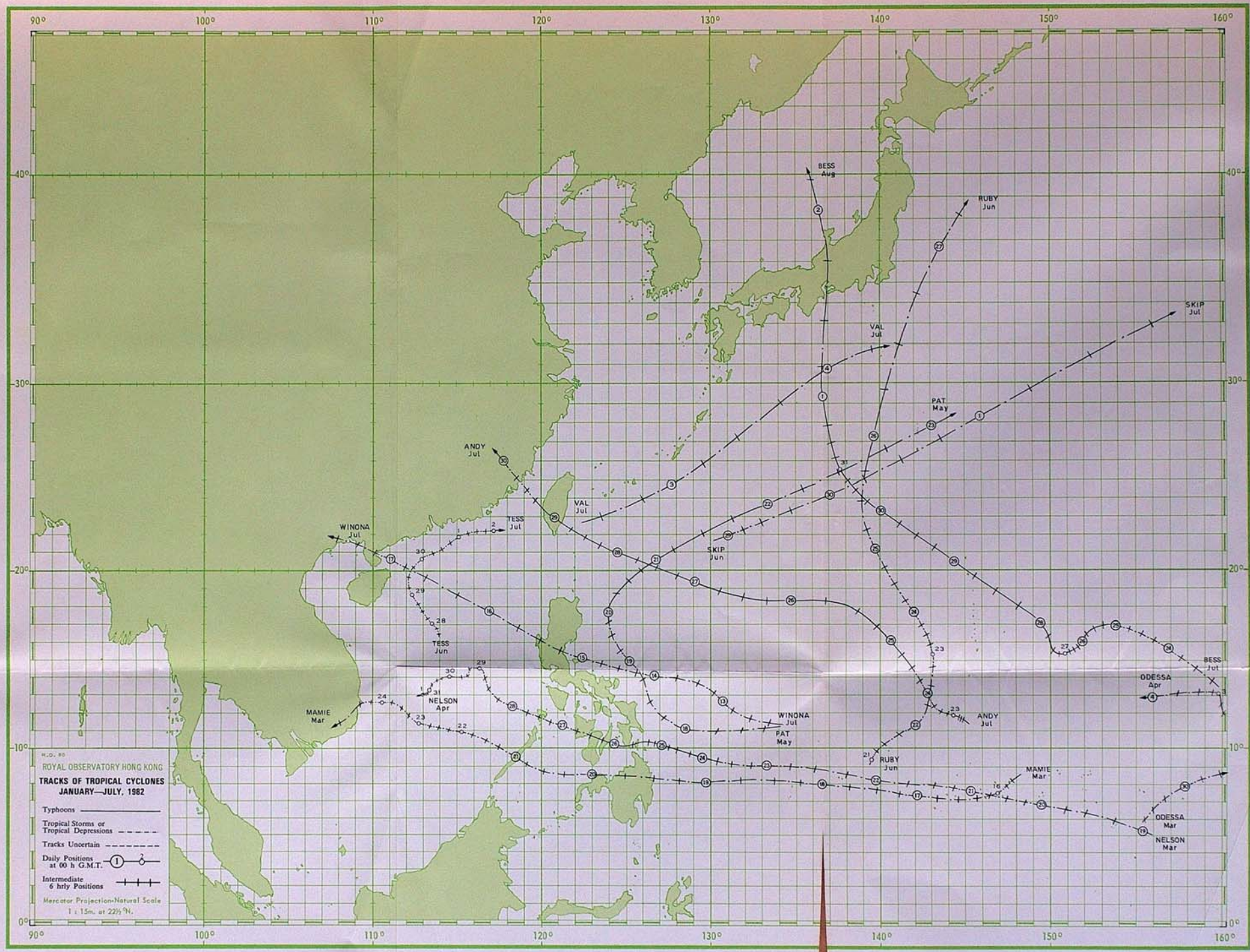
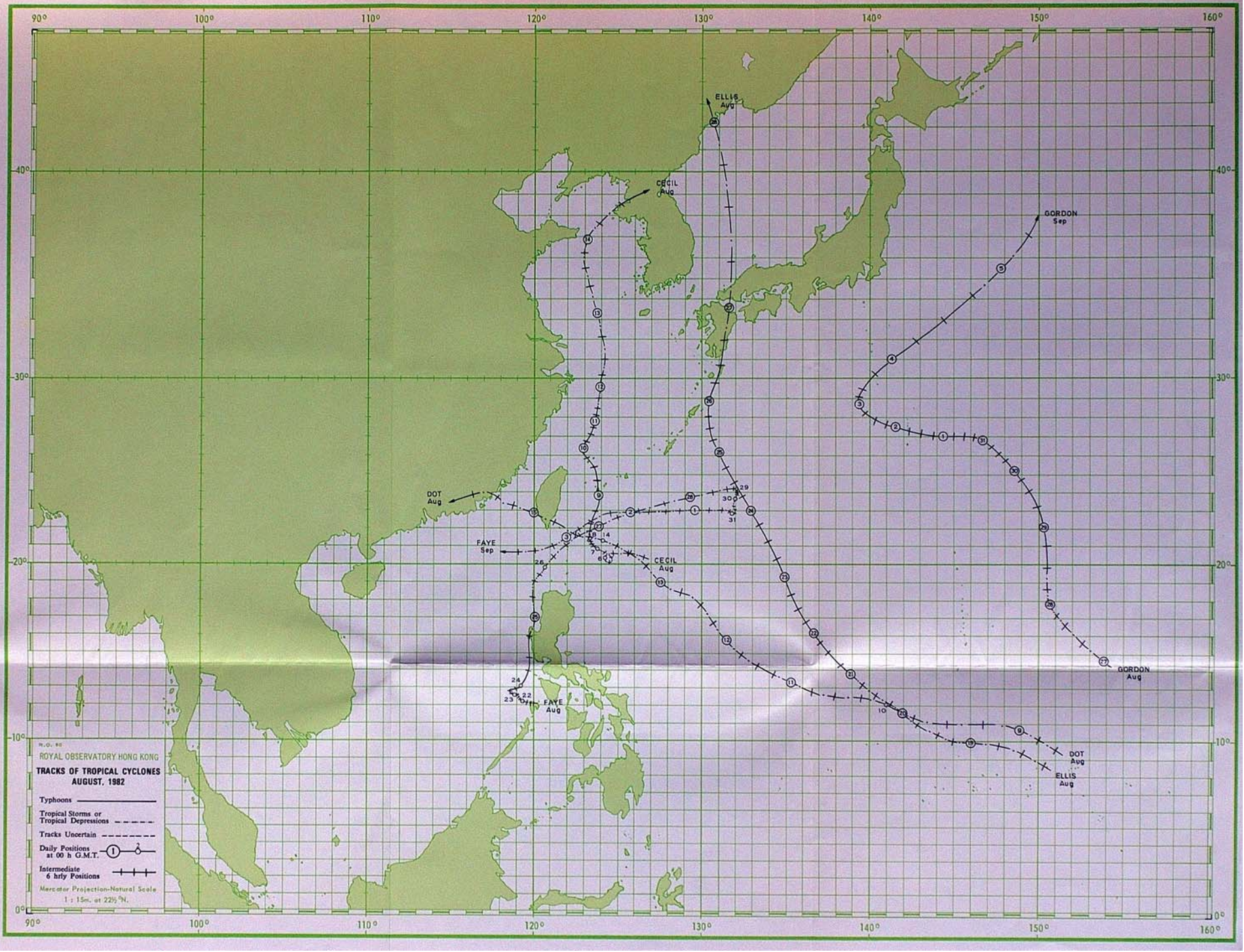
METEOROLOGICAL RESULTS

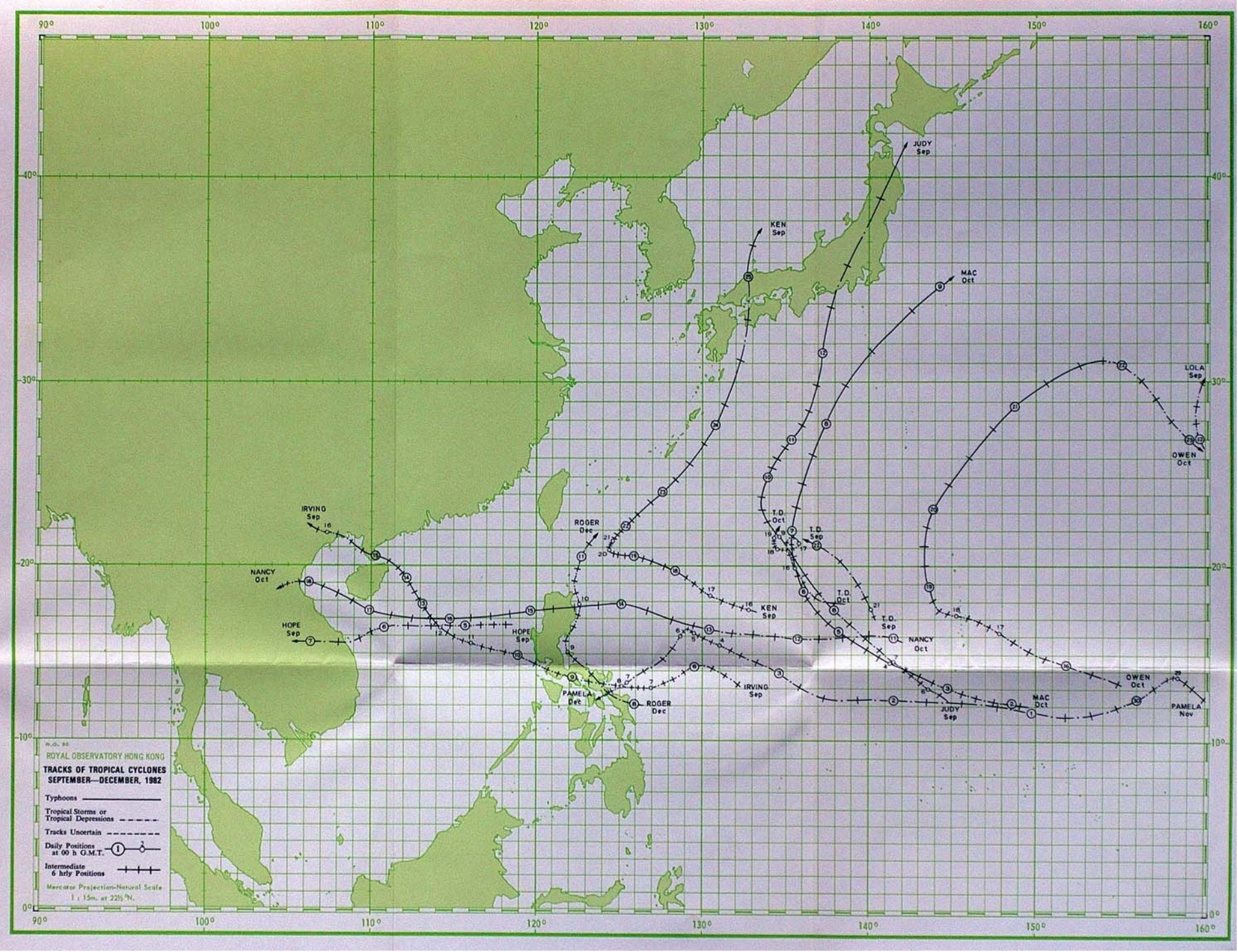
1982

PART III—TROPICAL CYCLONE SUMMARIES

1983


90°
100°
110°
120°
130°
140°
150°
160°
40°
30°
20°
10°
0°
BESS Aug
RUBY Jun
SKIP Jul
VAL Jul
PAT May
ANDY Jul
VAL Jul
WINONA Jul
TESS Jul
SKIP Jun
TESS Jun
NELSON Apr
MAMIE Mar
WINONA Jul
PAT May
ANDY Jul
RUBY Jun
MAMIE Mar
ODESSA Apr
BESS Jul
ODESSA Mar
NELSON Mar
H.O. 80
ROYAL OBSERVATORY HONG KONG
TRACKS OF TROPICAL CYCLONES
JANUARY—JULY, 1982
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 : 15m. at 22½°N.


90°
100°
110°
120°
130°
140°
150°
160°
40°
30°
20°
10°
0°
ELLIS
Aug
CECIL
Aug
GORDON
Sep
DOT
Aug
FAYE
Sep
CECIL
Aug
GORDON
Aug
FAYE
Aug
DOT
Aug
ELLIS
Aug
H.O. 80
ROYAL OBSERVATORY HONG KONG
TRACKS OF TROPICAL CYCLONES
AUGUST, 1982
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 : 15m. at 22½°N.


90°
100°
110°
120°
130°
140°
150°
160°
40°
30°
20°
10°
0°
JUDY Sep
KEN Sep
MAC Oct
LOLA Sep
OWEN Oct
IRVING Sep
ROGER Dec
T.D. Oct
T.D. Sep
NANCY Oct
HOPE Sep
PAMELA Oct
PAMELA Nov
W.O. 88
ROYAL OBSERVATORY HONG KONG
TRACKS OF TROPICAL CYCLONES
SEPTEMBER—DECEMBER, 1982
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 : 15m. at 22½°N.

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 were begun in 1947 and from then onwards the annual volumes were 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 then introduced. It contains information about all tropical cyclones over the western North Pacific and the South China Sea (i.e. the area bounded by the Equator, 45°N, 100°E and 160°E). The first issue containing reports on tropical cyclones occurring during 1968, was published in 1971.

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. During the period 1884–1960, the tracks were plotted with day circle positions only. The time of the day circle varied to some extent but remained fixed at 0000 G.M.T. after 1944. The day circle times used for earlier tropical cyclones 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; this is done in order 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 during which any tropical cyclone warning signal was raised.

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

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 34–47 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 which has attained tropical storm intensity a common number which is composed of 4 digits. For example, (8204) means the fourth tropical cyclone of tropical storm intensity or above in 1982. The appropriate number follows the name of the tropical cyclone in this publication.

The Royal Observatory has a network of anemographs to record surface winds in Hong Kong. The instruments used are all Dines pressure-tube anemographs or M.O. Mark IV cup-generator type anemographs manufactured by R.W. Munro Ltd. Quick-run mechanisms are also fitted to the anemographs at the Hong Kong Airport (Southeast), 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$^{\Delta}$	32	72	Cup
Hong Kong Airport (Southeast)	22° 20′	114° 11′	24	4	16	Dines, Cup
Hong Kong Airport (Northwest)	22° 20′	114° 11′	24	4	14	Dines, 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
Castle Peak	22° 23′	113° 58′	*	11	24	Dines
Chek Lap Kok	22° 19′	113° 56′	53	51	65	Cup
Lei Yue Mun	22° 17′	114° 14′	*	54	73	Cup
Yau Yat Chuen	22° 20′	114° 10′	*	27	64	Cup
Kowloon Tsai Hill	22° 20′	114° 11′	*	91	105	Cup

$^{\Delta}$ 33 m up to 1300 Hong Kong Time 7 May 1982.

* 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 a new anemometer installed at the top of a mast which is about 93 metres west-southwest of the previous location on top of the old headquarters building. It became operational on 1 June 1982. Wind speed measurements have not been corrected for the reduced density of the air 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 affecting Hong Kong from formation to dissipation including:

(*a*) how the tropical cyclone affected 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 amount of rainfall recorded at the Royal Observatory; and
(*f*) the times and heights of the highest tides and maximum storm surges recorded in Hong Kong.

Whenever practical, radar photographs 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 have been in use 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 were taken directly from eye-fix messages received operationally at the Royal Observatory, Hong Kong. No attempt has been made to convert the wind speeds into equivalent 10-minute mean winds to make them comparable 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 1982

In 1982 twenty eight tropical cyclones formed over the western North Pacific and the South China Sea and eighteen of them attained typhoon intensity. Four tropical cyclones made landfall over south China. Eight tropical cyclones affected the Philippines and two crossed Taiwan. Four tropical cyclones hit Japan but only one struck Korea. The monthly distribution of the frequency of first occurrence of tropical cyclones is shown in Figure 1 and a brief summary of their tracks 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 1946–1981 is given in Figure 2.

During the year there were sixteen tropical cyclones in Hong Kong's area of responsibility for tropical cyclone warnings for shipping, (i.e. the area bounded by 10°N, 30°N, 105°E and 125°E) compared with an average of seventeen over the past 36 years. Twelve tropical cyclones moved into the area while four developed within it. Altogether 492 warnings for shipping were issued by the Royal Observatory in connection with fifteen of these tropical cyclones. Tropical Storm Val developed within Hong Kong's area of responsibility but moved out of the area in less than 6 hours so that no tropical cyclone warnings for shipping were issued for Val.

Tropical cyclone warning signals were displayed in Hong Kong for five tropical cyclones. Only one tropical cyclone came within 100 nautical miles of Hong Kong. However, no gales were experienced and there were no reports of damage.

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 1982 amounted to 1 148.0 mm, which is the fifth highest on record and is more than double the annual average value of 566.9 mm (1884–1939 and 1947–70). It accounted for over 35 per cent of the year's total rainfall of 3 247.5 mm.

There were no tropical cyclones in January and February.

Three tropical cyclones developed in March over the western North Pacific, of which two attained typhoon strength. The first tropical cyclone of the year, Tropical Storm Mamie (8201), killed 45 people and led to 49 others missing and 36 000 homeless as it crossed the southern Philippines between 19 and 21 March. It landed in Vietnam on 24 March and weakened rapidly. Typhoon Nelson (8202) swept across the central Philippines between 26 and 27 March, and caused serious damage there. At least 56 people were killed, 32 reported missing and 17 others injured. A total of 165 000 people were rendered homeless. It dissipated over the South China Sea on 1 April. Typhoon Odessa (8203) formed about 780 nautical miles southeast of Guam on 29 March and dissipated over the ocean about 660 nautical miles east of the island on 4 April.

No tropical cyclones developed in April.

Typhoon Pat (8204) was the only tropical cyclone in May. It formed over the Pacific about 740 nautical miles east-southeast of Manila on 17 May and recurved near northern Luzon on 20 May.

Three tropical cyclones developed in June over the western North Pacific and the South China Sea. Typhoon Ruby (8205) formed over the Pacific on 21 June about 390 nautical miles southwest of Guam, moved in a generally northward direction and passed about 140 nautical miles southeast of Tokyo on 27 June. Tropical Storm Tess (8206) formed over the South China Sea on 27 June, recurved near Hainan on 29 June and dissipated near Dongsha on 2 July. It was the first tropical cyclone for which tropical cyclone warning signals were displayed in Hong Kong during the year. Tropical Storm Skip (8207) formed over the Pacific about 310 nautical miles south-southeast of Okinawa on 29 June and moved rapidly to the northeast.

