yangjiang, where sustained winds of 34 knots, gusts reaching 46 knots and a minimum sea-level pressure of 977.1 millibars were recorded. Tess weakened into a severe tropical storm soon after crossing the coast. It continued moving northwestwards at about 10 knots as a tropical storm over western Guangdong and dissipated about 110 nautical miles northeast of Nanning early on 7 September. In Guangdong, 26 counties were affected. The city of Jiangmen was most seriously hit. In the affected areas, power supply was interrupted and telecommunication lines and irrigation works were damaged. There were reports of collapsed houses. Vast stretches of paddy fields and fish-ponds were inundated. Sugar-cane plantations were devastated.

In Hong Kong, the Stand By Signal, No. 1, was hoisted at 9.00 a.m. on 4 September, when Severe Tropical Storm Tess was centred about 340 nautical miles to the southeast. Winds locally were moderate northeasterly and freshened during the evening. The Strong Wind Signal, No. 3, was hoisted at 9.10 p.m. on 4 September, when Tess was about 210 nautical miles to the south-southeast of Hong Kong. Winds were generally strong over Hong Kong on 5 September and strengthened further from the east during the day as Tess intensified into a typhoon and changed to a north-northwesterly track, bringing it closer to Hong Kong. Gale-force winds were reported offshore in the afternoon and turned southeasterly during the evening. The Southeasterly Gale or Storm Signal, No. 8 SE, was hoisted at 1.10 a.m. on 6 September when Typhoon Tess was centred about 110 nautical miles southwest of Hong Kong. Tess was closest to Hong Kong around 2.00 a.m. on 6 September when it was about 105 nautical miles to the southwest. Hourly mean winds of 38 knots and gusts reaching 75 knots were recorded at Star Ferry Pier, Kowloon, early the same morning. In the western approaches of the harbour, a gust of 88 knots was recorded at Green Island. Tess crossed the China coast near Yangjiang around 6.00 a.m. on 6 September and weakened into a severe tropical storm. The Gale or Storm Signal, No. 8 SE, was replaced by the Strong Wind Signal, No. 3, at 6.10 a.m. on 6 September. Winds subsided later in the morning. All signals were lowered at 2.00 p.m. on 6 September when Tess was centred over western Guangdong about 160 nautical miles west of Hong Kong. The minimum sea-level pressure of 995.5 millibars at the Royal Observatory was recorded at 6.00 p.m. on 5 September, when Tess was about 130 nautical miles to the south-southwest. The maximum hourly mean winds and maximum gust peak speeds together with associated wind directions at selected locations during the passage of the typhoon were as follows:

Location	*Maximum mean hourly wind speed in knots with direction in points*		*Maximum gust peak speed in knots with direction in points*	
Royal Observatory	E & ESE	28	E	60
Hong Kong Airport (SE)	ESE	35	ESE	65
Hong Kong Airport (NW)	ESE	32	SE	55
Waglan Island	ESE	43	ESE	62
Tate's Cairn	SE & SSW	42	SE	84
Cheung Chau	ESE	46	SE	71
King's Park	ESE	27	ESE	56
Star Ferry	ESE	38	ESE	75
Green Island	ESE	44	ESE	88
Tsim Bei Tsui	ESE	36	ESE	61
Chek Lap Kok	E	48	E	70
Tai O	SE	36	SE	74
Kwai Chung	ESE	33	ESE	55
Sha Tin	SE	22	SE	57

In Hong Kong it was sunny and very hot on 4 September, with the temperature rising to a maximum of 32.7°C at the Royal Observatory. Some showers set in during the afternoon and it became cloudy. Showers became heavier and more frequent on 5 September as Tess moved closer to Hong Kong. Frequent heavy squally showers occurred early on 6 September but the weather improved in the afternoon. Apart from some slight showers, the weather was sunny on 7 September. It became cloudy and there were some scattered showers on 8 September. The daily amounts of rainfall recorded were as follows:

	Royal Observatory	*Cheung Chau*	*Tate's Cairn*
4 September	1.1 mm	Trace	5.9 mm
5 September	47.9 mm	22.1 mm	61.5 mm
6 September	114.3 mm	77.5 mm	105.5 mm
7 September	0.8 mm	Trace	11.4 mm
8 September	16.9 mm	35.0 mm	20.1 mm
Total:	181.0 mm	134.6 mm	204.4 mm

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

Location	Highest tide above chart datum			Maximum storm surge above astronomical tide		
	Height (m)	Date	Time	Height (m)	Date	Time
North Point	2.26	5 Sep	11.15 p.m.	0.50	5 Sep	10.15 p.m.
Tai Po Kau	2.60	5 Sep	10.30 p.m.	0.96	5 Sep	10.30 p.m.
Lok On Pai	2.51	6 Sep	12.30 a.m.	0.59	6 Sep	5.15 a.m.
Tsim Bei Tsui	2.76	6 Sep	1.00 a.m.	0.60	6 Sep	12.30 a.m.

In Hong Kong, 2 people were killed and a total of 12 people were injured from 4 to 6 September. One man was killed at a construction site in Tai Koo Shing on 5 September when a wall collapsed. Another man was killed when a crane collapsed at Kwai Chung on 6 September. Due to engine trouble the jetfoil 'Sao Jorge', bound for Macau with 120 people on board, ran aground near Chi Ma Wan on Lantau Island at 8.50 p.m. on 5 September. None of the passengers or crew suffered serious injury. Six ships ran into trouble and were involved in incidents including slight collision, listing and dragging anchors. The M.V. 'New Horse' collided with the M.V. 'Fiona Mary' in the Western Anchorage during the night of 5 September. Both vessels suffered damage but no casualties were reported. The 4 000-tonne cargo ship, the M.V. 'Carlina', with 28 crew on board listed 25 degrees about 180 nautical miles south of Hong Kong early on 6 September. The vessel was brought under control around 11.00 a.m. Landslips and flooding occurred in various places in Hong Kong. On 5 September, there were 20 reports of minor flooding. On 6 September, there were 34 reports of flooding and 19 cases of landslips. Flooding was more serious in the northwestern part of the New Territories. Among the worst-affected areas were Kam Tin, Pat Heung, Ngau Tam Mei, Sheung Shui and Tai Po. About 80 hectares of vegetable fields and 12 hectares of fish-ponds were inundated. The Lower Shing Mun Reservoir overflowed from the heavy downpours. In Sheung Wan, a 220-square metre retaining wall at a construction site collapsed around 6.30 p.m. on 6 September, causing the subsidence of a section of Square Street. 600 people were evacuated from nearby buildings but no one was injured. Other landslips occurred in Shau Kei Wan, Kwun Tong, Sha Tin and Tsuen Wan. More than 30 squatters were evacuated. Road subsidences also occurred in Sai Kung and Tsuen Wan. Ferry services were suspended late on 5 September. Public transport resumed normal during the morning of 6 September. At the airport, 2 flights were diverted, 10 flights were cancelled and 50 were delayed on 5 and 6 September.

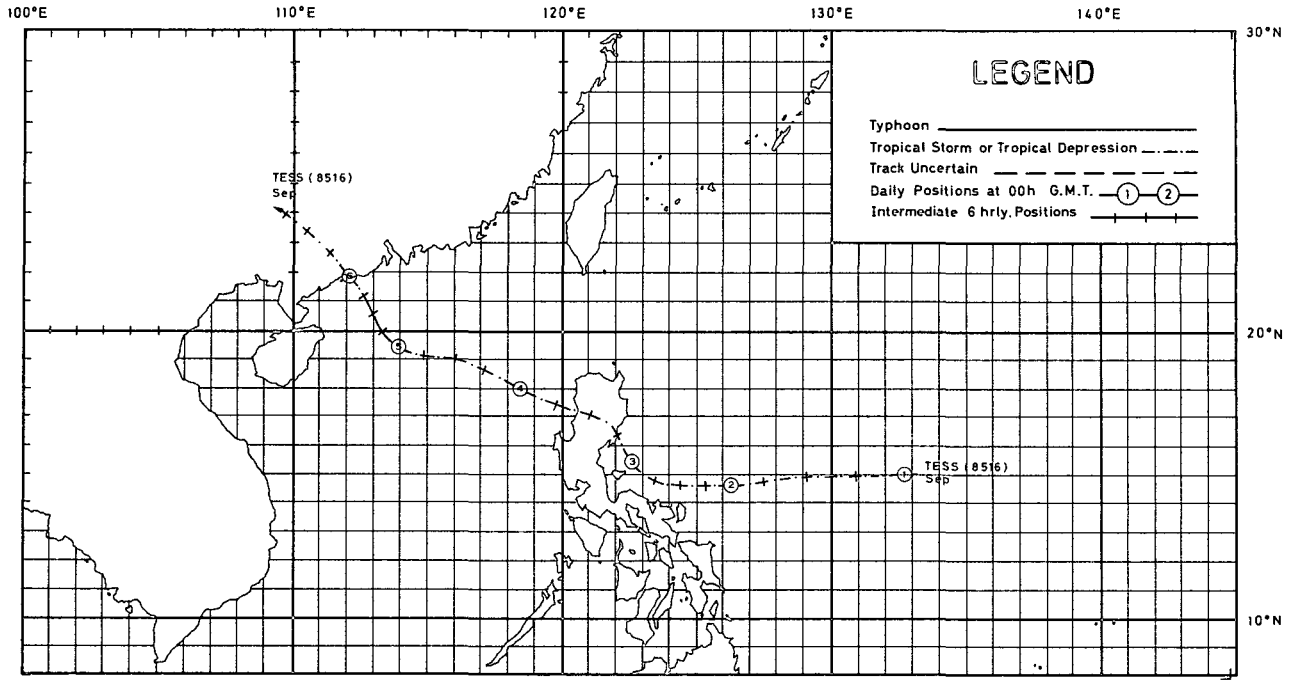

Figure 10. **Track of Typhoon Tess (8516): 1–7 September 1985.**

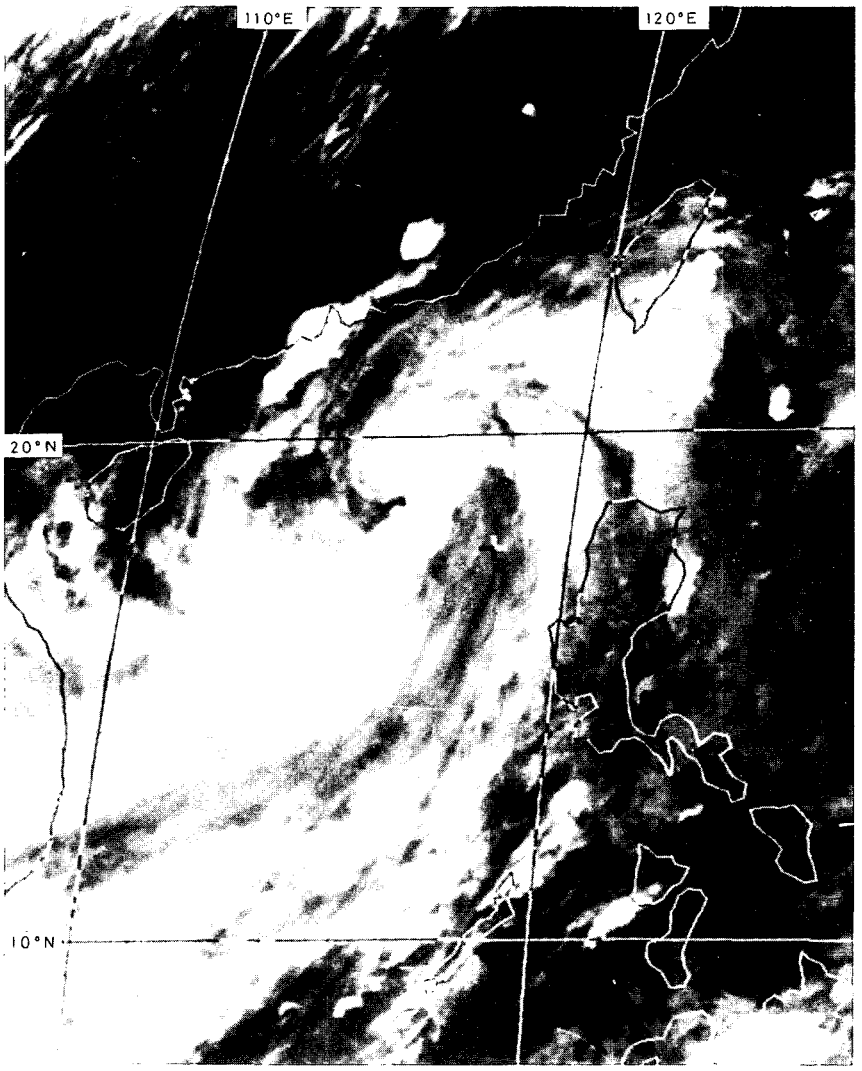

Figure 11. **GMS-3 infra-red imagery of Typhoon Tess (8516) around 8.00 p.m. on 4 September 1985.**

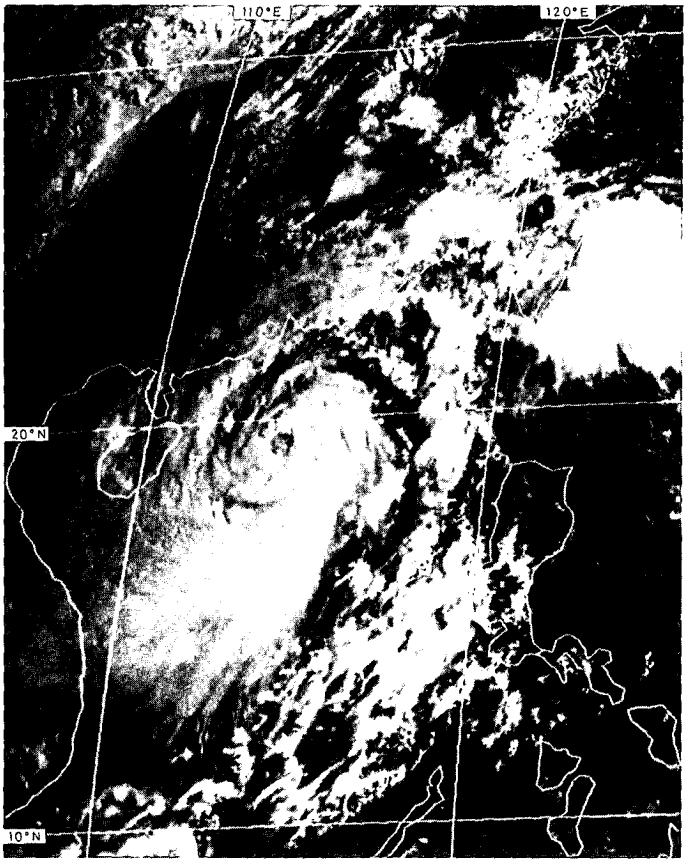

Figure 12. GMS-3 visible imagery of Typhoon Tess (8516) around 8.00 a.m. on 5 September 1985.

