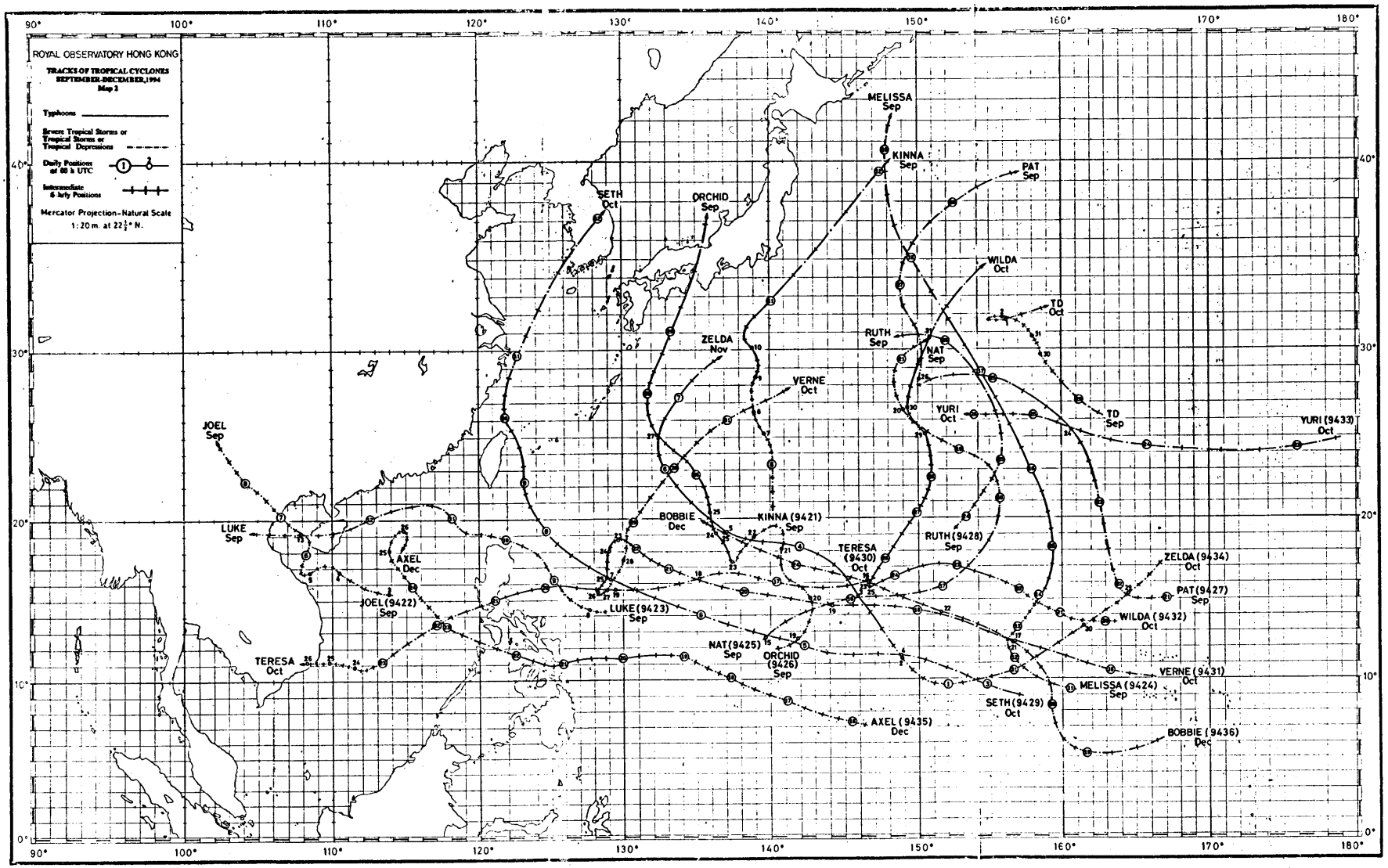
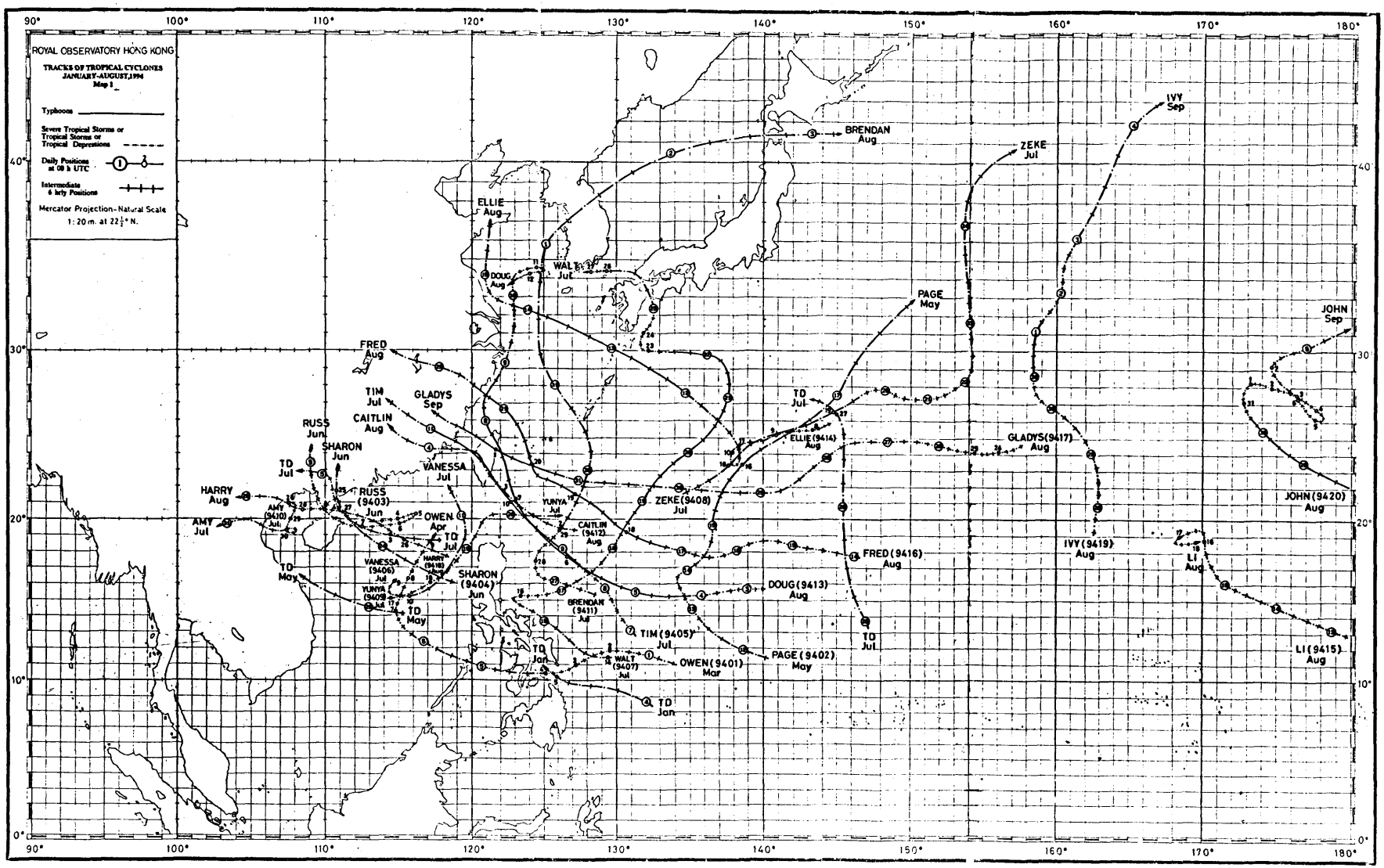
ROYAL OBSERVATORY HONG KONG

TROPICAL CYCLONES IN 1994


ROYAL OBSERVATORY HONG KONG
TRACKS OF TROPICAL CYCLONES
SEPTEMBER-DECEMBER, 1994
Map 2
Typhoons
Severe Tropical Storms or Tropical Storms or Tropical Depressions
Daily Positions at 00 h UTC
Intermediate 6 hrly Positions
Mercator Projection - Natural Scale
1:20 m. at 22½° N.
MELISSA Sep
KINNA Sep
PAT Sep
SETH Oct
ORCHID Sep
WILDA Oct
TD Oct
RUTH Sep
NAT Sep
ZELDA Nov
VERNE Oct
TD Sep
YURI Oct
YURI (9433) Oct
JOEL Sep
BOBBIE Dec
KINNA (9421) Sep
LUKE Sep
AXEL Dec
RUTH (9428) Sep
TERESA (9430) Oct
ZELDA (9434) Oct
PAT (9427) Sep
JOEL (9422) Sep
LUKE (9423) Sep
WILDA (9432) Oct
NAT (9425) Sep
ORCHID (9426) Sep
VERNE (9431) Oct
TERESA Oct
MELISSA (9424) Sep
SETH (9429) Oct
AXEL (9435) Dec
BOBBIE (9436) Dec
90°
100°
110°
120°
130°
140°
150°
160°
170°
180°
40°
30°
20°
10°
0°


ROYAL OBSERVATORY HONG KONG
TRACKS OF TROPICAL CYCLONES
JANUARY-AUGUST,1994
Map 1
Typhoons
Severe Tropical Storms or Tropical Storms or Tropical Depressions
Daily Positions at 00 h UTC
Intermediate 6 hrly Positions
Mercator Projection - Natural Scale
1: 20 m. at 22½° N.
90°
100°
110°
120°
130°
140°
150°
160°
170°
180°
0°
10°
20°
30°
40°
BRENDAN Aug
IVY Sep
ZEKE Jul
ELLIE Aug
DOUG Aug
WALT Jul
PAGE May
JOHN Sep
FRED Aug
TIM Jul
GLADYS Sep
TD Jul
CAITLIN Aug
RUSS Jun
SHARON Jun
ELLIE (9414) Aug
GLADYS (9417) Aug
VANESSA Jul
TD Jul
HARRY Aug
RUSS (9403) Jun
ZEKE (9408) Jul
JOHN (9420) Aug
AMY (9410) Jul
OWEN Apr
TD Jul
YUNYA Jul
CAITLIN (9412) Aug
AMY Jul
IVY (9419) Aug
FRED (9416) Aug
LI Aug
TD May
VANESSA (9406) Jul
SHARON (9404) Jun
DOUG (9413) Aug
YUNYA (9409) Jul
TD May
BRENDAN (9411) Jul
TIM (9405) Jul
TD Jul
LI (9415) Aug
TD Jan
WALT (9407) Jul
OWEN (9401) Mar
PAGE (9402) May
TD Jan

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FIGURES

TABLES

Hong Kong's Tropical Cyclone Warning Signals

Signal		Display		Meaning of the Signal
		Symbol	Lights	
Stand By	1		White White White	A tropical cyclone is centred within about 800 kilometres of Hong Kong and may later affect Hong Kong.
Strong Wind	3		Green White Green	Strong wind is expected or blowing in the Victoria harbour, with a sustained speed of 41-62 kilometres per hour (km/h), and gusts which may exceed 110 km/h.
NW'ly Gale or Storm	8NW		White Green Green	Gale or storm force wind is expected or blowing in the Victoria harbour, with a sustained wind speed of 63-117 km/h from the quarter indicated and gusts which may exceed 180 km/h.
SW'ly Gale or Storm	8SW		Green White White	
NE'ly Gale or Storm	8NE		Green Green White	
SE'ly Gale or Storm	8SE		White White Green	
Increasing Gale or Storm	9		Green Green Green	Gale or storm force wind is increasing or expected to increase significantly in strength.
Hurricane	10		Red Green Red	Hurricane force wind is expected or blowing, with sustained speed reaching upwards from 118 km/h and with gusts that may exceed 220 km/h.

Section 1

INTRODUCTION

Apart from a short break during 1940-1946, surface observations of meteorological elements since 1884 have been summarized and published in the Royal Observatory's Meteorological Results. Upper-air observations began in 1947 and from then onwards the annual publication was divided into two parts, namely Part I - Surface Observations and Part II - Upper-air Observations. The publication of Meteorological Results Part II was terminated in 1981. Upper-air data are now archived on magnetic tapes. Starting from 1987, Part I was re-titled as "Surface Observations in Hong Kong" but the format and contents remained unchanged.

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 to 1967 inclusive. The series "Meteorological Results Part III - Tropical Cyclone Summaries" was subsequently introduced. It contained information on tropical cyclones over the western North Pacific and the South China Sea. The first issue, which contained reports on tropical cyclones occurring in 1968, was published in 1971. Tropical cyclones within the area bounded by the Equator, 45^{o}N, 100^{o}E and 160^{o}E were described. With reconnaissance aircraft reports (terminated from August 1987 onwards) and satellite pictures facilitating the tracking of tropical cyclones over the otherwise data-sparse ocean, the eastern boundary of the area of coverage was extended from 160^{O}E to 180^{O} from 1985 onwards. Starting from 1987, the series was re-titled as "Tropical Cyclones in 19YY" but its contents remained largely the same.

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. Before 1961, only daily positions were plotted on the tracks. The time of the daily positions varied to some extent in the older publications but remained fixed at 0000 UTC after 1944. Details of the variation are given in the Royal Observatory Technical Memoir No. 11, Volume 1. From 1961 onwards, six-hourly positions are shown on the tracks of all tropical cyclones.

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

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

A TROPICAL DEPRESSION (T.D.) has maximum sustained winds of less than 63 km/h.
A TROPICAL STORM (T.S.) has maximum sustained winds in the range 63-87 km/h.
A SEVERE TROPICAL STORM (S.T.S.) has maximum sustained winds in the range 88 - 117 km/h.
A TYPHOON (T.) has maximum sustained winds of 118 km/h or more.

Throughout this publication, maximum sustained surface winds when used without qualification refer to wind speeds averaged over a period of 10 minutes. Mean hourly winds are winds averaged over a 60-minute interval ending on the hour. Daily rainfall amounts are computed over a 24-hour period ending at midnight Hong Kong Time.

Over the western North Pacific and the South China Sea, tropical cyclone names are assigned by the Joint Typhoon Warning Center in Guam according to a pre-determined list that undergoes revisions from time to time. Since 1981, a common system for identification of tropical cyclones in the western North Pacific and the South China Sea has been adopted and the Japan Meteorological Agency is delegated with the responsibility of assigning to each tropical cyclone of tropical storm intensity or above a numerical code of four digits. For example, the first tropical cyclone of tropical storm intensity or above which occurred within the region in 1994 was assigned the code "9401". In this publication, the appropriate code immediately follows the name of the tropical cyclone in bracket, e.g. Severe Tropical Storm Owen (9401).

Surface wind data presented in this report were obtained from a network of anemometers operated by the Royal Observatory. Details of the stations are listed on the next page:

Station	Position		Head of anemometer above M.S.L. (m)
	Latitude N	Longitude E	
Central (Star Ferry Pier)	22°17'	11°410'	17
Cheung Chau	22°12'	114°01'	592
Cheung Sha Wan	22°20'	114°09'	30
Green Island	22°17'	114°07'	105
Hong Kong Airport (SE)	22°19'	114°13'	16
King's Park	22°19'	114°10'	78
Lau Fau Shan	22°28'	113°59'	50
Sai Kung	22°23'	114°16'	31
Sha Lo Wan	22°18'	113°54'	71
Sha Tin	22°24'	114°12'	16
Star Ferry Pier Kowloon	22°18'	114°10'	18
Ta Kwu Ling	22°32'	114°09'	28
Tai Mo Shan	22°25'	114°07'	969
Tai Po Kau	22°27'	114°11'	28
Tate's Cairn	22°22'	114°13'	588
Tseung Kwan 0	22°19'	114°15'	52
Tsing Yi (Ching Pak House)	22°21'	114°06'	136
Tuen Mun	22°24'	113°58'	68
Waglan Island	22°11'	114°18'	82
Wong Chuk Hang	22°15'	114°10'	30

Maximum storm surges caused by tropical cyclones were measured by tide gauges installed at several locations around Hong Kong. The locations of these anemometers and tide gauges are shown in Figure 1.

In Section 2, an overall review of all the tropical cyclones over the western North Pacific and the South China Sea in 1994 is presented.

The reports in Section 3 are individual accounts of the life history of tropical cyclones affecting Hong Kong in 1994. They include the following information:-

(a) the effects of the tropical cyclone on Hong Kong;
(b) the sequence of display of tropical cyclone warning signals;
(c) the maximum gust peak speeds and maximum hourly mean winds recorded in Hong Kong;
(d) the lowest barometric pressure recorded at the Royal Observatory;
(e) the daily amounts of rainfall recorded at the Royal Observatory and selected locations;
(f) the times and heights of the highest tides and maximum storm surges recorded in Hong Kong;
(g) satellite pictures and/or radar displays if applicable.

Statistics and information relating to tropical cyclones are presented in various tables in Section 4.

Six-hourly positions together with the corresponding estimated minimum central pressures and maximum sustained surface winds for individual tropical cyclones are tabulated in Section 5.

In this publication, different times are used in different contexts. The official reference times are given in Co-ordinated Universal Time and labelled UTC. Times of the day expressed as "a.m." or "p.m." or as "morning", "evening', etc. in the tropical cyclone narratives are in Hong Kong Time which is eight hours ahead of UTC.