Four tropical cyclones formed over the western North Pacific in July. Tropical Storm Val (8206) formed just east of Taiwan on 2 July and dissipated about 240 nautical miles south of Tokyo on 4 July. It was assigned the same serial number as Tropical Storm Tess (8206) by the Japan Meteorological Agency as it was considered to have regenerated from the remnant of Tess. Severe Tropical Storm Winona (8208) crossed the Luzon Island on 15 July, killing 2 people, injuring 5 others and leaving 5 000 homeless. It eventually landed in Leizhou Peninsula on 17 July. Typhoon Andy (8209) swept across southern Taiwan on 29 July. 13 people were killed, 2 reported missing and 25 others injured. Andy landed in Fujian about 60 nautical miles northeast of Xiamen around midnight on 29 July and weakened rapidly. Typhoon Bess (8210) crossed central Japan around midnight on 1 August, causing serious flooding and landslides. 54 people were killed, 26 reported missing, 325 others injured and 25 000 made homeless. 25 ships were left adrift or sent aground.

Four tropical cyclones formed over the western North Pacific and one tropical cyclone developed over the South China Sea in August. All of them attained typhoon intensity. Typhoon Cecil (8211) crossed the southern part of the Ryukyu Islands on 9 August, leaving two Panamanian-registered ships, the 24 655-ton tanker World Cosmos and the 3 654-ton freighter Marvic, in distress. It skirted northeastern Taiwan and brought heavy rain to Taibei on 11 August, resulting in the death of 19 people. On 14 August, it landed in Korea. In southern Korea, 35 people were killed and 28 others reported missing. Typhoon Dot (8212) crossed southern Taiwan and landed in south China on 15 August, causing serious flooding there. Typhoon Ellis (8213) crossed southwestern Japan between 26 and 27 August. 5 people were killed in southern Japan and 3 others killed in southern Korea. Typhoon

Faye (8214) developed over the central Philippines on the eastern verge of the South China Sea on 21 August. It moved northwards, close to the coast of Luzon, and crossed the western part of the island on 25 August. 32 people were killed and over 53 000 left homeless in the Philippines. Faye was about 290 nautical miles southeast of Okinawa on 30 August. It eventually changed course, moved westwards and dissipated over the northeastern part of the South China Sea on 3 September. Typhoon Gordon (8215) formed over the Pacific about 530 nautical miles east of Guam on 27 August and recurved about 420 nautical miles south of Tokyo on 3 September.

Altogether six tropical cyclones formed in September, one over the South China Sea and the other five over the western North Pacific. Severe Tropical Storm Hope (8216) developed over the South China Sea close to Luzon on 4 September and made landfall in central Vietnam around midnight on 6 September. Typhoon Irving (8217) crossed the central Philippines between 8 and 9 September, causing serious damage to life and property there. Causalty figures included 49 people killed, 29 missing and 22 others injured. About 200 000 people were rendered homeless. It landed in Leizhou Peninsula on 15 September, destroying about 90 per cent of the houses in a people's commune. Farmlands in Leizhou and northeastern Hainan were also seriously damaged. Typhoon Judy (8218) hit east and central Japan on 12 September, about six days after its formation near Guam. 25 people were killed, 9 reported missing and 94 others injured. Typhoon Ken (8219) struck southwestern Japan on 25 September, killing 5 people and injuring 12 others. Tropical Storm Lola (8220) formed over the Pacific about 1 300 nautical miles southeast of Tokyo and became extratropical on 19 September. A tropical depression developed over the Pacific about 340 nautical miles northwest of Guam on 21 September, moved northwestwards and dissipated over the ocean on the following day.

Four tropical cyclones developed over the western North Pacific in October. Typhoon Mac (8221) formed on 2 October about 260 nautical miles east-southeast of Guam, recurved south of Japan and passed about 190 nautical miles southeast of Tokyo on 9 October. Typhoon Nancy (8222) crossed northern Luzon between 14 and 15 October, inflicting widespread damage there. 90 people were killed, 70 injured and 30 others reported missing. Damage to crops and property was estimated at HK$ 300 million. It landed in Vietnam about 120 nautical miles south of Hanoi on 18 October. It was reported that hurricane force winds were experienced in the northern part of central Vietnam for a record period of more than 12 hours. 71 people were killed, 290 others injured and more than 194 000 made homeless. It also caused widespread damage to crops. A tropical depression formed over the Pacific about 990 nautical miles east-northeast of Manila on 15 October and dissipated over the ocean four days later. Typhoon Owen (8223) developed about 580 nautical miles east of Guam on 15 October and recurved about 450 nautical miles north-northwest of the island on 19 October.

Typhoon Pamela (8224) was the only tropical cyclone which developed over the western North Pacific in November. It hit the central Philippines on 7 December and eventually dissipated there on the same day.

Severe Tropical Storm Roger (8225) was the last tropical cyclone during the year. It formed just east of the central Philippines on 8 December, moved along the east coast of the Philippines and dissipated over the sea on 11 December about 430 nautical miles north-northeast of Manila.

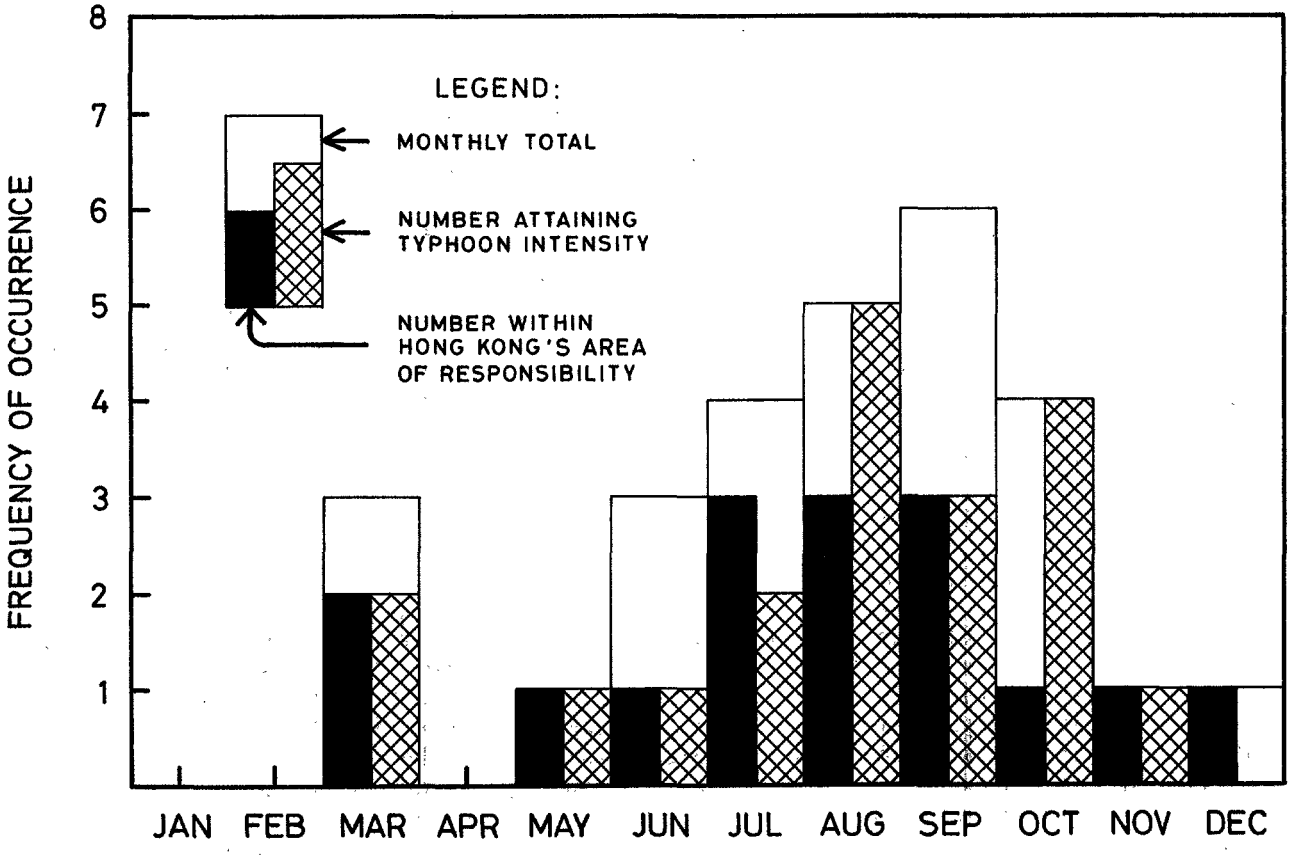


Figure 1. Monthly distribution of the frequency of first occurrence of tropical cyclones and typhoons in the western North Pacific and the South China Sea in 1982.

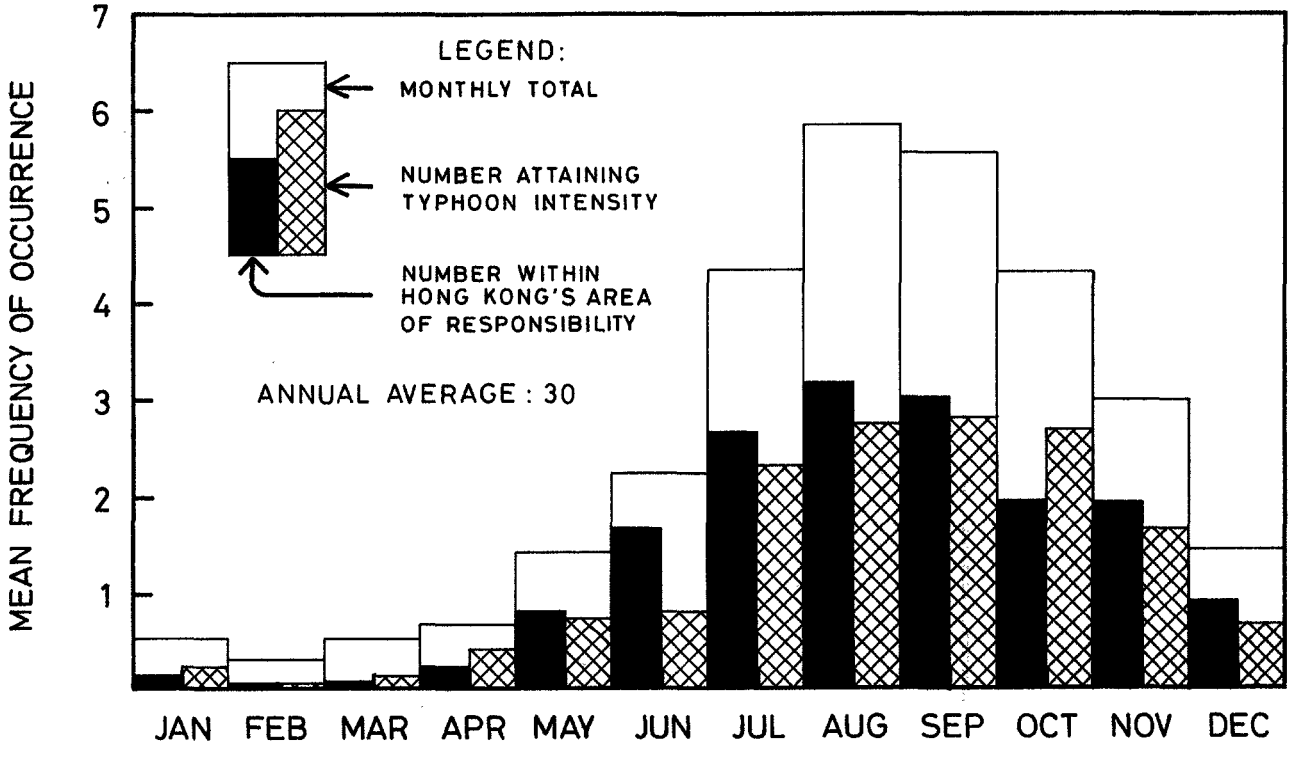


Figure 2. Monthly distribution of the mean frequency of first occurrence of tropical cyclones and typhoons in the western North Pacific and the South China Sea, 1946–1981.

3. REPORTS ON TROPICAL CYCLONES AFFECTING HONG KONG IN 1982

a. TROPICAL STORM TESS (8206)

27 June–2 July 1982

The track of this tropical storm is shown in Figure 3

A tropical depression developed over the South China Sea near Xisha Dao on 27 June and moved northwestward at about 4 knots. Early on 28 June it intensified into a tropical storm and was subsequently named Tess. Satellite pictures revealed that the tropical storm was not well-organised and the centre was ill-defined. Sustained winds of 40 knots were reported by the M.V. 'Chengtu' and at Xisha Dao about 150 and 70 nautical miles from the centre respectively on 28 June. Tess recurved near Hainan on 29 June and weakened into a tropical depression while moving east-northeast at about 6 knots in a direction roughly parallel to the south China coast. Satellite pictures received at 8.00 a.m. on 30 June (Figure 4) showed that the centre of the storm remained ill-defined and the main cloud mass was displaced to the west of the centre of the low level circulation. Tess eventually dissipated about 170 nautical miles east of Hong Kong on 2 July.

In Hong Kong, the Stand By Signal, No. 1, was hoisted at 12.00 noon on 28 June when Tess was centred about 300 nautical miles south of Hong Kong. Easterly winds strengthened during the evening and the Strong Wind Signal, No. 3, was hoisted at 7.10 p.m. on 28 June. Easterly winds remained strong throughout the day on 29 June and maximum gusts of 47 knots and 53 knots were recorded at Waglan Island and Tate's Cairn respectively. Winds moderated during the day on 30 June as Tess weakened south of Hong Kong. Tess was closest to Hong Kong around 3.00 a.m. on 1 July when it was centred about 50 nautical miles to the southeast. The minimum mean sea-level pressure at the Royal Observatory was 996.1 millibars recorded at 5.00 a.m. on 1 July. Winds turned northerly during the morning and the Strong Wind Signal was replaced by the Stand By Signal at 6.10 a.m. on 1 July. All signals were lowered at 6.40 p.m. on 1 July as Tess continued to move further away from Hong Kong. The maximum mean hourly winds and the maximum gust speeds together with associatd wind directions recorded at some selected locations during the display of tropical cyclone warning signals 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	16	ENE	38
Hong Kong Airport (SE)	E	20	E	38
Hong Kong Airport (NW)	ENE	17	NE	43
Waglan Island	E	38	E	47
Tate's Cairn	ENE	32	ENE	53
Cheung Chau	E	22	E	39
King's Park	E	15	E	32
Star Ferry	E	21	E	39
Green Island	ENE	32	ENE	46
Tsim Bei Tsui	E	20	E	31
Tai O	E	19	ENE	40
Castle Peak	NNE	14	NNE	33
Chek Lap Kok	E	21	E	29
Lei Yue Mun	not available		not available	
Yau Yat Chuen	ENE	19	ENE	43
Kowloon Tsai Hill	ENE	24	ENE	47

The weather was sunny and hot on 28 June. There were showers and periods of rain from 29 June to 2 July. Thunderstorms occurred every morning from 1 to 3 July. There were more heavy showers and periods of rain on the following few days. The daily amounts of rainfall recorded were as follows:

	Royal Observatory	*Cheung Chau*	*Tate's Cairn*
28 June	Trace	Nil	Nil
29 June	8.0 mm	1.1 mm	10.8 mm
30 June	34.3 mm	14.4 mm	75.5 mm
1 July	29.3 mm	41.1 mm	31.7 mm
2 July	3.8 mm	0.1 mm	15.0 mm
3 July	54.3 mm	84.7 mm	81.2 mm
4 July	51.7 mm	44.6 mm	65.0 mm
5 July	27.1 mm	0.3 mm	not available
Total:	208.5 mm	186.3 mm	279.2 mm (for 7 days)

During the passage of Tess one dwelling boat was sunk. There were no other reports of damage in Hong Hong.

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

Location	Highest tide above chart datum			Maximum storm surge above astronomical tide		
	Height	Date	Time	Height	Date	Time
	(m)			(m)		
North Point*	—	—	—	—	—	—
Tai Po Kau	2.2	28 June	5.00 p.m.	0.9	28 June	5.30 p.m.
Chi Ma Wan* (Lantau Island)	—	—	—	—	—	—

* Data not available.