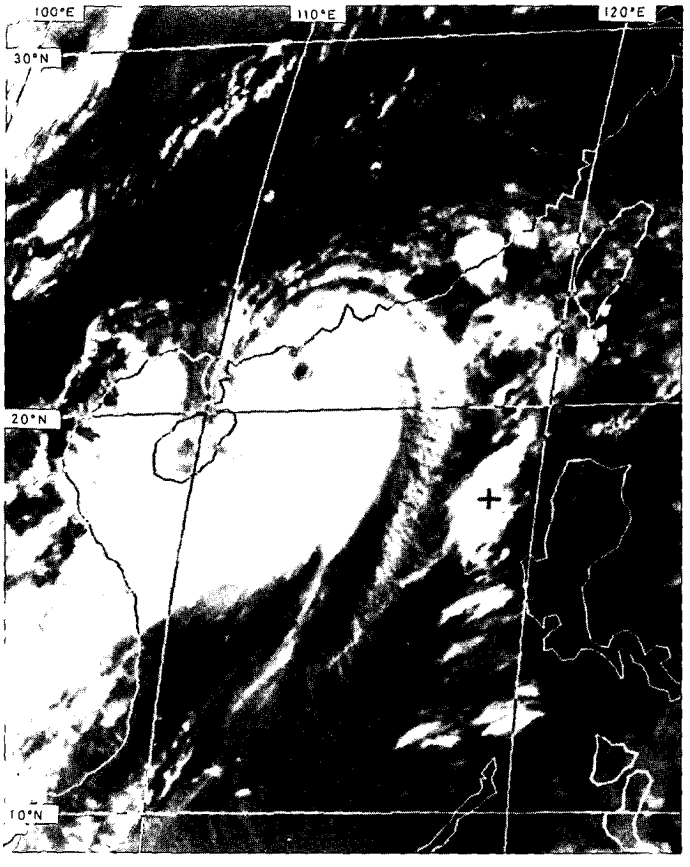

Figure 13. GMS-3 infra-red imagery of Typhoon Tess (8516) around midnight on September 1985.

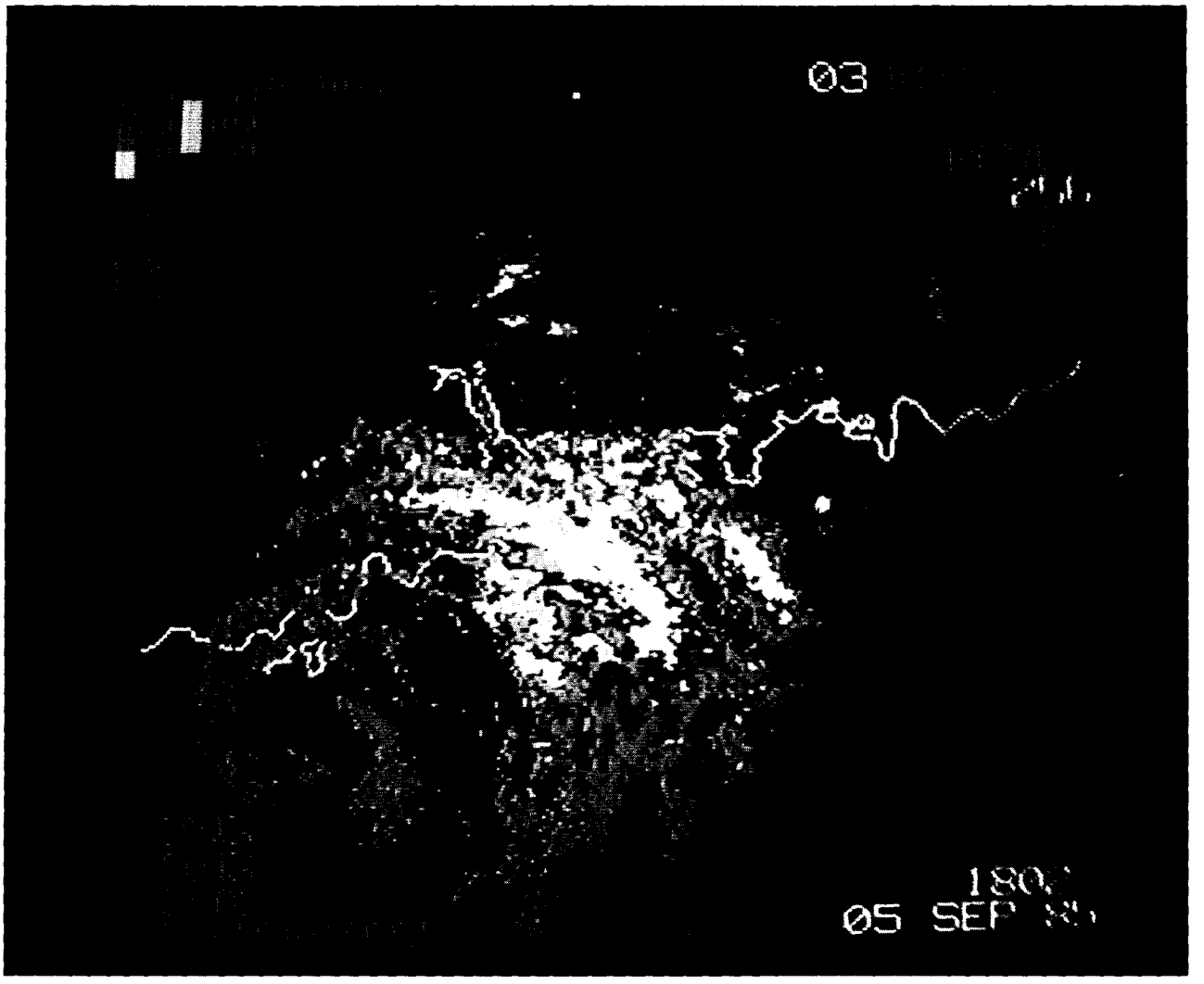

Figure 14. **Radar display of Typhoon Tess (8516) at 2.02 a.m. on 6 September 1985.**

(d) Tropical Storm Val (8517)

15–18 September 1985

The track of Tropical Storm Val is shown in Figure 15

Val developed as a tropical depression about 730 nautical miles southeast of Taibei on 15 September. It moved northwestwards at about 20 knots and intensified into a tropical storm that afternoon. Val adopted a westerly track when it was about 370 nautical miles southeast of Taibei early on 16 September. Satellite pictures showed that Val had a well-defined low-level circulation centre but the main cloud mass was displaced to the north. At 5.00 p.m. sustained surface winds of 46 knots and a sea-level pressure of 1 002.9 millibars were recorded at Lan Yu, about 80 nautical miles northwest of the centre. The tropical storm slowed down to about 7 knots as it crossed the Bashi Channel. In the morning of 17 September, Val passed about 40 nautical miles off the southern tip of Taiwan. Val caused flooding and landslips in Taiwan. 2 people were reported missing in floods. A freight train was derailed on a damaged railway track. In the evening of 17 September, Val weakened into a tropical depression over the South China Sea and dissipated about 110 nautical miles east-northeast of Dongsha early on 18 September.

In Hong Kong, the Stand By Signal, No. 1, was hoisted at 5.00 a.m. on 17 September when Val was centred about 390 nautical miles east of Hong Kong and lowered at 8.10 a.m. on 18 September when Val dissipated about 240 nautical miles east-southeast of Hong Kong. The lowest sea-level pressure of 1 005.6 millibars at the Royal Observatory was recorded between 4.00 p.m. and 5.00 p.m. on 17 September. The maximum hourly mean winds and maximum gust peak speeds together with associated wind directions at selected locations during the display of the Stand By Signal were as follows:

Location	*Maximum mean hourly wind speed in knots with direction in points*		*Maximum gust peak speed in knots with direction in points*	
Royal Observatory	W	9	N	18
Hong Kong Airport (SE)	N	12	N	23
Hong Kong Airport (NW)	N	11	NNE	26
Waglan Island	N	17	N	22
Tate's Cairn	N	20	NNE	32
Cheung Chau	N	12	ESE	20
King's Park	ESE	9	NE	21
Star Ferry	W	12	W	18
Green Island	ENE	15	ENE	24
Tsim Bei Tsui	NNW	14	NNW	24
Lau Fau Shan	—	13	—	23
Chek Lap Kok	NW	15	NW	19
Tai O	ENE	10	ENE	29
Kwai Chung	WNW	9	N	19
Sha Tin	N	8	N	17

The weather was fine, sunny and hot on 17 September with the temperature rising to a maximum of 32.3°C in the afternoon. It became cloudy with some scattered showers during the next two days but there were also sunny intervals on 19 September. The daily amounts of rainfall recorded were as follows:

	Royal Observatory	*Cheung Chau*	*Tate's Cairn*
17 September	Nil	1.0 mm	Nil
18 September	3.2 mm	1.9 mm	2.9 mm
19 September	10.3 mm	5.7 mm	14.8 mm
Total:	13.5 mm	8.6 mm	17.7 mm

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

Location	Highest tide above chart datum			Maximum storm surge above astronomical tide		
	Height (m)	Date	Time	Height (m)	Date	Time
North Point	2.07	17 Sep	10.45 a.m.	0.09	17 Sep	8.45 p.m.
Tai Po Kau	2.22	17 Sep	12.00 noon	0.39	17 Sep	2.30 p.m.
Lok On Pai	2.29	17 Sep	11.45 p.m.	0.24	18 Sep	1.30 a.m.
Tsim Bei Tsui	2.54	17 Sep	12.30 p.m.	0.30	18 Sep	3.00 a.m.

There were no reports of damage in Hong Kong.

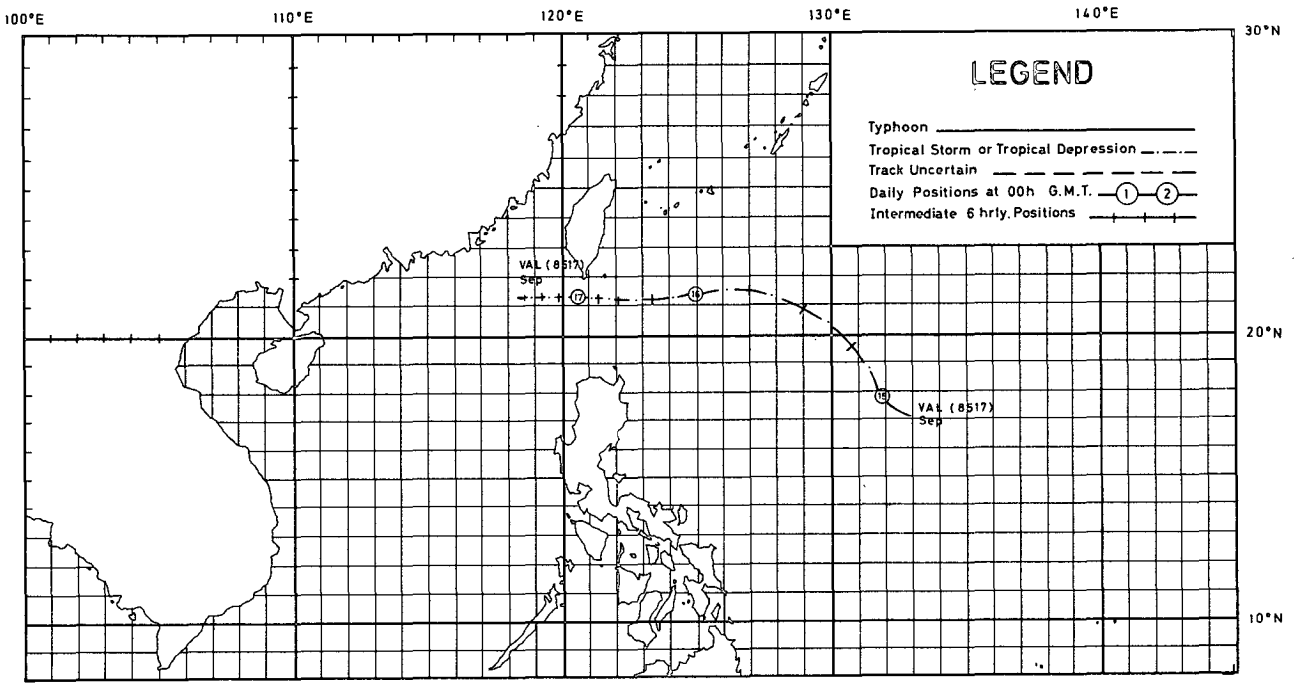

Figure 15. Track of Tropical Storm Val (8517): 15–18 September 1985.