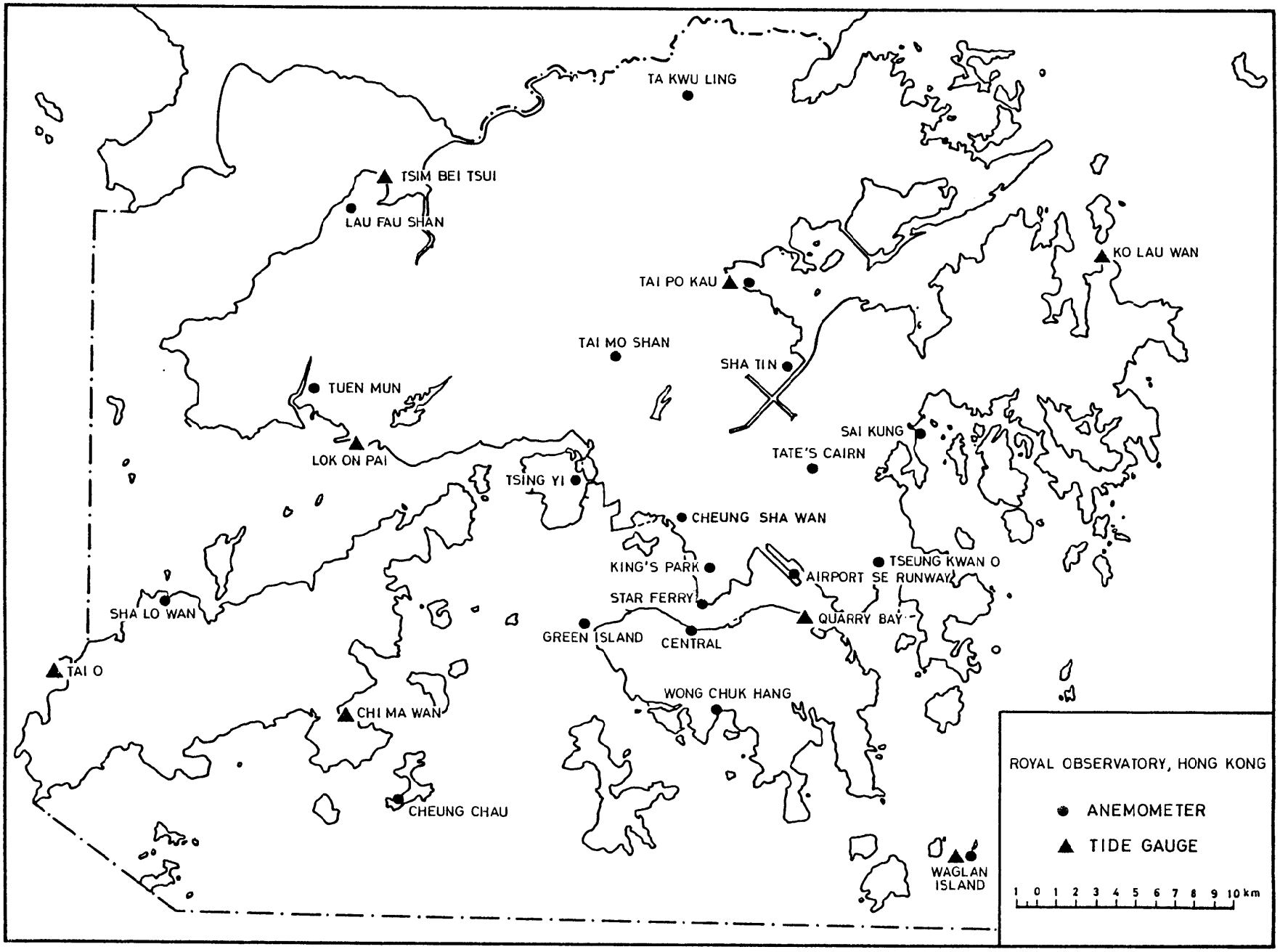

Figure 1. Locations of anemometers and tide gauge stations in Hong Kong.

Section 2

TROPICAL CYCLONE OVERVIEW FOR 1994

In 1994, there were 4l* tropical cyclones over the western North Pacific and the adjacent seas bounded by the equator, 45°N, 100°E and 180° Compared with the 30-year annual average (1961-1990) of 31 tropical cyclones, 1994 was a year with above normal tropical cyclone activity. Also, the number of tropical cyclones attaining typhoon intensity was above-normal - a total of 19 typhoons in 1994 against the 30-year annual average of 15.6. The monthly distributions of the frequency of first occurrence of tropical cyclones and that of typhoons for 1994 are shown in Figure 2. The monthly mean frequencies of these two parameters during the years 1961 - 1990 are shown in Figure 3.

Along the coast of China, the landfall locations were confined to Hainan, western Guangdong, Fujian and Zhejiang. To the east, Taiwan was affected by four landfalling storms, three of which were typhoons. Japan, including the Ryukyus, was visited by a total of seven tropical cyclones. Elsewhere, two storms landed over Korea, four over the Philippines and three over Vietnam.

Among the typhoons in 1994, Seth (9429) and Zelda (9434) were the strongest in respect of intensity. However, the most destructive in terms of human damage was Fred (94 16) which in August inflicted serious damage and killed over 750 people in China's Zhejiang Province.

During the year, 20 tropical cyclones occurred within the area of responsibility of Hong Kong (i.e. the area bounded by 10°N, 30°N, 105°E and 125°E). This number was higher than the 30-year (1961-90) annual average of 16.4. Of the 20 tropical cyclones, nine developed within Hong Kong's area of responsibility. Altogether, 485 tropical cyclone warnings to ships and vessels were issued by the Royal Observatory in 1994 (Table 2).

Local warning signals were hoisted in Hong Kong for four tropical cyclones. The Stand By Signal No. 1 was the highest for Tropical Storm Sharon, while the Strong Wind Signal No.3 was that for Severe Tropical Storm Russ, Severe Tropical Storm Harry and Tropical Storm Luke. In 1994, no tropical cyclone warning signal was hoisted in July. The last time this happened was 1987.

The total tropical cyclone rainfall (defined as the total rainfall recorded at the Royal Observatory from the time when a tropical cyclone was centred within 600 km of Hong Kong to 72 hours after the tropical cyclone has dissipated or moved outside 600 km of Hong Kong) in 1994 amounted to 761.5 mm, 3 per cent above the mean annual value of 741.0 mm (196 l-l 990). It accounted for 28 per cent of the year's total rainfall of 2725.6 mm. Eight tropical cyclones came within 600 km of Hong Kong, including the four which necessitated the hoisting of tropical cyclone warning signals. Rainfall figures associated with these tropical cyclones are given in Table 8(a).

The following is a review of all the tropical cyclones in 1994.

The first tropical cyclone in 1994 was a tropical depression which remained poorly organised during its lifespan. It formed about 600 km west of Yap on 4 January. Heading in the general direction of the Philippines at 30 km/h, it slowed down in the morning of 5 January. It dissipated over the coastal waters of the Philippines that afternoon.

The remnant of the tropical depression brought heavy rain to the Philippines. Flooding and landslides killed 29 people. About 50 others were reported missing and more than 16000 people had to seek refuge in government shelters. Roads were blocked in some provinces as a result of the landslides. Three bridges were also destroyed in floods.

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* including Tropical Storm Li (9415) and Typhoon John (9420) which formed over the central North Pacific and moved across the International Date Line into the western North Pacific.

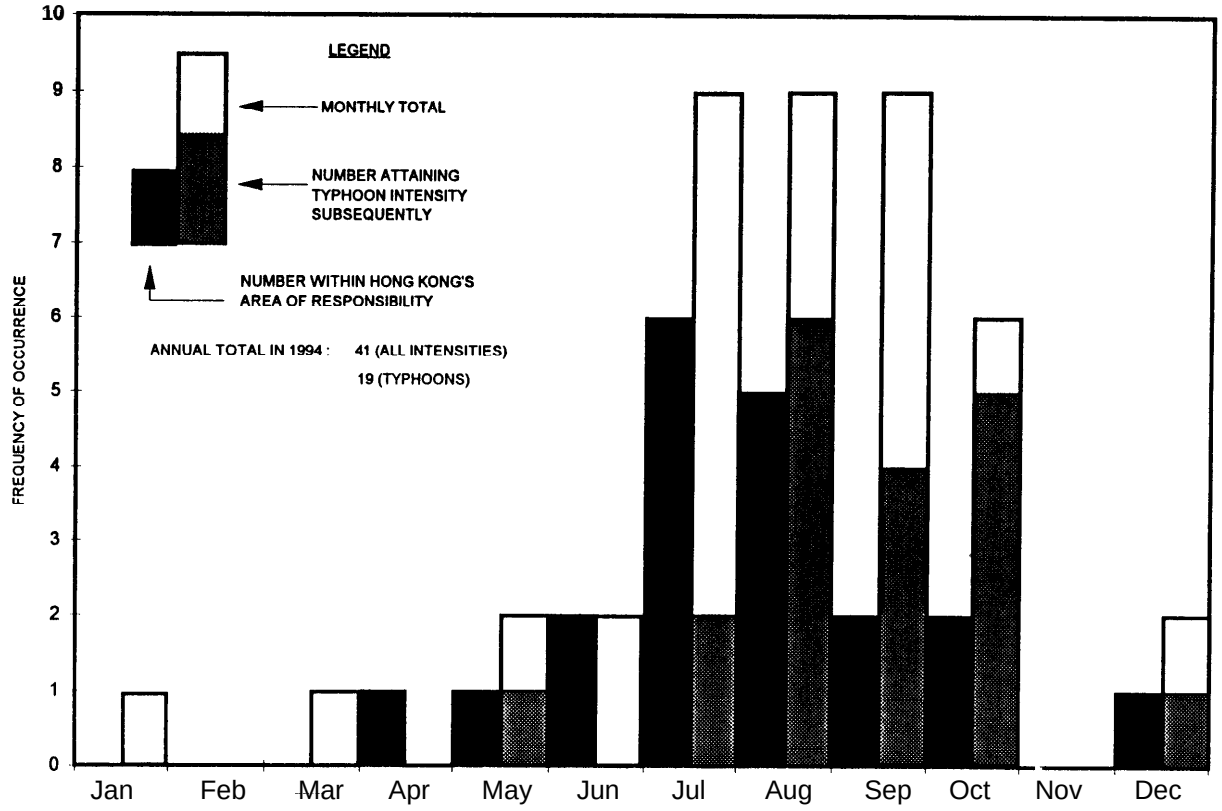

Figure 2. Monthly distribution of the frequency of first occurrence of tropical cyclones in the western North Pacific and the South China Sea in 1994.

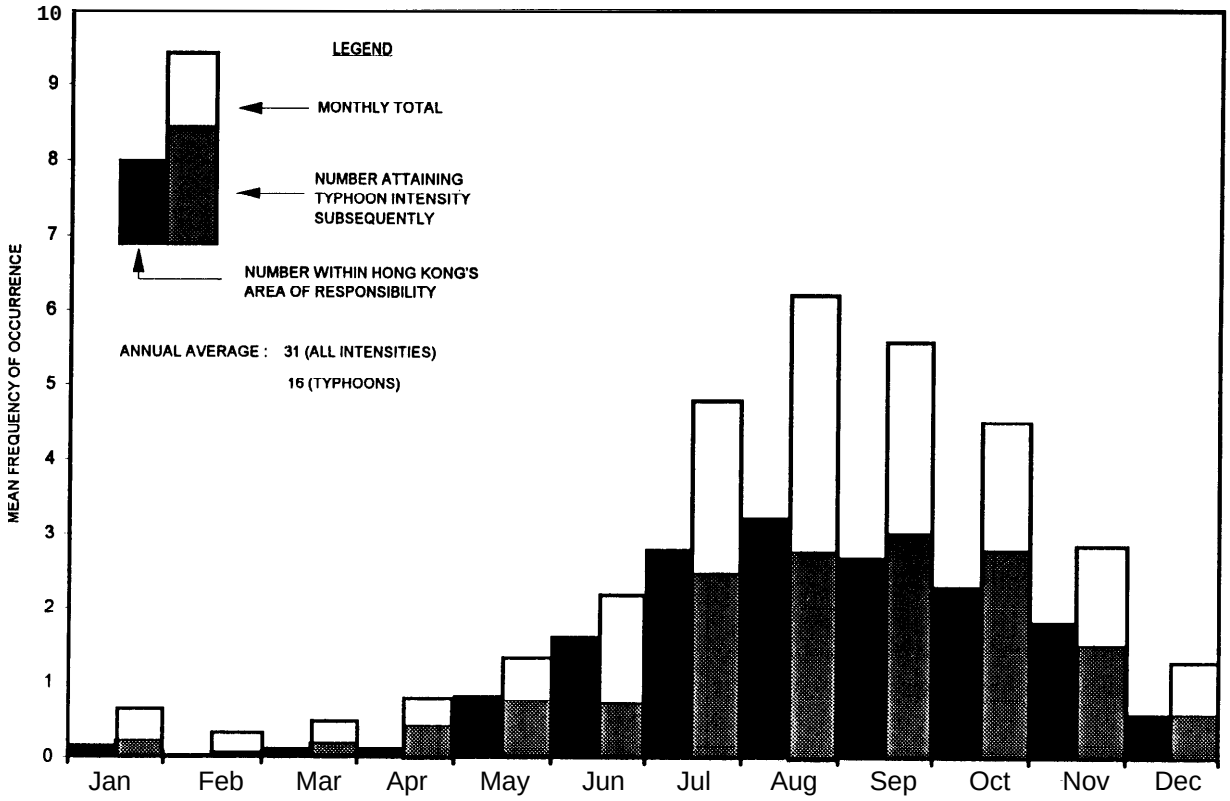

Figure 3. Monthly distribution of the mean frequency of first occurrence of tropical cyclones in the western North Pacific and the South China Sea, 1961-1990.

The next tropical cyclone occurred in late March and was named Owen (9401). Starting as a tropical depression about 420 km west-northwest of Yap on 31 March, Owen intensified to a tropical storm the following morning while heading westwards at about 13 km/h. Turning west-southwestwards, Owen intensified to a severe tropical storm on 3 April. It swept across the central Philippines the next day, wreaking havoc there. Three people were killed and four were reported missing. On the island of Cebu, more than 7000 villagers living in the coastal areas were affected by flash floods. Electricity supply was interrupted in many places. Owen entered the South China Sea as a tropical storm in the evening of 5 April, moving northwestwards for about 36 hours before recurving north-northeastwards. Owen weakened to a tropical depression when it was about 500 km northwest of Manila on 9 April. It then dissipated as a low pressure area over water shortly afterwards.

Tropical Depression Page (9402) formed about 510 km west-southwest of Guam on 12 May. Moving northwestwards at 20 km/h, it deepened into a tropical storm that evening. Page recurved northeastwards on 14 May and at the same time intensified to a severe tropical storm. It attained typhoon strength on the morning of 15 May. After skirting past Iwo Jima the next day, Page weakened to a severe tropical storm. It weakened further to a tropical storm on 17 May and to a tropical depression the following morning. Page dissipated over water shortly afterwards.

A tropical depression formed over the South China Sea about 520 km southeast of Xisha on the early morning of 26 May. However, it was short-lived and degenerated into an area of low pressure over the sea some 24 hours later while moving towards Vietnam. This tropical depression formed from an area of disturbance originally over the southwestern Philippines. There the inclement weather due to this disturbance caused severe flooding in the city of Davao where five people were killed, 200 had to seek refuge, 2000 others were forced to evacuate their homes and one person was reported missing.

Two tropical cyclones occurred over the western North Pacific and the South China Sea in June. Both of them, Severe Tropical Storm Russ (9403) and Tropical Storm Sharon (9404) necessitated the hoisting of tropical cyclone warning signals in Hong Kong. Detailed reports on Russ and Sharon are presented in Section

A total of nine tropical cyclones occurred over the western North Pacific and the South China Sea in July, compared with the monthly average of 4.6 for the month.

An area of low pressure over the South China Sea developed to a tropical depression about 310 km southeast of Dongsha on 2 July. Moving westwards at first and then turning to the northwest, it made landfall over the coast of western Guangdong on evening of 4 July. The tropical depression dissipated over land the following day.

This tropical depression brought torrential rain to western Guangdong. In Yangjiang and Maoming, four people were killed and two others were reported missing. About 56700 houses were damaged or destroyed. Irrigation facilities were damaged and 120 000 hectares of farmland were ruined. Economic loss was estimated to be 980 million RMB. The tropical depression also affected Guangxi where six people were killed and more than 30000 people were made homeless.

Tim (9405) formed as a tropical depression over the western North Pacific about 1160 km east of Manila on the morning of 7 July. Tracking northwestwards at 13 km/h, Tim intensified rapidly to a tropical storm that afternoon and became a typhoon on 9 July when it was about 790 km east-northeast of Manila. On the evening of 10 July, Tim made landfall over Taiwan about 200 km south of Taibei and inflicted serious damage on the island. At least 19 people were killed, 67 injured and 11 were reported missing. A freighter with 97 mainland fishermen on board ran aground near Suao. About 50000 hectares of farmland were inundated and more than

300 buildings collapsed. Inclement weather also disrupted domestic and international traffic. Widespread electricity failure affected some 2 million households. Total loss was put at NT$2 billion.