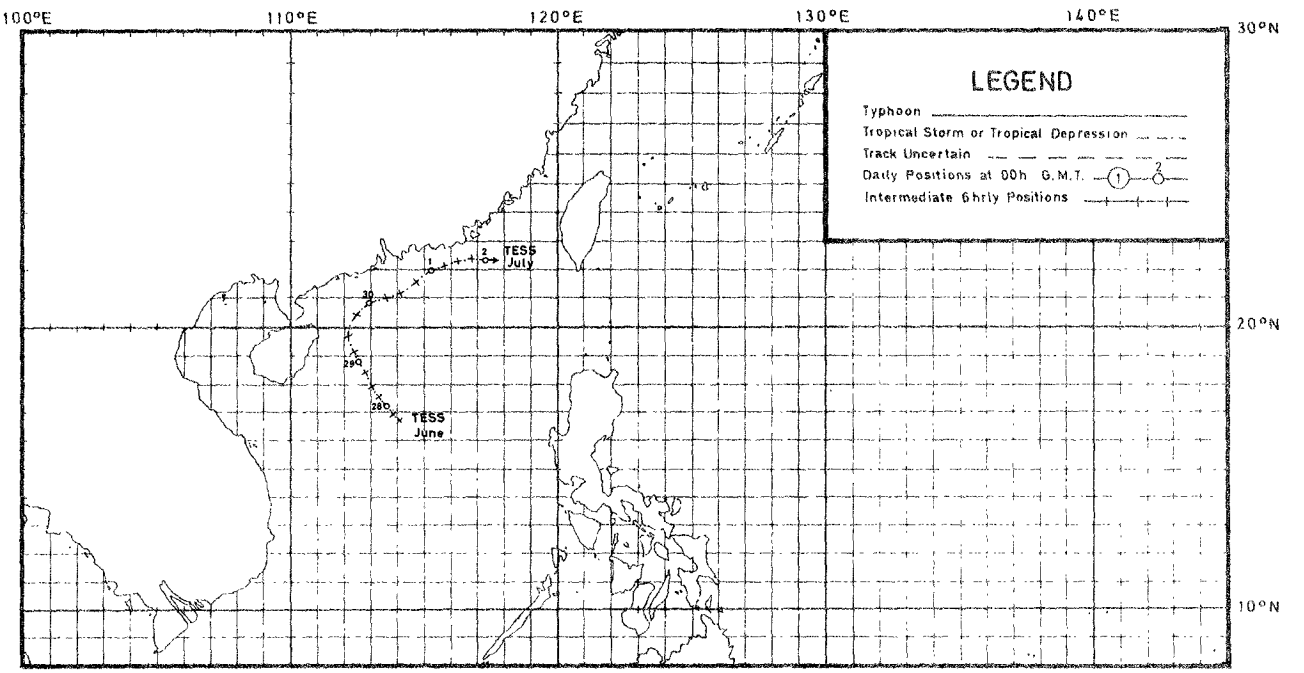


Figure 3. Track of Tropical Storm Tess (8206): 27 June – 2 July 1982

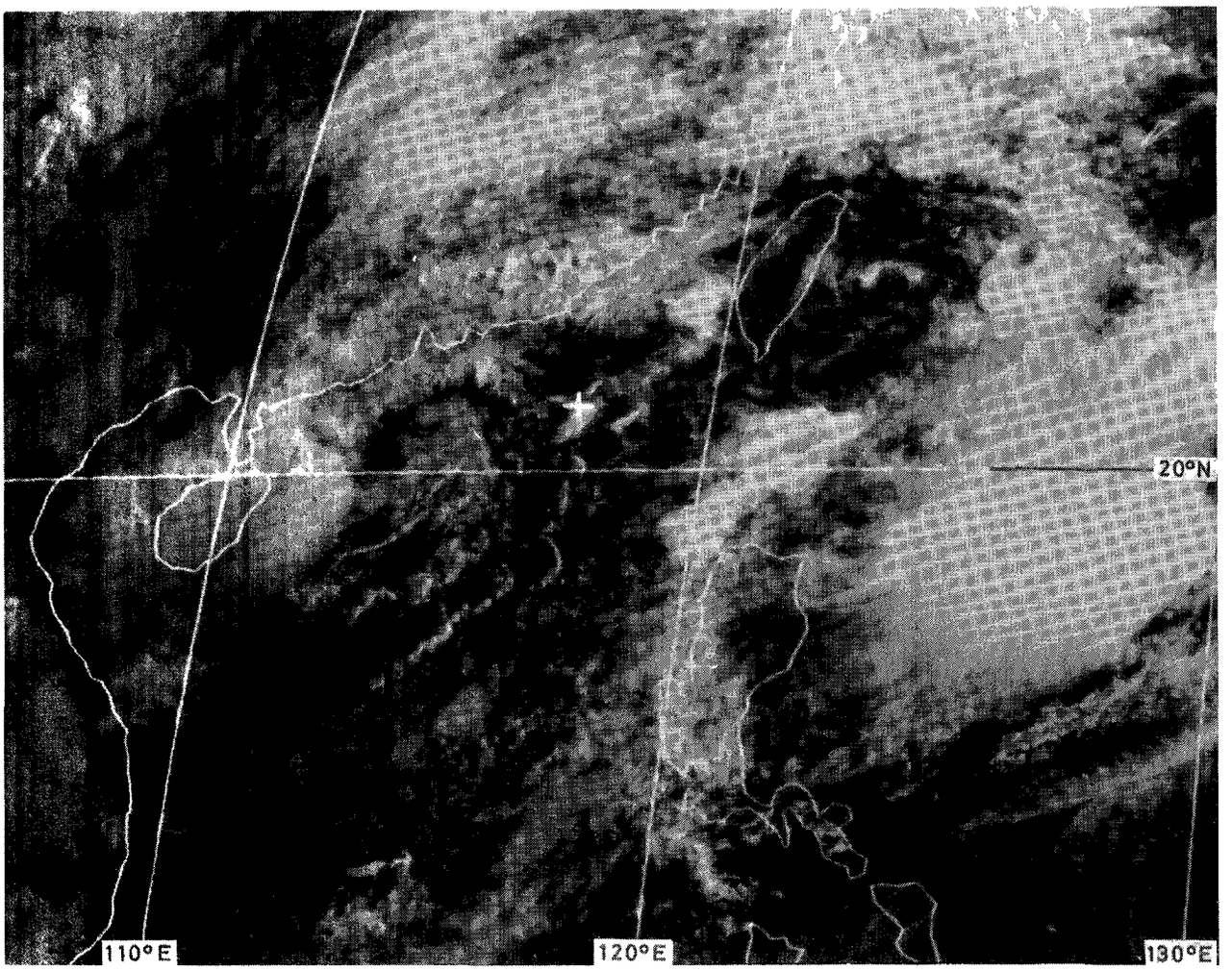


Figure 4. GMS-2 visible imagery of Tropical Storm Tess (8206) taken around 8.00 a.m. on 30 June 1982.

b. SEVERE TROPICAL STORM WINONA (8208)

12–18 July 1982

The track of this severe tropical storm is shown in Figure 5

Winona developed as a tropical depression about 750 nautical miles east-southeast of Manila on 12 July. It intensified into a tropical storm two days later and moved west-northwest at about 11 knots towards Luzon. Satellite pictures received around 11.00 a.m. on 14 July (Figure 6) revealed that the cloud mass was confined to the west and south of the centre. Early on 15 July, Winona intensified into a severe tropical storm. Winona crossed Luzon during the afternoon of 15 July. Two persons were killed, five injured and about 5 000 left homeless.

Winona accelerated rapidly on entering the South China Sea and on 16 July, it was moving at about 20 knots towards the west-northwest. Satellite pictures received on 16 July showed that the main cloud mass was displaced to the southwest of the centre, but the surface circulation was well-defined. At 2.39 p.m. on 16 July, a reconnaissance aircraft reported maximum surface winds of 55 knots and a minimum mean sea-level pressure of 985 millibars near the centre. At 8.00 p.m. the M.V. 'Ledamaersk' reported sustained winds of 42 knots about 75 nautical miles north of the centre. Winona slowed down during the evening of 16 July and weakened into a tropical depression near Hainan on 17 July. Widespread thunderstorms occurred over Hainan and Leizhou Peninsula as Winona moved towards Zhanjiang. Around 2.00 p.m. Winona crossed the China coast about 15 nautical miles south of Zhanjiang, where a mean sea-level pressure of 991.9 millibars was recorded. The tropical depression then crossed the Leizhou Peninsula and entered into the Gulf of Tonkin. At 8.00 p.m., it passed over a land station where sustained winds were only 22 knots. It finally dissipated overland about 110 nautical miles northeast of Hanoi on 18 July.

In Hong Kong, the Stand By Signal, No. 1, was hoisted at 5.00 a.m. on 16 July when Winona was centred about 380 nautical miles to the southeast. Winds were moderate east-northeasterly. They turned easterly and became strong off shore in the afternoon. The Strong Wind Signal, No. 3, was hoisted at 4.30 p.m. on 16 July. Easterly winds were generally strong during the night and maximum gusts of 50 knots were recorded at Tate's Cairn. Winds changed to southeasterly in the morning of 17 July and gradually moderated. All signals were lowered at 9.15 a.m. on 17 July when Winona was about to cross the Leizhou Peninsula. Winona was closest to Hong Kong around 9.00 p.m. on 16 July when it was centred about 170 nautical miles to the southwest. The minimum mean sea-level pressure of 999.8 millibars at the Royal Observatory was recorded earlier at 5.00 p.m. The maximum mean hourly wind speeds, the maximum gust peak speeds and the associated wind directions recorded at some selected locations during the display of tropical cyclone warning signals 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	17	ENE	34
Hong Kong Airport (SE)	E	22	E	42
Hong Kong Airport (NW)	ESE	18	E	40
Waglan Island	E	31	E	39
Tate's Cairn	E	31	E	50
Cheung Chau	E	27	E	45
King's Park	ESE	18	ESE	35
Star Ferry	E	22	E	40
Green Island	ENE	25	ENE	46
Tsim Bei Tsui	E	18	E	36
Tai O	ESE	26	ESE	47
Castle Peak	NNE	12	NNE	30
Chek Lap Kok	E	27	E	37
Lei Yue Mun	SE	29	SE	42
Yau Yat Chuen	ENE	18	ENE	34
Kowloon Tsai Hill	ENE	22	ENE	48

The weather was fine and sunny on 15 July. There were scattered showers on 16 and 17 July. It was sunny and hot on the following few days apart from a few isolated showers. The daily amounts of rainfall recorded were as follows:

	Royal Observatory	*Cheung Chau*	*Tate's Cairn*
16 July	13.8 mm	0.6 mm	5.0 mm
17 July	1.6 mm	Nil	1.9 mm
18 July	1.0 mm	0.2 mm	1.8 mm
19 July	13.4 mm	8.8 mm	5.3 mm
20 July	Nil	Nil	Nil
Total:	29.8 mm	9.6 mm	14.0 mm

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

Location	Highest tide above chart datum			Maximum storm surge above astronomical tide		
	Height	Date	Time	Height	Date	Time
	(m)			(m)		
North Point	2.2	17 July	5.45 a.m.	0.3	17 July	0.15 a.m.
Tai Po Kau	2.0	17 July	7.30 a.m.	0.4	17 July	8.30 a.m.
Chi Ma Wan* (Lantau Island)	—	—	—	—	—	—

* Data not available.

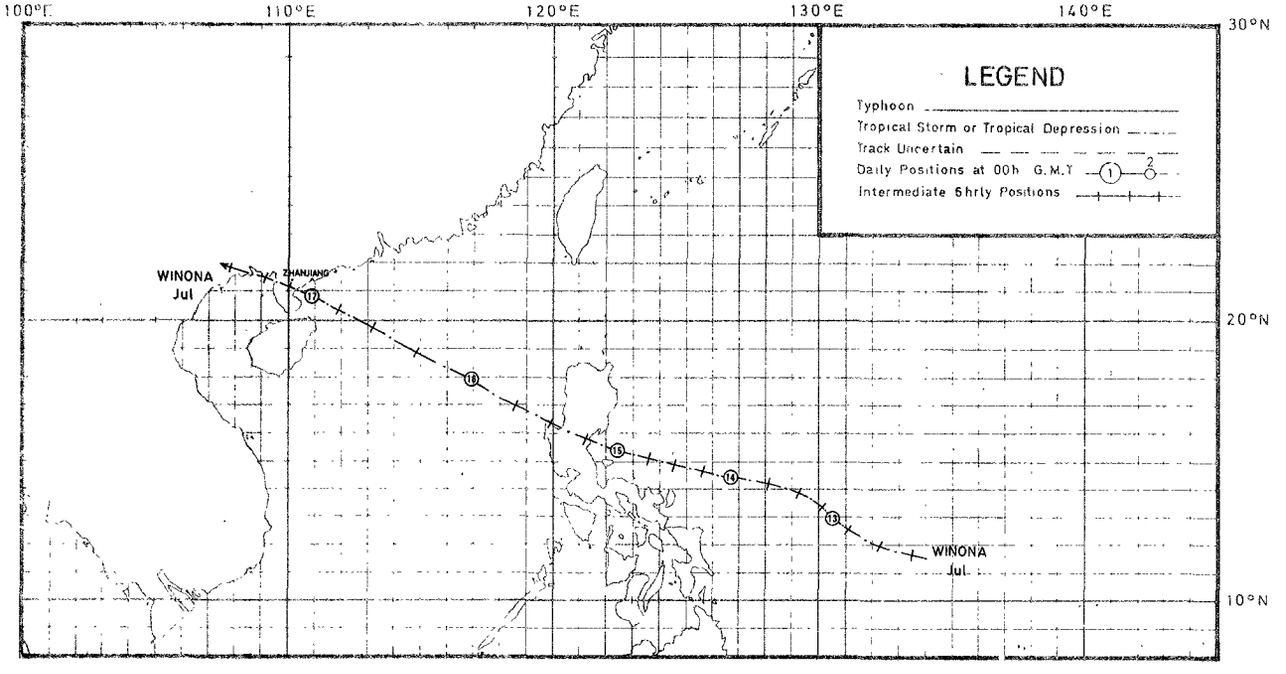


Figure 5. Track of Severe Tropical Storm Winona (8208): 12–18 July 1982.

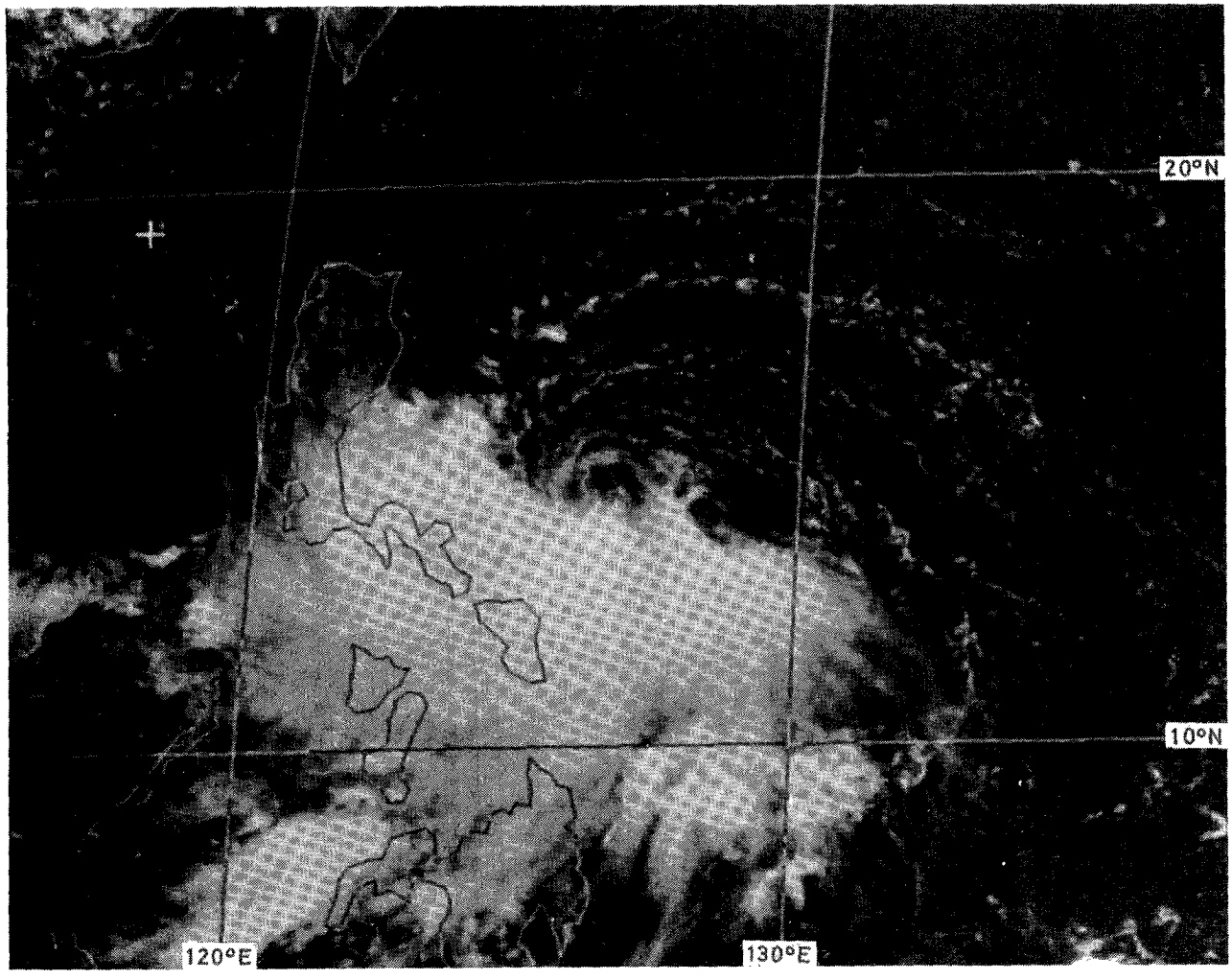


Figure 6. GMS-2 Visible imagery of Tropical Storm Winona (8208) taken around 11.00 a.m. on 14 July 1982.

c. TYPHOON ANDY (8209)

22–30 July 1982

The track of this typhoon is shown in Figure 7

Andy developed as a tropical storm over the western North Pacific about 130 nautical miles south of Guam on 22 July. It was slow-moving for the first 24 hours and intensified into a severe tropical storm in the evening of 23 July. It then started to move northwest at about 8 knots and further intensified into a typhoon during the night of 24 July.

For the next 24 hours, Typhoon Andy continued to move northwest and accelerated to about 12 knots. It changed to a westerly course starting at about 8.00 p.m. on 25 July. Late on 26 July, Andy took a west-northwest course and deepened rapidly as it moved steadily towards Taiwan. At 5.21 p.m. on 27 July, a reconnaissance aircraft reported a maximum surface wind of 110 knots and a minimum mean sea-level pressure of 915 millibars near the centre. Satellite pictures received at 8.00 p.m. on the same day (Figure 8) revealed that Andy was very well-organised and had a small eye. At about 1.10 p.m. on 28 July, a 5 393-ton Panamanian-registered freighter, the M.V. 'Eighth Star', was abandoned in the Balintang Channel when Typhoon Andy was about 150 nautical miles to her northeast. At 2.00 p.m., sustained winds of 56 knots were reported by an island station about 120 nautical miles west-northwest of the centre of Andy.

The typhoon's eye was still discernible on satellite pictures received at 2.00 a.m. on 29 July (Figure 9), about 4 hours before Andy landed in Taiwan. Typhoon Andy swept across southern Taiwan during the morning of 29 July and caused serious and widespread damage. 13 persons were reported killed, 2 missing and 25 others injured. About 300 houses were totally or partially destroyed and at least 60 fishing boats were seriously damaged. In Taibei, one quarter of the city area experienced power failure during typhoon passage. Andy weakened considerably after passing Taiwan, but the maximum sustained winds were still in excess of 70 knots.