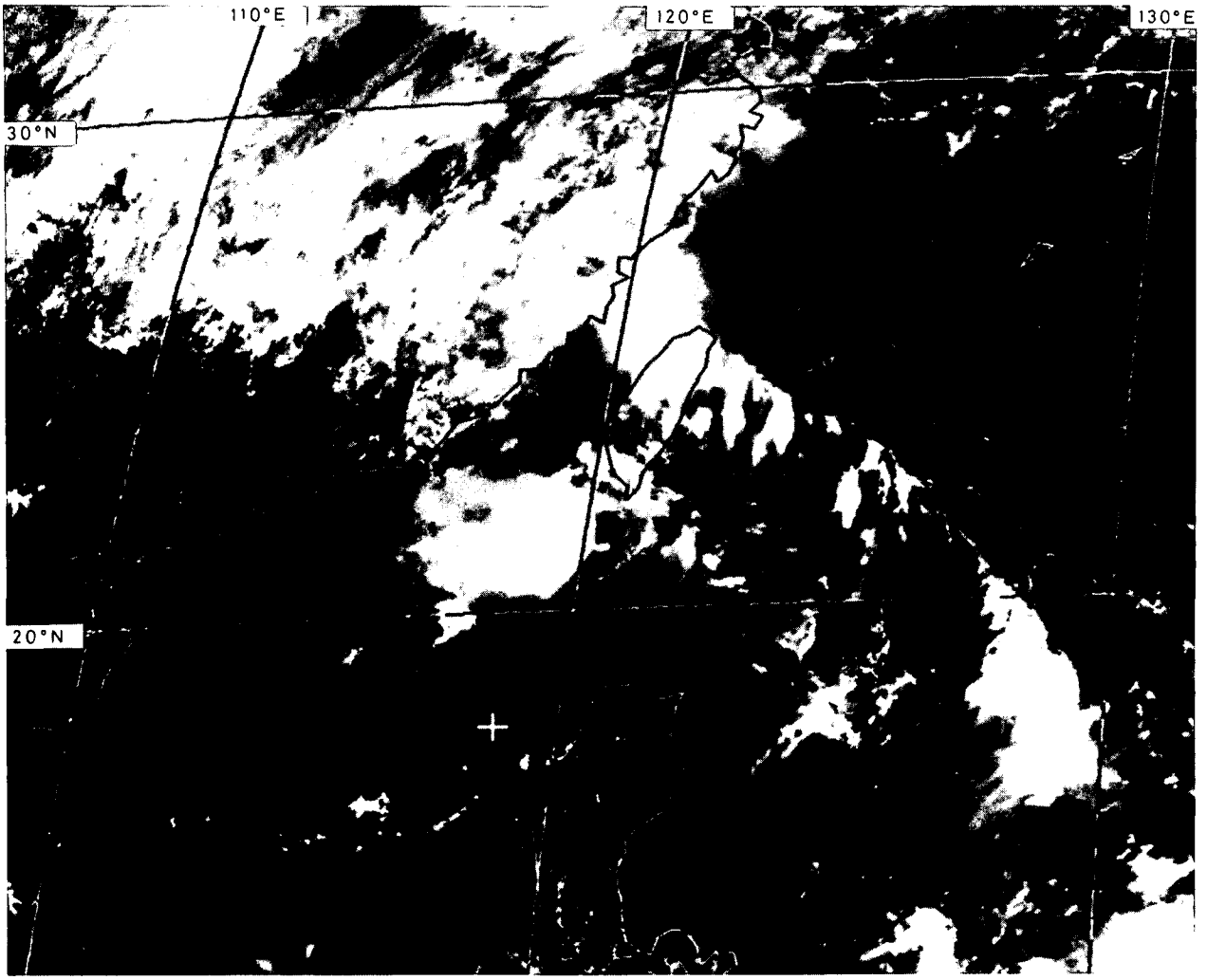

Figure 16. GMS-3 visible imagery of Tropical Storm Val (8517) around 11.00 a.m. on 17 September 1985.

(e) Typhoon Dot (8522)

13–22 October 1985

The track of Typhoon Dot is shown in Figure 17

Dot originated as a tropical depression over the western Pacific about 290 nautical miles southeast of Guam on 13 October. It moved west-northwestwards and intensified into a typhoon on 15 October about 410 nautical miles west of the island. At 5.59 p.m. on 16 October, a reconnaissance aircraft reported a minimum sea-level pressure of 893 millibars near the centre of Dot when it was about 620 nautical miles east of Manila. Typhoon Dot attained its peak intensity around this time and the maximum sustained winds near the centre were estimated at 130 knots.

On 16 and 17 October, Dot headed westwards at about 12 knots towards the Philippines. Around 8.00 a.m. on 18 October, Dot passed about 20 nautical miles north of Virac, on Catanduanes Island in eastern Philippines and adopted a west-northwesterly course. At midnight on 18 October, sustained surface winds of 90 knots were reported at Casiguran about 70 nautical miles northeast of the centre. Dot accelerated to about 15 knots and crossed Luzon during the early hours of 19 October. The typhoon brought about a death toll of 81 in the Philippines. 13 other people were missing and 24 were injured. Dot caused landslips and floods in the central and northern Philippines. More than 1 million people were affected. 250 000 houses were damaged or destroyed. 185 000 hectares of farmland were devastated. Damage to property was estimated at US$60 million.

Dot weakened on crossing Luzon but maintained typhoon intensity as it entered the South China Sea in the morning of 19 October. At 11.00 a.m. a ship about 150 nautical miles north of the centre of Dot reported sustained winds of 60 knots and a sea-level pressure of 1 001.0 millibars. In the afternoon of 20 October, Dot re-intensified as it moved across the South China Sea. At 4.31 p.m., a reconnaissance aircraft reported a sea-level pressure of 962 millibars near the centre. Around 9.00 p.m. on 20 October, Dot passed about 55 nautical miles north of Xisha, where sustained winds of 58 knots, gusts of 74 knots and a sea-level pressure of 988.2 millibars were recorded. Dot accelerated to 18 knots early on 21 October. It passed close to Yulin at the southern tip of Hainan Island around 8.00 a.m. when maximum surface winds near the centre were estimated at 85 knots. On Hainan Island, 2 people were killed and 34 others were injured. 2 300 houses collapsed and 48 000 were damaged. About 56 000 hectares of farmland were devastated. During the evening on 21 October, Dot weakened into a severe tropical storm and crossed the Viet Nam coast about 150 nautical miles south of Hanoi. It finally dissipated near Vientiane on 22 October.

In Hong Kong, the Stand By Signal, No. 1, was hoisted at 9.50 a.m. on 20 October when Dot was about 320 nautical miles south of Hong Kong. Under the combined effects of the northeast monsoon and Typhoon Dot, winds locally were moderate to fresh from the northeast, strong at times offshore. As Dot moved away, the Stand By Signal, No. 1, was lowered at 5.00 a.m. on 21 October when Dot was about 340 nautical miles southwest of Hong Kong. At the same time, the Strong Monsoon Signal was hoisted as Hong Kong came under the influence of an intense northeast monsoon. Winds became strong easterly offshore on 21 October. They moderated early the next morning and the Strong Monsoon Signal was lowered at 5.00 a.m. on 22 October. Dot was closest to Hong Kong around 7.00 p.m. on 20 October when it was centred about 290 nautical miles to the south-southwest. The lowest sea-level pressure at the Royal Observatory was 1 011.9 millibars recorded at 3.00 p.m. on 20 October. The maximum hourly mean winds and maximum gust peak speeds together with associated wind directions at selected locations during the display of the Stand By Signal were as follows:

Location	*Maximum mean hourly wind speed in knots with direction in points*		*Maximum gust peak speed in knots with direction in points*	
Royal Observatory	ENE	14	E	33
Hong Kong Airport (SE)	NE	20	ENE	37
Hong Kong Airport (NW)	N	22	NNE	48
Waglan Island	ENE	31	ENE	42
Tate's Cairn	NE	40	NE	61
Cheung Chau	N	25	N	39
King's Park	E	11	E	30
Star Ferry	E	13	E	33
Green Island	NNE	31	NE	44
Tsim Bei Tsui	NNE	17	NNE	28
Lau Fau Shan	NE	16	NE	28
Chek Lap Kok	NNE	19	NNE	28
Tai O	NNE	25	NE	35
Kwai Chung	N	13	N	29
Sha Tin	NNE	13	N	25

In Hong Kong, the weather was fine and sunny on 19 October apart from a few showers early in the morning. It became cooler and cloudy with periods of rain on 20 October. More rain occurred on 21 October, mostly in the evening. The weather improved with abundant sunshine on 22 October. The daily amounts of rainfall recorded were as follows:

	Royal Observatory	*Cheung Chau*	*Tate's Cairn*
20 October	7.9 mm	8.8 mm	4.7 mm
21 October	6.1 mm	1.5 mm	7.6 mm
22 October	Nil	Nil	Nil
Total:	14.0 mm	10.3 mm	12.3 mm

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

Location	Highest tide above chart datum			Maximum storm surge above astronomical tide		
	Height (m)	Date	Time	Height (m)	Date	Time
North Point	2.66	21 Oct	2.45 a.m.	0.49	21 Oct	3.45 a.m.
Quarry Bay	2.65	21 Oct	2.45 a.m.	0.49	21 Oct	3.45 a.m.
Tai Po Kau	2.76	20 Oct	2.00 a.m.	0.68	21 Oct	3.30 a.m.
Lok On Pai	2.77	20 Oct	1.00 a.m.	0.70	21 Oct	4.15 a.m.
Tsim Bei Tsui	2.96	20 Oct	2.00 a.m.	1.05	21 Oct	5.00 a.m.

In Hong Kong, damage was slight. A woman was injured by a falling plank at Diamond Hill. A sampan with a family of 3 on board capsized off Rennies Mill in Junk Bay but all were rescued. In To Kwa Wan, six parked cars were damaged by a fallen roof-top canopy. Some ferry services to China were cancelled on 20 October.

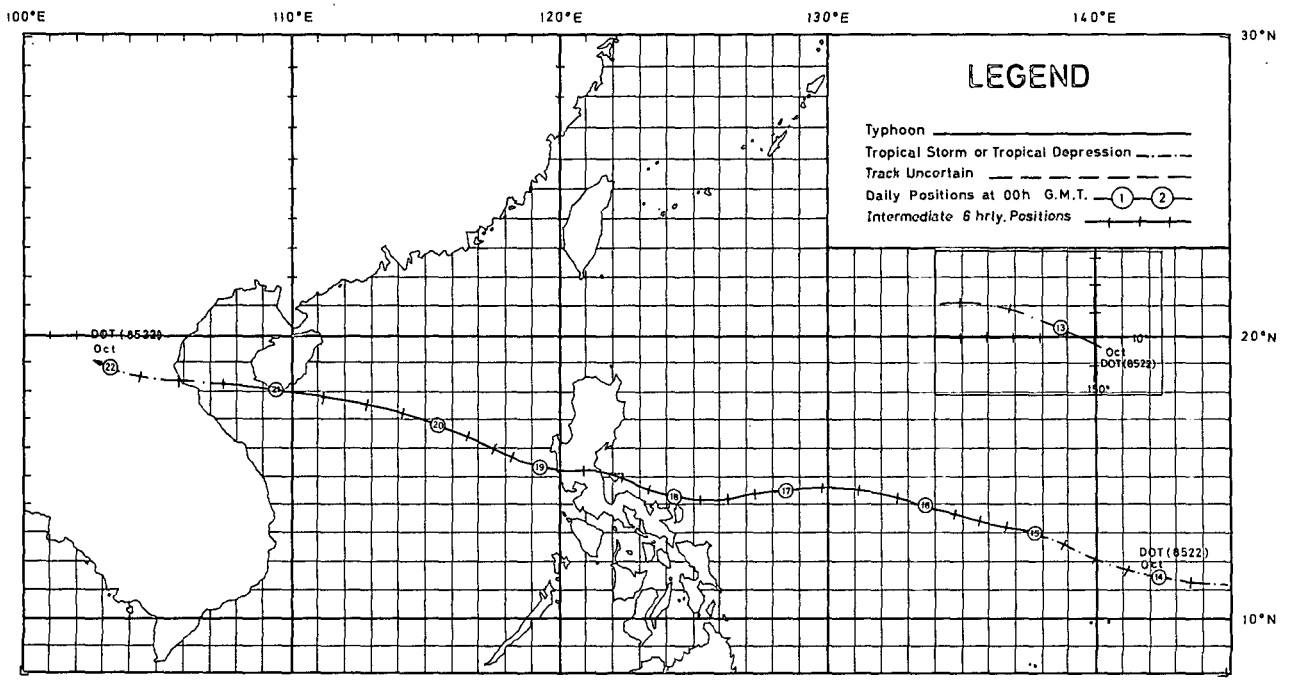

Figure 17. Track of Typhoon Dot (8522): 13–22 October 1985.