After rampaging through Taiwan, Tim crossed the Taiwan Strait and landed over Fujian about 150 km south-southwest of Fuzhou on 11 July. Tim then weakened rapidly over land and dissipated as an area of low pressure that night. In Fujian Tim claimed three lives. A total of 140000 hectares of farmland was inundated and 3000 factories were forced to shut down due to damaged power lines. Total economic loss was estimated at 1.5 billion RMB.

While Tim was heading towards Taiwan, Vanessa (9406) developed as a tropical depression over the South China Sea about 610 km west-northwest of Manila on the morning of 9 July, deepening to a tropical storm a few hours later. It tracked southwestwards at first but turned eastwards towards the Philippines the next day. Turning north to north-northwestwards, Vanessa dissipated over water on 11 July as it was approaching the coast of southeast China.

The fourth tropical cyclone in July was Walt (9407). It developed as a tropical depression over the western Pacific about 1050 km east-southeast of Manila on 14 July. It moved northwestwards towards Luzon initially and adopted an eastward course on 16 July when it intensified to a tropical storm. Turning towards the northeast on 17 July, Walt intensified to a severe tropical storm. It deepened further to a typhoon the following day when it was about 890 km south-southeast of Okinawa. After moving northeastwards for 5 days over the western North Pacific, Walt took on a westward track on 22 July and weakened to a severe tropical storm the next day. It made landfall over Shikoku on 25 July and degenerated further to a tropical storm. Walt eventually dissipated over the Korea Strait on 27 July.

While Typhoon Walt was traversing the Pacific, an area of disturbance over the South China Sea developed to a tropical depression named Yunya (9409) about 610 km west of Manila on 17 July. It deepened to a tropical storm the next day while moving northeastwards. Taking on an eastward course on the morning of 20 July, Yunya weakened to a tropical depression about 620 km north-northeast of Manila. It dissipated over water that night. In the Philippines, Yunya brought heavy rain which triggered off flooding and mudslides. Eight people were killed and thousands had to be evacuated.

Soon after the formation of Yunya, Tropical Depression Zeke (9408) developed about 710 km west-southwest of Iwo Jima on the afternoon of 17 July. Moving east-northeastwards at 30 km/h, Zeke intensified to a tropical storm on the morning of 18 July and passed close to Iwo Jima that evening. Traversing the Pacific, Zeke began to head northwards on 22 July and intensified to a severe tropical storm. Moving into higher latitudes, Zeke weakened to a tropical storm two days later. It became extratropical while tracking northeastwards over the Pacific on 25 July.

A tropical depression formed about 290 km east of Guam on 25 July, tracking north-northwestwards at 34 km/h initially. The tropical depression turned northwards the next day and took on a northwestward course on the morning of 27 July. It dissipated over water that evening.

Brendan (9411) formed as a tropical depression about 890 km east of Manila on 26 July, moving west-northwestwards at 20 km/h. It turned northeastwards two days later and intensified to a tropical storm on 30 July. Adopting a north to northwestward track, Brendan traversed the Ryukyus and entered the East China Sea. It turned northeast over the Yellow Sea and rampaged through Korea on 1 August, resulting in one dead and 28 others missing. About 200000 people had to be evacuated and 66000 vessels took shelter in nearby harbours. Brendan entered the Sea of Japan that evening and turned eastwards towards Japan. After sweeping across the northern tip of Honshu on the late evening of 2 August, Brendan weakened to a tropical depression about 700 km north-northeast of Tokyo the following day and dissipated over water soon afterwards.

Amy (9410) formed as a tropical depression over Beibu Wan about 210 km west-northwest of Haikou on the morning of 28 July, deepening to a tropical storm that evening. It made landfall over Hainan Island the next day, but re-entered Beibu Wan early on 30 July. Tracking westwards at 20 km/h, Amy landed over northern Vietnam that night. Over land, it weakened to a tropical depression and soon dissipated.

While Brendan was traversing the Sea of Japan, Tropical Depression Caitlin (9412) formed about 880 km east-southeast of Gaoxiong on the morning of 2 August. Moving northwestwards at 20 km/h towards Taiwan, Caitlin intensified to a tropical storm that evening and landed over the eastern coast of Taiwan the next day. Heavy rain associated with Caitlin triggered off numerous flash floods and over 1100 people were stranded. During Caitlin's passage across Taiwan, at least 10 people were killed and several houses were damaged. Electricity supply to 100000 families was cut off. Air and land traffic were also disrupted in adverse weather. Loss in agricultural products was estimated at NT$ 620 million.

Caitlin continued to move west across the Taiwan Strait, making landfall over mainland China about 50 km south-southwest of Xiamen on 4 August. It rapidly degenerated to an area of low pressure over land later that day.

Another tropical depression named Doug (9413) formed about 500 km west-northwest of Guam on 2 August, deepening to a tropical storm a few hours later. It moved westwards at 13 km/h and intensified further to a severe tropical storm on the evening of 3 August. An eye was discernible when Doug attained typhoon intensity about 18 hours later. Doug tracked northwestwards over the next few days and battered northern Taiwan early on 8 August. In Taiwan 26 people were killed and four were reported missing. About 126 houses collapsed and 453 others were damaged. Electricity and water supplies to 100000 people were cut off. Flood-related loss was estimated at over NT$ 4 billion.

Doug then took on a north to northeasterly track over the East China Sea after sweeping across northern Taiwan. It weakened to a severe tropical storm on 9 August and was downgraded further to a tropical storm on 10 August. Over the next couple of days, Doug made a clockwise loop over the Yellow Sea before dissipating over water on 12 August. The influence of Doug extended to Korea. On Cheju island an airbus skidded off the runway while landing in bad weather. Fortunately, all 160 people aboard escaped without serious injury.

While Doug was making its way towards Taiwan, Ellie (9414) formed about 380 km east-northeast of Iwo Jima on 7 August. It intensified and tracked generally west-southwestwards over the Pacific and became a severe tropical storm about 160 km west-southwest of Iwo Jima on the evening of 9 August. After making an anti-clockwise loop the next day, Ellie took on a northwesterly course with a speed of 22 km/h on 11 August. Typhoon intensity was attained the following day when it was about 770 km east of Okinawa. Ellie entered the East China Sea on 13 August. It weakened to a severe tropical storm on the evening of 14 August when it was about to recurve sharply towards the north. Ellie became extratropical on the night of 15 August.

Tropical Storm Li (9415) was the fourth tropical cyclone to form in August. After moving west-northwestwards at 16 km/h across the International Date Line on 13 August, it weakened to a tropical depression that evening about 1300 km east-southeast of Wake Island. Li slowed down on the morning of 16 August and started to make an anti-clockwise loop over the next two days. It dissipated in-situ on 18 August.

One day after Li crossed the International Date Line, Fred (9416) developed into a tropical depression about 480 km north-northeast of Guam on 14 August. Moving westwards at a speed of about 19 km/h initially, Fred intensified to a tropical storm that evening and to a severe tropical storm on 16 August. It attained typhoon intensity about 1260 km west-northwest of Guam on 17 August and turned northwestwards towards the East China Sea over the next few days.

The circulation of Fred affected Taiwan as it traversed the East China Sea. Three people were killed, one was injured and two were reported missing. Almost NT$22 million worth of agricultural products were destroyed. Electricity supply to about 100000 families and telephone lines to 21000 households were cut off. Land traffic was also disrupted as a result of landslides brought by Fred.

Fred headed towards Zhejiang and made landfall about 20 km south-southeast of Wenzhou near midnight of 21 August. Moving further inland, it weakened to a severe tropical storm on the morning of 22 August and degenerated rapidly to an area of low pressure that night.

Fred caused serious damage in Zhejiang. A total of 752 people were killed and 317 were reported missing. Over 96600 houses collapsed and 690000 others damaged. Around 140000 hectares of farmland and 425 hectares of fish farm were destroyed. Loss of livestock amounted to 367000 heads. Irrigation works, dykes, power cables and telecommunication lines were destroyed. At sea, about 700 fishing vessels sank and 900 others were damaged. Direct economic loss was estimated to be 7.5 billion RMB.

Gladys (9417) developed as a tropical depression about 1700 km east of Iwo Jima on 23 August. Moving generally westwards at 12 km/h, it intensified over the Pacific and became a severe tropical storm on the early morning of 26 August. It turned southwestwards on 28 August after weakening to a tropical storm about 780 km east of Iwo Jima the day before. Gladys reverted to a westward course on 29 August and attained typhoon intensity two days later while approaching Taiwan. It rampaged through northern Taiwan on 1 September. At least six people were killed, 51 injured and one reported missing. Land traffic in many places was disrupted as a result of torrential rain. Electricity supply to over 600000 households was also cut. Loss in agriculture was put at NT$400 million. At sea, a freighter ran aground in northern Taiwan. Fortunately all the 40 crew members were rescued.

Gladys crossed the Taiwan Strait and made landfall over Fujian on the evening of 1 September. It dissipated over land the next morning. In Fujian over 30000 people had to flee their homes in the fury of Gladys. Serious flooding was reported in many places, damaging houses and inundating farmland. Power supply to Fuzhou was also interrupted.

Severe Tropical Storm Harry (9418) formed over the South China Sea on 25 August. It necessitated the hoisting of tropical cyclone warning signals in Hong Kong. A detailed report on Harry is presented in Section 3.

Ivy (9419) formed as a tropical depression about 380 km west of Wake Island on 27 August. Moving northwards at 14 km/h, it deepened to a tropical storm the following day. Ivy turned northwestwards on 29 August while maintaining its strength. It further intensified to a severe tropical storm on 30 August and to a typhoon the next day. Recurving towards the north-northeast on 1 September, Ivy weakened to a tropical storm the following day and became extratropical on 4 September.

Typhoon John (9420) crossed the International Date Line from the central North Pacific near 22^{o}N on 28 August, moving northwestwards at 22 km/h initially. It weakened to a severe tropical storm on 31 August and to a tropical storm on 1 September. John made a clockwise loop over the next few days, intensifying again to a severe tropical storm after completing the loop on 7 September. The next day, John turned east-northeastwards and re-entered the central North Pacific.

A low pressure area developed into Tropical Depression Joel (9422) about 320 km southeast of Xisha on 3 September, quickly deepening to a tropical storm while moving west-northwestwards at 16 km/h. Joel turned southwestwards on the early morning of 5 September and started to take on a northerly track that evening. Intensifying to a severe tropical storm about 200 km south-southwest of Haikou, it swept across Hainan and

Beibu Wan to make landfall over northern Vietnam on the evening of 7 September. Over land, Joel weakened progressively to a tropical depression and dissipated on 9 September.

Over the Pacific, Kinna (9421) developed as a tropical depression about 490 km south of Iwo Jima on 5 September. Moving northwards at about 15 km/h, it deepened progressively and attained typhoon strength on 9 September when it was about 410 km north-northwest of Iwo Jima. Kinna adopted a northeastward track the following day. Accelerating to 45 km/h, it weakened to a severe tropical storm on the evening of 11 September and to a tropical storm the next morning. Extratropical transition took place later that day.

Luke (9423) formed as a tropical depression about 920 km east of Manila on 7 September. It necessitated the hoisting of tropical cyclone warning signals in Hong Kong. A detailed report on Luke is presented in Section 3.

Melissa (9424) formed as a tropical depression about 1270 km south-southwest of Wake Island on 11 September. Moving northwestwards, Melissa intensified to a tropical storm the next day. It turned northeastwards and intensified further to a severe tropical storm on 13 September. After attaining typhoon strength on 14 September, Melissa tracked north-northwestwards the next day, maintaining typhoon intensity until 18 September when it weakened to a severe tropical storm about 1130 km east-southeast of Tokyo. Melissa became extratropical the following day while moving northwards. In Japan at least three people were killed, nine were injured and seven were reported missing.

Nat (9425) developed as a tropical depression about 500 km west-southwest of Guam on 15 September. Moving east-northeastwards, it intensified to a tropical storm the next day. Nat took on a northward track on the morning of 18 September, but turned northwestwards that evening. After weakening to a tropical depression on the afternoon of 20 September, it recurved northeastwards and eventually dissipated over water.

Orchid (9426) started as a tropical depression about 450 km west-southwest of Guam on 18 September. Moving on a winding path towards the north, it intensified to a tropical storm the next day. Orchid turned southwestwards on the evening of 21 September, intensifying to a severe tropical storm on 22 September and to a typhoon on 23 September. For the next five days, Orchid moved north-northwestwards over the Pacific before turning towards Japan on 28 September. It landed over Honshu on the evening of 29 September and entered the Sea of Japan as a severe tropical storm the next morning. Orchid became extratropical soon afterwards. In Japan at least nine people were injured and one reported missing. More than 90 houses were submerged in flood water due to heavy rain.

Pat (9427) started as a tropical depression about 490 km south of Wake Island on 21 September. Gathering strength over water, it intensified progressively and attained typhoon intensity on 23 September. Pat moved northwestwards the following day and became westward-moving on 25 September. Having weakened to a severe tropical storm, Pat further degenerated to a tropical storm on 26 September and took on a northerly track. On 27 September, Pat started to recurve northeastwards. It became extratropical the following night.

An area of low pressure deepened to a tropical depression named Ruth (9428) about 1410 km west of Wake Island on 24 September. Ruth intensified to a tropical storm on 25 September and interacted with the circulation of Typhoon Pat. Having weakened to a tropical depression, it merged with Pat the next day.

An area of disturbance developed into a tropical depression about 850 km north-northwest of Wake Island on 29 September. Initially moving northwestwards, the tropical depression began heading westwards on the morning of 2 October and turned sharply towards the east that evening. It became extratropical later on 3 October.

Seth (9429) developed as a tropical depression about 640 km east-northeast of Truk on 3 October. It intensified quickly to a tropical storm later that day. Seth moved west-northwestwards over the Pacific during

the next three days and attained typhoon intensity about 1450 km east of Manila on 6 October. Seth began taking on a northwestward track on 7 October and turned northwards two days later while it was about 390 km east of Gaoxiong. Heavy rain and high winds associated with the outer circulation of Seth affected Taiwan and eight people were killed. Six were reported missing and 15 were injured. A total of 2 200 hectares of farmland was flooded and about 100 houses were damaged. Loss in agriculture amounted to NT$60 million. Electricity supply to over 600000 households was disrupted.

Seth weakened to a severe tropical storm on 11 October as it headed further north. After rampaging through Korea, it became extratropical on 12 October. Seth claimed one life and left 550 homeless in Korea.

After the dissipation of Seth, another tropical cyclone named Verne (9431) formed about 1630 km east of Truk on 15 October. Moving west-northwestwards at a speed of about 30 km/h, Verne intensified to a tropical storm about 780 km east of Guam on 18 October. It deepened further to a severe tropical storm the next day. Verne attained typhoon intensity on 21 October and maintained its intensity for almost six days before weakening to a severe tropical storm on 27 October. During this time it made a counter-clockwise loop over the Pacific to the east of the Philippines, completing the loop by 29 October. Heading northeastwards towards the Ogasawara Islands, Verne weakened to a tropical storm on 30 October and became extratropical on 1 November.

Teresa (9430) formed as a tropical depression on the morning of 16 October. Gathering strength over water on a westward track, it intensified progressively and became a typhoon about 860 km east of Manila on 19 October. Heading west-southwestwards, Teresa hit the Philippines and weakened to a severe tropical storm on 21 October. During the passage of Teresa over the Philippines, 11 people were killed, four were reported missing and 100 000 had to be evacuated. In addition to the heavy damage to rice and coconut plantations, electricity supply to Manila and the surrounding areas was cut off. In stormy weather and high seas, a tanker, Thanassis A, capsized and split into two in the northern part of the South China Sea about 600 km southeast of Hong Kong. Of the 36 people on board, two were found dead and 14 were reported missing.

After sweeping across the Philippines, Teresa entered the South China Sea and tracked southwestwards over the next couple of days. Adopting a westward course, Teresa weakened progressively to a tropical depression on 26 October. It dissipated over water shortly afterwards.

Wilda (9432) formed as a tropical depression about 710 km south-southeast of Wake Island on 20 October. Tracking west-northwestwards at about 15 km/h, it intensified progressively and attained typhoon intensity about 1050 km north-northeast of Truk on 22 October. Maintaining typhoon intensity over the Pacific, Wilda turned sharply towards the northeast on 25 October. Moving into higher latitudes, it weakened to a severe tropical storm on 31 October and became extratropical that night.

Yuri (9433) formed as a tropical depression near the International Date Line about 1400 km east-northeast of Wake Island on 23 October. It deepened quickly to a tropical storm that day and moved westwards rapidly at about 40 km/h. Yuri weakened to a tropical depression on 25 October and dissipated over water the following day.

Zelda (9434) formed as a tropical depression about 260 km south of Wake Island on 28 October. Moving southwestwards initially, it turned westwards on 31 October and deepened to a tropical storm that day. It intensified further to a severe tropical storm on 1 November when it was about 250 km north of Truk Island. Zelda became a typhoon about 360 km east of Guam the following day. Tracking generally northwestwards over water, recurvature took place on the evening of 6 November. Zelda weakened to a severe tropical storm on 7 November and soon became extratropical over the Pacific to the south of Japan.