In Hong Kong, the Stand By Signal, No. 1, was hoisted at 10.00 a.m. on 29 July when Andy was about 350 nautical miles to the east. In the afternoon, westerly winds freshened and the Strong Wind Signal, No. 3, was hoisted at 4.00 p.m. Andy was then in the Taiwan Strait about 315 nautical miles to the east-northeast of Hong Kong. A minimum mean sea-level pressure of 990.5 millibars was recorded at the Royal Observatory at about the same time. Andy landed in Fujian about 60 nautical miles northeast of Xiamen around midnight on 29 July and weakened rapidly. At 6.30 a.m. on 30 July, Andy had weakened into a tropical storm and all signals were lowered as local winds moderated. Andy was also closest to Hong Kong at that time and was located about 295 nautical miles to the northeast. It finally dissipated as an area of low pressure shortly after midday on 30 July. The maximum mean hourly wind speeds, the maximum gust peak speeds and the associated wind directions recorded at some selected locations during the display of tropical cyclone warning signals 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	WSW	14	NW	30
Hong Kong Airport (SE)	W	18	N	34
Hong Kong Airport (NW)	WNW	13	N	35
Waglan Island	WSW	25	NNW	45
Tate's Cairn	WSW	20	WNW	32
Cheung Chau	WNW	18	WNW	32
King's Park	W	10	NNW	27
Star Ferry	WNW	19	NW	30
Green Island	SW	24	NNW	45
Tsim Bei Tsui	NNW	19	NW	38
Tai O	not available		not available	
Castle Peak	NW	23	SSW	37
Chek Lap Kok	NW	19	WSW	26
Lei Yue Mun	NW	22	NW	36
Yau Yat Chuen	W	14	N	30
Kowloon Tsai Hill	W	16	N	32

In Hong Kong, the weather was fine and very hot on 27 and 28 July with maximum temperatures exceeding 33°C. On 29 July, the maximum temperature reached 34.8°C, which is the fourth highest for July. There were some evening thundery showers on 29 July but it was again fine and hot on the following day. The weather became unsettled with occasional thundery showers on 31 July. The daily amounts of rainfall recorded were as follows:

	Royal Observatory	*Cheung Chau*	*Tate's Cairn*
29 July	14.2 mm	9.4 mm	0.2 mm
30 July	Nil	Nil	Nil
31 July	30.5 mm	8.1 mm	52.8 mm
1 August	114.9 mm	61.4 mm	149.0 mm
2 August	5.4 mm	0.4 mm	3.3 mm
Total:	165.0 mm	79.3 mm	205.3 mm

There were only minor reports of damage in Hong Kong.

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

Location	Highest tide above chart datum			Maximum storm surge above astronomical tide		
	Height	Date	Time	Height	Date	Time
	(m)			(m)		
North Point	2.0	30 July	5.15 a.m.	0.3	29 July	8.15 p.m.
Tai Po Kau	2.0	30 July	6.30 a.m.	0.4	29 July	7.00 p.m.
Chi Ma Wan* (Lantau Island)	—	—	—	—	—	—

* Data not available.

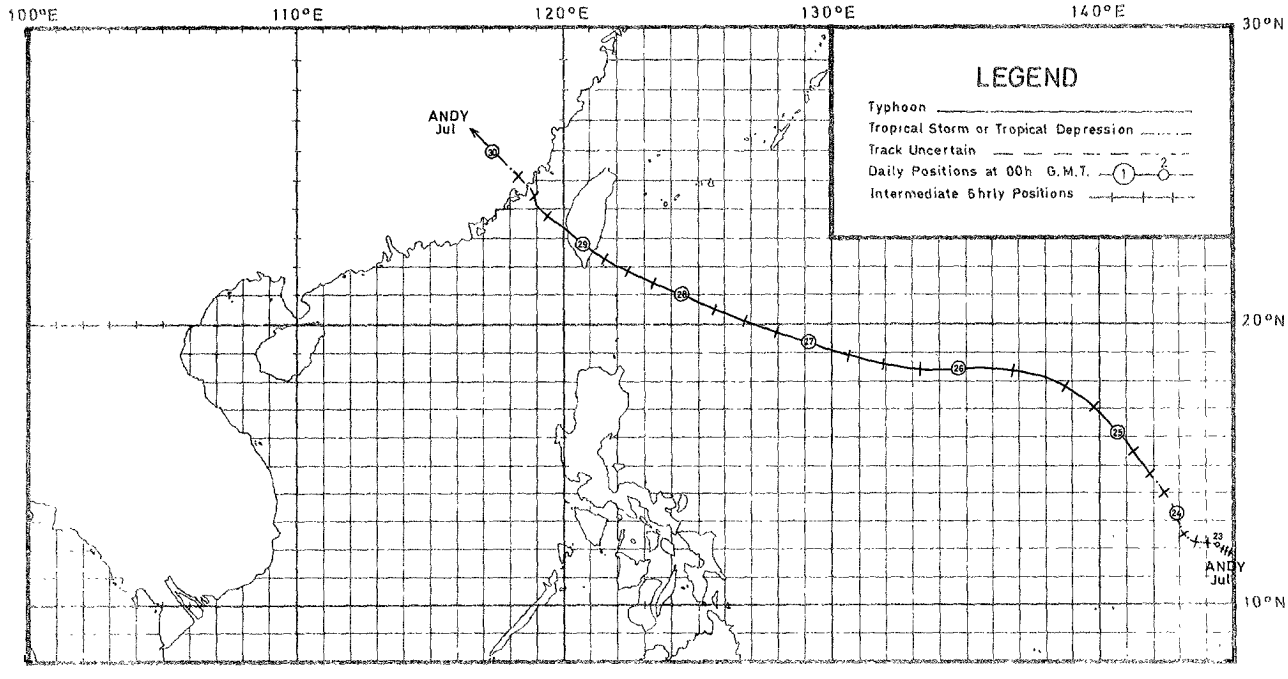


Figure 7. Track of Typhoon Andy (8209): 22–30 July 1982.

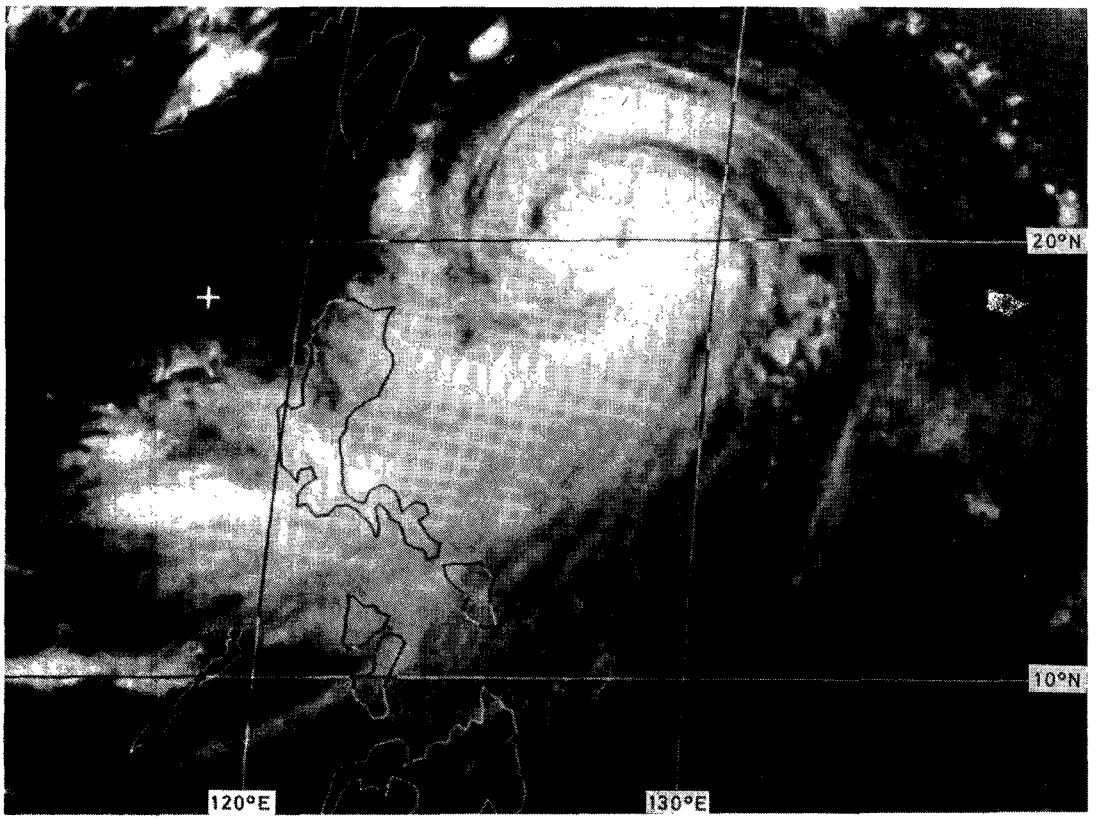


Figure 8. GMS-2 infra-red imagery of Typhoon Andy (8209) taken around 8.00 p.m. on 27 July 1982.

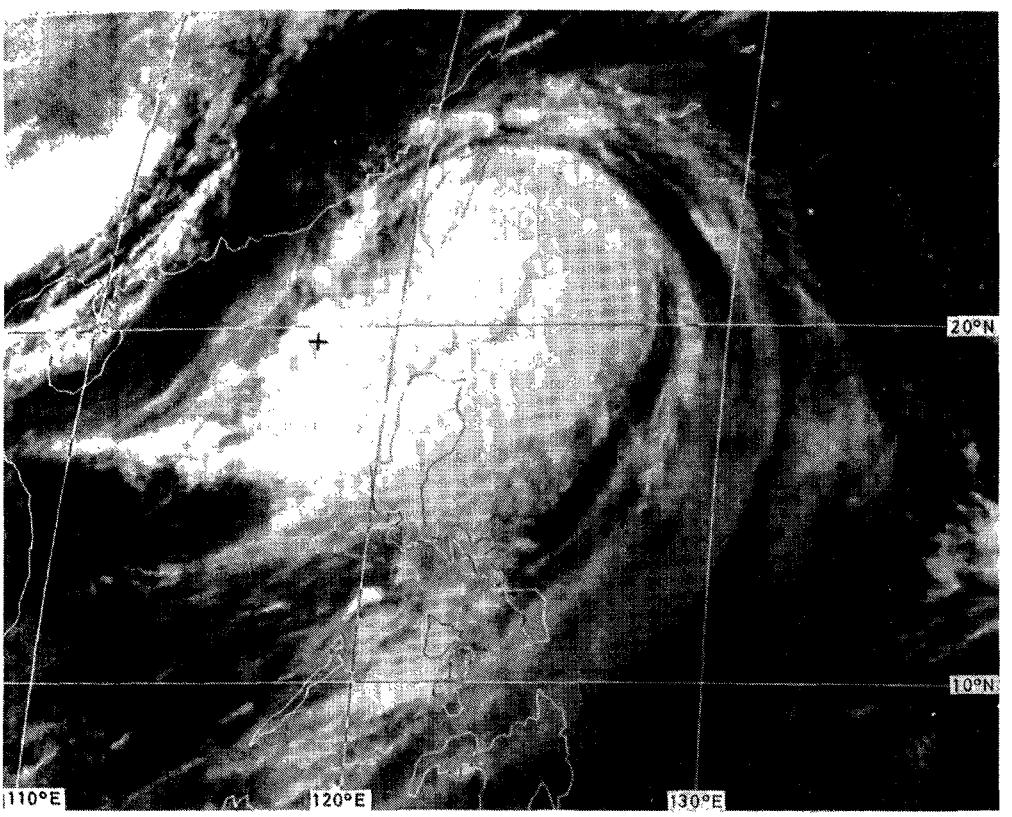


Figure 9. GMS-2 infra-red imagery of Typhoon Andy (8209) taken around 2.00 a.m. on 29 July 1982.

d. TYPHOON IRVING (8217)

5–16 September 1982

The track of this typhoon is shown in Figure 10

Typhoon Irving developed as a tropical depression over the western North Pacific about 650 nautical miles east of Manila on 5 September. Meteorological satellite pictures received at 2.00 p.m. and 5.00 p.m. on that day showed that the cloud system of Irving was poorly organised.

Irving moved west-northwestwards at about 9 knots for the first 18 hours and then changed to a west-southwest course for the following 24 hours. It intensified into a tropical storm in the afternoon of 6 September and into a severe tropical storm early on 7 September. Irving slowed down to 4 knots and moved westwards before hitting the central Philippines during the night of 8 September. An eye appeared on the meteorological satellite pictures received at 8.00 p.m. on 8 September, but it soon disappeared when Irving was moving across the Philippines. At 2.00 a.m. on 9 September, winds of 50 knots were reported by a land station in southern Luzon about 55 nautical miles north of the centre of Irving. Irving caused serious losses of life and property in the Philippines. According to press reports, 49 people were killed, 29 others were missing and 22 were injured. More than 20 000 houses were destroyed and about 200 000 people were made homeless.

Irving weakened into a tropical storm while crossing the Philippines but re-intensified into a severe tropical storm on entering the South China Sea on 10 September. It moved west-northwestwards at about 7 knots and further intensified into a typhoon on 11 September. On 12 September, Irving changed to a northwesterly course and slowed down to about 4 knots. Meteorological satellite pictures received at 2.00 p.m. (Figures 11 and 12) revealed that it had a well-defined eye. At about the same time, a reconnaissance aircraft reported a maximum sustained surface wind of 90 knots and a minimum mean sea-level pressure of 947 millibars near its centre. During the night of 14 September Irving accelerated to a speed of 8 knots and changed to a west-northwesterly course. It landed in Leizhou Peninsula early on 15 September, causing serious damage to crops there. According to Chinese press reports, about 90 per cent of the houses in a people's commune were destroyed. Farmlands in northeastern Hainan were also seriously damaged. Irving entered the Gulf of Tonkin in the afternoon of 15 September and continued to move west-northwest at about 8 knots. At 5.00 p.m. on 15 September, winds of 76 knots were reported from an island just west of the Leizhou Peninsula about 10 nautical miles from its centre. Around midnight on the same day, Irving crossed the coast of Guangxi and moved inland. It weakened rapidly and dissipated the next day.

In Hong Kong, the Stand By Signal, No. 1, was hoisted at 4.00 p.m. on 11 September when Irving was about 390 nautical miles to the south. Easterly winds freshened early on 12 September and the Strong Wind Signal, No. 3, was hoisted at 6.00 p.m. on the same day. Winds became generally strong off shore on 13 September but gradually moderated on 14 September. At 12.50 p.m. on 14 September the Strong Wind Signal, No. 3, was replaced by the Stand By Signal, No. 1. All signals were lowered at 7.10 a.m. on 15 September when Irving landed in Leizhou Peninsula. Irving was closest to Hong Kong at about 8.00 p.m. on 14 September when it was about 210 nautical miles to the southwest. A minimum mean sea-level pressure of 1 005.8 millibars was recorded at the Royal Observatory earlier at 3.00 p.m. and 4.00 p.m. on 13 September. The maximum mean hourly wind speeds, the maximum gust peak speeds and the associated wind directions recorded at some selected locations during the display of tropical cyclone warning signals 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	15	ENE	29
Hong Kong Airport (SE)	E	18	E	33
Hong Kong Airport (NW)	E	15	E	32
Waglan Island	E	31	E	39
Tate's Cairn	E	24	E	40
Cheung Chau	ESE	22	ESE	34
King's Park	ESE	14	E	31
Star Ferry	E	20	E	34
Green Island	ENE	25	ENE	38
Tsim Bei Tsui	E	16	E	24
Tai O	SE	19	SE	42
Castle Peak	ENE	14	ENE	27
Chek Lap Kok	E	24	E	33
Lei Yue Mun	E	29	E	53
Yau Yat Chuen	ESE	15	SE	33
Kowloon Tsai Hill	ESE	18	ESE	37

The weather in Hong Kong was cloudy with scattered showers on 11 and 12 September. Showers became frequent on 13, 14 and 15 September. There were some heavy thundery showers from late 16 September to early 17 September. The weather improved rapidly during the day on 17 September. The daily amounts of rainfall recorded were as follows:

	Royal Observatory	*Cheung Chau*	*Tate's Cairn*
13 September	21.4 mm	14.8 mm	not available
14 September	70.8 mm	3.3 mm	59.3 mm
15 September	26.5 mm	0.6 mm	40.1 mm
16 September	73.8 mm	33.5 mm	175.7 mm
17 September	7.0 mm	10.5 mm	2.0 mm
18 September	Nil	Nil	Nil
Total:	199.5 mm	62.7 mm	277.1 mm (for 5 days)

There were only minor reports of damage in Hong Kong.

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

Location	Highest tide above chart datum			Maximum storm surge above astronomical tide		
	Height	Date	Time	Height	Date	Time
	(m)			(m)		
North Point	2.5	15 Sept.	7.15 a.m.	0.4	12 Sept.	4.00 p.m.
Tai Po Kau	2.5	15 Sept.	8.30 a.m.	0.6	12 Sept.	6.00 p.m.
Chi Ma Wan* (Lantau Island)	—	—	—	—	—	—

* Data not available.

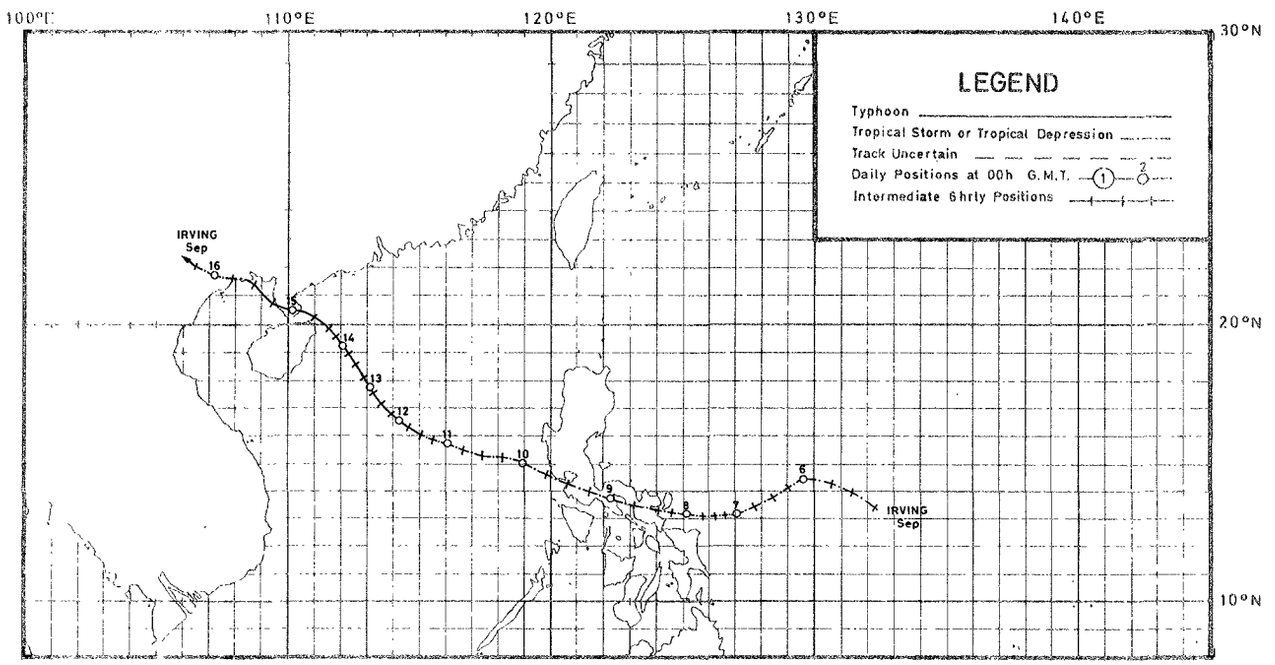


Figure 10. Track of Typhoon Irving (8217): 5–16 September 1982.