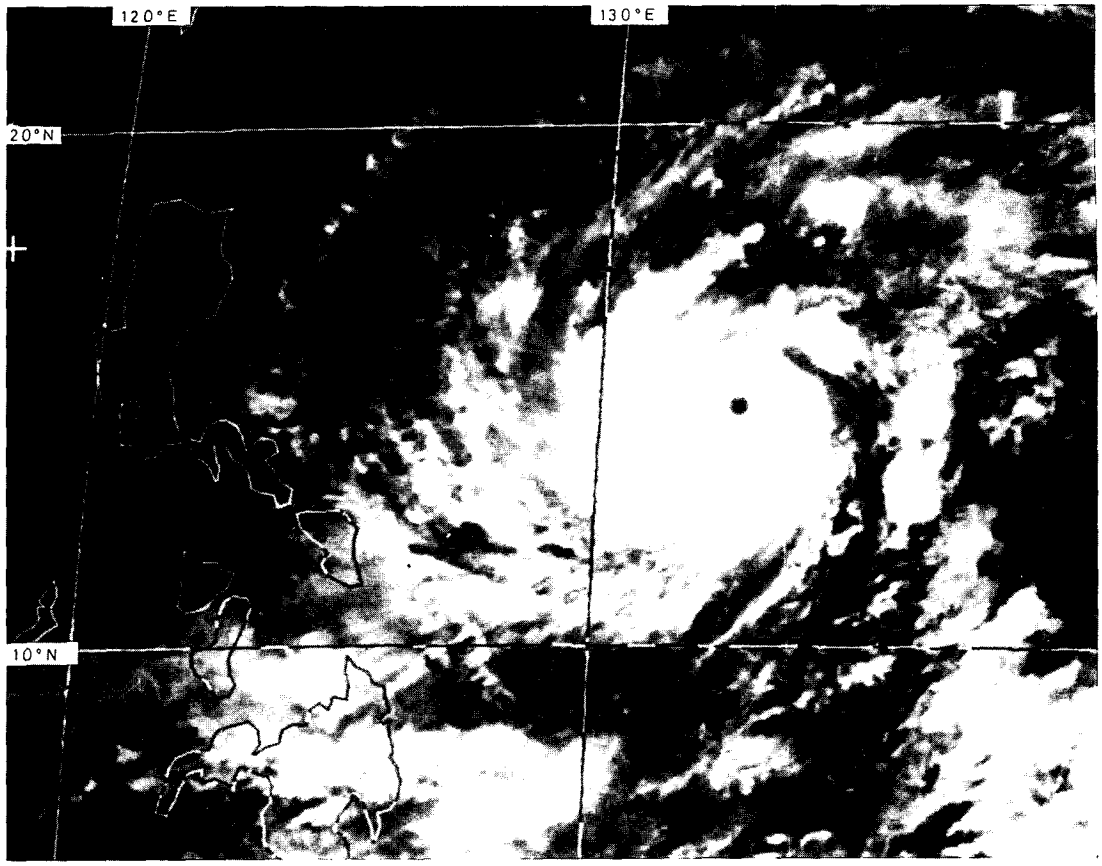

Figure 18. GMS-3 infra-red imagery of Typhoon Dot (8522) around 2.00 p.m. on 16 October 1985.

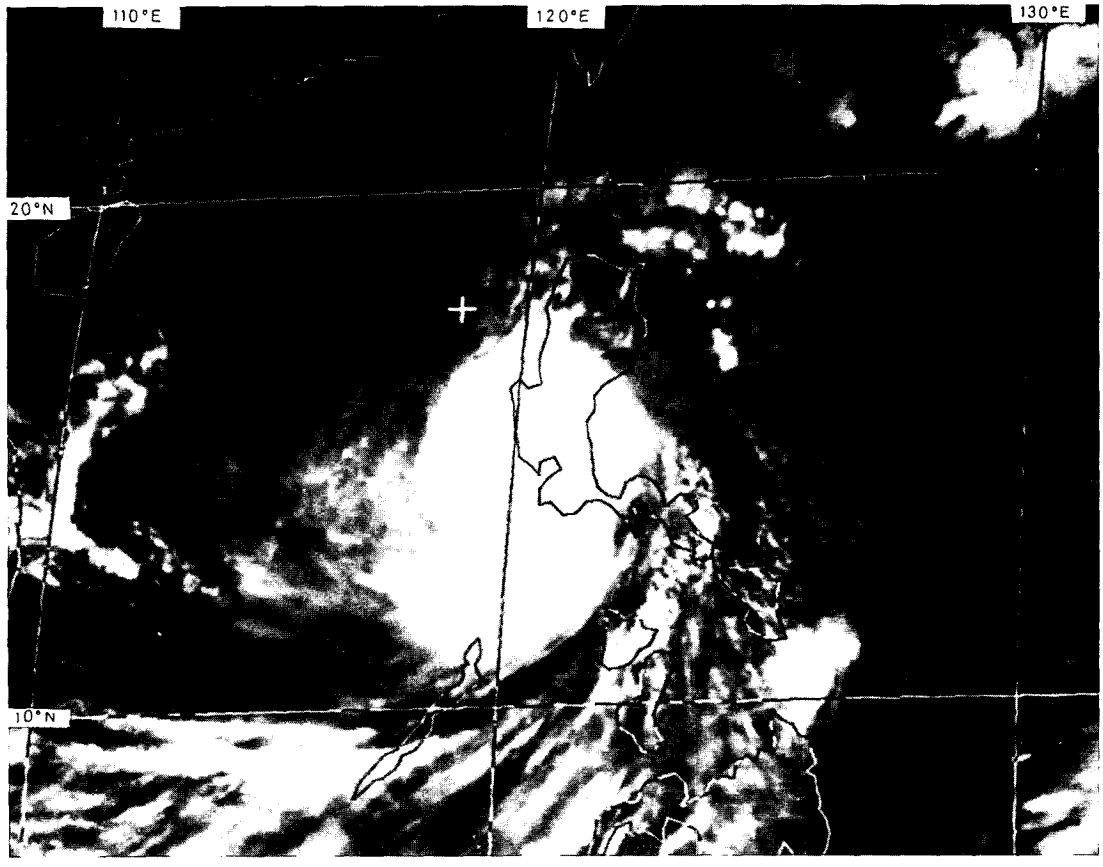

Figure 19. GMS-3 infra-red imagery of Typhoon Dot (8522) around 2.00 a.m. on 19 October 1985.

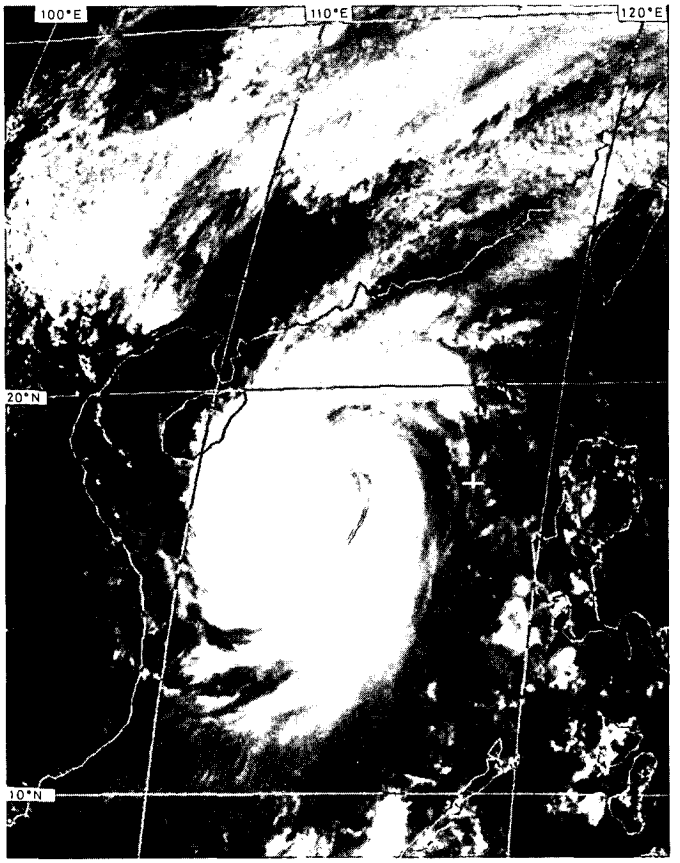

Figure 20. GMS-3 visible imagery of Typhoon Dot (8522) around 2.00 p.m. on 20 October 1985.

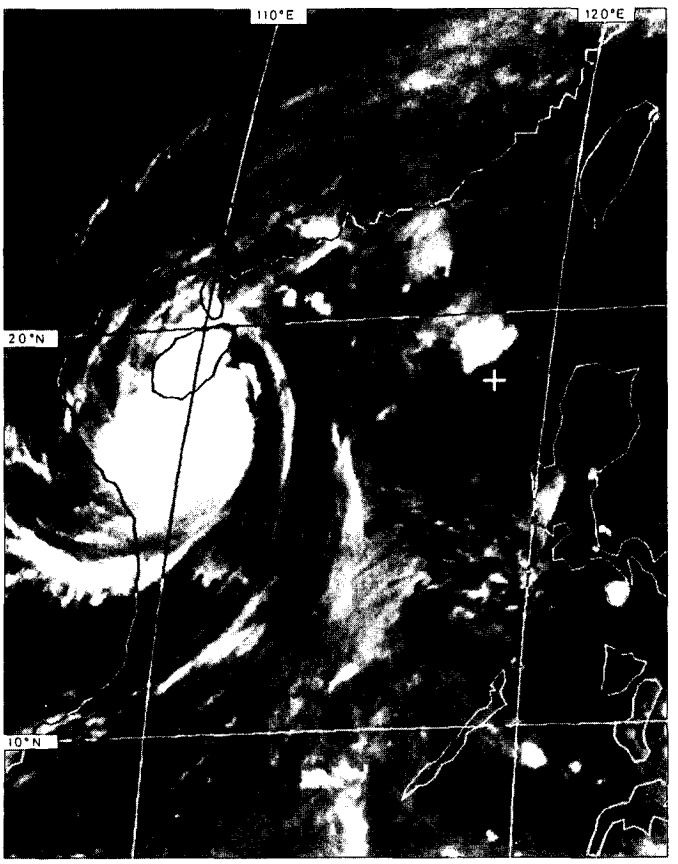

Figure 21. GMS-3 infra-red imagery of Typhoon Dot (8522) around 5.00 a.m. on 21 October 1985.

4. DESCRIPTION OF TABLES

TABLE 1 is a list of tropical cyclones in 1985 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 1985, 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 G.M.T.

TABLE 3 presents a summary of the occasions on which tropical cyclone warning signals were hoisted during 1985. 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 1985. 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 1985. 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 1946–1985.

TABLE 7 presents the casualties and damage figures associated with tropical cyclones in Hong Kong for the period 1937–1985. 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 1985. 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 1985. 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 1985