Originating from an area of disturbance, Axe1 (9435) developed to a tropical depression about 550 km west of Truk Island on 16 December. It deepened to a tropical storm on 17 December and intensified further to a severe tropical storm when it was about 220 km northwest of Yap. Moving westwards at 16 km/h, Axe1 attained typhoon strength on 19 December. It made landfall over the Philippines two days later and inflicted significant damage there. At least 16 people were killed and 49 were injured. Power supply to the main island of Luzon was disrupted. Axe1 weakened to a severe tropical storm on 22 December shortly before entering the South China Sea. Tracking northwestwards, it weakened progressively to a tropical depression about 420 km south-southwest of Dongsha. Axe1 became slow-moving on 26 December. It dissipated over water the following day while moving southwards.

The last tropical cyclone in 1994, Bobbie (9436), formed as a tropical depression about 1680 km east of Truk Island on 18 December. It deepened to a tropical storm the next day and turned north-northwestwards. Adopting a west-northwestward course across the Mariana Islands, Bobbie weakened to a tropical depression on the morning of 25 December. It dissipated over the Pacific later that day.

Note: Casualties and damage figures were consolidated from press reports.

Section 3

REPORTS ON TROPICAL CYCLONES AFFECTING HONG KONG IN 1994

(a) Severe Tropical Storm Russ (9403)

3 - 9 June 1994

The track of Russ is shown in Figure 4

An area of disturbance associated with a trough of low pressure over the South China Sea developed into Tropical Depression Russ about 290 km south of Hong Kong in the afternoon of 3 June. Moving eastwards at about 13 km/h initially, Russ quickly intensified to a tropical storm that night. It passed about 60 km south of Dongsha during the early hours of 5 June. Slowing down significantly, Russ deepened into a severe tropical storm about 380 km southeast of Hong Kong later that morning. It then turned west-southwestwards and temporarily weakened to a tropical storm early on 7 June when it was about 330 km south of Hong Kong. Russ re-intensified to a severe tropical storm that night and headed west-northwestwards just east of Hainan and Leizhou. It made landfall over the coast of western Guangdong near Zhanjiang in the afternoon of 8 June. Moving further inland, Russ weakened to a tropical depression and dissipated over land the next day.

Russ and its associated torrential downpour inflicted heavy losses on southern China. In Guangdong 59 people were killed, 684 were injured and 16 others were reported missing. Around 690 000 houses were damaged, leaving 253 000 people homeless. Furthermore, 530 000 hectares of farmland were devastated by flash floods. In the hardest-hit cities of Zhanjiang and Maoming, a number of main roads were cut off. Telecommunication, water and electricity supplies also suffered different degrees of disruption. Economic loss in Guangdong was estimated at 5.8 billion RMB. In Guangxi, 14 people were killed and 37 were injured. About 170 000 hectares of farmland were destroyed and a total of 35 000 houses was damaged. Economic loss in the province was put at 480 million RMB. In Hainan Russ left one person dead and five injured. Around 2430 hectares of farmland were flooded and some irrigation works were damaged.

Russ was closest to Hong Kong at the time of its formation at around 2 p.m. on 3 June. Its movement at the time was towards the east and therefore posed no immediate threat to the territory. But as Russ took on a west-southwestward course on 5 June, the Stand By Signal No. 1 was hoisted at 10.10 a.m. when Russ was about 390 km to the southeast of Hong Kong. Weather in Hong Kong that day was mainly fine with moderate northeasterly winds. When winds gradually strengthened from the east, the Strong Wind Signal No. 3 was hoisted at 8.30 p.m. on 6 June. The lowest sea-level pressure of 1 002.8 hPa was recorded at the Royal Observatory at 6 p.m. that evening when Russ was to the south-southeast. The weather deteriorated and showers began setting in on 7 June. As Russ continued to move away from Hong Kong and local winds generally moderated, all signals were lowered at 3.45 p.m. that afternoon. The showery conditions over Hong Kong, however, persisted for a further couple of days.

In Hong Kong a collapsed scaffolding was reported in Kwun Tong. A Panama freighter "IONIAN SUN" was in trouble during the passage of Russ while it was about 200 km southeast of Hong Kong.

The rainfall distribution associated with Russ is shown in Figure 5. Information on wind, rainfall and tide during the passage of Russ is given as follows :

Maximum gust peak speeds and maximum hourly mean winds with associated wind directions recorded at various stations during the hoisting of tropical cyclone warning signals for Russ : -

Station (see Fig. 1)	Maximum Gust				Maximum Hourly Wind				
	Direction	Speed(km/h)	Date	Time	Direction	Speed(km/h)	Date	Time
Central	E	65	7 Jun	0114	E	34	6 Jun	2100
Cheung Chau	E	85	7 Jun	0601	ESE	52	7 Jun	1100
Cheung Sha Wan	NE	70	6 Jun	1742	ENE	25	7 Jun	0200

Station (see Fig. 1)	Maximum Gust Direction	Speed(km/h)	Date	Time	Maximum Hourly Wind Direction	Speed(km/h)	Date	Time
Green Island	ENE	87	6 Jun	2210	ENE	59	6 Jun	2200
H.K.Airport(SE)	NE	72	6 Jun	1750	E	34	7 Jun	1100
King's Park	E	56	6 Jun	2352	ESE	25	7 Jun	1100
	ESE	56	7 Jun	0759				
	ESE	56	7 Jun	1009				
L au Fau Shan	ENE	67	6 Jun	1820	ENE	34	6 Jun	1900
Sai Kung	ENE	67	6 Jun	1359	ENE	41	6 Jun	1800
Sha Lo Wan	E	83	7 Jun	1455	E	47	7 Jun	0300
Sha Tin	ENE	52	7 Jun	0022	ENE	22	6 Jun	1700
Star Ferry	E	63	7 Jun	0647	E	36	7 Jun	0900
Ta Kwu Ling	ESE	52	7 Jun	0752	ESE	23	7 Jun	1200
Tai Mo Shan	ESE	104	7 Jun	0633	E	76	7 Jun	0800
Tai Po Kau	E	72	7 Jun	0915	E	40	7 Jun	0200
T be's Cairn	ESE	96	7 Jun	0854	E	58	7 Jun	0500
Tseung Kwan 0	ESE	59	7 Jun	0300	ESE	19	6 Jun	2200
					E	19	6 Jun	2300
					ESE	19	7 Jun	0200
Tsing Yi	ESE	81	7 Jun	1019	ESE	43	7 Jun	0900
Tuen Mun	SE	62	7 Jun	1137	E	20	6 Jun	1500
Waglan Island	E	83	6 Jun	2302	E	68	6 Jun	2400
Wong Chuk Hang	ENE	76	6 Jun	2358	ENE	34	6 Jun	2400

Daily rainfall amounts in millimetres recorded at the Royal Observatory and other stations during the passage of Russ : -

Station (see Fig. 5)	5Jun	6 Jun	7 Jun	8 Jun	total
Royal Observatory	Nil	Trace	10.3	33.4	43.7
H19(HK Island (east))	Nil	Nil	9.0	26.5	35.5
H13(HK Island (west))	Nil	Nil	24.0	39.5	63.5
H21 (HK Island (south))	Nil	Nil	13.0	18.0	31.0
K04(Kowloon (east))	Nil	Nil	14.5	20.5	35.0
K06(Kowloon (west))	Nil	Nil	17.0	27.0	44.0
Nl7(Lantau)	Nil	Nil	38.0	24.5	62.5
Nl3(Sai Kung)	Nil	Nil	6.0	30.5	36.5
N09(Sha Tin)	Nil	Nil	11.0	26.5	37.5
R26(Shek Kong)	Nil	Nil	36.0	36.5	72.5
N05(Sheung Shui)	Nil	Nil	12.0	59.0	71.0
N06(Tsuen Wan - Kwai Chung)	Nil	Nil	24.5	37.5	62.0
R21(Tuen Mun)	Nil	Nil	22.5	15.0	37.5
N12(Yuen Long)	Nil	Nil	11.0	41.0	52.0

Station with incomplete record :
R31 (Tai Po)

Times and heights of the maximum sea level and maximum storm surge recorded at tide stations in Hong Kong during the passage of Russ :-

Station (see Fig.1)	Maximum sea level above chart datum			Maximum storm surge above astronomical tide		
	Height (m)	Date	Time	Height (m)	Date	Time
Chi Ma Wan	2.42	7 Jun	6.28 a.m.	0.50	6 Jun	10.25 p.m.
Ko Lau Wan	2.20	7 Jun	5.30 a.m.	0.35	6 Jun	9.45 p.m.
Quarry Bay	2.35	7 Jun	6.30 a.m.	0.53	7 Jun	5.11 a.m.
Tai Po Kau	2.35	7 Jun	5.20 a.m.	0.61	7 Jun	3.35 a.m.
Tsim Bei Tsui	2.72	7 Jun	8.06 a.m.	0.52	7 Jun	6.12 a.m.

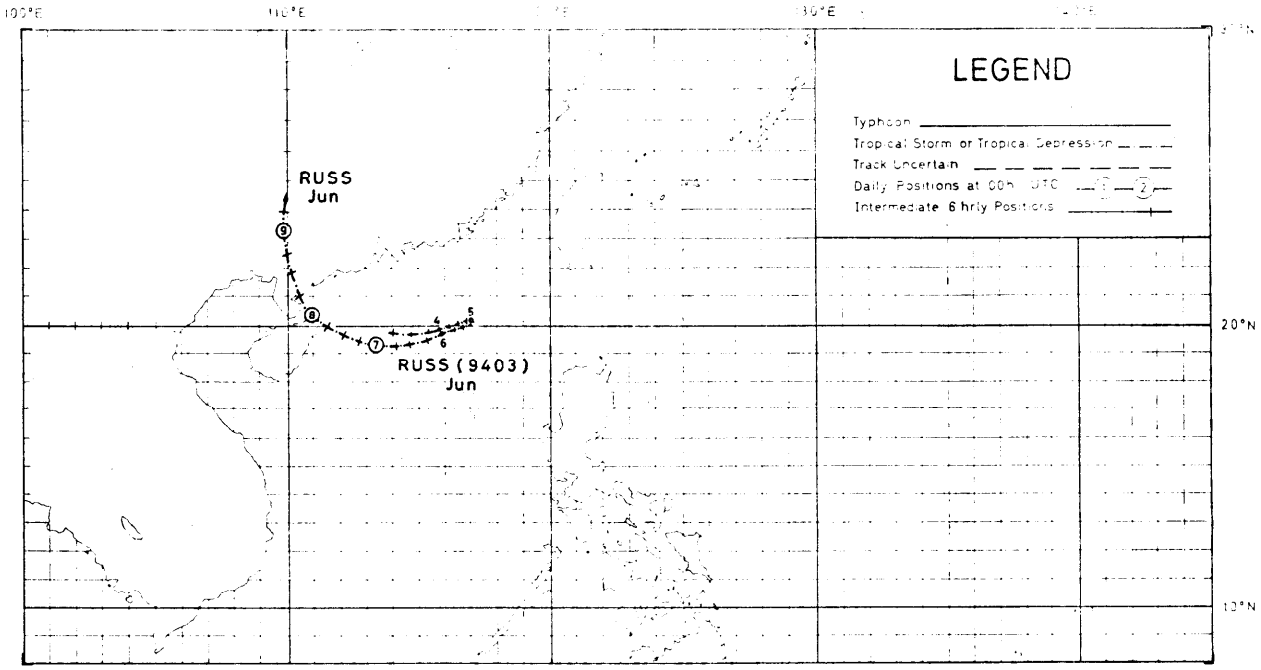

Figure 4. Track of Severe Tropical Storm Russ (9403) : 3 - 9 June 1994.

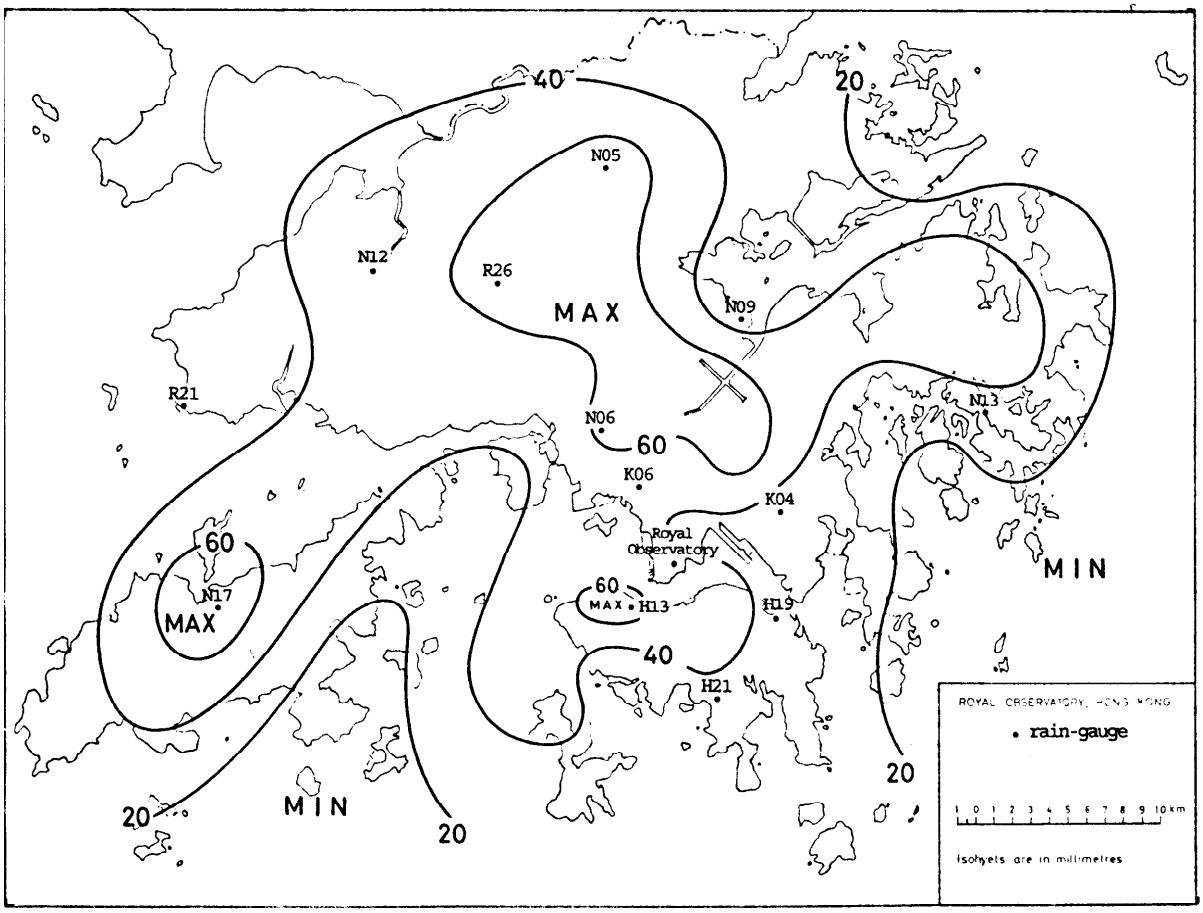

Figure 5. Rainfall distribution on 5 - 8 June 1994.

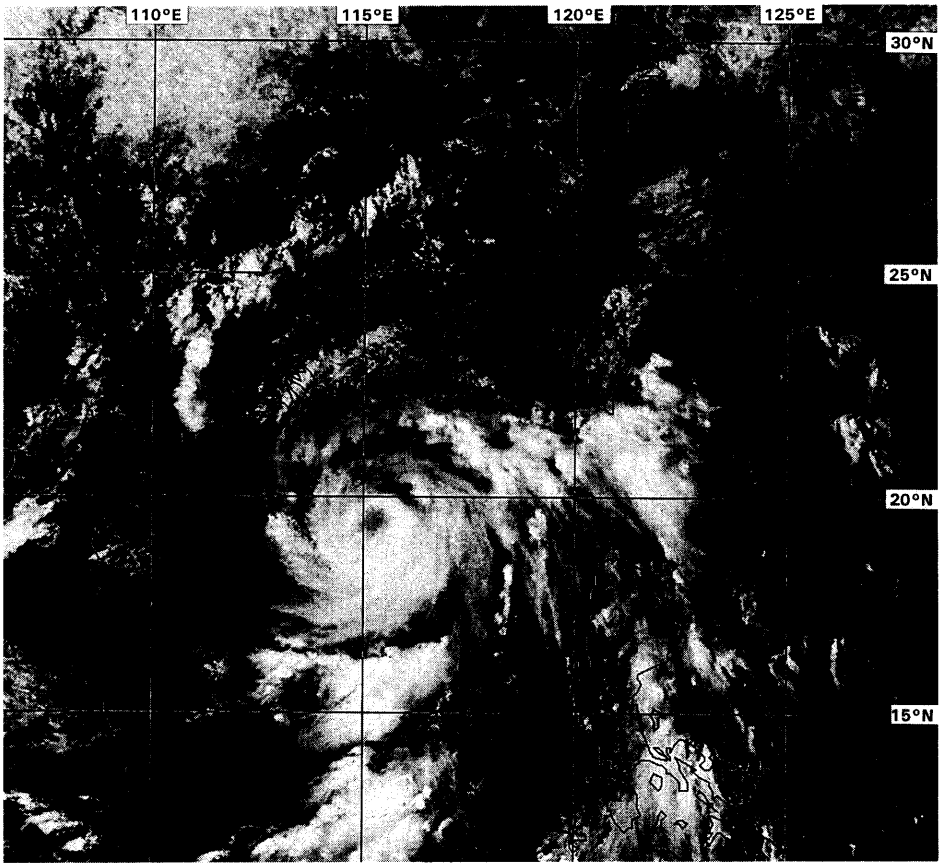

Figure 6. GMS-4 visible imagery of Russ at around 2 p.m. on 6 June 1994.