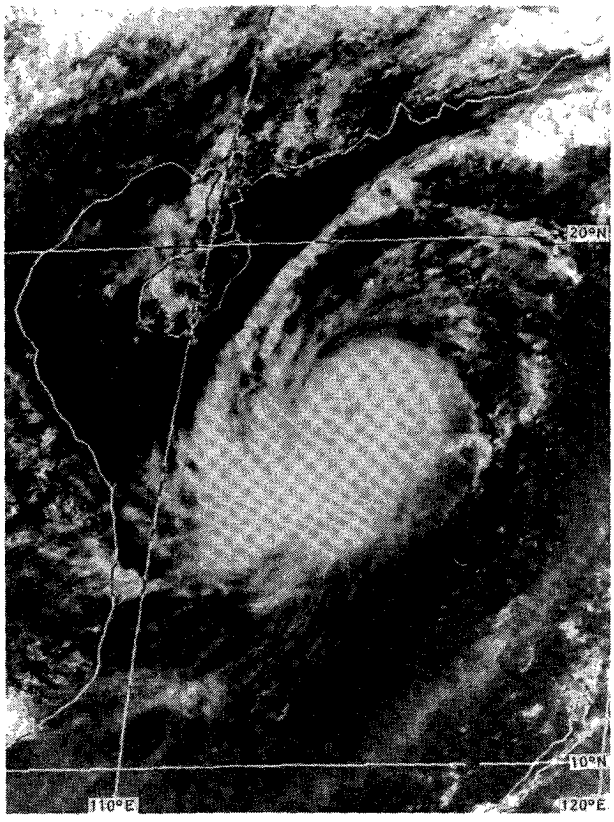


Figure 11. GMS-2 visible imagery of Typhoon Irving (8217) taken around 2.00 p.m. on 12 September 1982.

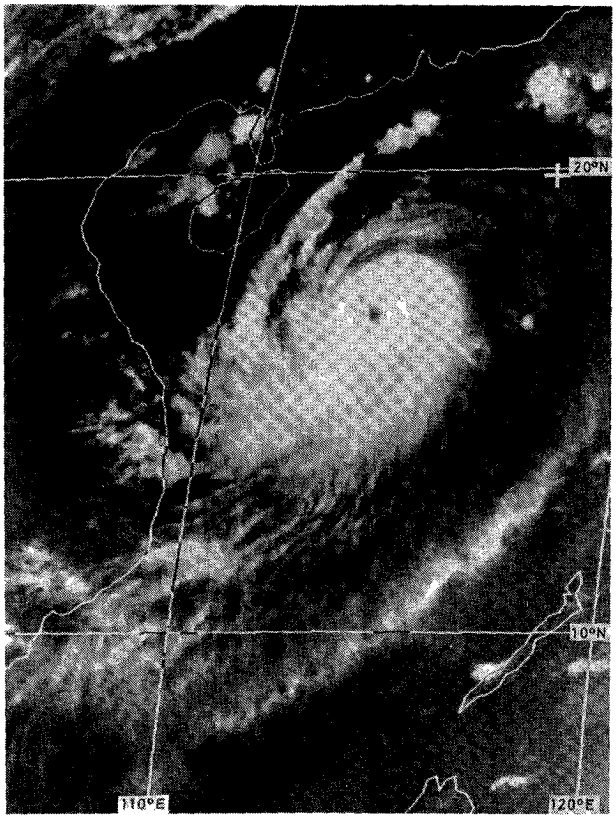


Figure 12. GMS-2 infra-red imagery of Typhoon Irving (8217) taken around 2.00 p.m. on 12 September 1982.

e. TYPHOON NANCY (8222)

11–19 October 1982

The track of this typhoon is shown in Figure 13

Typhoon Nancy developed as a tropical depression over the western North Pacific about 240 nautical miles northwest of Guam in the morning of 11 October. It intensified into a tropical storm in the afternoon of 11 October and into a severe tropical storm in the evening of 12 October. During this period, it moved westwards at about 13 knots.

Nancy attained typhoon strength in the morning of 13 October when it was about 570 nautical miles east-northeast of Manila and continued to move towards northern Luzon at about 13 knots in a generally westward direction. A well-defined eye was first observed on meteorological satellite pictures received at 2.00 a.m. on 14 October (Figure 14). Maximum sustained surface winds of 100 knots and a minimum mean sea-level pressure of 933 millibars were reported by a reconnaissance aircraft at 5.41 p.m. when Nancy was estimated to have acquired maximum intensity. It landed in northern Luzon during the night and winds of 52 knots were reported by a land station close to its centre at 11.00 p.m. Meteorological satellite pictures received at midnight revealed that Nancy had weakened significantly and its eye was no longer discernible. Nevertheless, widespread damage was inflicted as it crossed northern Luzon. According to press reports, 90 people were killed, 70 injured and 30 others reported missing; damage to crops and property was estimated at more than HK$300 million.

Typhoon Nancy entered the South China Sea in the morning of 15 October and moved steadily westwards at about 12 knots. An eye re-appeared on meteorological satellite pictures received in the morning of 16 October (Figure 15), indicating that Nancy had re-intensified. Winds of 60 knots were reported at Xisha at 5.00 p.m. when the centre of Nancy was about 30 nautical miles east of the island. At 8.00 p.m. winds of less than 10 knots were recorded when the eye of Nancy passed over Xisha. A mean sea-level pressure of 958.2 millibars was also reported at that time.

Nancy changed to a west-northwesterly course on 17 October and slowed down to about 9 knots on entering the Gulf of Tonkin. It reverted to a westerly course on 18 October and crossed the Vietnam coast about 120 nautical miles south of Hanoi around noon. Meteorological satellite pictures received at 2.00 p.m. revealed that an eye was still discernible. Nancy continued to move inland and dissipated early on 19 October. According to press reports, hurricane force winds were experienced in the northern part of central Vietnam for more than 12 hours and crops were seriously damaged. 71 people were killed, 290 others injured and more than 194 000 rendered homeless.

In Hong Kong, the Stand By Signal, No. 1, was hoisted at noon on 15 October when Nancy was about 395 nautical miles to the southeast. A minimum mean sea-level pressure of 1 009.4 millibars was recorded at the Royal Observatory at 5.00 p.m. Typhoon Nancy was closest to Hong Kong at 8.00 a.m. on 16 October when it was 330 nautical miles to the south. All signals were lowered at 9.00 p.m. on the same day when Nancy was about 340 nautical miles south-southwest of Hong Kong and was moving westwards towards the Vietnam coast. The maximum mean hourly wind speeds, the maximum gust peak speeds and the associated wind directions recorded at some selected locations during the period when tropical cyclone signals were displayed 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	11	ENE	21
Hong Kong Airport (SE)	E	16	E	28
Hong Kong Airport (NW)	NNE	12	E	30
Waglan Island	E	26	E	37
Tate's Cairn	NE	23	NE	37
Cheung Chau	E	15	E	27
King's Park	ESE	12	ESE	25
Star Ferry	E	17	E	28
Green Island	NE	23	NE	38
Tsim Bei Tsui	ENE	16	ENE	21
Tai O	NE	15	NE	30
Castle Peak	not available		not available	
Chek Lap Kok	E	16	E	26
Lei Yue Mun	E	15	E	27
Yau Yat Chuen	NNE	15	NNE	27
Kowloon Tsai Hill	ENE	14	ENE	25

The weather in Hong Kong was fine and hot on 15 October. Winds which were light to moderate northerly, veered to northeast and then to east on 16 October and became moderate to fresh. The weather was generally cloudy with some light showers from 16 to 18 October. A surge of the winter monsoon arrived during the night of 16 October and winds were strong off shore in the morning of 17 October but moderated during the night. The Strong Monsoon Signal was displayed between 4.00 a.m. and 11.00 p.m. on 17 October. The daily amounts of rainfall recorded during the display of tropical cyclone warning signals were as follows:

	Royal Observatory	*Cheung Chau*	*Tate's Cairn*
15 October	Nil	Nil	Nil
16 October	Trace	Trace	0.2 mm
Total:	Trace	Trace	0.2 mm

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

Location	Highest tide above chart datum			Maximum storm surge above astronomical tide		
	Height	Date	Time	Height	Date	Time
	(m)			(m)		
North Point	2.3	16 Oct.	9.45 a.m.	0.4	16 Oct.	10.30 p.m.
Tai Po Kau	2.4	16 Oct.	10.30 a.m.	0.7	16 Oct.	11.00 p.m.
Chi Ma Wan* (Lantau Island)	—	—	—	—	—	—

* Data not available.

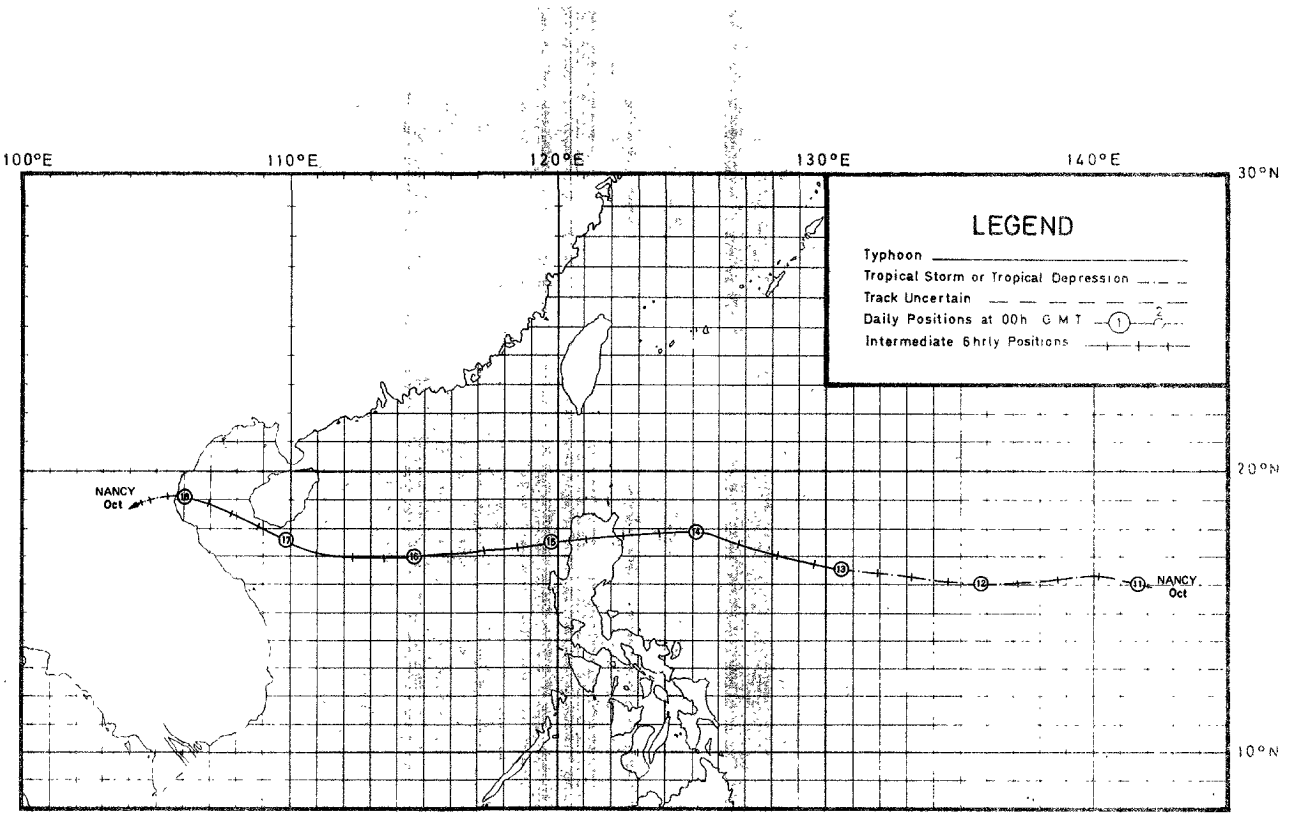


Figure 13. Track of Typhoon Nancy (8222): 11–19 October 1982.

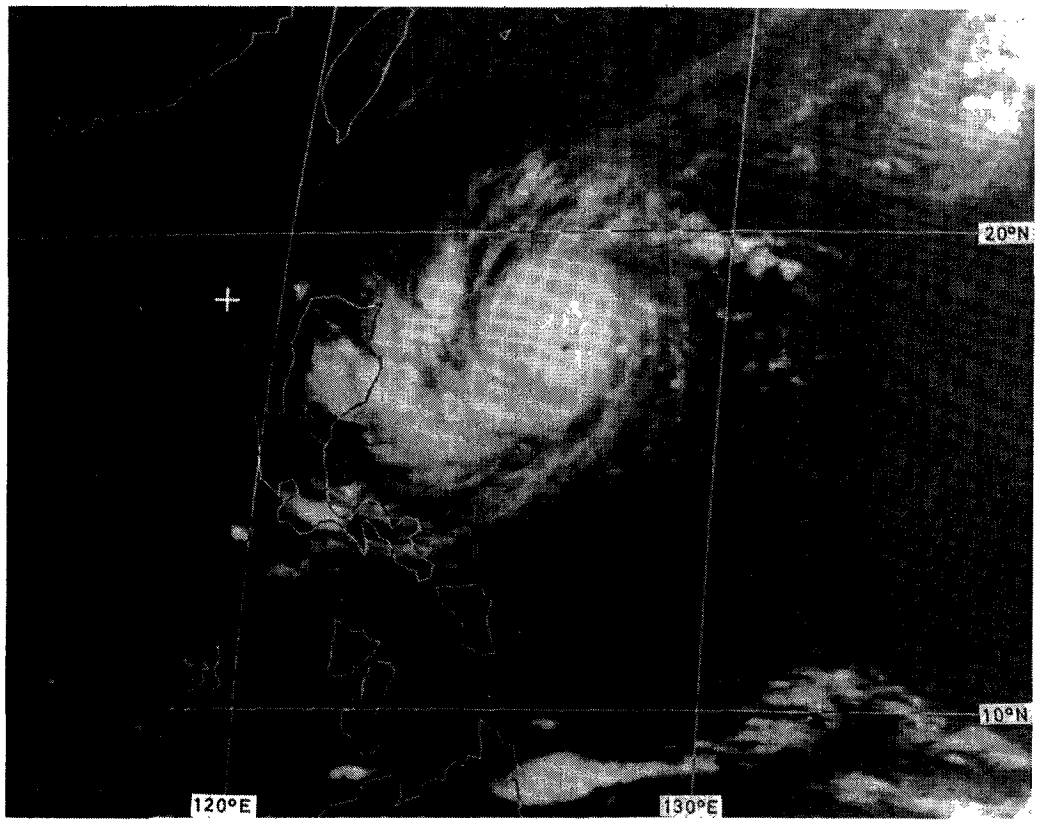


Figure 14. GMS-2 infra-red imagery of Typhoon Nancy (8222) taken around 2.00 a.m. on 14 October 1982.

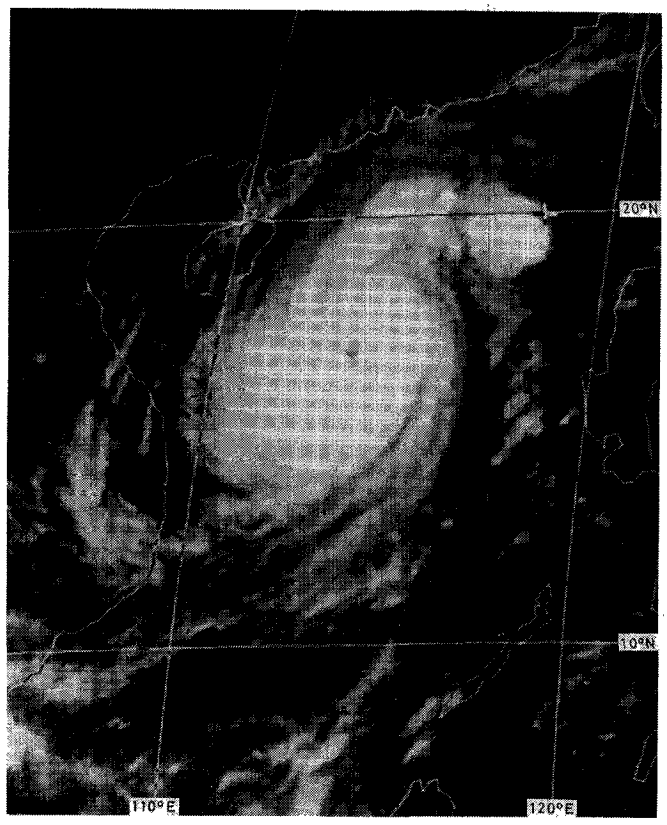


Figure 15. GMS-2 infra-red imagery of Typhoon Nancy (8222) taken around 11.00 a.m. on 16 October 1982.

4. DESCRIPTION OF TABLES

TABLE 1 is a list of tropical cyclones in 1982 in the western North Pacific and the South China Sea (i.e. in the area bounded by the Equator, 45°N, 100°E and 160°E). The names of these tropical cyclones are those used by the U.S. Naval Oceanography Command Center/Joint Typhoon Warning Center, 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 may not necessarily represent 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 1982, 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 1982. 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 1982. 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 1982. 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 1946–1982.

TABLE 7 presents the casualties and damage figures associated with tropical cyclones in Hong Kong for the period 1937–1982. The information is compiled from local newspaper reports and from the Marine Department records.

TABLE 8 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 1982. 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 9 presents 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.

The figures in Tables 4, 5, 6 and 7 have been revised this year based on the latest available information and may differ from the corresponding figures in previous issues.