Name of tropical cyclone		Beginning of track				First day circle	Last day circle	End of track				Remarks
		Date	Time G.M.T.	Position °N	Position °E	Date	Date	Date	Time G.M.T.	Position °N	Position °E	
Tropical Storm Fabian (I)	(8501)	6 Jan	0600	12.6	134.2	7	13	13 Jan	0000	8.8	139.2	dissipated
(II)		13 Jan	0600	10.5	131.2	13	13	13 Jan	1800	10.8	131.6	dissipated
Tropical Storm Elsie	(8502)	7 Jan	0000	5.6	154.1	7	11	11 Jan	0600	21.0	150.0	dissipated
Tropical Depression		22 Apr	0600	17.6	131.1	23	24	24 Apr	0000	20.7	140.8	dissipated
Typhoon Gay	(8503)	21 May	0000	13.1	132.0	21	26	26 May	1200	31.1	140.9	became extratropical
Tropical Depression	(8504)	17 Jun	0600	16.5	112.4	18	20	20 Jun	0600	19.5	109.2	dissipated
Typhoon Hal	(8505)	19 Jun	0000	13.8	135.6	19	25	25 Jun	0000	24.3	114.4	dissipated
Typhoon Irma	(8506)	24 Jun	1800	9.0	135.0	25	1	1 Jul	0600	41.5	144.9	became extratropical
Tropical Depression		4 Jul	0000	10.2	131.1	4	8	8 Jul	1200	22.1	116.0	dissipated
Typhoon Jeff	(8507)	22 Jul	0000	22.8	145.6	22	2	2 Aug	0600	39.3	124.0	became extratropical
Typhoon Kit	(8508)	3 Aug	1800	27.2	133.4	4	11	11 Aug	0000	40.2	132.0	became extratropical
Severe Tropical Storm Lee	(8509)	11 Aug	0600	22.1	130.5	12	14	14 Aug	1800	45.0	128.0	became extratropical
Severe Tropical Storm Mamie	(8510)	15 Aug	1800	26.0	126.2	16	19	19 Aug	1800	42.0	123.2	dissipated
Typhoon Nelson	(8511)	17 Aug	1800	20.4	140.6	18	24	24 Aug	0600	25.3	117.0	dissipated
Typhoon Odessa	(8512)	24 Aug	0600	17.4	143.5	25	1	1 Sep	1800	37.5	140.0	dissipated
Typhoon Pat	(8513)	27 Aug	0000	21.3	126.0	27	1	1 Sep	1200	42.2	144.8	became extratropical
Severe Tropical Storm Ruby	(8514)	27 Aug	1800	22.0	143.1	28	1	1 Sep	0600	42.3	154.2	became extratropical
Typhoon Skip	(8515)	31 Aug	0000	13.5	178.6	31	8	8 Sep	0000	36.9	179.9	moved east of 180°
Typhoon Tess	(8516)	1 Sep	0000	15.1	132.8	1	6	6 Sep	1800	24.0	109.7	dissipated
Tropical Storm Val	(8517)	15 Sep	0000	17.9	131.9	15	17	17 Sep	1800	21.3	118.6	dissipated
Tropical Storm Winona	(8518)	19 Sep	0000	14.7	115.6	19	22	22 Sep	1200	22.2	109.9	dissipated
Typhoon Andy	(8519)	27 Sep	1200	18.7	116.4	28	2	2 Oct	0000	17.6	105.2	dissipated
Typhoon Brenda	(8520)	30 Sep	0600	15.9	130.6	1	5	5 Oct	1200	35.3	130.1	became extratropical
Typhoon Cecil	(8521)	12 Oct	0000	10.4	121.3	12	16	16 Oct	1200	17.7	104.3	dissipated
Typhoon Dot	(8522)	13 Oct	0000	10.4	148.6	13	22	22 Oct	0000	19.0	103.1	dissipated
Severe Tropical Storm Ellis	(8523)	16 Oct	0000	10.6	152.4	16	21	21 Oct	1800	9.5	136.2	dissipated
Typhoon Faye	(8524)	23 Oct	0000	13.2	126.0	23	1	1 Nov	1200	28.7	140.6	dissipated
Tropical Depression Gordon	(8525)	23 Nov	0000	8.9	112.9	23	25	25 Nov	1200	10.8	109.0	dissipated
Typhoon Hope	(8526)	17 Dec	0000	9.5	139.6	17	24	24 Dec	0000	18.0	130.8	dissipated
Tropical Storm Irving	(8527)	16 Dec	1800	7.0	115.0	17	21	21 Dec	1800	6.7	107.6	dissipated

TABLE 2. TROPICAL CYCLONE WARNINGS FOR SHIPPING ISSUED IN 1985

Tropical cyclone	No. of warnings issued	Date and time+ of issue of		Duration of warnings (hours)
		First warning	Last warning	
Tropical Depression	27	17 Jun 0300	20 Jun 0600	75
* Typhoon Hal	31	21 Jun 0900	25 Jun 0300	90
* Tropical Depression #	8	5 Jul 0600	6 Jul 0300	21
	13	7 Jul 0300	8 Jul 1500	36
Typhoon Jeff	18	29 Jul 0300	31 Jul 0600	51
Severe Tropical Storm Mamie	5	17 Aug 0900	17 Aug 2100	12
Typhoon Nelson	17	22 Aug 0600	24 Aug 0600	48
* Typhoon Tess	35	2 Sep 0900	6 Sep 1200	99
* Tropical Storm Val	15	16 Sep 0600	18 Sep 0000	42
Tropical Storm Winona	27	19 Sep 0300	22 Sep 0600	75
Typhoon Andy	38	27 Sep 1200	2 Oct 0300	111
Typhoon Brenda	13	3 Oct 0600	4 Oct 1800	36
Typhoon Cecil	33	12 Oct 0900	16 Oct 0900	96
* Typhoon Dot	31	17 Oct 2100	21 Oct 1500	90
Typhoon Faye	46	24 Oct 0000	29 Oct 1200	132
Tropical Depression Gordon	14	24 Nov 0000	25 Nov 1500	39
Total	371			1 053

No warnings were issued for the Tropical Depression between 0600 GMT on 6 July and 0000 GMT on 7 July due to a poorly-defined centre after it crossed the Philippines.

* Tropical cyclones for which tropical cyclone warning signals were hoisted in Hong Kong.

+ Times are given in hours G.M.T.

TABLE 3. TROPICAL CYCLONE WARNING SIGNALS HOISTED IN HONG KONG AND NUMBER OF WARNING BULLETINS ISSUED IN 1985

SUMMARY

Signal	No. of occasions	Total duration
1	5	94 h 40 min
3	4	78 h 10 min
8 NORTHWEST	1	15 h 45 min
8 SOUTHWEST	-	-
8 NORTHEAST	-	-
8 SOUTHEAST	1	5 h
9	-	-
10	-	-
Total	11	193 h 35 min

DETAILS

Tropical cyclone	No. of warning bulletins issued	Signal	Hoisted		Lowered	
			Date	Time*	Date	Time*
Typhoon Hal	45	1	22 Jun	1000	23 Jun	0040
		3	23 Jun	0040	24 Jun	0415
		8 NW	24 Jun	0415	24 Jun	2000
		3	24 Jun	2000	25 Jun	1045
Tropical Depression	12	1	8 Jul	0130	8 Jul	2300
Typhoon Tess	30	1	4 Sep	0900	4 Sep	2110
		3	4 Sep	2110	6 Sep	0110
		8 SE	6 Sep	0110	6 Sep	0610
		3	6 Sep	0610	6 Sep	1400
Tropical Storm Val	14	1	17 Sep	0500	18 Sep	0810
Typhoon Dot	10	1	20 Oct	0950	21 Oct	0500

* Hong Kong Time (G.M.T. + 8)

TABLE 4. FREQUENCY AND TOTAL DURATION OF DISPLAY OF TROPICAL CYCLONE WARNING SIGNALS : 1946-1985

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
Total △	201	186	15	19	54	40	20	12	584	10 350.6
Mean △	6.7	6.2	0.4	0.5	1.4	1.0	0.5	0.3	14.6	258.8

* 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 34

\+ 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 1956-1985. The corresponding values for higher signals and the total duration are calculated for the period 1946-1985.

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 : 1946-1985

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
Total	663	249
Mean	16.6	6.2

TABLE 6. DURATION OF DISPLAY OF TROPICAL CYCLONE WARNING SIGNALS IN HONG KONG : 1946 - 1985

Signal	Duration of each occasion						Duration per year					
	Mean		Maximum		Minimum		Mean		Maximum		Minimum	
1*	20 h	43 min	124 h	40 min	1 h	20 min	138 h	48 min	273 h	15 min	12 h	40 min
3*	20	28	71	45	1	00	126	51	267	45	23	55
8 NW+	7	15	15	45	1	30	2	43	15	45	0	0
8 SW+	5	15	11	10	2	30	2	30	16	10	0	0
8 NE+	10	41	35	35	2	15	14	25	61	45	0	0
8 SE+	7	37	21	45	0	20	7	37	31	15	0	0
Gale or Storm Signals	16	31	55	17	2	40	27	15	82	25	0	0
9	3	31	6	30	0	25	1	45	11	00	0	0
10	6	03	9	10	2	30	1	49	12	10	0	0

* 1956 - 1985

+ 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 - 1985

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	33**	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

N.B. Information compiled from Hong Kong newspapers and from Marine Department's records
* Data unavailable
+ Struck by lightning

**Note: Number of Ocean-going vessels in trouble is revised on 30 Jul 2021.

TABLE 8. SHIPS DAMAGED BY TROPICAL CYCLONES IN HONG KONG, 1985

Year	Date	Name of tropical cyclone	Name of ship	Location of incident	Nature of incident
1985	1 - 7 Sep	T. Tess	M.V. Fiona Mary	Western Anchorage	Collided with M.V. New Horse
			M.V. New Horse	Western Anchorage	Collided with M.V. Fiona Mary
			M.V. Carlina	180 nautical miles south of Hong Kong	Listed 25 degrees
			M.V. Colombia Glory	Northwest of Green Island	Dragging anchor
			M.V. Miss Consulation	Western Anchorage	Dragging anchor
			M.V. Pacific Glory No. 1	Northwest of Green Island	Dragging anchor

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

TABLE 9. A SUMMARY OF METEOROLOGICAL OBSERVATIONS RECORDED IN HONG KONG DURING THE PASSAGES OF TROPICAL CYCLONES IN 1985

(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	North Point	Tai Po Kau	Lok On Pai	Tsim Bei Tsui
					n miles	kn	mbar			mbar	m	m	m	m
T. Hal	Jun	24	1200	ENE	60	NNW 8	965	24	0500	985.5	0.8	0.9	0.7	0.8
T.D.	Jul	8	2000	E	100	N 14	997	8	1700	1 001.7	0.0	0.3	0.2	0.3
T. Tess	Sep	6	0200	SW	105	NW 8	965	5	1800	995.5	0.5	1.0	0.6	0.6
T.S. Val	Sep	18	0300	ESE	240	W 6	1 000	17	1600	1 005.6	0.1	0.4	0.2	0.3
T. Dot	Oct	20	1900	SSW	290	W 13	965	20	1500	1 011.9	0.5	0.7	0.7	1.1

* Hong Kong Time (G.M.T. + 8)

(b)

Name of tropical cyclone	Month	Maximum 60-min mean wind in points and knots		Maximum 10-min mean wind in points and knots		Maximum gust peak speed in knots with direction in points		Rainfall at the Royal Observatory (mm)				
		Royal Observatory	Waglan Island	Royal Observatory	Waglan Island	Royal Observatory	Waglan Island	(i) 300 n miles	(ii) 24 hours	(iii) 48 hours	(iv) 72 hours	(i)+(iv)
T. Hal	Jun	WNW 23	WSW 36	WNW 25	WSW 37	SW 49	WNW 55	209.8	65.1	68.0	71.1	280.9
T.D.	Jul	SSW 15	SSW 29	SSW 16	SSW 31	SSW 31	SSW 37	18.0	18.9	19.3	19.3	37.3
T. Tess	Sep	E ESE 28	ESE 43	E ESE 30	ESE 45	E 60	ESE 62	163.3	1.0	17.7	22.9	186.2
T.S. Val	Sep	W 9	N 17	E 11	N 19	N 18	N 22	NIL	3.2	13.5	22.3	22.3
T. Dot	Oct	ENE 15	ENE 31	ENE 15	ENE 33	E 33	ENE 42	7.4	6.1	6.1	6.1	13.5

N.B. (i) during the period when the tropical cyclone was centred within 300 n miles of Hong Kong
(ii) during the 24-hour period after the tropical cyclone moved outside (or dissipated within) the 300-n mile radius
(iii) during the 48-hour period after the tropical cyclone moved outside (or dissipated within) the 300-n mile radius
(iv) during the 72-hour period after the tropical cyclone moved outside (or dissipated within) the 300-n mile radius

TABLE 10. TYPHOONS WHICH REQUIRED THE HOISTING OF THE HURRICANE SIGNAL NO. 10 DURING THE PERIOD 1946-1985

Name of typhoon	Date	Nearest approach to Royal Observatory n miles	Minimum M.S.L. pressure (mbar)		Maximum 60-min mean winds in points and knots								Maximum gust peak speed in knots 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 37	985.7	-	NE -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gloria	22 Sep 1957	SW 30	986.2	984.3	ESE 62	ESE 39	E 61	-	-	-	-	-	E 101	ENE 86	ENE 100	-	-	-	-	-
Mary	9 Jun 1960	WNW 5	974.3	973.8	SSE 52	SSE 50	SSW 60	-	-	-	-	-	SSE 103	SE 88	SSW 105	-	-	-	-	-
Alice	19 May 1961	0	981.6	981.1	ENE 45	E 38	ESE 49	ENE 41	-	-	-	-	E 89	ENE 75	SW 69	ENE 73	-	-	-	-
Wanda	1 Sep 1962	SSW 10	955.1	953.2	N 72	N 58	NW 80	NW 64	SE 102	-	-	-	N 140	N 123	NNW 117	NW 125	ESE 154	-	-	-
Ruby	5 Sep 1964	SW 17	971.0	968.2	E 59	N 64	ENE 80	NE 61	ESE 90	SSE 83	-	-	NNE 122	NW 110	E 124	NNE 117	E 145	S 120	-	-
Dot	13 Oct 1964	E 18	978.9	977.3	NNW 48	N 36	N 63	NNW 52	NNE 85	N 54	-	-	N 94	N 107	N 99	WNW 111	NE 119	NNE 101	-	-
Shirley	21 Aug 1968	0	968.7	968.6	N 37	N 40	NNE 67	SSW 49	NNE 68	SSW 46	-	-	N 72	N 82	NE 113	SSW 90	NNE 110	N 93	-	-
Rose	17 Aug 1971	WSW 11	984.5	982.8	SE 55	SE 66	ESE 76	SE 71	S 80	SSW 74	-	-	ESE 121	ESE 114	ESE 102	SE 105	S 120	S 103	-	-
Elsie	14 Oct 1975	S 27	996.4	996.2	ENE 31	NNW 36	NNE 64	N 57	NE 70	-	NNW 64	N 35	NE 76	N 76	ENE 95	NE 86	NNE 97	-	NE 90	N 65
Hope	2 Aug 1979	NNW 6	961.8	961.6	W 40	W 62	SW 78	SSW 63	NW 62	-	W 58	- 52	W 94	WNW 98	SW 107	WSW 100	WNW 123	-	W 90	- 93
Ellen	9 Sep 1983	SW 24	983.9	983.1	E 50	E 60	ESE 91	ESE 92	E 68	-	S 74	SE 51	E 100	E 110	E 122	SSE 128	ENE 118	-	S 119*	SE 92

* estimated, exceeding upper limit of anemogram.