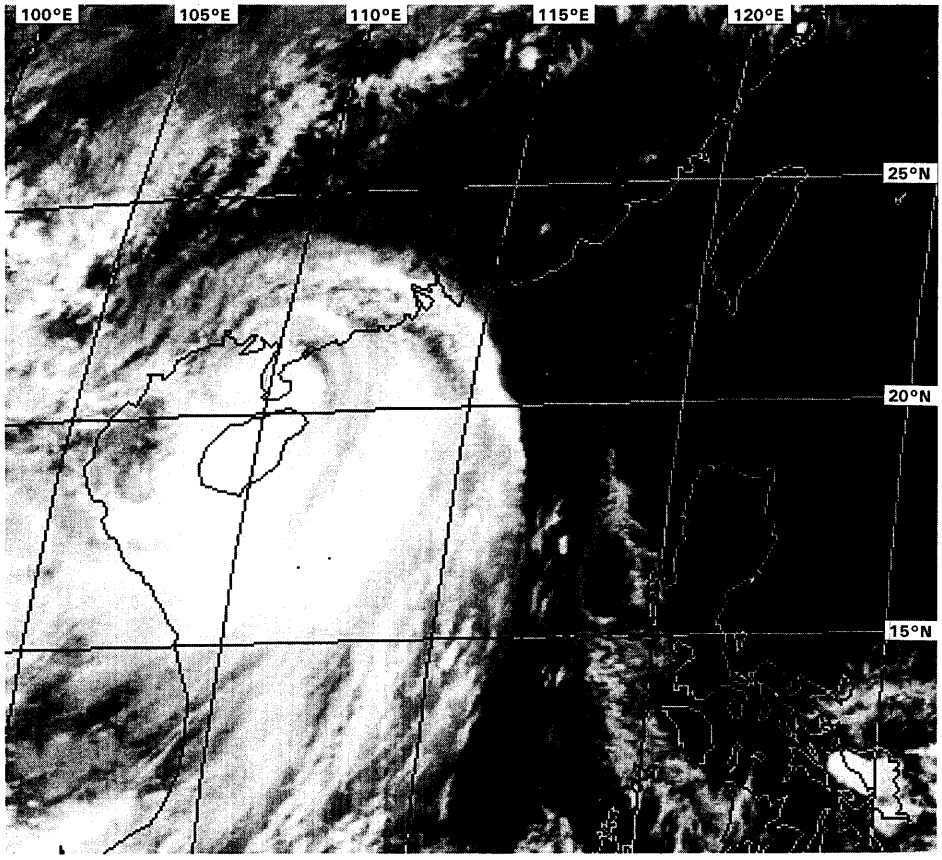

Figure 7. GMS-4 infra-red imagery of Russ at around 2 p.m. on 8 June 1994.

(b) Tropical Storm Sharon (9404)

23 - 25 June 1994

The track of Sharon is shown in Figure 8

An area of disturbance travelled west-northwestwards across Luzon in the morning of 23 June. This disturbance developed into Tropical Depression Sharon about 210 km northwest of Manila shortly after entering the South China Sea that afternoon. Gathering strength over water, Sharon deepened into a tropical storm about 380 km south of Dongsha early the next day. It then moved towards the coast of western Guangdong. Sharon made landfall about 140 km east-northeast of Zhanjiang in the morning of 25 June and at the same time weakened to a tropical depression. Moving further inland, Sharon dissipated as an area of low pressure later that day.

In Luzon heavy rain associated with Sharon caused flooding and unleashed mudflows from Mount Pinatubo. Two people were killed. The mudflows also disrupted traffic on two main highways near Manila.

Sharon claimed four lives in Guangdong. In Yangjiang and Maoming, more than 6700 houses collapsed and 50 000 others were damaged. A total of 120 000 hectares of agricultural land was also affected.

In Hong Kong, the Stand By Signal No. 1 was hoisted at 10.50 a.m. on 24 June when Sharon was about 430 km to the south. At the time, showery weather dominated over the territory. Winds were moderate to fresh easterlies at first, becoming southeasterlies, occasionally strong offshore later in the day. The No. 1 signal was lowered at 6.30 a.m. on 25 June when Sharon was about to make landfall. Sharon came closest to Hong Kong at around 2 p.m. on 25 June when it was about 250 km to the west-northwest. The lowest sea-level pressure of 1 002.3 hPa was recorded at the Royal Observatory at around 5 p.m. on 24 June.

During the passage of Sharon, a Chinese fishing vessel with 11 fishermen on board sank near Tathong Channel. Another boat was tom off from its mooring in Kwun Tong Typhoon Shelter. In Central five people were injured by broken glass falling from the window of a commercial building. There were also reports of collapsed scaffoldings in Kowloon Tong and To Kwa Wan.

The rainfall distribution associated with Sharon is shown in Figure 9. Information on wind, rainfall and tide during the passage of Sharon is given as follows :

Maximum gust peak speeds and maximum hourly mean winds with associated wind directions recorded at various stations during the hoisting of tropical cyclone warning signal for Sharon : -

	Maximum Gust				Maximum Hourly Wind			
Station (see Fig. 1)	Direction	Speed(km/h)	Date	Time	Direction	Speed(km/h)	Date	Time
Central	ESE	58	24 Jun	1635	E	31	24 Jun	1600
Cheung Chau	E	70	24 Jun	1624	ESE	47	24 Jun	2200
Cheung Sha Wan	ENE	54	24 Jun	1403	ENE	22	24 Jun	1300
Green Island	ENE	81	24 Jun	1528	E	51	24 Jun	1300
H.K. Airport(SE)	E	70	24 Jun	1440	E	38	24 Jun	1500
King's Park	ESE	52	24 Jun	1743	ESE	22	24 Jun	1800
Lau Fau Shan	E	62	24 Jun	1501	E	31	24 Jun	1600
Sai Kung	S	62	25 Jun	0317	S	38	25 Jun	0300
Sha Lo Wan	ESE	85	24 Jun	2031	E	45	24 Jun	1400
					E	45	24 Jun	1500
Sha Tin	SE	43	24 Jun	2029	SE	16	24 Jun	2200
Star Ferry	E	65	24 Jun	1421	E	31	24 Jun	1600
Ta Kwu Ling	ESE	47	24 Jun	1914	ESE	22	24 Jun	1900
Tai Mo Shan	ESE	96	24 Jun	1529	ESE	72	24 Jun	2000
Tai Po Kau	E	58	24 Jun	1522	E	31	24 Jun	1600

Station (see Fig. 1)	Maximum Gust Direction	Speed(km/h)	Date	Time	Maximum Hourly Wind Direction	Speed(km/h)	Date	Time
Tseung Kwan O	E	52	24 Jun	1456	S	20	25 Jun	0300
Tsing Yi	ESE	79	24 Jun	1641	SE	40	25 Jun	0100
Tuen Mun	SE	62	24 Jun	2303	SE	22	24 Jun	2400
					SE	22	25 Jun	0100
Waglan Island	ENE	72	24 Jun	1211	SE	52	25 Jun	0200
Wong Chuk Hang	ESE	67	24 Jun	1616	ENE	30	24 Jun	1400

Station with incomplete record:
Tate's Cairn

Daily rainfall amounts in millimetres recorded at the Royal Observatory and other stations on days when tropical cyclone warning signal was hoisted for Sharon :-

Station (see Fig. 9)	24 Jun	25 Jun	Total
Royal Observatory	4.5	16.5	21.0
H19 (HK Island (east))	2.5		11.5
H13 (HK Island (west))	4.5	30.5	35.0
H21 (HK Island (south))	0.5	20.5	21.0
K04 (Kowloon (east))	1.0	15.0	16.0
K06. (Kowloon (west))	3.5	21.0	24.5
N17 (Lantau)	1.0	37.0	38.0
N13 (Sai Kung)	1.5	13.0	14.5
N09 (Sha Tin)	2.0	13.0	15.0
R26 (Shek Kong)	2.5	12.5	15.0
N05 (Sheung Shui)	5.5	16.5	22.0
R31 (Tai Po)	5.5	18.5	24.0
N06 (Tsuen Wan - Kwai Chung)	3.5	26.0	29.5
R21 (Tuen Mun)	Nil	13.5	13.5
N12 (Yuen Long)	0.5	18.5	19.0

Times and heights of the maximum sea level and maximum storm surge recorded at tide stations in Hong Kong during the passage of Sharon :-

Station (see Fig. 1)	Maximum sea level above chart datum			Maximum storm surge above astronomical tide		
	Height (m)	Date	Time	Height (m)	Date	Time
Chi Ma Wan	2.58	25 Jun	8.57 a.m.	0.41	24 Jun	2.59 p.m.
Ko Lau Wan	2.41	25 Jun	7.38 a.m.	0.23	24 Jun	7.28 p.m.
Quarry Bay	2.55	25 Jun	8.34 a.m.	0.39	25 Jun	7.10 a.m.
Tai Po Kau	2.61	25 Jun	7.45 a.m.	0.47	24 Jun	7.37 p.m.
Tsim Bei Tsui	3.29	25 Jun	10.00 a.m.	0.63	25 Jun	9.59 a.m.

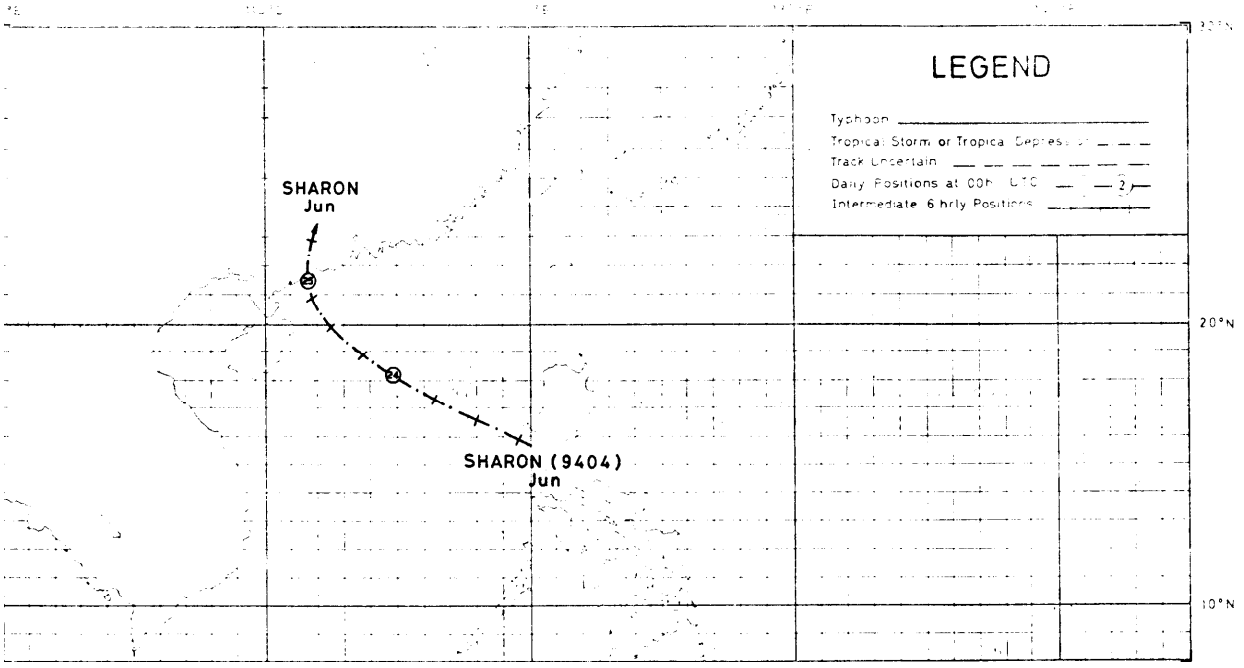

Figure 8. Track of Tropical Storm Sharon (9404) : 23 - 25 June 1994.

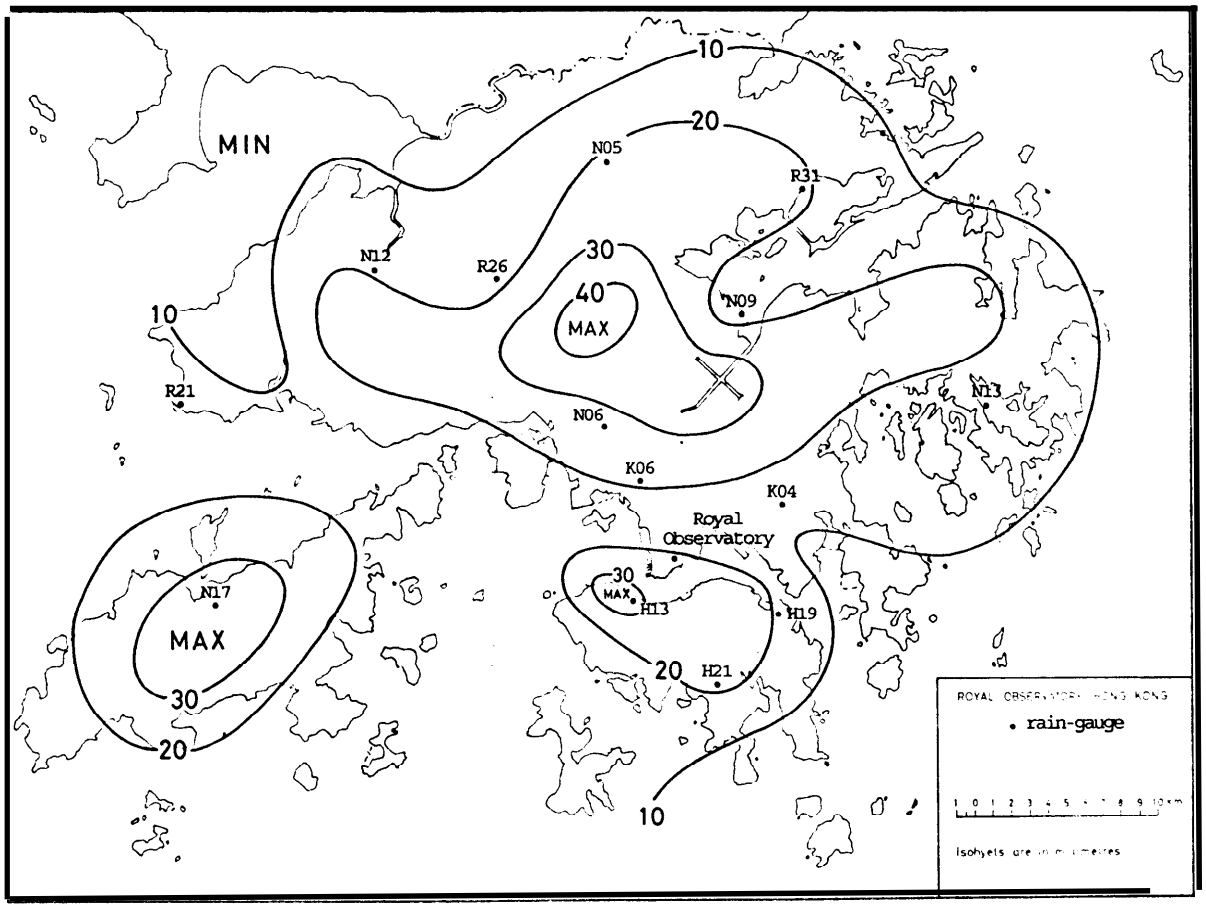

Figure 9. Rainfall distribution on 24 - 25 June 1994.