Table 1 LIST OF TROPICAL CYCLONES IN THE WESTERN NORTH PACIFIC AND THE SOUTH CHINA SEA IN 1982

Name of tropical cyclone	Beginning of track				First day circle	Last day circle	End of track				Remark
	Date	Time G.M.T.	Position °N	Position °E	Date	Date	Date	Time G.M.T.	Position °N	Position °E	
Tropical Storm Mamie (8201)	15 Mar	1200	8.2	147.8	16	24	24 Mar	1800	11.4	108.2	dissipated
Typhoon Nelson (8202)	19 Mar	0000	5.4	155.5	19	1	1 Apr	0000	13.0	113.0	dissipated
Typhoon Odessa (8203)	29 Mar	0600	6.1	155.6	30	4	4 Apr	0000	12.9	156.0	dissipated
Typhoon Pat (8204)	17 May	0600	11.2	133.2	18	23	23 May	0000	27.9	143.2	became extratropical
Typhoon Ruby (8205)	21 Jun	0000	9.4	139.6	21	27	27 Jun	0600	38.3	144.9	became extratropical
Tropical Storm Tess (8206)*	27 Jun	1200	16.5	114.0	28	2	2 Jul	0000	22.2	117.3	dissipated
Tropical Storm Skip (8207)	29 Jun	0000	22.0	131.0	29	1	1 Jul	1800	33.0	156.1	became extratropical
Tropical Storm Val (8206)*	2 Jul	1200	23.0	123.6	3	4	4 Jul	0600	31.7	139.6	dissipated
Severe Tropical Storm Winona (8208)	12 Jul	0600	11.5	133.5	13	17	17 Jul	1800	21.8	108.0	dissipated
Typhoon Andy (8209)	22 Jul	0600	11.6	145.0	23	30	30 Jul	0000	26.0	117.7	dissipated
Typhoon Bess (8210)	23 Jul	0600	13.8	159.5	24	2	2 Aug	0600	39.8	136.1	dissipated
Typhoon Cecil (8211)	5 Aug	0600	20.4	126.5	6	14	14 Aug	1200	38.5	125.2	dissipated
Typhoon Dot (8212)	8 Aug	1200	9.5	151.0	9	15	15 Aug	1800	23.8	116.4	dissipated
Typhoon Ellis (8213)	18 Aug	0600	8.7	150.3	19	28	28 Aug	0000	42.3	130.7	became extratropical
Typhoon Faye (8214)	21 Aug	0600	12.1	120.0	22	3	3 Sep	1800	20.7	119.0	dissipated
Typhoon Gordon (8215)	27 Aug	0000	14.6	153.9	27	5	5 Sep	0600	37.1	149.4	became extratropical
Severe Tropical Storm Hope (8216)	4 Sep	0600	16.6	118.1	5	7	7 Sep	0000	15.6	106.3	dissipated
Typhoon Irving (8217)	5 Sep	0600	13.3	132.1	6	16	16 Sep	0600	22.0	106.7	dissipated
Typhoon Judy (8218)	5 Sep	1800	12.7	144.2	6	12	12 Sep	1800	39.1	140.6	became extratropical
Typhoon Ken (8219)	16 Sep	0000	17.6	132.7	16	25	25 Sep	0600	36.9	132.9	dissipated
Tropical Storm Lola (8220)	17 Sep	0000	27.0	159.6	17	17	17 Sep	1800	29.9	159.8	moved east of 160°E
Tropical Depression	20 Sep	1800	17.1	140.3	21	22	22 Sep	0000	21.1	136.9	dissipated
Typhoon Mac (8221)	1 Oct	1800	12.1	149.0	2	9	9 Oct	0000	34.8	144.4	became extratropical
Typhoon Nancy (8222)	11 Oct	0000	15.9	141.5	11	18	18 Oct	1800	18.8	104.6	dissipated
Tropical Depression	15 Oct	0600	17.9	137.9	16	19	19 Oct	0000	21.6	134.2	dissipated
Typhoon Owen (8223)	15 Oct	1200	13.4	154.8	16	23	23 Oct	0000	27.1	159.1	moved east of 160°E
Typhoon Pamela (8224)	28 Nov	0600	12.5	159.9	29	7	7 Dec	0600	12.8	124.5	dissipated
Severe Tropical Storm Roger (8225)	8 Dec	0000	12.1	125.9	8	11	11 Dec	0600	21.3	123.1	dissipated

* see paragraph 1 on page 27

TABLE 2. TROPICAL CYCLONE WARNINGS FOR SHIPPING ISSUED IN 1982

Tropical cyclone	No. of warnings issued	Date and time+ of issue of		Duration of warnings (hours)
		First warning	Last warning	
Tropical Storm Mamie	29	21 Mar 0600	24 Mar 1800	84
Typhoon Nelson	49	26 Mar 0000	1 Apr 0000	144
Typhoon Pat	12	19 May 0300	20 May 1200	33
Tropical Storm Tess*	38	27 Jun 1200	2 Jul 0300	111
Severe Tropical Storm Winona*	27	14 Jul 1200	17 Jul 1800	78
Typhoon Andy*	19	28 Jul 0000	30 Jul 0600	54
Typhoon Cecil	53	5 Aug 1500	12 Aug 0300	156
Typhoon Dot	18	13 Aug 2100	16 Aug 0000	51
Typhoon Faye	49	21 Aug 0600	27 Aug 0600	144
Typhoon Faye#	15	2 Sep 0600	4 Sep 0000	42
Severe Tropical Storm Hope	24	4 Sep 0900	7 Sep 0600	69
Typhoon Irving*	68	8 Sep 0000	16 Sep 0900	201
Typhoon Ken	23	19 Sep 0900	22 Sep 0300	66
Typhoon Nancy*	36	14 Oct 0000	18 Oct 0900	105
Typhoon Pamela	8	7 Dec 0600	8 Dec 0300	21
Severe Tropical Storm Roger	24	8 Dec 0300	11 Dec 0000	69
Total	492			1 428

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

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

\# Faye re-entered Hong Kong's area of responsibility

TABLE 3. TROPICAL CYCLONE WARNING SIGNALS HOISTED IN HONG KONG AND NUMBER OF WARNING BULLETINS ISSUED IN 1982

SUMMARY

Signal	No. of Occassions	Total duration
1	7	114 h 30 min
3	4	133 h 5 min
8 NORTHWEST	-	-
8 SOUTHWEST	-	-
8 NORTHEAST	-	-
8 SOUTHEAST	-	-
9	-	-
10	-	-
Total	11	247 h 35 min

DETAILS

Tropical cyclone	No. of warning bulletins issued	Signal	Hoisted		Lowered	
			Date	Time*	Date	Time*
Tropical Storm Tess	41	1	28 Jun	1200	28 Jun	1910
		3	28 Jun	1910	1 Jul	0610
		1	1 Jul	0610	1 Jul	1840
Severe Tropical Storm Winona	16	1	16 Jul	0500	16 Jul	1630
		3	16 Jul	1630	17 Jul	0915
Typhoon Andy	11	1	29 Jul	1000	29 Jul	1600
		3	29 Jul	1600	30 Jul	0630
Typhoon Irving	47	1	11 Sep	1600	12 Sep	1800
		3	12 Sep	1800	14 Sep	1250
		1	14 Sep	1250	15 Sep	0710
Typhoon Nancy	17	1	15 Oct	1200	16 Oct	2100

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

TABLE 4. FREQUENCY AND TOTAL DURATION OF DISPLAY OF TROPICAL CYCLONE WARNING SIGNALS : 1946-1982

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
Total Δ	182	169	14	18	51	37	19	11	538	9 587.3
Mean Δ	6.7	6.3	0.4	0.5	1.4	1.0	0.5	0.3	14.5	259.1

* 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 27

+ 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.

Δ The total and annual mean values for the duration of display of Stand By Signal No. 1 and the Strong Wind Signal No. 3 are calculated for the period 1956-1982. The corresponding values for higher signals and the total duration are calculated for the period 1946-1982.

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 - 1982

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
1 [illegible]	16	5
Total	619	232
Mean	16.7	6.3

TABLE 6. DURATION OF DISPLAY OF TROPICAL CYCLONE WARNING SIGNALS IN HONG KONG : 1946 - 1982

Signal	Duration of each occasion			Duration per year		
	Mean	Maximum	Minimum	Mean	Maximum	Minimum
1*	18 h 57 min	124 h 40 min	1 h 20 min	116 h 56 min	273 h 15 min	12 h 40 min
3*	20 54	71 45	1 00	130 49	267 45	23 55
8 NW+	6 39	13 00	1 30	2 31	13 00	0 0
8 SW+	5 20	11 10	2 30	2 36	16 10	0 0
8 NE+	10 58	35 35	2 15	15 08	61 45	0 0
8 SE+	7 52	21 45	0 20	7 52	31 15	0 0
8	8 40	35 35	0 20	28 07	82 25	0 0
9	3 39	6 30	0 25	1 52	11 00	0 0
10	5 52	9 10	2 30	1 45	12 10	0 0

* 1956 - 1982

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

TABLE 7. CASUALTIES AND DAMAGE CAUSED BY TROPICAL CYCLONES IN HONG KONG : 1937-1982

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	28	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
	29 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. Gary	0	0	2	0	0	0
1981	5 - 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

N.B. Information Compiled from Hong Kong newspapers and from Marine Department records

* Data unavailable

\+ Struck by lightning

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

TABLE 8. A SUMMARY OF METEOROLOGICAL OBSERVATIONS RECORDED IN HONG KONG DURING THE PASSAGES OF TROPICAL CYCLONES IN 1982

(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	Tsi Po Kau
					n miles	kn	mbar			mbar	m	m
T.S. Tess	Jun-Jul	1	0300	SE	50	NE 6	992	1	0500	996.1	-	0.9
S.T.S. Winona	Jul	16	2100	SW	170	WNW 13	985	16	1700	999.8	0.3	0.4
T. Andy	Jul	30	0630	NE	295	NW 11	985	29	1600	990.5	0.3	0.4
T. Irving	Sep	14	2000	SW	210	NW 5	965	13	1500 1600	1005.8	0.4	0.6
T. Nancy	Oct	16	0800	S	330	W 12	970	15	1700	1009.4	0.4	0.7

* 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.S. Tess	Jun-Jul	ENE 17	E 39	ENE 18	E 40	ENE 38	E 47	73.8	46.0	60.2	111.7	185.5
S.T.S. Winona	Jul	E 18	E 32	ENE 19	E 33	ENE 34	E 39	15.4	1.0	14.4	14.4	29.8
T. Andy	Jul	WSW 15	WSW 26	WSW 16	NNW 30	NW 30	NNW 45	2.6	TRACE	36.3	145.4	148.0
T. Irving	Sep	ENE 15	E 31	ENE 16	E 32	ENE 29	E 39	117.0	5.7	82.5	82.5	199.5
T. Nancy	Oct	E 12	E 26	ENE 13	E 31	ENE 21	E 37	outside 300 n miles				

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 9 . TYPHOONS WHICH REQUIRED THE HOISTING OF THE HURRICANE SIGNAL NO. 10 DURING THE PERIOD 1946–1982

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

5. TROPICAL CYCLONE POSITION AND INTENSITY DATA 1982

Six-hourly position and intensity data are tabulated for the following tropical cyclones in 1982 in the western North Pacific and the South China Sea.

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 MAMIE (8201)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (kn)	Lat. °N	Long. °E
March	15	1200	T.D.	1000	25	8.2	147.8
		1800	T.D.	998	30	7.9	147.5
	16	0000	T.S.	994	35	7.5	147.0
		0600	T.S.	990	40	7.2	145.8
		1200	T.S.	992	40	7.1	144.7
		1800	T.S.	993	40	7.2	143.5
	17	0000	T.S.	994	40	7.3	142.3
		0600	T.S.	994	40	7.5	141.2
		1200	T.S.	994	40	7.7	139.9
		1800	T.S.	994	40	7.8	138.3
	18	0000	T.S.	995	40	7.9	136.6
		0600	T.S.	1000	40	8.1	135.3
		1200	T.S.	996	40	8.2	133.8
		1800	T.S.	994	40	8.2	131.8
	19	0000	T.S.	990	45	8.1	129.9
		0600	T.S.	990	45	8.2	128.3
		1200	T.S.	995	45	8.3	126.7
		1800	T.S.	995	45	8.4	125.0
	20	0000	T.S.	995	45	8.5	123.1
		0600	T.S.	995	40	8.5	121.4
		1200	T.S.	998	35	8.7	120.3
		1800	T.S.	998	35	9.2	119.3
	21	0000	T.S.	998	35	9.5	118.5
		0600	T.S.	998	40	10.0	117.6
		1200	T.S.	998	40	10.4	116.8
		1800	T.S.	1000	35	10.7	116.0
	22	0000	T.S.	1000	35	10.8	115.4
		0600	T.D.	1002	30	11.1	114.6
		1200	T.D.	1002	30	11.2	114.0
		1800	T.D.	1002	25	11.3	113.5
	23	0000	T.D.	1002	25	11.4	112.9
		0600	T.D.	1002	25	11.8	112.3
		1200	T.D.	1003	25	12.3	111.8
		1800	T.D.	1003	25	12.5	111.2
	24	0000	T.D.	1003	25	12.6	110.7
		0600	T.D.	1003	25	12.6	110.0
		1200	T.D.	1004	25	12.5	109.4
		1800	T.D.	1006	25	11.4	108.2

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON NELSON (8202)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (kn)	Lat. °N	Long. °E
March	19	0000	T.D.	1000	25	5.4	155.5
		0600	T.S.	995	35	5.9	153.8
		1200	T.S.	994	40	6.4	152.2
		1800	T.S.	994	40	6.6	150.9
	20	0000	T.S.	994	40	6.7	149.6
		0600	T.S.	994	40	7.0	148.5
		1200	T.S.	998	35	7.2	147.5
		1800	T.S.	1000	35	7.5	146.5
	21	0000	T.S.	994	40	7.6	145.4
		0600	T.S.	994	40	7.7	144.4
		1200	T.S.	982	45	7.9	143.3
		1800	S.T.S.	975	55	8.1	141.7
	22	0000	S.T.S.	981	50	8.3	139.9
		0600	S.T.S.	986	50	8.6	138.2
		1200	S.T.S.	986	50	8.9	136.3
		1800	S.T.S.	988	50	9.1	134.7
	23	0000	S.T.S.	985	55	9.1	133.4
		0600	S.T.S.	984	55	9.1	132.5
		1200	S.T.S.	982	60	9.2	131.3
		1800	T.	980	65	9.4	130.4
	24	0000	T.	970	70	9.5	129.6
		0600	T.	955	80	9.7	128.8
		1200	T.	945	90	9.9	128.2
		1800	T.	940	90	10.1	127.6
	25	0000	T.	935	95	10.1	127.2
		0600	T.	935	95	10.3	126.8
		1200	T.	940	90	10.4	126.4
		1800	T.	940	90	10.2	125.5
	26	0000	T.	940	90	10.2	124.5
		0600	T.	945	85	10.4	123.6
		1200	T.	960	70	10.7	122.9
		1800	S.T.S.	970	60	11.0	122.2
	27	0000	S.T.S.	985	50	11.3	121.4
		0600	S.T.S.	985	50	11.5	120.6
		1200	S.T.S.	985	50	11.7	119.9
		1800	S.T.S.	990	50	12.0	119.3
	28	0000	T.S.	995	45	12.4	118.5
		0600	T.S.	995	45	12.7	117.5
		1200	T.S.	995	45	13.4	117.0
		1800	S.T.S.	990	55	14.0	116.7
	29	0000	S.T.S.	985	60	14.5	116.5
		0600	S.T.S.	990	55	14.6	115.8
		1200	T.S.	994	45	14.2	115.7
		1800	T.S.	996	40	14.0	115.4
	30	0000	T.S.	996	35	14.0	114.7
		0600	T.D.	998	30	13.9	114.2
		1200	T.D.	998	30	13.8	113.9
		1800	T.D.	998	30	13.6	113.6
	31	0000	T.D.	998	30	13.2	113.5
		0600	T.D.	998	30	13.1	113.4
		1200	T.D.	998	30	13.1	113.3
		1800	T.D.	1000	25	13.0	113.2
April	1	0000	T.D.	1000	25	13.0	113.0

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON ODESSA (8203)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (kn)	Lat. °N	Long. °E
March	29	0600	T.D.	994	30	6.1	155.6
		1200	T.D.	994	30	6.6	156.1
		1800	T.S.	994	35	7.2	156.7
	30	0000	T.S.	993	35	8.0	158.0
		0600	T.S.	989	40	8.4	158.9
		1200	T.S.	985	45	8.7	160.0
		1800	T.S.	987	45	8.8	161.3
	31	0000	T.S.	988	45	8.9	162.2
		0600	T.S.	990	45	9.0	163.2
		1200	S.T.S.	988	50	9.2	164.2
		1800	S.T.S.	986	50	9.7	164.7
April	1	0000	S.T.S.	986	55	10.2	163.6
		0600	S.T.S.	986	55	10.4	162.9
		1200	S.T.S.	986	60	10.6	162.4
		1800	S.T.S.	986	60	10.7	162.0
	2	0000	S.T.S.	983	60	11.0	161.5
		0600	T.	980	65	11.5	160.7
		1200	T.	970	70	12.1	160.3
		1800	T.	965	70	12.6	160.1
	3	0000	T.	975	65	13.3	159.7
		0600	S.T.S.	986	55	13.3	159.5
		1200	T.S.	995	40	13.3	158.8
		1800	T.D.	1001	30	13.2	157.5
	4	0000	T.D.	1006	25	12.9	156.0

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON PAT (8204)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (kn)	Lat. °N	Long. °E
May	17	0600	T.D.	1003	25	11.2	133.2
		1200	T.D.	1001	25	11.0	131.8
		1800	T.D.	1000	30	11.0	130.4
	18	0000	T.D.	998	30	11.1	128.7
		0600	T.S.	993	35	11.7	127.4
		1200	T.S.	988	35	12.6	126.5
		1800	T.S.	983	35	14.0	126.1
	19	0000	T.S.	980	40	15.0	125.2
		0600	S.T.S.	975	50	15.5	124.7
		1200	S.T.S.	965	60	16.4	124.3
		1800	T.	955	80	17.2	124.1
	20	0000	T.	950	90	17.7	124.0
		0600	T.	945	90	18.7	124.5
		1200	T.	945	90	19.5	125.2
		1800	T.	945	90	20.0	126.0
	21	0000	T.	950	85	20.6	126.9
		0600	T.	950	85	21.2	127.9
		1200	T.	955	80	22.0	129.7
		1800	T.	965	70	22.8	131.4
	22	0000	T.	970	65	23.7	133.4
		0600	S.T.S.	975	60	24.5	135.5
		1200	S.T.S.	980	50	25.4	137.6
		1800	T.S.	985	45	26.6	140.4
	23	0000	T.S.	990	35	27.9	143.2