5. TROPICAL CYCLONE POSITION AND INTENSITY DATA, 1985

Six-hourly position and intensity data are tabulated for the following tropical cyclones in 1985 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 TROPICAL STORM FABIAN (I)(8501)

Month	Day	G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (knots)	Lat. N	Long. E
Jan	6	0600	T.D.	1000	30	12.6	134.2
		1200	T.D.	1000	30	12.2	134.3
		1800	T.D.	1000	30	11.8	134.4
	7	0000	T.D.	1000	30	11.4	134.6
		0600	T.D.	1000	30	11.3	134.9
		1200	T.D.	998	30	11.5	135.0
		1800	T.D.	997	30	12.0	134.9
	8	0000	T.D.	996	30	12.3	134.7
		0600	T.D.	994	30	12.4	134.5
		1200	T.D.	993	30	12.0	134.5
		1800	T.S.	991	35	11.6	134.6
	9	0000	T.S.	990	40	11.1	134.9
		0600	T.S.	990	45	10.4	135.3
		1200	T.S.	990	45	9.8	136.0
		1800	T.S.	991	40	9.3	136.8
	10	0000	T.S.	992	35	9.1	137.6
		0600	T.S.	990	35	9.4	138.3
		1200	T.S.	991	35	9.4	138.4
		1800	T.D.	992	30	9.3	138.5
	11	0000	T.D.	992	30	9.3	138.6
		0600	T.D.	994	30	9.2	138.7
		1200	T.D.	996	30	9.1	138.9
		1800	T.D.	997	30	9.0	139.0
	12	0000	T.D.	998	30	8.9	139.1
		0600	T.D.	998	30	8.9	139.1
		1200	T.D.	998	30	8.9	139.1
		1800	T.D.	998	30	8.8	139.2
	13	0000	T.D.	998	25	8.8	139.2
			Dissipated				
				FABIAN (II)			
	13	0600	T.D.	998	25	10.5	131.2
		1200	T.D.	999	25	10.6	131.4
		1800	T.D.	1000	25	10.8	131.6
			Dissipated				

SIX-HOURLY POSITION AND INTENSITY DATA OF
TROPICAL STORM ELSIE (8502)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (knots)	Lat. N	Long. E
Jan	7	0000	T.D.	1002	30	5.6	154.1
		0600	T.S.	998	35	6.7	153.1
		1200	T.S.	998	35	7.9	152.0
		1800	T.S.	998	35	9.3	151.0
	8	0000	T.S.	1000	35	10.7	150.0
		0600	T.S.	1000	35	11.5	148.7
		1200	T.D.	1000	30	11.8	147.2
		1800	T.D.	1000	30	11.8	146.0
	9	0000	T.D.	1000	30	11.8	144.8
		0600	T.D.	1000	30	12.0	144.0
		1200	T.D.	1000	30	12.7	143.7
		1800	T.D.	1000	30	13.5	143.8
	10	0000	T.D.	1000	30	14.3	144.1
		0600	T.D.	1000	30	16.0	145.0
		1200	T.D.	1000	30	17.5	146.1
		1800	T.D.	1000	30	18.7	147.2
	11	0000	T.D.	1002	25	19.9	148.6
		0600	T.D.	1004	25	21.0	150.0

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF THE TROPICAL DEPRESSION OF 22 - 24 APRIL

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (knots)	Lat. N	Long. E
Apr	22	0600	T.D.	1000	25	17.6	131.1
		1200	T.D.	1000	25	17.8	132.3
		1800	T.D.	1000	25	18.1	133.8
	23	0000	T.D.	998	30	18.4	135.3
		0600	T.D.	998	30	18.9	136.7
		1200	T.D.	998	30	19.4	138.0
		1800	T.D.	1000	25	20.0	139.3
	24	0000	T.D.	1002	25	20.7	140.8

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON GAY (8503)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (knots)	Lat. N	Long. E
May	21	0000	T.D.	1002	25	13.1	132.0
		0600	T.D.	1000	30	13.7	132.0
		1200	T.D.	1000	30	14.3	131.9
		1800	T.D.	999	30	14.8	131.7
	22	0000	T.S.	998	35	15.3	131.6
		0600	T.S.	998	35	15.9	131.4
		1200	T.S.	997	40	16.7	131.3
		1800	T.S.	994	45	17.4	131.0
	23	0000	S.T.S.	987	55	18.0	130.5
		0600	T.	980	65	18.5	130.0
		1200	T.	970	70	19.1	129.4
		1800	T.	960	75	19.8	128.9
	24	0000	T.	955	80	20.7	128.7
		0600	T.	950	80	21.5	129.1
		1200	T.	960	75	22.4	130.1
		1800	T.	965	70	23.5	131.0
	25	0000	T.	970	70	24.7	132.1
		0600	T.	975	70	26.0	133.4
		1200	T.	980	65	27.3	134.8
		1800	S.T.S.	980	60	29.0	136.8
	26	0000	S.T.S.	983	55	30.3	138.5
		0600	S.T.S.	985	50	30.9	139.8
		1200	T.S.	990	40	31.1	140.9

Became extratropical

SIX-HOURLY POSITION AND INTENSITY DATA OF THE TROPICAL DEPRESSION (8504), 17-20 JUNE

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (knots)	Lat. N	Long. E
Jun	17	0600	T.D.	992	25	16.5	112.4
		1200	T.D.	990	25	16.4	111.9
		1800	T.D.	992	25	16.4	111.4
	18	0000	T.D.	992	25	16.4	111.0
		0600	T.D.	992	25	16.4	110.7
		1200	T.D.	992	25	16.5	110.4
		1800	T.D.	992	30	16.7	110.5
	19	0000	T.D.	990	30	17.0	110.8
		0600	T.D.	990	30	17.6	110.8
		1200	T.D.	992	30	18.2	110.5
		1800	T.D.	994	30	18.6	110.0
	20	0000	T.D.	996	25	19.0	109.5
		0600	T.D.	996	25	19.5	109.2

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON HAL (8505)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (knots)	Lat. N	Long. E
Jun	19	0000	T.D.	998	25	13.8	135.6
		0600	T.D.	996	25	13.9	134.2
		1200	T.D.	996	25	14.2	132.7
		1800	T.D.	994	30	14.5	131.7
	20	0000	T.S.	984	45	14.8	130.7
		0600	S.T.S.	980	50	15.2	129.8
		1200	S.T.S.	975	55	15.5	128.9
		1800	S.T.S.	970	60	15.8	127.9
	21	0000	T.	970	65	16.3	126.8
		0600	T.	965	70	17.0	125.6
		1200	T.	965	70	17.7	124.3
		1800	T.	960	75	18.5	122.8
	22	0000	T.	960	80	19.2	121.2
		0600	T.	960	80	19.5	120.4
		1200	T.	960	80	19.9	119.6
		1800	T.	965	75	20.2	119.0
	23	0000	T.	965	70	20.9	117.9
		0600	T.	965	70	21.3	116.9
		1200	T.	965	70	21.5	116.1
		1800	T.	965	70	21.8	115.6
	24	0000	T.	965	70	22.1	115.4
		0600	T.	970	65	22.8	115.2
		1200	T.S.	984	45	23.2	115.0
		1800	T.S.	985	40	23.6	114.8
	25	0000	T.S.	990	35	24.3	114.4

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON IRMA (8506)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (knots)	Lat. N	Long. E
Jun	24	1800	T.D.	1000	25	9.0	135.0
	25	0000	T.D.	998	30	9.4	134.0
		0600	T.S.	996	35	10.0	133.0
		1200	T.S.	994	40	10.3	132.3
		1800	T.S.	993	40	10.9	131.7
	26	0000	T.S.	992	40	11.5	131.4
		0600	T.S.	991	45	12.4	130.9
		1200	S.T.S.	990	50	13.2	130.6
		1800	S.T.S.	989	55	14.1	130.4
	27	0000	S.T.S.	987	60	15.0	130.1
		0600	T.	982	65	16.0	129.8
		1200	T.	975	65	16.8	129.6
		1800	T.	970	65	17.8	129.6
	28	0000	T.	965	70	18.8	129.8
		0600	T.	965	70	20.0	130.0
		1200	T.	960	75	21.3	130.0
		1800	T.	960	75	22.8	130.1
	29	0000	T.	960	75	24.3	130.2
		0600	T.	955	80	25.7	130.2
		1200	T.	960	70	26.9	130.4
		1800	T.	960	70	28.2	131.0
	30	0000	T.	970	65	29.6	132.0
		0600	T.	970	65	30.9	133.3
		1200	T.	970	65	32.4	135.5
		1800	T.	970	65	34.8	138.8
Jul	1	0000	S.T.S.	970	60	38.4	142.4
		0600	S.T.S.	970	55	41.5	144.9

Became extratropical

SIX-HOURLY POSITION AND INTENSITY DATA OF THE TROPICAL DEPRESSION OF 4-8 JULY

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (knots)	Lat. N	Long. E
Jul	4	0000	T.D.	1004	25	10.2	131.1
		0600	T.D.	1002	25	10.9	129.2
		1200	T.D.	1000	25	11.6	127.6
		1800	T.D.	998	25	12.3	125.8
	5	0000	T.D.	998	25	12.7	124.0
		0600	T.D.	1000	25	13.2	122.7
		1200	T.D.	1000	25	13.8	121.8
		1800	T.D.	1000	22	14.7	121.3
	6	0000	T.D.	1000	22	15.9	120.5
		0600	T.D.	1000	25	16.7	119.3
		1200	T.D.	998	25	16.8	118.1
		1800	T.D.	998	25	17.0	117.2
	7	0000	T.D.	998	25	17.3	116.5
		0600	T.D.	998	25	17.6	115.9
		1200	T.D.	998	25	18.2	115.5
		1800	T.D.	998	25	18.9	115.4
	8	0000	T.D.	998	25	19.5	115.5
		0600	T.D.	997	30	20.7	115.8
		1200	T.D.	997	30	22.1	116.0

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF
TYPHOON JEFF (8507)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (knots)	Lat. N	Long. E
Jul	22	0000	T.D.	1002	25	22.8	145.6
		0600	T.D.	998	30	23.0	145.5
		1200	T.D.	995	30	23.2	145.4
		1800	T.S.	991	40	23.5	145.4
	23	0000	S.T.S.	988	50	23.9	145.6
		0600	S.T.S.	986	55	24.5	146.1
		1200	S.T.S.	985	60	25.2	146.7
		1800	S.T.S.	985	60	25.9	147.0
	24	0000	S.T.S.	985	55	26.5	147.2
		0600	S.T.S.	985	55	27.3	147.3
		1200	S.T.S.	985	50	28.1	146.7
		1800	T.S.	985	45	28.1	145.8
	25	0000	T.S.	987	40	28.1	144.9
		0600	T.S.	988	35	28.1	144.2
		1200	T.D.	990	30	27.9	143.3
		1800	T.D.	992	25	27.4	141.9
	26	0000	T.D.	992	25	27.3	140.5
		0600	T.D.	995	22	27.3	139.2
		1200	T.D.	997	22	26.9	137.6
		1800	T.D.	995	22	26.3	135.8
	27	0000	T.D.	995	25	25.6	134.3
		0600	T.D	995	30	25.1	133.0
		1200	T.S.	994	35	25.0	131.4
		1800	T.S.	992	35	25.0	130.1
	28	0000	T.S.	991	40	25.0	128.9
		0600	T.S.	984	45	24.8	127.6
		1200	T.S.	982	45	24.7	126.8
		1800	S.T.S.	981	50	24.9	125.8
	29	0000	S.T.S.	975	55	25.1	125.1
		0600	S.T.S.	970	60	25.4	124.4
		1200	T.	970	65	25.8	123.6
		1800	T.	970	65	26.3	122.9
	30	0000	T.	970	70	27.0	122.2
		0600	T.	965	75	27.4	121.8
		1200	T.	965	75	28.0	121.4
		1800	S.T.S.	975	60	28.5	121.2
	31	0000	T.S.	990	40	29.3	120.8
		0600	T.S.	992	40	30.1	120.5
		1200	T.S.	994	35	30.7	120.4
		1800	T.S.	994	35	31.3	120.4
Aug	1	0000	T.S.	992	40	32.0	120.8
		0600	T.S.	990	40	33.0	121.4
		1200	T.S.	988	45	34.4	122.4
		1800	T.S.	988	45	35.9	123.0
	2	0000	T.S.	990	40	37.5	123.5
		0600	T.S.	992	35	39.3	124.0