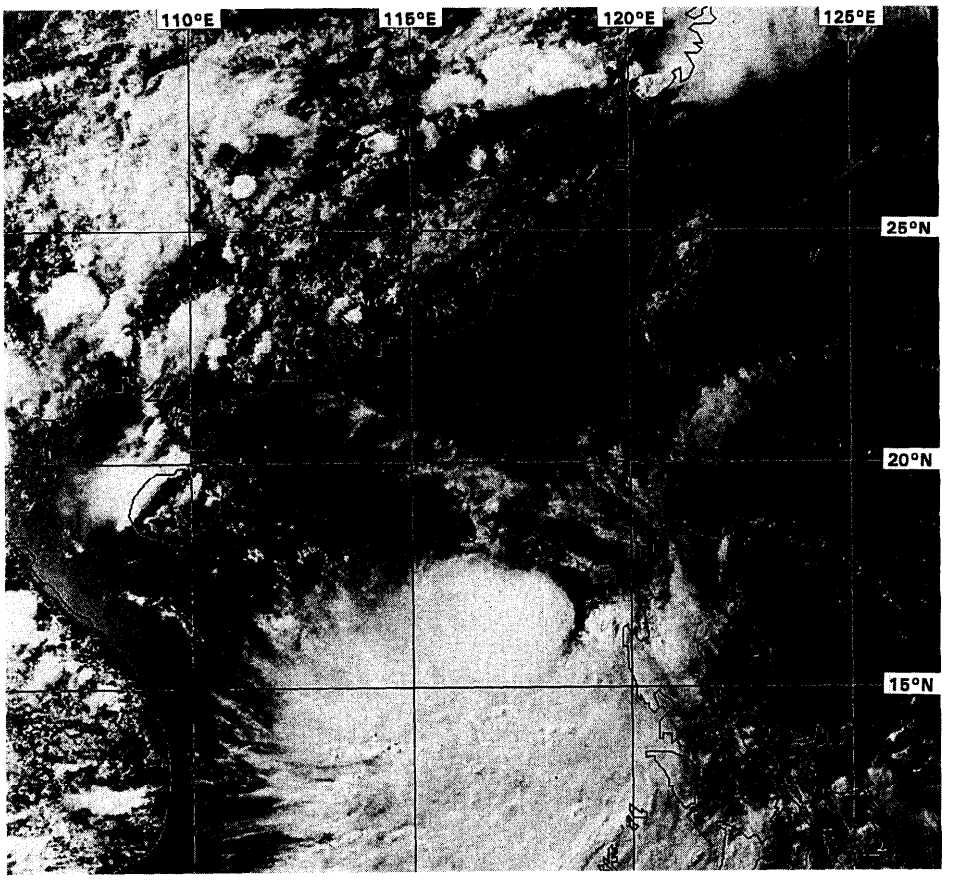

Figure 10. GMS-4 visible imagery of Sharon at aroun 5 p.m. on 23 June 1994.

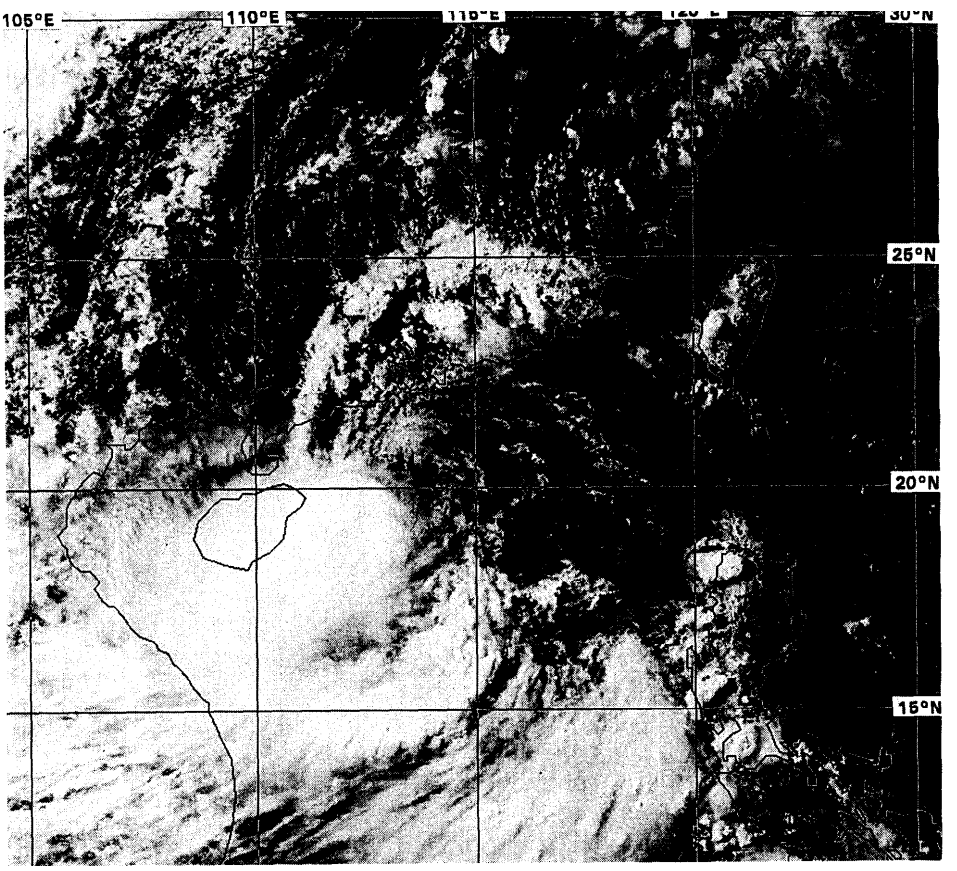

Figure 11. GMS-4 visible imagery of Sharon at around 5 p.m. on 24 June 1994

Figure 12. A collapsed scaffolding in Pak Tai Street, To Kwa Wan (by courtesy of Oriental Daily News).

Figure 13. Broken windows on a commercial building in Central (by courtesy of Oriental Daily News).

(c) Severe Tropical Storm Harry (9418)

25 - 29 August 1994

The track of Harry is shown in Figure 14

Originating from an area of disturbance near Luzon, Harry developed into a tropical depression over the South China Sea about 390 km north-northwest of Manila on the afternoon of 25 August. Moving west-northwestwards steadily at 19 km/h, it intensified to a tropical storm early the next morning. Harry intensified further to a severe tropical storm about 150 km southeast of Zhanjiang on 27 August and skirted the southern tip of Leizhou that night. Harry brought heavy rain to Zhanjiang and caused extensive damage. 90 000 hectares of sugar-cane, 13 000 hectares of paddy field, 16 600 houses, 50 km of river embankments and 370 sites of irrigation works were devastated. The total loss was estimated to be 484 million RMB.

Harry weakened to a tropical storm on the morning of 28 August. After traversing Beibu Wan, it made landfall over northern Vietnam about 160 km east of Hanoi. Harry weakened to a tropical depression on 29 August as it moved further inland and degenerated to an area of low pressure later that day.

In Hong Kong, the Stand By Signal No.1 was hoisted at 10.50 p.m. on 25 August when Harry was about 600 km to the southeast. The weather was fine with light winds at first but deteriorated early the next day as squally showers associated with the outermost rainbands of Harry began to affect the territory. Winds continued to strengthen from the east during the day on 26 August and the Strong Wind Signal No.3 was hoisted at 4.15 p.m. when Harry was about 340 km to the south. As Harry moved closer, near gale force winds were experienced offshore. Harry came closest to Hong Kong at around 11 p.m. on 26 August when it was about 270 km to the south. The lowest sea-level pressure of 1 004.4 hPa was recorded at the Royal Observatory at around 4 a.m. on 27 August. As Harry turned westwards and headed towards Leizhou, all signals were lowered at 11.45 a.m.

In Hong Kong, the adverse weather resulted in the collision of a hydroferry and a catamaran off Stonecutters Island, injuring two passengers. A double-decked ferry carrying 30 passengers smashed into a fish farm near Lamma Island after developing engine trouble. A swimmer was drowned in heavy seas in Sai Kung.

A 15-square-metre retaining wall collapsed near Chung Shan Terrace in Lai Chi Kok. On Wai Yip Street in Ngau Tau Kok, a scaffolding was blown askew. At Tsim Sha Tsui, a car was badly damaged by a fallen signboard. Tram services near Causeway Bay were also disrupted as a fallen signboard hit a section of the overhead cable in Percival Street.

During the passage of Harry, ferry services from Central to the outlying islands were suspended and four incoming flights had to be diverted.

The rainfall distribution associated with Harry is shown in Figure 15. Information on wind, rainfall and tide during the passage of Harry is given as follows :

Maximum gust peak speeds and maximum hourly mean winds with associated wind directions recorded at various stations during the hoisting of tropical cyclone warning signals for Harry :-

	Maximum Gust				Maximum Hourly Wind			
Station (see Fig. 1)	Direction	Speed(km/h)	Date	Time	Direction	Speed(km/h)	Date	Time
Central	ESE	81	27 Aug	1001	E	31	27 Aug	0600
Cheung Chau	E	101	27 Aug	0202	E	54	27 Aug	1000
Cheung Sha Wan	ENE	68	26 Aug	2319	ENE	22	26 Aug	2400

Station (see Fig. 1)	Maximum Gust Direction	Speed(km/h)	Date	Time	Maximum Hourly Wind Direction	Speed(km/h)	Date	Time
H.K. Airport(SE)	E	72	27 Aug	0435	E	38	27 Aug	0200
King's Park	SE	75	26 Aug	0934	ESE	23	27 Aug	0200
Lau Fau Shan	E	77	27 Aug	1021	ENE	31	26 Aug	1700
Sai Kung	SSE	77	27 Aug	1016	E	34	27 Aug	0200
Sha Lo Wan	ENE	113	26 Aug	1001	E	45	27 Aug	0100
					E	45	27 Aug	0400
Sha Tin	NE	63	26 Aug	1549	ENE	20	27 Aug	0100
Star Ferry	ESE	72	27 Aug	1018	E	36	27 Aug	0900
Ta Kwu Ling	ESE	68	27 Aug	0614	E	23	27 Aug	1000
Tai Mo Shan	ESE	140	27 Aug	0203	E	87	27 Aug	0700
Tai Po Kau	ESE	79	27 Aug	0944	ESE	38	27 Aug	0600
Tate's Cairn	ESE	118	26 Aug	2354	ESE	62	27 Aug	0200
Tseung Kwan O	S	75	27 Aug	0959	ESE	22	27 Aug	0200
Tsing Yi	SE	94	26 Aug	0941	ESE	43	27 Aug	0800
Tuen Mun	SE	67	26 Aug	0959	SE	19	26 Aug	1000
					SE	19	26 Aug	1100
Waglan Island	ESE	104	27 Aug	1110	ENE	65	26 Aug	2100
					ENE	65	26 Aug	2300
Wong Chuk Hang	ESE	87	27 Aug	0137	E	31	27 Aug	1000

Station with incomplete record:
Green Island

Daily rainfall amounts in millimetres recorded at the Royal Observatory and other stations during the passage of Harry:-

Station (see Fig. 15)	26 Aug	27 Aug	28 Aug	29 Aug	Total
Royal Observatory	41.8	73.4	18.7	12.2	146.1
H19 (HK Island (east))	45.5	64.0	27.0	6.5	143.0
H13 (HK Island (west))	43.5	76.0	27.5	5.5	152.5
H21 (HK Island (south))	43.0	67.5	19.5	0.5	130.5
K06 (Kowloon (west))	47.5	53.0	23.0	12.0	135.5
N17 (Lantau)	38.5	44.0	36.5	3.0	122.0
N13 (Sai Kung)	39.0	17.5	83.0	1.0	140.5
N09 (Sha Tin)	36.0	48.5	54.5	4.5	143.5
R26 (Shek Kong)	36.0	73.0	18.0	3.0	130.0
N06 (Tsuen Wan - Kwai Chung)	52.0	69.0	20.0	13.0	154.0
R21 (Tuen Mun)	26.0	55.5	21.0	Nil	102.5
N12 (Yuen Long)	18.5	47.0	20.0	0.5	86.0

Stations with incomplete record :
K04 (Kowloon (east))
N05 (Sheung Shui)
R31 (Tai Po)

Times and heights of the maximum sea level and maximum storm surge recorded at tide stations in Hong Kong during the passage of Harry:-

Station (see Fig. 1)	Maximum sea level above chart datum			Maximum storm surge above astronomical tide		
	Height (m)	Date	Time	Height (m)	Date	Time
Chi Ma Wan	2.26	27 Aug	0.30 a.m.	0.47	27 Aug	5.14 a.m.
Ko Lau Wan	2.19	27 Aug	1.45 a.m.	0.61	26 Aug	6.14 p.m.
Quarry Bay	2.23	27 Aug	2.01 a.m.	0.60	27 Aug	2.33 a.m.
Tai Po Kau	2.28	27 Aug	1.43 a.m.	0.56	27 Aug	10.12 a.m.
Tsim Bei Tsui	2.46	27 Aug	1.18 a.m.	0.46	27 Aug	12.24 p.m.

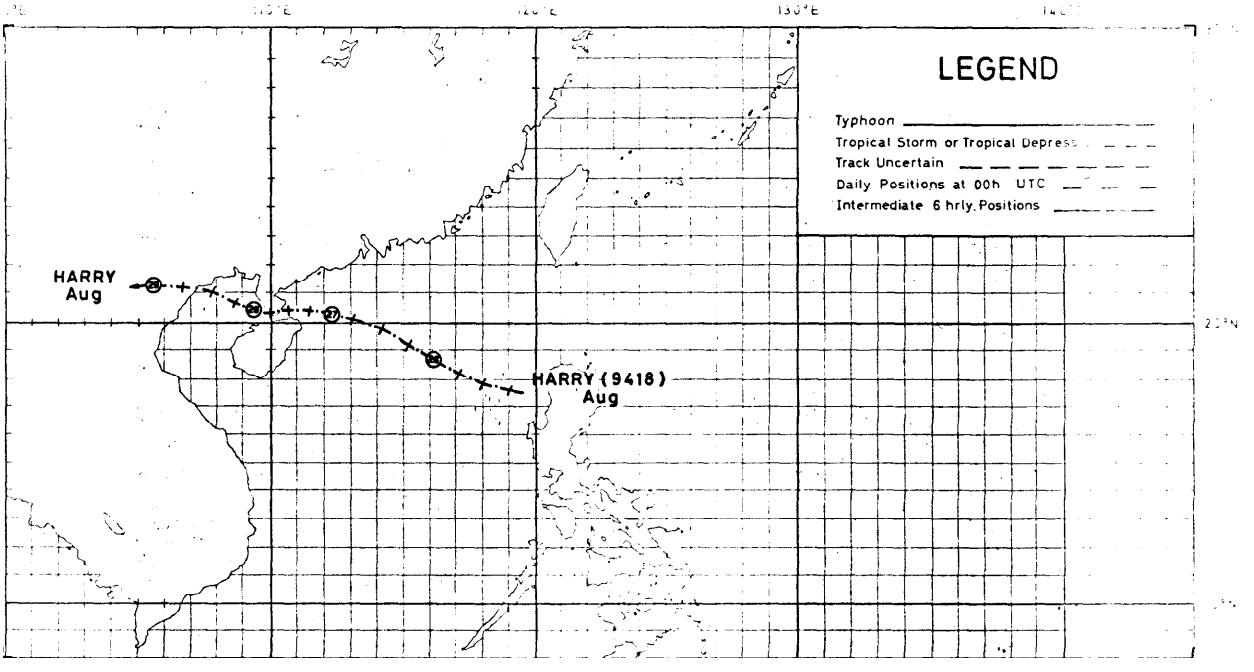

Figure 14. Track of Severe Tropical Storm Harry (9418) : 25 - 29 August 1994.

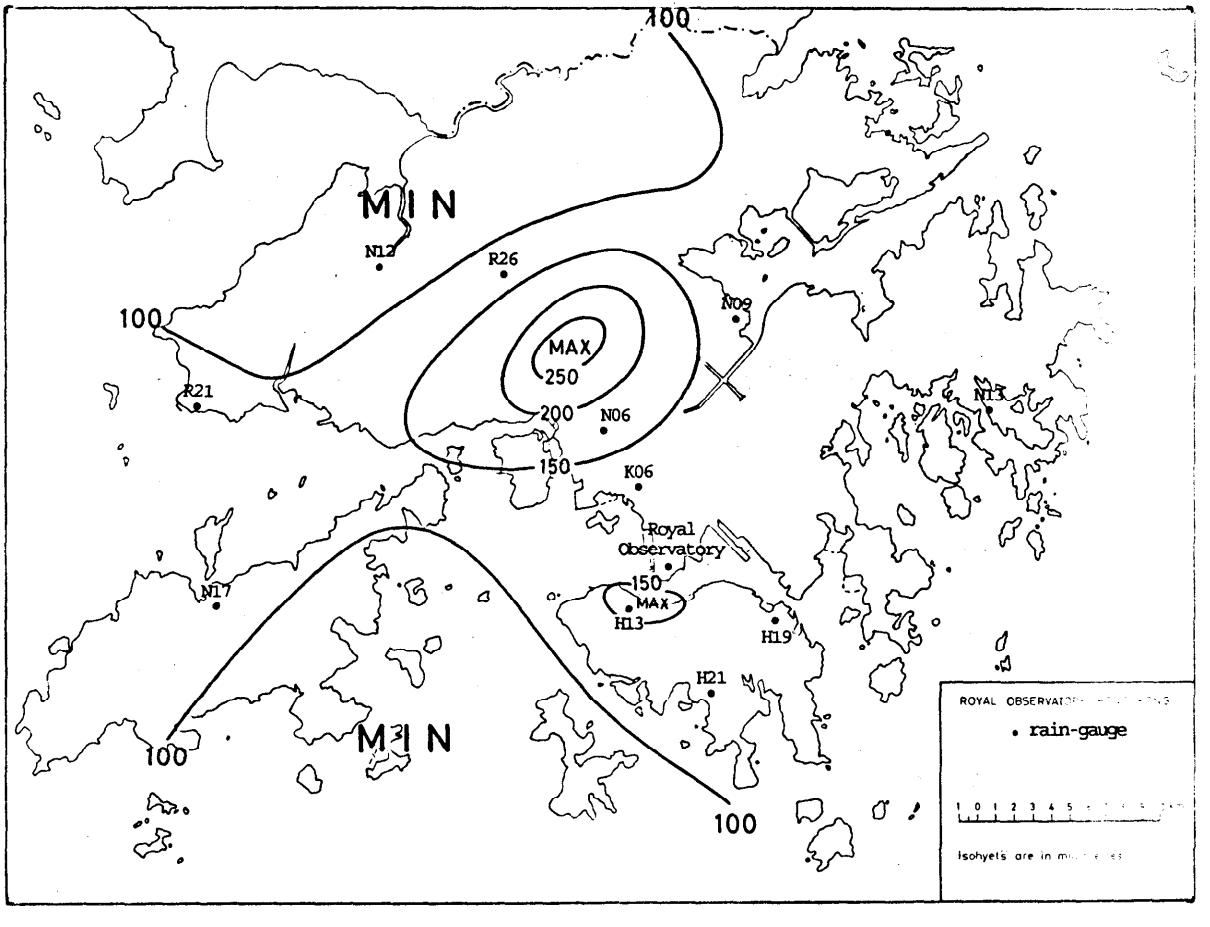

Figure 15. Rainfall distribution on 26 - 29 August 1994.