Became extratropical

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON RUBY (8205)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (kn)	Lat. °N	Long. °E
June	21	0000	T.D.	1000	25	9.4	139.6
		0600	T.D.	1000	25	9.8	139.8
		1200	T.D.	1000	25	10.3	140.3
		1800	T.D.	999	30	10.8	141.2
	22	0000	T.D.	998	30	11.4	142.2
		0600	T.S.	997	35	12.5	142.9
		1200	T.S.	997	35	13.6	143.1
		1800	T.S.	996	40	14.7	143.3
	23	0000	T.S.	995	40	15.4	143.2
		0600	T.S.	994	45	15.9	143.1
		1200	T.S.	993	45	16.5	142.8
		1800	S.T.S.	990	50	17.0	142.5
	24	0000	S.T.S.	989	50	17.7	142.1
		0600	S.T.S.	989	55	18.4	141.5
		1200	S.T.S.	986	55	19.2	140.9
		1800	S.T.S.	984	55	20.2	140.4
	25	0000	S.T.S.	980	60	21.2	139.8
		0600	S.T.S.	980	60	22.4	139.4
		1200	S.T.S.	975	60	23.9	139.1
		1800	T.	975	65	25.5	139.3
	26	0000	T.	975	65	27.3	139.7
		0600	T.	975	65	29.7	140.4
		1200	S.T.S.	975	60	32.0	141.3
		1800	S.T.S.	980	55	34.5	142.3
	27	0000	S.T.S.	980	55	36.7	143.7
		0600	S.T.S.	980	55	38.3	144.9

Became extratropical

SIX-HOURLY POSITION AND INTENSITY DATA OF TROPICAL STORM TESS (8206)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (kn)	Lat. °N	Long. °E
June	27	1200	T.D.	992	30	16.5	114.0
		1800	T.D.	992	30	16.8	113.9
	28	0000	T.S.	992	35	17.1	113.7
		0600	T.S.	990	40	17.4	113.4
		1200	T.S.	990	40	17.8	113.1
		1800	T.S.	990	40	18.2	112.8
	29	0000	T.S.	990	40	18.6	112.5
		0600	T.S.	990	40	19.1	112.3
		1200	T.S.	990	40	19.7	112.2
		1800	T.S.	990	40	20.3	112.5
	30	0000	T.S.	992	35	20.7	113.0
		0600	T.S.	992	35	20.9	113.6
		1200	T.D.	992	30	21.3	114.2
		1800	T.D.	992	30	21.6	114.7
July	1	0000	T.D.	992	30	21.9	115.2
		0600	T.D.	994	30	22.1	115.7
		1200	T.D.	996	25	22.2	116.3
		1800	T.D.	1000	25	22.2	116.8
	2	0000	T.D.	1000	25	22.2	117.3

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF TROPICAL STORM SKIP (8207)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (kn)	Lat. °N	Long. °E
June	29	0000	T.D.	1002	25	22.0	131.0
		0600	T.D.	1000	25	22.3	132.0
		1200	T.D.	998	30	22.7	133.1
		1800	T.S.	995	35	23.4	134.8
	30	0000	T.S.	992	35	24.2	137.1
		0600	T.S.	990	40	25.1	139.2
		1200	T.S.	990	40	26.1	141.3
		1800	T.S.	992	35	27.2	143.6
July	1	0000	T.S.	996	35	28.3	146.0
		0600	T.S.	996	35	29.7	149.0
		1200	T.S.	996	35	31.4	152.5
		1800	T.S.	996	35	33.0	156.1

Became extratropical

SIX-HOURLY POSITION AND INTENSITY DATA OF TROPICAL STORM VAL (8206)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (kn)	Lat. °N	Long. °E
July	2	1200	T.D.	996	25	23.0	123.6
		1800	T.S.	990	35	24.0	126.1
	3	0000	T.S.	985	40	24.8	127.8
		0600	T.S.	985	40	25.8	129.7
		1200	T.S.	985	40	27.3	131.6
		1800	T.S.	990	35	29.0	134.2
	4	0000	T.D.	998	25	30.7	136.9
		0600	T.D.	1000	25	31.7	139.6

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF SEVERE TROPICAL STORM WINONA (8208)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (kn)	Lat. °N	Long. °E
July	12	0600	T.D.	1007	25	11.5	133.5
		1200	T.D.	1005	25	11.7	132.4
		1800	T.D.	1003	25	12.2	131.3
	13	0000	T.D.	1001	25	12.7	130.7
		0600	T.D.	1000	30	13.2	130.2
		1200	T.D.	998	30	13.7	129.3
		1800	T.S.	995	35	13.9	128.1
	14	0000	T.S.	990	40	14.2	126.8
		0600	T.S.	988	40	14.4	125.6
		1200	T.S.	985	45	14.6	124.6
		1800	T.S.	983	45	14.8	123.6
	15	0000	S.T.S.	980	50	15.1	122.5
		0600	S.T.S.	975	60	15.6	121.3
		1200	S.T.S.	980	55	16.2	120.0
		1800	S.T.S.	980	50	16.8	118.7
	16	0000	S.T.S.	980	50	17.8	117.0
		0600	S.T.S.	985	50	18.7	115.1
		1200	S.T.S.	985	50	19.7	113.3
		1800	T.S.	990	45	20.2	112.0
	17	0000	T.D.	992	30	20.6	111.1
		0600	T.D.	992	30	21.0	110.2
		1200	T.D.	992	30	21.4	109.2
		1800	T.D.	998	25	21.8	108.0

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON ANDY (8209)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (kn)	Lat. °N	Long. °E
July	22	0600	T.S.	995	40	11.6	145.0
		1200	T.S.	995	40	11.7	144.8
		1800	T.S.	990	45	11.8	144.6
	23	0000	T.S.	990	45	11.9	144.4
		0600	T.S.	990	45	12.0	144.1
		1200	S.T.S.	986	50	12.0	143.6
		1800	S.T.S.	986	50	12.4	143.3
	24	0000	S.T.S.	982	60	13.1	142.9
		0600	S.T.S.	982	60	13.8	142.5
		1200	T.	980	65	14.5	142.0
		1800	T.	978	65	15.4	141.4
	25	0000	T.	975	70	16.0	140.7
		0600	T.	975	70	16.9	139.9
		1200	T.	972	75	17.8	138.8
		1800	T.	972	75	18.3	136.9
	26	0000	T.	970	80	18.4	134.8
		0600	T.	965	85	18.4	133.4
		1200	T.	949	90	18.5	132.0
		1800	T.	948	95	18.9	130.7
	27	0000	T.	944	95	19.3	129.3
		0600	T.	930	100	19.7	128.1
		1200	T.	920	105	20.1	126.9
		1800	T.	925	105	20.5	125.8
	28	0000	T.	930	100	21.0	124.5
		0600	T.	930	100	21.4	123.5
		1200	T.	930	100	21.8	122.6
		1800	T.	930	100	22.4	121.8
	29	0000	T.	950	85	22.8	120.9
		0600	T.	960	80	23.8	119.6
		1200	T.	970	70	24.4	119.2
		1800	S.T.S.	980	50	25.2	118.6
	30	0000	T.S.	986	35	26.0	117.7

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON BESS (8210)

Month	Day	Time G.M.T	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (kn)	Lat. °N	Long. °E
July	23	0600	T.D.	999	30	13.8	159.5
		1200	T.D.	995	30	14.6	158.5
		1800	T.S.	990	35	15.2	157.7
	24	0000	T.S.	985	45	15.7	156.9
		0600	S.T.S.	985	50	16.1	156.1
		1200	S.T.S.	980	55	16.5	155.4
		1800	S.T.S.	970	60	16.7	154.6
	25	0000	T.	970	65	17.0	153.9
		0600	T.	965	70	17.0	153.2
		1200	T.	960	75	16.8	152.7
		1800	T.	960	75	16.5	152.2
	26	0000	T.	955	80	16.0	152.0
		0600	T.	950	85	15.8	151.8
		1200	T.	948	90	15.7	151.5
		1800	T.	948	90	15.6	151.3
	27	0000	T.	948	90	15.5	151.0
		0600	T.	948	90	15.4	150.6
		1200	T.	948	90	15.6	150.3
		1800	T.	948	90	16.4	150.0
	28	0000	T.	948	90	17.2	149.5
		0600	T.	948	90	18.1	148.3
		1200	T.	940	100	18.9	146.9
		1800	T.	925	110	19.7	145.7
	29	0000	T.	900	125	20.4	144.5
		0600	T.	900	125	21.4	143.4
		1200	T.	905	125	22.0	142.3
		1800	T.	910	120	22.7	141.3
	30	0000	T.	915	120	23.3	140.2
		0600	T.	920	115	23.8	139.4
		1200	T.	934	105	24.5	138.8
		1800	T.	936	100	25.0	138.3
	31	0000	T.	940	100	25.6	137.8
		0600	T.	945	95	26.2	137.5
		1200	T.	950	90	26.9	137.3
		1800	T.	955	80	27.8	137.1
August	1	0000	T.	960	75	29.3	136.8
		0600	T.	965	70	30.9	136.7
		1200	S.T.S.	970	60	33.2	136.9
		1800	S.T.S.	974	50	36.1	137.2
	2	0000	T.S.	985	40	38.5	136.6
		0600	T.D.	990	30	39.8	136.1

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON CECIL (8211)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (kn)	Lat. °N	Long. °E
August	5	0600	T.D.	999	25	20.4	126.5
		1200	T.D.	999	25	20.6	125.6
		1800	T.D.	999	25	20.6	124.7
	6	0000	T.D.	994	30	20.4	124.2
		0600	T.S.	986	35	20.1	124.5
		1200	T.S.	985	40	20.4	124.6
		1800	S.T.S.	980	50	20.7	124.2
	7	0000	S.T.S.	974	55	20.8	123.8
		0600	T.	965	70	21.0	123.5
		1200	T.	945	90	21.1	123.4
		1800	T.	940	90	21.3	123.3
	8	0000	T.	924	100	21.4	123.3
		0600	T.	924	100	21.9	123.3
		1200	T.	920	110	22.3	123.3
		1800	T.	920	110	22.9	123.7
	9	0000	T.	920	110	23.9	123.8
		0600	T.	925	100	24.6	123.7
		1200	T.	935	95	25.4	123.6
		1800	T.	935	95	25.8	123.2
	10	0000	T.	940	90	26.4	122.9
		0600	T.	945	85	26.7	123.2
		1200	T.	950	80	27.1	123.4
		1800	T.	955	75	27.5	123.5
	11	0000	T.	960	70	27.8	123.6
		0600	T.	965	65	28.1	123.7
		1200	T.	970	65	28.5	123.8
		1800	S.T.S.	975	60	29.0	123.9
	12	0000	S.T.S.	975	60	29.6	123.9
		0600	S.T.S.	980	55	30.2	124.0
		1200	S.T.S.	980	55	31.0	124.2
		1800	S.T.S.	985	50	32.2	124.1
	13	0000	S.T.S.	985	50	33.3	123.8
		0600	T.S.	990	45	34.6	123.4
		1200	T.S.	990	45	35.5	123.1
		1800	T.S.	990	40	36.3	123.0
	14	0000	T.S.	990	40	36.9	123.2
		0600	T.S.	995	35	37.7	123.9
		1200	T.D.	999	25	38.5	125.2

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON DOT (8212)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (kn)	Lat. °N	Long. °E
August	8	1200	T.D.	1003	25	9.5	151.0
		1800	T.D.	1003	25	10.1	150.0
	9	0000	T.D.	1000	30	10.7	148.9
		0600	T.D.	1000	30	11.0	146.8
		1200	T.S.	998	35	11.0	144.6
		1800	T.S.	998	35	11.3	142.6
	10	0000	T.S.	998	40	12.1	140.9
		0600	S.T.S.	990	50	12.5	139.5
		1200	S.T.S.	986	55	12.5	137.9
		1800	S.T.S.	984	55	12.8	136.5
	11	0000	S.T.S.	978	60	13.4	135.3
		0600	T.	970	75	13.8	134.3
		1200	T.	970	75	14.3	133.3
		1800	S.T.S.	980	60	15.0	132.3
	12	0000	S.T.S.	986	55	15.7	131.5
		0600	S.T.S.	986	55	16.7	130.7
		1200	S.T.S.	990	50	17.8	130.0
		1800	S.T.S.	990	50	18.4	128.8
	13	0000	S.T.S.	990	50	19.0	127.5
		0600	S.T.S.	988	55	19.9	126.7
		1200	S.T.S.	986	55	20.6	125.7
		1800	S.T.S.	986	55	21.0	124.9
	14	0000	S.T.S.	986	55	21.4	124.1
		0600	S.T.S.	980	60	21.5	123.2
		1200	S.T.S.	980	60	21.7	122.5
		1800	S.T.S.	982	55	22.4	121.3
	15	0000	T.S.	990	45	22.8	119.9
		0600	T.S.	995	40	23.3	118.8
		1200	T.D.	997	30	23.7	117.8
		1800	T.D.	999	30	23.8	116.4

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON ELLIS (8213)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (kn)	Lat. °N	Long. °E
August	18	0600	T.D.	1003	25	8.7	150.3
		1200	T.D.	1003	25	9.3	149.1
		1800	T.D.	1003	30	9.8	147.7
	19	0000	T.D.	1002	30	9.9	146.0
		0600	T.D.	1000	30	10.0	145.0
		1200	T.S.	996	35	10.3	144.1
		1800	T.S.	990	40	10.9	142.8
	20	0000	T.S.	985	45	11.6	142.0
		0600	S.T.S.	982	50	12.0	141.2
		1200	S.T.S.	980	55	12.6	140.4
		1800	S.T.S.	975	60	13.2	139.6
	21	0000	T.	970	65	13.7	139.0
		0600	T.	968	65	14.3	138.3
		1200	T.	960	75	15.1	137.6
		1800	T.	955	80	15.7	137.1
	22	0000	T.	945	90	16.2	136.7
		0600	T.	935	100	16.8	136.2
		1200	T.	925	110	17.5	135.8
		1800	T.	915	120	18.3	135.4
	23	0000	T.	915	120	19.2	135.0
		0600	T.	920	115	20.3	134.5
		1200	T.	920	115	21.2	134.0
		1800	T.	925	110	22.2	133.4
	24	0000	T.	930	105	23.0	132.9
		0600	T.	935	100	23.7	132.4
		1200	T.	940	95	24.5	132.0
		1800	T.	945	90	25.4	131.5
	25	0000	T.	945	90	26.2	131.0
		0600	T.	945	85	26.8	130.7
		1200	T.	950	80	27.4	130.5
		1800	T.	950	80	28.0	130.4
	26	0000	T.	950	80	28.9	130.5
		0600	T.	955	75	29.8	130.8
		1200	T.	955	75	30.7	131.2
		1800	T.	955	70	32.0	131.3
	27	0000	S.T.S.	965	60	33.6	131.6
		0600	S.T.S.	970	55	35.8	131.8
		1200	S.T.S.	970	50	38.4	131.6
		1800	T.S.	975	45	40.3	131.3
	28	0000	T.S.	980	35	42.3	130.7

Became extratropical

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON FAYE (8214)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (kn)	Lat. °N	Long. °E
August	21	0600	T.D.	1002	25	12.1	120.0
		1200	T.D.	1002	25	12.1	119.8
		1800	T.D.	1000	30	12.2	119.6
	22	0000	T.D.	998	30	12.2	119.4
		0600	T.S.	995	40	12.3	119.3
		1200	S.T.S.	984	55	12.4	119.2
		1800	S.T.S.	975	60	12.5	119.1
	23	0000	T.	970	65	12.5	118.9
		0600	T.	965	70	12.6	118.8
		1200	T.	963	75	12.8	118.6
		1800	T.	960	80	12.9	118.9
	24	0000	T.	960	80	13.1	119.3
		0600	T.	960	80	13.9	119.7
		1200	T.	960	80	14.7	119.7
		1800	T.	970	70	15.9	119.7
	25	0000	S.T.S.	980	60	17.1	120.1
		0600	S.T.S.	985	50	18.2	120.0
		1200	S.T.S.	985	50	19.0	120.0
		1800	S.T.S.	985	50	19.5	120.3
	26	0000	S.T.S.	987	50	19.8	120.6
		0600	T.S.	990	45	20.5	121.2
		1200	T.S.	997	40	21.1	121.9
		1800	T.S.	998	35	21.6	122.7
	27	0000	T.D.	998	35	22.1	123.9
		0600	T.D.	1000	30	22.6	125.0
		1200	T.D.	1001	25	23.0	126.3
		1800	T.D.	1001	25	23.4	127.8
	28	0000	T.D.	1000	30	23.7	129.4
		0600	T.S.	995	40	24.0	130.7
		1200	T.	975	65	24.2	131.5
		1800	T.	975	65	24.2	131.9
	29	0000	S.T.S.	980	60	24.2	132.1
		0600	S.T.S.	980	60	24.1	132.1
		1200	S.T.S.	980	60	24.0	132.1
		1800	S.T.S.	985	50	23.9	132.1
	30	0000	T.S.	990	45	23.6	132.0
		0600	T.S.	995	40	23.3	131.9
		1200	T.S.	997	40	23.1	132.0
		1800	T.S.	997	40	22.9	132.0
	31	0000	T.S.	997	40	22.8	131.9
		0600	T.D.	999	35	23.0	131.6
		1200	T.D.	999	30	23.0	131.2
		1800	T.D.	999	30	23.0	130.5
September	1	0000	T.D.	1000	25	23.0	129.6
		0600	T.D.	1000	25	22.9	128.7
		1200	T.D.	1000	25	22.9	127.9
		1800	T.D.	1000	25	22.9	126.9
	2	0000	T.D.	1000	25	22.9	125.8
		0600	T.D.	1000	25	22.9	124.5
		1200	T.D.	1000	25	22.4	123.4
		1800	T.D.	1000	30	21.9	122.7
	3	0000	T.D.	1000	30	21.5	122.0
		0600	T.D.	1000	25	21.0	121.2
		1200	T.D.	1001	25	20.7	120.1
		1800	T.D.	1002	25	20.7	119.0