Became extratropical

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON KIT (8508)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (knots)	Lat. N	Long. E
Aug	3	1800	T.D.	998	25	27.2	133.4
	4	0000	T.D.	998	25	27.5	133.1
		0600	T.D.	994	30	27.7	132.9
		1200	T.D.	994	30	27.8	132.5
		1800	T.S.	993	35	27.8	132.1
	5	0000	T.S.	993	35	28.1	131.9
		0600	T.S.	990	45	28.3	131.9
		1200	S.T.S.	984	50	28.5	131.9
		1800	S.T.S.	985	50	28.7	131.9
	6	0000	S.T.S.	982	55	28.8	132.0
		0600	S.T.S.	970	60	28.9	132.3
		1200	T.	960	70	29.1	132.5
		1800	T.	960	75	29.3	132.5
	7	0000	T.	965	75	29.5	132.5
		0600	T.	965	80	29.7	132.3
		1200	T.	965	80	30.0	131.7
		1800	T.	965	75	30.2	131.1
	8	0000	T.	965	75	30.5	130.4
		0600	T.	960	75	30.8	129.5
		1200	T.	960	75	31.0	128.8
		1800	T.	970	70	31.4	128.0
	9	0000	T.	970	65	32.1	127.2
		0600	S.T.S.	970	60	32.5	126.7
		1200	S.T.S.	970	60	32.9	126.4
		1800	S.T.S.	975	55	33.4	126.2
	10	0000	T.S.	980	45	34.1	126.4
		0600	T.S.	985	45	35.2	127.0
		1200	T.S.	990	40	36.8	128.5
		1800	T.S.	992	40	38.4	130.3
	11	0000	T.S.	995	35	40.2	132.0

Became extratropical

SIX-HOURLY POSITION AND INTENSITY DATA OF
SEVERE TROPICAL STORM LEE (8509)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (knots)	Lat. N	Long. E
Aug	11	0600	T.D.	993	30	22.1	130.5
		1200	T.D.	991	30	23.1	129.9
		1800	T.S.	990	35	24.1	129.4
	12	0000	T.S.	990	40	25.1	129.0
		0600	T.S.	989	45	26.3	128.6
		1200	S.T.S.	988	50	27.5	128.1
		1800	S.T.S.	985	50	28.4	127.4
	13	0000	S.T.S.	980	55	29.7	126.1
		0600	S.T.S.	980	55	31.0	125.0
		1200	S.T.S.	980	55	32.6	124.4
		1800	S.T.S.	980	60	34.0	124.1
	14	0000	S.T.S.	980	60	36.7	124.6
		0600	S.T.S.	982	50	39.5	125.0
		1200	T.S.	985	40	42.2	126.2
		1800	T.S.	988	35	45.0	128.0

Became extratropical

SIX-HOURLY POSITION AND INTENSITY DATA OF
SEVERE TROPICAL STORM MAMIE (8510)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (knots)	Lat. N	Long. E
Aug	15	1800	T.D.	1000	30	26.0	126.2
	16	0000	T.S.	997	35	26.4	126.1
		0600	T.S.	994	40	26.8	126.0
		1200	T.S.	991	45	27.3	126.0
		1800	S.T.S.	988	50	27.8	126.0
	17	0000	S.T.S.	988	50	28.7	125.7
		0600	S.T.S.	985	55	29.2	125.1
		1200	S.T.S.	980	60	29.5	124.6
		1800	S.T.S.	975	60	30.0	123.5
	18	0000	S.T.S.	975	60	31.0	122.4
		0600	S.T.S.	980	50	32.0	121.4
		1200	T.S.	985	45	33.0	120.7
		1800	T.S.	990	40	34.1	120.1
	19	0000	T.S.	985	45	35.4	120.0
		0600	T.S.	985	45	37.3	120.5
		1200	T.S.	985	45	39.1	121.4
		1800	T.S.	990	35	42.0	123.2

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF
TYPHOON NELSON (8511)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (knots)	Lat. N	Long. E
Aug	17	1800	T.D.	991	30	20.4	140.6
	18	0000	T.S.	990	35	21.1	140.1
		0600	T.S.	990	40	21.7	139.6
		1200	T.S.	983	45	22.4	138.7
		1800	S.T.S.	982	50	22.7	137.6
	19	0000	S.T.S.	980	55	22.8	136.6
		0600	S.T.S.	980	55	22.9	135.8
		1200	S.T.S.	980	55	23.0	134.8
		1800	S.T.S.	975	55	23.0	134.0
	20	0000	S.T.S.	970	60	23.1	133.1
		0600	S.T.S.	970	60	23.1	132.4
		1200	S.T.S.	970	60	23.2	131.6
		1800	T.	970	65	23.4	130.9
	21	0000	T.	970	70	23.8	130.2
		0600	T.	965	70	24.1	129.0
		1200	T.	965	70	24.2	128.1
		1800	T.	965	75	24.3	126.9
	22	0000	T.	960	75	24.4	125.9
		0600	T.	960	80	24.7	124.7
		1200	T.	960	85	24.9	123.8
		1800	T.	955	90	25.3	122.7
	23	0000	T.	950	100	25.5	121.7
		0600	T.	955	100	25.7	120.7
		1200	T.	955	90	25.7	119.8
		1800	T.	965	70	25.6	118.6
	24	0000	T.S.	985	40	25.5	117.8
		0600	T.D.	995	30	25.3	117.0

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON ODESSA (8512)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (knots)	Lat. N	Long. E
Aug	24	0600	T.D.	993	30	17.4	143.5
		1200	T.S.	990	40	18.6	143.9
		1800	T.S.	988	45	19.9	144.1
	25	0000	S.T.S.	984	50	21.0	143.9
		0600	S.T.S.	980	55	22.0	143.5
		1200	S.T.S.	980	60	22.9	143.1
		1800	S.T.S.	980	60	23.9	142.8
	26	0000	T.	975	65	25.1	142.5
		0600	T.	970	65	26.0	142.3
		1200	T.	965	65	26.8	142.0
		1800	T.	965	70	27.4	141.6
	27	0000	T.	965	70	27.9	141.1
		0600	T.	965	70	28.2	140.7
		1200	T.	965	70	28.3	140.1
		1800	T.	965	75	28.2	139.5
	28	0000	T.	965	75	28.2	138.8
		0600	T.	965	75	28.2	137.9
		1200	T.	960	75	28.3	137.0
		1800	T.	960	80	28.6	136.0
	29	0000	T.	955	80	29.1	135.0
		0600	T.	960	80	29.7	133.6
		1200	T.	960	75	30.0	131.9
		1800	T.	960	75	30.2	129.8
	30	0000	T.	960	75	30.3	128.0
		0600	T.	970	75	30.4	126.5
		1200	T.	975	65	30.3	125.6
		1800	S.T.S.	980	60	29.7	125.3
	31	0000	S.T.S.	985	55	30.1	126.1
		0600	S.T.S.	990	50	31.1	127.6
		1200	S.T.S.	990	50	32.7	128.8
		1800	T.S.	993	45	34.1	130.0
Sep	1	0000	T.S.	997	40	35.4	131.7
		0600	T.S.	1002	35	36.7	134.2
		1200	T.D.	1004	30	37.6	137.0
		1800	T.D.	1008	25	37.5	140.0

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON PAT (8513)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (knots)	Lat. N	Long. E
Aug	27	0000	T.D.	1000	30	21.3	126.0
		0600	T.D.	998	30	21.7	126.8
		1200	T.S.	995	40	22.1	127.6
		1800	T.S.	990	45	22.4	128.3
	28	0000	S.T.S.	983	50	22.7	128.8
		0600	S.T.S.	975	55	23.1	129.4
		1200	S.T.S.	975	60	23.4	129.8
		1800	T.	975	65	23.5	130.0
	29	0000	T.	975	65	23.6	130.2
		0600	T.	975	65	23.8	130.5
		1200	T.	975	65	24.2	130.8
		1800	T.	970	65	24.9	131.0
	30	0000	T.	970	65	25.9	131.1
		0600	T.	970	70	27.2	131.1
		1200	T.	960	80	28.8	130.8
		1800	T.	965	80	30.9	130.4
	31	0000	T.	975	65	33.1	130.1
		0600	T.	980	65	35.4	130.7
		1200	S.T.S.	980	60	37.5	132.2
		1800	S.T.S.	985	55	39.4	134.2
Sep	1	0000	S.T.S.	985	50	40.9	137.0
		0600	S.T.S.	985	50	42.0	140.4
		1200	T.S.	995	40	42.2	144.8

Became extratropical

SIX-HOURLY POSITION AND INTENSITY DATA OF
SEVERE TROPICAL STORM RUBY (8514)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (knots)	Lat. N	Long. E
Aug	27	1800	T.D.	1002	25	22.0	143.1
	28	0000	T.S.	992	35	23.4	143.6
		0600	T.S.	992	40	24.7	143.9
		1200	T.S.	992	40	25.8	143.9
		1800	T.S.	992	40	26.6	143.6
	29	0000	T.S.	992	40	27.8	142.7
		0600	T.S.	995	35	28.9	141.9
		1200	T.S.	995	35	29.8	141.3
		1800	T.S.	995	40	30.9	140.7
	30	0000	T.S.	995	40	32.3	140.1
		0600	S.T.S.	990	50	33.5	139.7
		1200	S.T.S.	990	50	34.7	139.6
		1800	T.S.	996	40	36.3	140.2
	31	0000	T.S.	1000	35	38.1	141.2
		0600	T.S.	998	35	39.5	142.6
		1200	T.S.	998	35	40.1	145.0
		1800	T.S.	1000	35	40.7	148.2
Sep	1	0000	T.S.	1000	40	41.2	151.5
		0600	T.S.	1000	40	42.3	154.2

Became extratropical

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON SKIP (8515)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (knots)	Lat. N	Long. E
Aug	31	0000	T.D.	1004	25	13.5	178.6
		0600	T.D.	1000	30	14.5	177.9
		1200	T.S.	997	35	15.0	177.4
		1800	T.S.	993	40	15.6	177.0
Sep	1	0000	T.S.	990	45	16.1	176.5
		0600	S.T.S.	985	55	16.7	176.0
		1200	S.T.S.	980	60	17.2	175.6
		1800	S.T.S.	988	55	17.4	175.3
	2	0000	S.T.S.	996	50	17.6	175.0
		0600	S.T.S.	996	50	17.8	174.5
		1200	S.T.S.	996	50	18.1	173.7
		1800	S.T.S.	994	50	18.2	173.0
	3	0000	S.T.S.	994	50	18.5	172.4
		0600	S.T.S.	994	50	18.9	171.9
		1200	T.S.	996	45	19.3	171.7
		1800	T.S.	996	45	19.9	171.5
	4	0000	T.S.	997	40	20.4	171.4
		0600	T.S.	997	40	20.9	171.4
		1200	T.S.	997	40	21.3	171.8
		1800	T.S.	997	40	21.5	172.7
	5	0000	T.S.	1002	35	21.7	173.8
		0600	T.S.	994	40	22.5	174.7
		1200	T.S.	988	45	23.6	174.8
		1800	S.T.S.	987	50	24.5	174.6
	6	0000	S.T.S.	987	50	25.3	174.6
		0600	S.T.S.	986	55	26.2	174.6
		1200	S.T.S.	982	55	27.4	174.7
		1800	S.T.S.	980	60	28.8	174.8
	7	0000	S.T.S.	975	60	30.3	175.1
		0600	T.	970	70	31.8	175.9
		1200	T.	970	70	33.4	177.3
		1800	T.	970	65	35.0	178.8
	8	0000	S.T.S.	975	60	36.9	179.9

Moved east of 180°

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON TESS (8516)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (knots)	Lat. N	Long. E
Sep	1	0000	T.D.	1003	25	15.1	132.8
		0600	T.D.	1002	30	15.1	131.0
		1200	T.D.	1000	30	15.0	129.2
		1800	T.D.	1000	30	14.9	127.6
	2	0000	T.S.	994	35	14.7	126.4
		0600	T.S.	989	40	14.7	125.4
		1200	T.S.	985	45	14.7	124.5
		1800	S.T.S.	983	50	14.9	123.5
	3	0000	S.T.S.	983	55	15.5	122.7
		0600	S.T.S.	983	60	16.5	122.2
		1200	S.T.S.	985	55	17.1	121.1
		1800	S.T.S.	988	50	17.5	119.8
	4	0000	S.T.S.	985	50	18.0	118.5
		0600	S.T.S.	982	55	18.7	117.2
		1200	S.T.S.	975	60	19.1	116.1
		1800	S.T.S.	970	60	19.2	114.9
	5	0000	T.	970	65	19.4	114.0
		0600	T.	965	70	20.0	113.4
		1200	T.	965	75	20.6	113.0
		1800	T.	965	75	21.2	112.6
	6	0000	S.T.S.	970	60	21.9	112.1
		0600	T.S.	980	45	22.6	111.3
		1200	T.S.	990	35	23.4	110.5
		1800	T.D.	996	25	24.0	109.7

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF
TROPICAL STORM VAL (8517)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (knots)	Lat. N	Long. E
Sep	15	0000	T.D.	1000	30	17.9	131.9
		0600	T.S.	998	35	19.7	130.8
		1200	T.S.	996	40	20.9	129.0
		1800	T.S.	995	40	21.6	127.0
	16	0000	T.S.	994	45	21.4	124.9
		0600	T.S.	994	45	21.2	123.3
		1200	T.S.	994	45	21.2	122.1
		1800	T.S.	995	40	21.3	121.3
	17	0000	T.S.	996	40	21.3	120.6
		0600	T.S.	998	35	21.3	119.9
		1200	T.D.	999	30	21.3	119.2
		1800	T.D.	1000	30	21.3	118.6