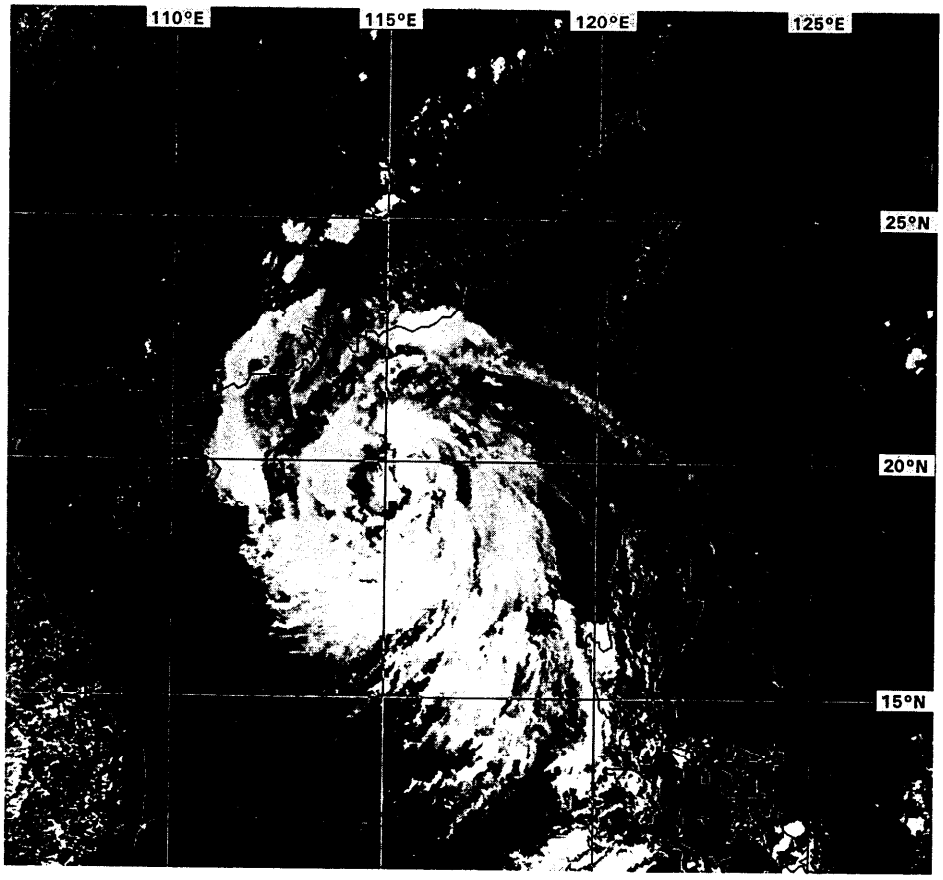

Figure 16. GMS-4 visible imagery of Harry at around 2 p.m. on 26 August 1994.

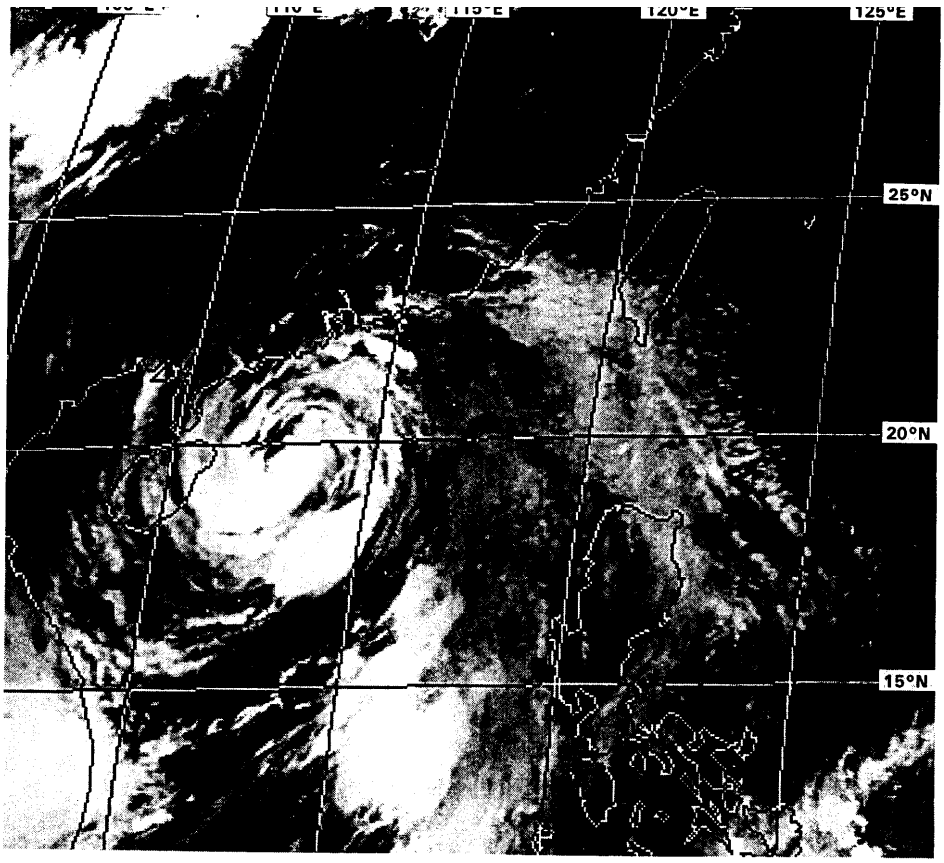

Figure 17. GMS-4 infra-red imagery of Harry at around 2 a.m. on 27 August 1994.

(d) Tropical Storm Luke (9423)

7 - 14 September 1994

The track of Luke is shown in Figure 18

Luke developed as a tropical depression about 920 km east of Manila on the evening of 7 September. Moving northwestwards towards the Luzon Strait, it intensified to a tropical storm the next morning. Luke crossed the Luzon Strait on 10 September and entered the South China Sea early the next day.

Over the South China Sea, Luke headed northwestwards at first. After passing near Dongsha on the evening of 11 September, it turned west-southwestwards and headed towards Hainan Island with a speed of about 20 km/h. It made landfall about 130 km south of Haikou on the late evening of 12 September. Sweeping across Hainan, Luke traversed Beibu Wan the following day. It weakened to a tropical depression on the early morning of 14 September just before making landfall over northern Vietnam. Luke dissipated over land later that morning. In Hainan, more than 3 500 houses were damaged and 45 000 hectares of farmland ruined. Damage to roads, bridges, power plants and reservoirs was also reported. Direct economic loss amounted to over 100 million RMB.

In Hong Kong, the Stand By Signal No. 1 was hoisted at 7.50 a.m. on 11 September when Luke was about 580 km to the east-southeast. At the time, winds were light northerlies. As Luke moved closer to Hong Kong, winds strengthened from the east. The Strong Wind Signal No.3 was hoisted at 10.30 p.m. that evening when Luke was about 240 km to the southeast. Strong winds which occasionally reached gale force were reported at Waglan Island and there were squally showers the next morning. Luke was closest to Hong Kong at about 2 a.m. on 12 September when it was about 230 km to the south-southeast. As Luke moved away from Hong Kong, all signals were lowered at 11.50 a.m. that morning. Heavy showers, however, continued to affect Hong Kong for the rest of the day. During the passage of Luke, the lowest sea-level pressure of 1 003.9 hPa was recorded at the Royal Observatory at around 4 p.m. on 11 September when it was about 400 km to the east-southeast.

In the territory, there were reports of collapsed scaffoldings and toppled trees but no one was injured.

The rainfall distribution associated with Luke is shown in Figure 19. Information on wind, rainfall and tide during the passage of Luke is given as follows :

Maximum gust peak speeds and maximum hourly mean winds with associated wind directions recorded at various stations during the hoisting of tropical cyclone warning signals for Luke :-

	Maximum Gust				Maximum Hourly Wind			
Station (see Fig. 1)	Direction	Speed(km/h)	Date	Time	Direction	Speed(km/h)	Date	Time
Central	E	59	12 Sep	0123	E	30	12 Sep	0400
	NE	75	12 Sep	0444	NE	41	12 Sep	0300
Cheung Sha Wan	NNE	56	11 Sep	2315	NE	20	12 Sep	0100
H.K. Airport(SE)	ENE	62	12 Sep	0305	ENE	27	12 Sep	0400
King's Park	E	62	12 Sep	0841	ENE	19	11 Sep	2400
Lau Fau Shan	NNE	45	12 Sep	0316	NE	27	12 Sep	0200
Sai Kung	NNE	63	11 Sep	2323	NE	38	11 Sep	2300
Sha Lo Wan	ENE	59	11 Sep	2333	ENE	36	11 Sep	2400
Sha Tin	ENE	54	12 Sep	0305	NE	19	11 Sep	2300
Star Ferry	ESE	49	12 Sep	0141	E	22	12 Sep	1000
Ta Kwu Ling	E	51	11 Sep	2222	E	19	11 Sep	2300
Tai Mo Shan	ENE	92	12 Sep	0620	ENE	65	12 Sep	0900
Tai Po Kau	ENE	68	11 Sep	2210	E	34	11 Sep	2300
Tate's Cairn	NE	94	11 Sep	2330	NE	63	11 Sep	2400
Tseung Kwan O	N	67	12 Sep	0134	NNE	22	12 Sep	0200

Station (see Fig. 1)	Maximum Gust Direction	Speed(km/h)	Date	Time	Maximum Hourly Wind Direction	Speed(km/h)	Date	Time
Tsing Yi	NE	76	11 Sep	2309	NE	36	11 Sep	2300
Tuen Mun	NNE	43	11 Sep	2313	NNE	19	11 Sep	2400
Waglan Island	NE	94	12 Sep	0022	ENE	75	11 Sep	2300
					NE	75	11 Sep	2400
					NE	75	12 Sep	0100
Wong Chuk Hang	E	75	12 Sep	0057	E	27	12 Sep	0200

Station with incomplete record:
Green Island

Daily rainfall amounts in millimetres recorded at the Royal Observatory and other stations during the passage of Luke :-

Royal Observatory	79.1	14.1	32.1	125.3
H19 (HK Island (east))	Nil	47.5	43.5	91.0
H13 (HK Island (west))	163.5	10.5	61.5	235.5
H21 (HK Island (south))	15.5	58.5	77.5	151.5
K04 (Kowloon (east))	Nil	2.0	35.0	37.0
K06 (Kowloon (west))	23.5	3.5	33.0	60.0
N17 (Lantau)	0.5	1.0	64.0	65.5
N13 (Sai Kung)	Nil	Nil	24.0	24.0
N09 (Sha Tin)	7.0	3.0	42.5	52.5
N05 (Sheung Shui)	13.0	0.5	24.5	38.0
N06 (Tsuen Wan - Kwai Chung)	25.5	1.5	26.5	53.5
R21 (Tuen Mun)	1.0	34.5	21.0	56.5
N12 (Yuen Long)	4.5	Nil	13.0	17.5

Station with incomplete record :
R31 (Tai Po)
R26 (Shek Kong)

Times and heights of the maximum sea level and maximum storm surge recorded at tide stations in Hong Kong during the passage of Luke :-

Station (see Fig. 1)	Maximum sea level above chart datum			Maximum storm surge above astronomical tide		
	Height (m)	Date	Time	Height (m)	Date	Time
Chi Ma Wan	2.53	12 Sep	1.58 a.m.	0.55	12 Sep	9.10 a.m.
Quarry Bay	2.61	12 Sep	2.14 a.m.	0.61	12 Sep	10.00 a.m.
Tai Po Kau	2.87	12 Sep	2.33 a.m.	0.63	12 Sep	2.33 a.m.
Tsim Bei Tsui	2.58	12 Sep	1.52 a.m.	0.40	12 Sep	11.58 a.m.

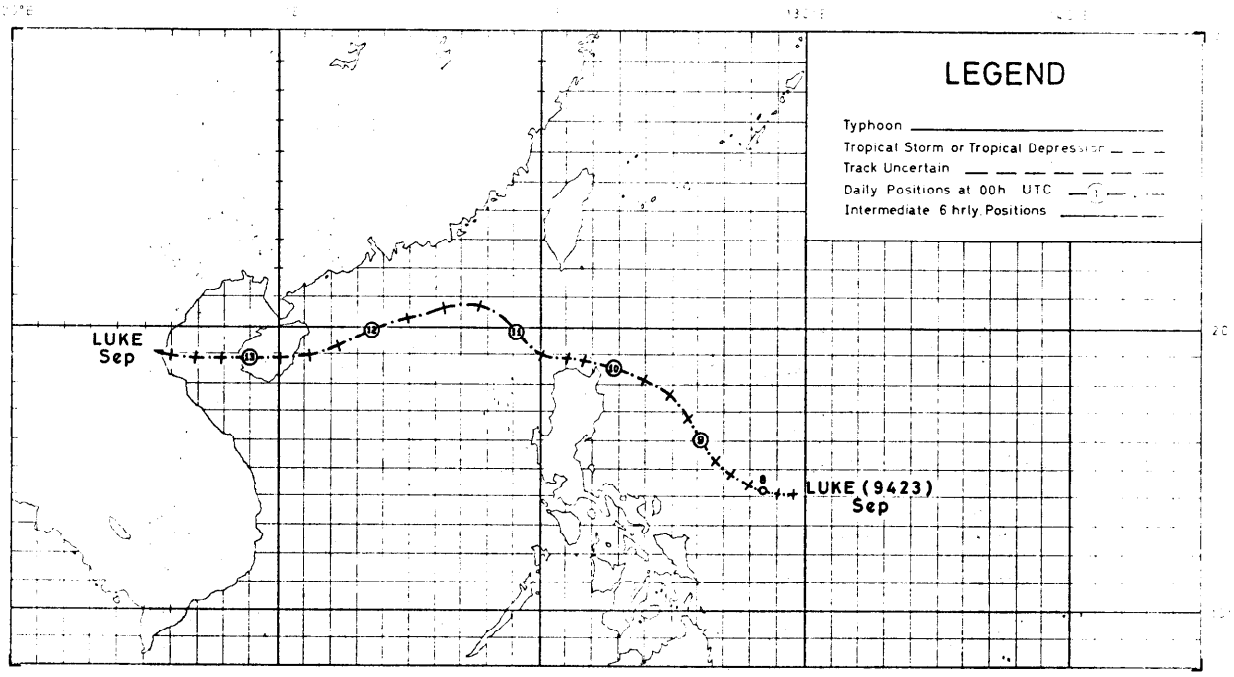

Figure 18. Track of Tropical Storm Luke (9423) : 7 - 14 September 1994.