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON GORDON (8215)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (kn)	Lat. °N	Long. °E
August	27	0000	T.D.	1000	30	14.6	153.9
		0600	T.S.	995	35	15.6	152.6
		1200	T.S.	990	40	16.6	151.6
		1800	T.S.	985	45	17.2	151.1
	28	0000	S.T.S.	975	55	17.8	150.7
		0600	S.T.S.	972	60	18.7	150.5
		1200	T.	965	65	19.8	150.5
		1800	T.	960	70	21.0	150.5
	29	0000	T.	950	80	22.2.	150.3
		0600	T.	946	90	23.2	150.0
		1200	T.	945	90	24.1	149.5
		1800	T.	945	90	24.8	149.0
	30	0000	T.	945	90	25.2	148.5
		0600	T.	945	90	25.8	148.1
		1200	T.	945	90	26.1	147.7
		1800	T.	945	90	26.5	147.3
	31	0000	T.	947	85	26.8	146.8
		0600	T.	947	85	26.9	146.2
		1200	T.	947	85	27.0	145.7
		1800	T.	947	85	27.0	145.1
September	1	0000	T.	950	85	27.0	144.4
		0600	T.	950	85	27.1	143.8
		1200	T.	950	85	27.2	143.1
		1800	T.	955	80	27.3	142.3
	2	0000	T.	960	75	27.5	141.6
		0600	T.	960	70	27.6	141.0
		1200	T.	965	70	27.9	140.4
		1800	T.	965	70	28.2	139.8
	3	0000	T.	965	70	28.7	139.4
		0600	T.	965	70	29.1	139.5
		1200	T.	965	70	29.5	139.6
		1800	T.	965	70	30.2	140.3
	4	0000	T.	965	70	31.0	141.3
		0600	T.	965	70	31.9	142.8
		1200	T.	965	70	32.9	144.5
		1800	T.	970	65	34.2	146.2
	5	0000	S.T.S.	975	60	35.5	147.9
		0600	S.T.S.	975	60	37.1	149.4

Became extratropical

SIX-HOURLY POSITION AND INTENSITY DATA OF SEVERE TROPICAL STORM HOPE (8216)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (kn)	Lat. °N	Long. °E
September	4	0600	T.D.	993	30	16.6	118.1
		1200	T.D.	993	30	16.6	117.4
		1800	T.D.	993	30	16.6	116.6
	5	0000	T.S.	992	40	16.6	115.7
		0600	T.S.	990	45	16.5	114.7
		1200	S.T.S.	988	50	16.5	113.5
		1800	S.T.S.	986	50	16.5	112.2
	6	0000	S.T.S.	986	50	16.4	110.8
		0600	S.T.S.	984	55	16.2	110.0
		1200	S.T.S.	984	55	15.8	109.3
		1800	T.S.	990	45	15.6	108.0
	7	0000	T.S.	995	35	15.6	106.3

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON IRVING (8217)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (kn)	Lat. °N	Long. °E
September	5	0600	T.D.	999	30	13.3	132.1
		1200	T.D.	999	30	13.7	131.3
		1800	T.D.	999	30	14.1	130.5
	6	0000	T.D.	999	30	14.2	129.5
		0600	T.S.	995	40	13.9	128.9
		1200	T.S.	995	45	13.5	128.3
		1800	S.T.S.	990	50	13.2	127.6
	7	0000	S.T.S.	990	50	13.0	126.9
		0600	S.T.S.	985	55	13.0	126.5
		1200	S.T.S.	985	55	13.0	126.1
		1800	S.T.S.	985	55	13.0	125.7
	8	0000	S.T.S.	980	60	13.1	125.1
		0600	S.T.S.	980	60	13.1	124.6
		1200	S.T.S.	980	60	13.2	124.0
		1800	S.T.S.	980	60	13.3	123.1
	9	0000	S.T.S.	985	55	13.5	122.2
		0600	S.T.S.	985	50	13.8	121.4
		1200	T.S.	990	45	14.1	120.6
		1800	T.S.	990	45	14.5	119.8
	10	0000	T.S.	990	45	14.9	118.9
		0600	S.T.S.	985	50	15.1	118.1
		1200	S.T.S.	985	55	15.2	117.3
		1800	S.T.S.	980	60	15.4	116.7
	11	0000	S.T.S.	980	60	15.6	116.0
		0600	S.T.S.	980	60	15.7	115.5
		1200	T.	975	65	15.9	115.0
		1800	T.	965	75	16.2	114.6
	12	0000	T.	955	80	16.5	114.2
		0600	T.	947	90	16.8	113.9
		1200	T.	947	90	17.2	113.6
		1800	T.	950	85	17.5	113.3
	13	0000	T.	950	85	17.7	113.1
		0600	T.	955	80	18.1	112.9
		1200	T.	955	80	18.5	112.6
		1800	T.	960	75	18.9	112.3
	14	0000	T.	965	70	19.3	112.1
		0600	T.	965	70	19.6	111.9
		1200	T.	965	70	19.9	111.6
		1800	T.	965	70	20.2	111.0
	15	0000	T.	965	70	20.5	110.2
		0600	T.	965	70	20.7	109.4
		1200	T.	970	65	21.4	108.8
		1800	S.T.S.	980	55	21.6	107.9
	16	0000	T.S.	990	45	21.7	107.3
		0600	T.D.	1000	30	22.0	106.7

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON JUDY (8218)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (kn)	Lat. °N	Long. °E
September	5	1800	T.D.	1000	30	12.7	144.2
	6	0000	T.S.	994	40	13.0	143.6
		0600	T.S.	994	40	13.4	143.1
		1200	T.S.	992	45	13.8	142.5
		1800	T.S.	992	45	14.1	142.1
	7	0000	S.T.S.	988	50	14.5	141.4
		0600	S.T.S.	985	55	15.3	140.6
		1200	S.T.S.	985	55	15.9	139.8
		1800	S.T.S.	980	60	16.8	138.8
	8	0000	S.T.S.	978	60	17.6	137.9
		0600	T.	975	65	18.4	137.0
		1200	T.	970	70	19.5	136.1
		1800	T.	960	75	20.5	135.4
	9	0000	T.	955	85	21.6	134.6
		0600	T.	955	85	22.5	133.8
		1200	T.	960	80	23.2	133.5
		1800	T.	960	80	23.9	133.5
	10	0000	T.	965	70	24.9	133.9
		0600	T.	965	70	25.5	134.2
		1200	T.	965	70	26.0	134.4
		1800	T.	965	70	26.6	134.9
	11	0000	T.	965	70	27.1	135.3
		0600	T.	965	70	27.8	136.0
		1200	T.	965	70	28.5	136.4
		1800	T.	965	70	29.9	136.9
	12	0000	T.	965	70	31.5	137.2
		0600	T.	965	70	33.8	137.7
		1200	S.T.S.	978	60	35.8	138.7
		1800	S.T.S.	984	50	39.1	140.6

Became extratropical

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON KEN (8219)

Mohth	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (kn)	Lat. °N	Long. °E
September	16	0000	T.D.	1003	25	17.6	132.7
		0600	T.D.	1000	30	17.7	132.3
		1200	T.S.	995	35	17.8	131.8
		1800	T.S.	995	35	18.0	131.1
	17	0000	T.S.	990	40	18.4	130.4
		0600	S.T.S.	980	50	18.6	129.9
		1200	S.T.S.	975	55	19.0	129.5
		1800	T.	960	70	19.3	129.0
	18	0000	T.	950	85	19.7	128.3
		0600	T.	938	100	20.0	127.7
		1200	T.	940	90	20.2	126.9
		1800	T.	945	90	20.4	126.4
	19	0000	T.	955	85	20.5	125.9
		0600	T.	950	85	20.6	125.3
		1200	T.	945	90	20.6	124.8
		1800	T.	940	100	20.7	124.6
	20	0000	T.	940	100	20.9	124.3
		0600	T.	936	105	21.0	124.3
		1200	T.	936	105	21.2	124.3
		1800	T.	945	95	21.3	124.4
	21	0000	T.	955	85	21.4	124.5
		0600	T.	955	85	21.6	124.6
		1200	T.	960	80	21.8	124.8
		1800	T.	960	80	22.0	125.0
	22	0000	T.	965	70	22.2	125.3
		0600	T.	965	70	22.6	125.7
		1200	T.	965	70	22.9	126.1
		1800	T.	965	70	23.6	126.9
	23	0000	T.	965	65	24.1	127.5
		0600	T.	965	65	24.8	128.4
		1200	T.	965	65	25.7	129.2
		1800	T.	970	65	26.8	130.1
	24	0000	T.	970	65	27.8	130.8
		0600	T.	970	65	28.9	131.3
		1200	T.	970	65	31.1	132.3
		1800	S.T.S.	980	55	33.3	132.7
	25	0000	T.S.	990	45	35.3	132.7
		0600	T.D.	995	30	36.9	132.9

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF TROPICAL STORM LOLA (8220)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (kn)	Lat. °N	Long. °E
September	17	0000	T.S.	996	35	27.0	159.6
		0600	T.S.	990	45	27.9	159.4
		1200	T.S.	990	45	28.8	159.4
		1800	T.S.	990	45	29.9	159.8

Moved to the east of 160°E

SIX-HOURLY POSITION AND INTENSITY DATA OF THE TROPICAL DEPRESSION (20 - 22 SEPTEMBER)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (kn)	Lat. °N	Long. °E
September	20	1800	T.D.	1002	25	17.1	140.3
	21	0000	T.D.	1000	30	17.6	140.1
		0600	T.D.	1000	30	18.2	139.8
		1200	T.D.	1000	30	18.9	139.3
		1800	T.D.	1000	30	20.2	138.3
	22	0000	T.D.	1003	25	21.1	136.9

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON MAC (8221)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (kn)	Lat. °N	Long. °E
October	1	1800	T.D.	1002	25	12.1	149.0
	2	0000	T.S.	995	35	12.1	148.5
		0600	T.S.	993	40	12.2	147.4
		1200	T.S.	990	45	12.5	146.4
		1800	S.T.S.	985	50	12.7	145.6
	3	0000	S.T.S.	970	55	13.0	144.6
		0600	T.	960	70	13.4	143.8
		1200	T.	955	80	13.7	143.0
		1800	T.	955	80	14.1	142.1
	4	0000	T.	940	90	14.5	141.3
		0600	T.	920	100	14.9	140.5
		1200	T.	910	110	15.3	139.8
		1800	T.	900	120	15.8	139.0
	5	0000	T.	895	130	16.3	138.3
		0600	T.	895	130	16.8	137.5
		1200	T.	910	120	17.4	136.9
		1800	T.	915	110	18.2	136.3
	6	0000	T.	920	100	18.6	136.1
		0600	T.	920	100	19.5	135.7
		1200	T.	915	110	20.4	135.4
		1800	T.	920	100	21.2	135.3
	7	0000	T.	920	100	21.9	135.3
		0600	T.	920	100	23.4	135.6
		1200	T.	925	100	24.7	136.0
		1800	T.	930	95	26.2	136.7
	8	0000	T.	935	90	27.8	137.4
		0600	T.	935	90	29.8	138.6
		1200	T.	945	85	31.6	140.2
		1800	T.	955	80	33.7	142.6
	9	0000	T.	965	75	34.8	144.4

Became extratropical

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON NANCY (8222)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (kn)	Lat. °N	Long. °E
October	11	0000	T.D.	1006	25	15.9	141.5
		0600	T.S.	999	35	16.2	140.0
		1200	T.S.	998	35	16.0	138.5
		1800	T.S.	998	35	15.9	137.0
	12	0000	T.S.	998	35	15.9	135.6
		0600	T.S.	988	40	16.0	134.3
		1200	S.T.S.	985	55	16.1	133.0
		1800	S.T.S.	980	60	16.2	131.7
	13	0000	T.	975	65	16.4	130.5
		0600	T.	970	70	16.6	129.5
		1200	T.	965	75	16.9	128.1
		1800	T.	955	80	17.4	126.6
	14	0000	T.	945	90	17.8	125.0
		0600	T.	940	100	17.7	123.6
		1200	T.	935	100	17.6	122.3
		1800	T.	950	80	17.5	121.0
	15	0000	T.	965	70	17.4	119.7
		0600	T.	980	65	17.3	118.4
		1200	T.	980	65	17.1	117.2
		1800	T.	975	70	17.0	116.0
	16	0000	T.	970	70	16.9	114.7
		0600	T.	965	75	16.9	113.5
		1200	T.	955	80	16.9	112.4
		1800	T.	955	80	17.1	111.1
	17	0000	T.	960	75	17.5	109.9
		0600	T.	960	75	18.0	108.8
		1200	T.	960	75	18.4	107.9
		1800	T.	965	75	18.8	107.0
	18	0000	T.	965	75	19.0	106.2
		0600	T.	970	70	19.0	105.5
		1200	T.S.	990	45	18.9	104.8
		1800	T.D.	995	30	18.8	104.6

SIX-HOURLY POSITION AND INTENSITY DATA OF THE TROPICAL DEPRESSION (15 - 19 OCTOBER)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (kn)	Lat. °N	Long. °E
October	15	0600	T.D.	1005	25	17.9	137.9
		1200	T.D.	1005	25	18.2	136.7
		1800	T.D.	1005	25	19.0	136.0
	16	0000	T.D.	1004	25	19.9	135.5
		0600	T.D.	1003	30	20.6	135.2
		1200	T.D.	1005	25	21.3	135.0
		1800	T.D.	1005	25	21.6	135.4
	17	0000	T.D.	1005	25	21.3	135.8
		0600	T.D.	1005	25	21.0	135.4
		1200	T.D.	1005	25	20.9	135.0
		1800	T.D.	1005	25	20.9	134.7
	18	0000	T.D.	1005	25	20.9	134.4
		0600	T.D.	1005	25	21.1	134.3
		1200	T.D.	1005	25	21.3	134.2
		1800	T.D.	1005	25	21.4	134.2
	19	0000	T.D.	1005	25	21.6	134.2

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON OWEN (8223)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (kn)	Lat. °N	Long. °E
October	15	1200	T.D.	1002	25	13.4	154.8
		1800	T.D.	1000	30	13.9	153.2
	16	0000	T.D.	1000	30	14.4	151.7
		0600	T.S.	995	35	14.8	150.5
		1200	T.S.	995	35	15.3	149.5
		1800	T.S.	992	40	15.7	148.6
	17	0000	T.S.	992	40	16.2	147.8
		0600	T.S.	990	45	16.6	147.1
		1200	S.T.S.	988	50	16.9	146.5
		1800	S.T.S.	985	55	17.1	145.9
	18	0000	S.T.S.	983	60	17.2	145.2
		0600	S.T.S.	980	60	17.3	144.7
		1200	S.T.S.	980	60	17.5	144.2
		1800	T.	970	70	18.1	143.9
	19	0000	T.	965	75	18.9	143.6
		0600	T.	965	75	20.0	143.3
		1200	T.	955	80	21.1	143.3
		1800	T.	945	90	22.2	143.5
	20	0000	T.	945	90	23.2	143.9
		0600	T.	945	90	24.6	144.8
		1200	T.	945	90	26.0	146.0
		1800	T.	940	95	27.6	147.4
	21	0000	T.	940	95	28.8	148.7
		0600	T.	950	85	29.9	150.5
		1200	T.	955	80	30.9	152.6
		1800	T.	960	70	31.2	154.0
	22	0000	S.T.S.	970	55	30.8	155.1
		0600	S.T.S.	975	50	30.0	156.2
		1200	T.S.	980	45	29.1	157.1
		1800	T.S.	985	45	28.0	158.0
	23	0000	T.S.	985	45	27.1	159.1

Moved to the east of 160°E

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON PAMELA (8224)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (kn)	Lat. °N	Long. °E
November	28	0600	T.	950	90	12.5	159.9
		1200	T.	950	90	13.1	159.2
		1800	T.	955	85	13.5	158.9
	29	0000	T.	965	70	13.7	158.4
		0600	S.T.S.	975	55	13.7	158.1
		1200	S.T.S.	985	50	13.6	157.8
		1800	T.S.	990	45	13.1	157.0
	30	0000	T.S.	995	45	12.4	156.0
		0600	T.S.	995	45	11.9	154.8
		1200	T.S.	1000	40	11.5	153.3
		1800	T.S.	1000	40	11.4	151.8
December	1	0000	T.S.	1000	40	11.7	149.7
		0600	T.S.	1000	40	12.0	147.7
		1200	T.S.	1000	40	12.2	145.6
		1800	T.S.	1000	35	12.2	143.5
	2	0000	T.S.	998	35	12.3	141.4
		0600	T.S.	998	35	12.3	139.3
		1200	T.S.	998	35	12.4	137.3
		1800	T.S.	998	35	13.1	135.8
	3	0000	T.S.	995	40	13.8	134.5
		0600	S.T.S.	990	50	14.5	133.2
		1200	S.T.S.	985	55	14.9	132.2
		1800	S.T.S.	985	55	15.2	131.6
	4	0000	S.T.S.	985	55	15.5	131.1
		0600	S.T.S.	985	55	15.7	130.5
		1200	S.T.S.	980	60	15.9	130.0
		1800	T.	970	70	16.0	129.8
	5	0000	T.	958	80	16.2	129.5
		0600	T.	975	70	16.3	129.4
		1200	S.T.S.	985	60	16.5	129.1
		1800	S.T.S.	985	55	16.3	128.9
	6	0000	S.T.S.	990	50	16.0	128.7
		0600	S.T.S.	990	50	15.3	128.2
		1200	S.T.S.	985	60	14.7	127.6
		1800	S.T.S.	990	55	14.0	126.5
	7	0000	S.T.S.	995	50	13.3	125.4
		0600	T.S.	1000	35	12.8	124.5

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF SEVERE TROPICAL STORM ROGER (8225)

Month	Day	Time G.M.T.	Intensity	Estimated minimum central pressure (mbar)	Estimated maximum surface wind (kn)	Lat. °N	Long. °E
December	8	0000	T.S.	1002	45	12.1	125.9
		0600	T.S.	1000	45	12.6	124.3
		1200	S.T.S.	995	50	13.8	123.3
		1800	S.T.S.	990	55	14.6	122.3
	9	0000	S.T.S.	980	60	15.1	121.9
		0600	S.T.S.	980	60	15.7	121.8
		1200	S.T.S.	990	55	16.5	122.2
		1800	S.T.S.	995	50	17.2	122.5
	10	0000	T.S.	998	45	17.8	122.5
		0600	T.S.	1002	35	18.5	122.4
		1200	T.D.	1005	30	19.1	122.3
		1800	T.D.	1005	25	19.8	122.4
	11	0000	T.D.	1008	25	20.5	122.6
		0600	T.D.	1008	25	21.3	123.1

Dissipated