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF
TROPICAL STORM WINONA (8518)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (knots)	Lat. N	Long. E
Sep	19	0000	T.D.	1002	25	14.7	115.6
		0600	T.D.	1002	30	15.2	114.6
		1200	T.D.	1000	30	15.8	113.7
		1800	T.D.	1000	30	16.5	113.0
	20	0000	T.D.	1000	30	17.2	112.7
		0600	T.S.	997	35	17.8	112.5
		1200	T.S.	995	40	18.4	112.2
		1800	T.S.	992	40	18.9	112.0
	21	0000	T.S.	990	45	19.4	111.7
		0600	T.S.	990	45	20.0	111.4
		1200	T.S.	990	45	20.5	111.0
		1800	T.S.	990	45	20.9	110.6
	22	0000	T.S.	990	45	21.3	110.2
		0600	T.S.	998	40	21.6	110.0
		1200	T.D.	1004	25	22.2	109.9

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON ANDY (8519)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (knots)	Lat. N	Long. E
Sep	27	1200	T.D.	1003	25	18.7	116.4
		1800	T.D.	1002	25	18.8	115.9
	28	0000	T.D.	1000	30	18.9	115.3
		0600	T.S.	998	35	19.0	114.5
		1200	T.S.	995	40	18.8	113.7
		1800	S.T.S.	990	50	18.7	112.8
	29	0000	S.T.S.	985	55	18.7	112.0
		0600	S.T.S.	982	60	18.8	111.6
		1200	T.	975	65	18.9	110.9
		1800	T.	975	65	18.5	110.0
	30	0000	T.	975	65	18.2	109.2
		0600	S.T.S.	980	60	18.2	108.9
		1200	S.T.S.	980	60	18.1	108.6
		1800	S.T.S.	980	60	18.1	108.3
Oct	1	0000	S.T.S.	984	55	18.0	107.8
		0600	S.T.S.	988	55	17.9	107.2
		1200	S.T.S.	990	50	17.8	106.4
		1800	T.S.	994	45	17.8	105.8
	2	0000	T.S.	1000	35	17.6	105.2

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON BRENDA (8520)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (knots)	Lat. N	Long. E
Sep	30	0600	T.D.	995	30	15.9	130.6
		1200	T.S.	994	35	15.8	130.2
		1800	T.S.	993	40	16.0	129.9
Oct	1	0000	S.T.S.	992	50	16.5	129.9
		0600	S.T.S.	990	55	17.6	129.8
		1200	S.T.S.	985	55	17.6	129.4
		1800	S.T.S.	983	55	17.7	129.1
	2	0000	S.T.S.	982	60	17.8	128.8
		0600	S.T.S.	980	60	18.2	128.2
		1200	S.T.S.	975	60	18.7	127.3
		1800	T.	970	65	19.2	126.2
	3	0000	T.	965	75	19.9	125.1
		0600	T.	965	80	20.6	124.3
		1200	T.	960	80	21.7	123.4
		1800	T.	960	80	22.8	123.1
	4	0000	T.	960	80	24.5	123.0
		0600	T.	965	80	26.1	122.4
		1200	T.	970	75	27.7	123.5
		1800	T.	980	70	29.7	124.9
	5	0000	T.	980	70	32.1	126.6
		0600	T.	985	65	34.0	128.2
		1200	S.T.S.	990	55	35.3	130.1

Became extratropical

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON CECIL (8521)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (knots)	Lat. N	Long. E
Oct	12	0000	T.D.	1004	25	10.4	121.3
		0600	T.D.	1002	30	10.8	120.1
		1200	T.D.	1000	30	11.2	118.9
		1800	T.S.	997	35	11.6	117.7
	13	0000	T.S.	990	45	11.8	117.0
		0600	S.T.S.	985	50	12.1	116.5
		1200	S.T.S.	981	50	12.6	115.9
		1800	S.T.S.	975	55	13.1	115.3
	14	0000	S.T.S.	970	60	13.5	114.9
		0600	T.	970	65	13.9	114.3
		1200	T.	965	65	14.3	113.6
		1800	T.	965	65	14.8	112.8
	15	0000	T.	965	70	15.3	111.8
		0600	T.	960	80	15.9	110.7
		1200	T.	960	80	16.6	109.4
		1800	T.	960	80	16.9	108.1
	16	0000	T.	965	75	17.1	106.8
		0600	S.T.S.	990	50	17.2	105.6
		1200	T.D.	1000	30	17.7	104.3

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON DOT (8522)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (knots)	Lat. N	Long. E
Oct	13	0000	T.D.	1004	25	10.4	148.6
		0600	T.D.	1003	25	11.1	146.9
		1200	T.D.	1001	30	11.3	145.0
		1800	T.S.	996	35	11.4	143.6
	14	0000	T.S.	992	40	11.6	142.3
		0600	T.S.	986	45	11.8	141.2
		1200	S.T.S.	980	50	12.2	140.0
		1800	S.T.S.	975	60	12.7	138.9
	15	0000	T.	970	70	13.1	137.8
		0600	T.	950	80	13.4	136.7
		1200	T.	930	95	13.6	135.7
		1800	T.	915	110	13.8	134.8
	16	0000	T.	900	125	14.1	133.7
		0600	T.	895	130	14.4	132.6
		1200	T.	893	130	14.6	131.2
		1800	T.	895	130	14.7	129.9
	17	0000	T.	900	125	14.7	128.5
		0600	T.	905	125	14.6	127.4
		1200	T.	910	125	14.4	126.3
		1800	T.	910	125	14.3	125.3
	18	0000	T.	915	120	14.4	124.3
		0600	T.	925	120	14.7	123.4
		1200	T.	935	110	15.1	122.3
		1800	T.	945	85	15.4	121.0
	19	0000	T.	970	70	15.5	119.3
		0600	T.	980	65	15.8	118.3
		1200	T.	980	65	16.1	117.6
		1800	T.	975	70	16.5	116.6
	20	0000	T.	970	75	16.9	115.5
		0600	T.	965	80	17.3	114.2
		1200	T.	960	85	17.7	112.9
		1800	T.	960	85	17.9	111.2
	21	0000	T.	960	85	18.2	109.4
		0600	T.	970	70	18.4	107.5
		1200	S.T.S.	980	60	18.5	105.8
		1800	T.S.	995	40	18.6	104.4
	22	0000	T.D.	1007	25	19.0	103.1
				Dissipated			

SIX-HOURLY POSITION AND INTENSITY DATA OF SEVERE TROPICAL STORM ELLIS (8523)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (knots)	Lat. N	Long. E
Oct	16	0000	T.D.	1002	30	10.6	152.4
		0600	T.S.	1000	35	10.7	152.0
		1200	T.S.	999	35	10.7	151.7
		1800	T.S.	998	40	10.7	151.3
	17	0000	T.S.	997	40	10.7	150.9
		0600	T.S.	996	45	10.6	150.6
		1200	T.S.	996	45	10.3	150.3
		1800	T.S.	996	45	9.8	150.0
	18	0000	S.T.S.	996	50	9.3	149.7
		0600	S.T.S.	996	50	8.8	149.5
		1200	S.T.S.	996	50	8.2	149.2
		1800	S.T.S.	997	50	7.7	148.8
	19	0000	T.S.	997	45	7.1	148.3
		0600	T.S.	998	40	6.6	147.8
		1200	T.S.	1000	35	6.3	147.0
		1800	T.S.	1002	35	6.2	146.2
	20	0000	T.S.	1004	35	6.2	145.2
		0600	T.D.	1005	30	6.5	144.0
		1200	T.D.	1006	25	7.2	142.8
		1800	T.D.	1006	25	7.9	141.2
	21	0000	T.D.	1007	25	8.5	139.6
		0600	T.D.	1007	25	9.0	138.0
		1200	T.D.	1007	25	9.3	137.0
		1800	T.D.	1008	25	9.5	136.2

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON FAYE (8524)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (knots)	Lat. N	Long. E
Oct	23	0000	T.D.	1004	25	13.2	126.0
		0600	T.D.	1002	25	13.6	125.0
		1200	T.D.	999	25	14.1	124.0
		1800	T.D.	996	25	14.6	123.1
	24	0000	T.D.	994	25	15.1	122.2
		0600	T.D.	995	25	15.6	121.4
		1200	T.D.	996	25	16.2	120.7
		1800	T.D.	997	25	17.3	119.8
	25	0000	T.D.	1002	25	18.3	119.0
		0600	T.D.	1001	25	18.0	118.9
		1200	T.D.	1000	30	18.1	119.1
		1800	T.D.	1000	30	18.2	119.4
	26	0000	T.D.	998	30	18.4	119.7
		0600	T.D.	998	30	18.6	120.2
		1200	T.S.	997	35	18.9	121.0
		1800	T.S.	997	35	19.2	121.9
	27	0000	T.S.	996	40	19.4	122.4
		0600	T.S.	992	45	19.5	122.7
		1200	S.T.S.	989	50	19.6	122.9
		1800	S.T.S.	989	50	19.6	123.1
	28	0000	S.T.S.	989	50	19.7	123.3
		0600	S.T.S.	988	55	19.8	123.4
		1200	S.T.S.	984	55	19.9	123.6
		1800	S.T.S.	982	60	20.1	123.8
	29	0000	S.T.S.	980	60	20.6	124.0
		0600	T.	975	65	21.2	124.3
		1200	T.	970	70	21.7	124.9
		1800	T.	965	75	22.2	125.4
	30	0000	T.	963	75	22.8	126.0
		0600	T.	965	75	23.5	126.7
		1200	T.	975	70	24.1	127.6
		1800	T.	986	65	24.8	128.7
	31	0000	S.T.S.	992	55	25.3	129.8
		0600	T.S.	994	45	25.9	130.9
		1200	T.S.	996	40	26.5	132.4
		1800	T.S.	999	40	27.0	134.2
Nov	1	0000	T.S.	1002	35	27.5	136.0
		0600	T.S.	1004	35	28.0	138.2
		1200	T.D.	1005	30	28.7	140.6

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF TROPICAL DEPRESSION GORDON (8525)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (knots)	Lat. N	Long. E
Nov	23	0000	T.D.	1002	25	8.9	112.9
		0600	T.D.	1001	25	9.2	112.9
		1200	T.D.	1000	30	9.5	112.7
		1800	T.D.	1000	30	10.0	112.3
	24	0000	T.D.	1000	30	10.5	112.5
		0600	T.D.	1000	30	11.0	112.5
		1200	T.D.	1000	30	11.3	111.8
		1800	T.D.	1000	30	11.6	111.1
	25	0000	T.D.	1002	30	11.8	110.3
		0600	T.D.	1003	25	11.5	109.6
		1200	T.D.	1004	25	10.8	109.0

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON HOPE (8526)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (knots)	Lat. N	Long. E
Dec	17	0000	T.D.	1000	25	9.5	139.6
		0600	T.D.	999	25	9.7	139.1
		1200	T.D.	998	25	9.9	138.6
		1800	T.D.	997	30	10.1	138.1
	18	0000	T.S.	996	35	10.3	137.7
		0600	T.S.	990	40	10.7	137.3
		1200	T.S.	984	45	11.0	137.0
		1800	S.T.S.	980	55	11.5	136.8
	19	0000	S.T.S.	975	60	11.9	136.6
		0600	T.	965	65	12.6	136.2
		1200	T.	965	70	13.2	135.6
		1800	T.	960	75	13.5	134.9
	20	0000	T.	960	80	13.6	133.7
		0600	T.	948	90	13.5	132.4
		1200	T.	950	90	13.5	131.3
		1800	T.	960	80	13.6	130.2
	21	0000	T.	965	75	13.7	129.0
		0600	T.	965	75	13.8	128.2
		1200	T.	970	70	13.9	127.2
		1800	T.	970	70	14.3	126.2
	22	0000	T.	975	70	15.3	125.6
		0600	T.	975	65	16.4	125.6
		1200	T.	975	65	17.0	125.8
		1800	T.	975	65	17.5	126.1
	23	0000	T.	980	65	18.0	126.5
		0600	S.T.S.	985	60	18.7	127.2
		1200	S.T.S.	990	55	19.5	128.6
		1800	S.T.S.	995	50	19.8	130.1
	24	0000	T.S.	1000	40	18.0	130.8

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF TROPICAL STORM IRVING (8527)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (knots)	Lat. N	Long. E
Dec	16	1800	T.D.	1004	25	7.0	115.0
	17	0000	T.D.	1001	25	7.3	115.0
		0600	T.D.	998	25	7.5	114.9
		1200	T.D.	996	30	7.7	114.8
		1800	T.S.	995	35	7.8	114.7
	18	0000	T.S.	994	45	7.9	114.6
		0600	T.S.	994	45	7.9	114.4
		1200	T.S.	995	45	7.8	114.1
		1800	T.S.	995	45	7.6	113.8
	19	0000	T.S.	995	45	7.5	113.5
		0600	T.S.	995	45	7.6	113.1
		1200	T.S.	995	40	7.9	112.7
		1800	T.S.	995	40	8.4	112.0
	20	0000	T.S.	996	35	8.9	111.1
		0600	T.S.	997	35	9.3	110.0
		1200	T.S.	998	35	9.2	109.0
		1800	T.D.	1000	30	8.7	108.7
	21	0000	T.D.	1004	30	8.3	108.5
		0600	T.D.	1006	25	7.8	108.0
		1200	T.D.	1008	25	7.3	107.8
		1800	T.D.	1009	25	6.7	107.6

Dissipated