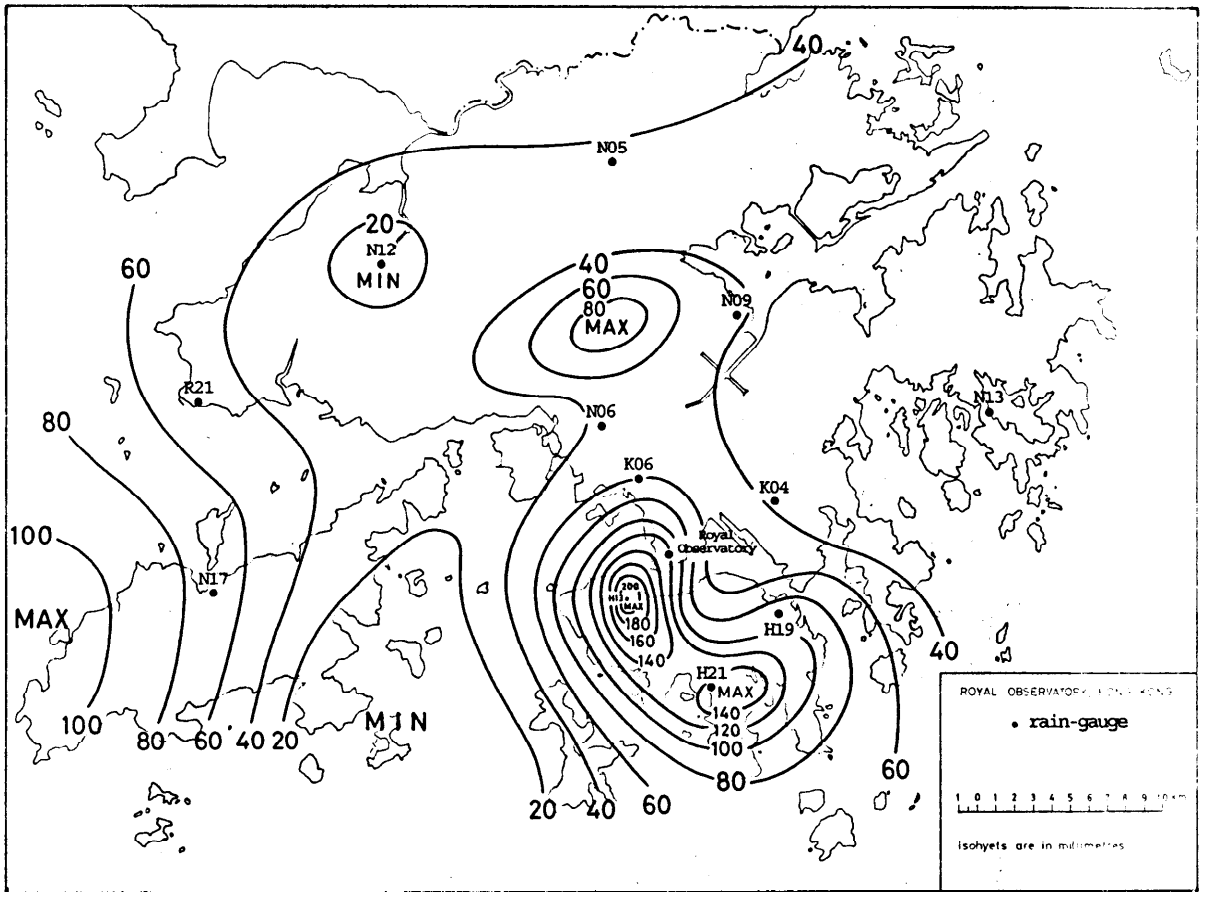

Figure 19. Rainfall distribution on 10 - 12 September 1994.

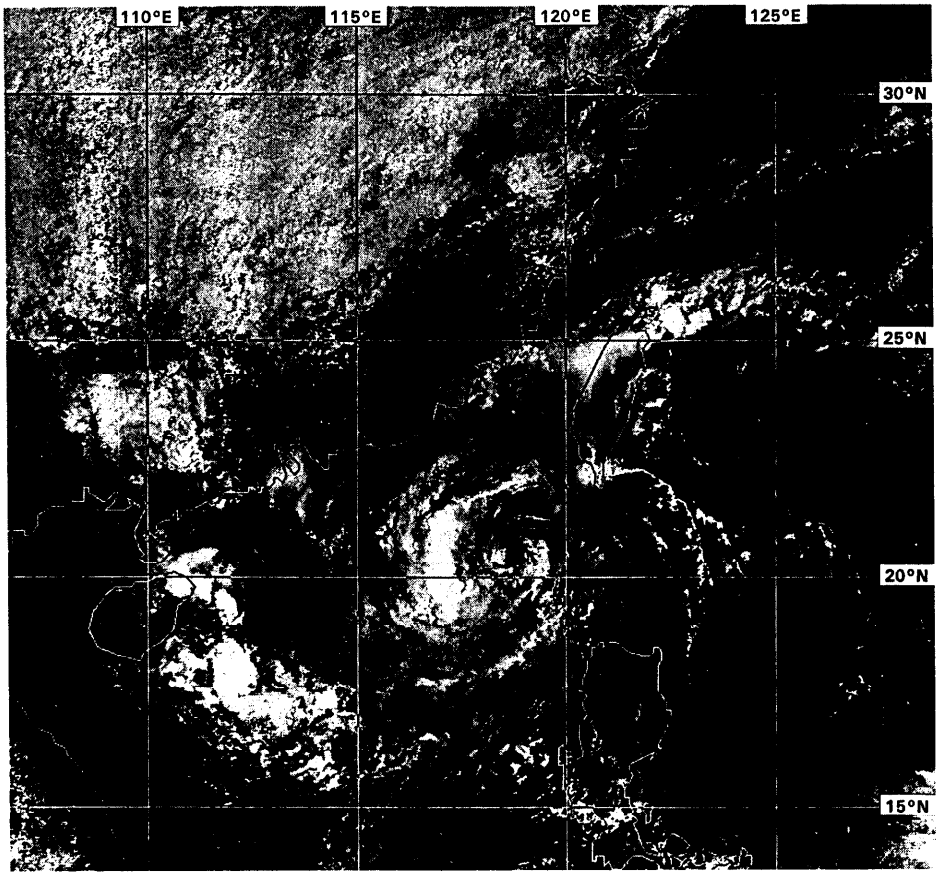

Figure 20. GMS-4 visible imagery of Luke at around 11 a.m. on 11 September 1994.

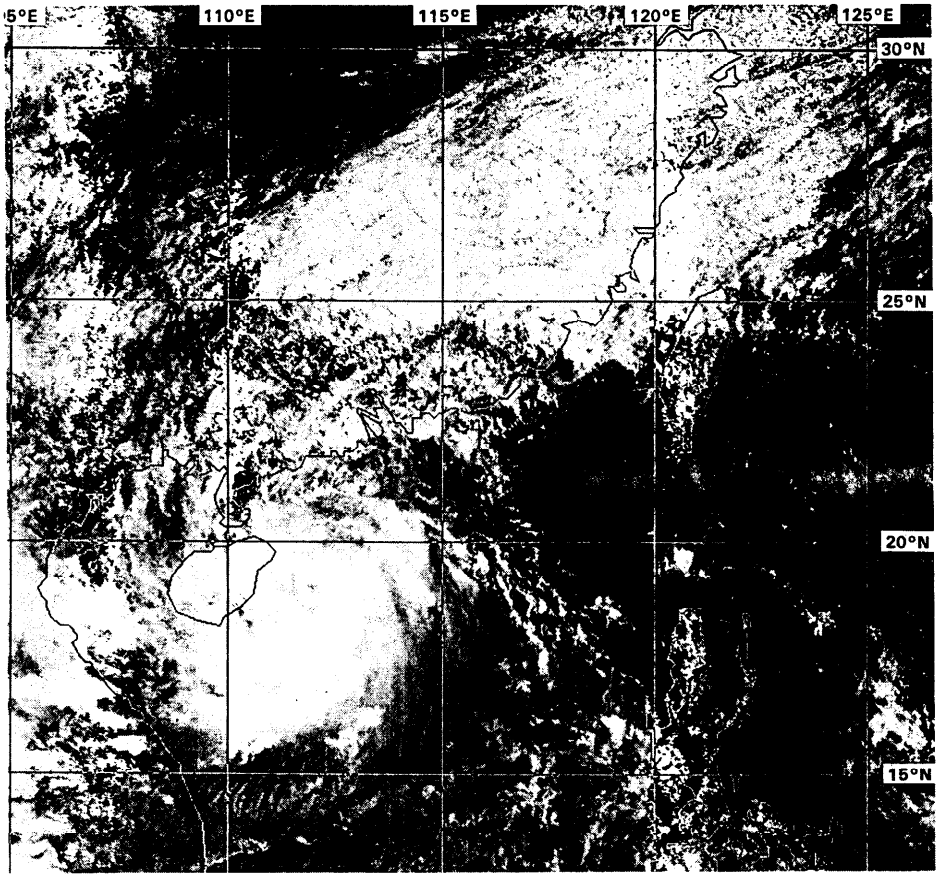

Figure 21. GMS-4 visible imagery of Luke at around 2 p.m. on 12 September 1994.

Section 4

TROPICAL CYCLONE STATISTICS AND TABLES

TABLE 1 is a list of tropical cyclones in 1994 in the western North Pacific and the adjacent seas (i.e. the area bounded by the Equator, 45°N, 100°E and 180°). The dates cited are the residence times of each tropical cyclone within the above-mentioned region and as such might not cover the 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 in 1994, the durations of these warnings and the times 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 and minutes in UTC.

TABLE 3 presents a summary of the occasions/durations of the hoisting of tropical cyclone warning signals in 1994. 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/durations of the hoisting of tropical cyclone warning signals from 1956 to 1994 inclusive.

TABLE 5 gives the annual number of tropical cyclones in Hong Kong's area of responsibility between 1956 and 1994. The annual number of tropical cyclones causing tropical cyclone warning signals to be raised in Hong Kong is also included.

TABLE 6 shows the maximum, mean and minimum durations of the tropical cyclone warning signals hoisted during the period 1956-1994.

TABLE 7 is a summary of meteorological information for each tropical cyclone affecting Hong Kong in 1994. Information on the nearest approach together with an estimate of the minimum central pressure of each tropical cyclone during its closest approach, the maximum winds at King's Park and Waglan Island, the minimum mean sea-level pressure recorded at the Royal Observatory and the maximum storm surge (the excess, in metres, of the actual water level over that predicted in the Tide Tables) are included.

TABLE 8 tabulates the amount of rainfall associated with each tropical cyclone that came within 600 km of Hong Kong in 1994 and highlights the 10 wettest tropical cyclones in Hong Kong for the period 1884-1939 and 1947-1994.

TABLE 9 provides some meteorological information for those typhoons requiring the hoisting of the Hurricane Signal No, 10 in Hong Kong since 1946. The information presented includes the distances and 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 stations in Hong Kong.

TABLE 10 contains damage caused by tropical cyclones in 1994. The information is compiled from reports by various government departments, public utility companies and local newspapers.

TABLE 11 presents the casualties and damage figures associated with tropical cyclones in Hong Kong for the past 30 years. The information is compiled from local newspaper reports and from the Marine Departments records.

TABLE 1. LIST OF TROPICAL CYCLONES IN THE WESTERN NORTH PACIFIC AND THE SOUTH CHINA SEA IN 1994

Name of tropical cyclone		Beginning of track				End of track				Remark
		Date	Time UTC	Position °N	°E	Date	Time UTC	Position °N	°E	
Tropical Depression		4 Jan	0000	8.8	132.6	5 Jan	0600	10.5	126.0	Dissipated
Severe Tropical Storm Owen	(9401)	31 Mar	1200	10.9	134.5	9 Apr	0000	18.4	118.0	Dissipated
Typhoon Page	(9402)	11 May	1800	11.3	140.7	17 May	1800	32.2	150.2	Dissipated
Tropical Depression		25 May	1800	14.0	116.2	26 May	1200	16.2	109.6	Dissipated
Severe Tropical Storm Russ	(9403)	3 Jun	0600	19.7	114.0	9 Jun	0600	23.9	109.9	Dissipated
Tropical Storm Sharon	(9404)	23 Jun	0600	15.9	119.6	25 Jun	0600	22.8	111.8	Dissipated
Tropical Depression		2 Jul	1200	18.5	118.6	5 Jul	1200	22.7	109.4	Dissipated
Typhoon Tim	(9405)	7 Jul	0000	12.9	131.6	11 Jul	1200	26.7	115.3	Dissipated
Tropical Storm Vanessa	(9406)	9 Jul	0000	15.9	115.5	11 Jul	0600	21.4	119.4	Dissipated
Typhoon Walt	(9407)	14 Jul	0000	11.3	130.1	27 Jul	0000	34.0	129.0	Dissipated
Tropical Storm Yunya	(9409)	17 Jul	0000	14.9	115.3	20 Jul	1200	20.0	126.6	Dissipated
Severe Tropical Storm Zeke	(9408)	17 Jul	0600	21.4	135.4	24 Jul	1800	40.2	157.2	Became Extratropical
Tropical Depression		25 Jul	0000	13.5	147.5	27 Jul	0600	26.8	144.3	Dissipated
Tropical Storm Brendan	(9411)	26 Jul	0600	15.2	129.2	3 Aug	0600	41.1	145.2	Dissipated
Tropical Storm Amy	(9410)	28 Jul	0000	20.7	108.5	31 Jul	0000	19.6	104.4	Dissipated
Tropical Storm Caitlin	(9412)	1 Aug	1800	19.1	127.9	4 Aug	1200	25.2	115.4	Dissipated
Typhoon Doug	(9413)	2 Aug	1200	15.5	140.6	12 Aug	0600	33.5	123.6	Dissipated
Typhoon Ellie	(9414)	7 Aug	0600	25.6	145.0	15 Aug	1200	36.4	122.0	Became Extratropical
Tropical Storm Li	(9415)	12 Aug	1800	12.8	179.9	18 Aug	0000	18.5	169.9	Dissipated
Typhoon Fred	(9416)	14 Aug	0000	17.5	146.7	22 Aug	1200	29.6	115.7	Dissipated
Typhoon Gladys	(9417)	23 Aug	0600	24.3	158.1	1 Sep	1800	26.1	118.5	Dissipated
Severe Tropical Storm Harry	(9418)	25 Aug	0600	17.6	119.1	29 Aug	0000	21.1	105.6	Dissipated
Typhoon Ivy	(9419)	27 Aug	1200	19.1	163.0	4 Sep	0600	42.5	167.1	Became Extratropical
Typhoon John	(9420)	28 Aug	1200	22.2	179.3	8 Sep	1200	31.0	179.8	Moved east of 180°
Severe Tropical Storm Joel	(9422)	3 Sep	0000	15.2	114.8	8 Sep	1800	24.2	103.6	Dissipated
Typhoon Kinna	(9421)	5 Sep	0600	20.4	140.8	12 Sep	0000	39.2	148.2	Became Extratropical
Tropical Storm Luke	(9423)	7 Sep	1200	14.1	129.5	13 Sep	1800	19.0	105.9	Dissipated
Typhoon Melissa	(9424)	11 Sep	0000	9.3	160.9	19 Sep	0600	41.4	148.7	Became Extratropical
Tropical Storm Nat	(9425)	15 Sep	0000	12.6	140.3	21 Sep	1200	30.3	151.2	Dissipated
Typhoon Orchid	(9426)	18 Sep	1200	11.8	141.1	29 Sep	1800	36.6	136.5	Became Extratropical
Typhoon Pat	(9427)	21 Sep	0000	14.9	167.5	28 Sep	1200	39.0	157.0	Became Extratropical
Tropical Storm Ruth	(9428)	23 Sep	1800	19.2	153.2	26 Sep	0600	30.6	149.6	Merged with Typhoon Pat
Tropical Depression		28 Sep	1800	26.2	163.0	3 Oct	1200	32.0	159.2	Became Extratropical
Typhoon Seth	(9429)	2 Oct	1800	8.9	157.5	12 Oct	0000	36.8	129.2	Became Extratropical
Typhoon Verne	(9431)	15 Oct	1200	10.0	166.4	31 Oct	1800	27.3	141.7	Became Extratropical
Typhoon Teresa	(9430)	16 Oct	0000	16.0	147.3	26 Oct	0000	11.0	109.3	Dissipated
Typhoon Wilda	(9432)	19 Oct	1800	13.4	164.0	31 Oct	1200	34.2	155.1	Became Extratropical
Tropical Storm Yuri	(9433)	22 Oct	1800	24.5	179.0	26 Oct	0000	26.1	154.5	Dissipated
Typhoon Zelda	(9434)	28 Oct	0600	16.9	166.9	7 Nov	1200	29.2	137.0	Became Extratropical
Typhoon Axel	(9435)	15 Dec	1800	7.0	146.9	26 Dec	1800	18.3	115.8	Dissipated
Tropical Storm Bobbie	(9436)	18 Dec	0600	6.2	167.0	25 Dec	0600	19.5	136.4	Dissipated

TABLE 2. TROPICAL CYCLONE WARNINGS FOR SHIPPING ISSUED IN 1994

Tropical cyclone	No. of warnings issued	Date and time + of issue of First warning	Date and time + of issue of Last warning	Duration of warnings (hours)
Severe Tropical Storm Owen	41	4 Apr 0600	9 Apr 0600	120
Tropical Depression	7	26 May 0300	26 May 2100	18
* Severe Tropical Storm Russ	37	4 Jun 0300	8 Jun 1500	108
* Tropical Storm Sharon	14	23 Jun 1200	25 Jun 0300	39
Tropical Depression	14	3 Jul 0000	4 Jul 1500	39
Tropical Storm Vanessa	20	9 Jul 0600	11 Jul 1500	57
Typhoon Tim	16	9 Jul 1500	11 Jul 1200	45
Typhoon Walt	15	15 Jul 0600	17 Jul 0000	42
Tropical Storm Yunya	18	18 Jul 0300	20 Jul 0600	51
Tropical Storm Amy	15	29 Jul 0600	31 Jul 0000	42
Tropical Storm Caitlin	15	2 Aug 1800	4 Aug 1200	42
Typhoon Doug	22	6 Aug 1500	9 Aug 0600	63
Typhoon Fred	17	20 Aug 0000	22 Aug 0000	48
* Severe Tropical Storm Harry	29	25 Aug 0900	28 Aug 2100	84
Typhoon Gladys	12	31 Aug 1200	1 Sep 2100	33
Severe Tropical Storm Joel	35	3 Sep 1200	7 Sep 1800	102
* Tropical Storm Luke	33	10 Sep 0000	13 Sep 2100	93
Typhoon Seth	23	8 Oct 0900	11 Oct 0300	66
Typhoon Teresa	52	20 Oct 0600	26 Oct 1500	153
Typhoon Axel	50	21 Dec 1500	27 Dec 1800	147
Total	485			1392

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

+ Times are given in hours UTC

TABLE 3. TROPICAL CYCLONE WARNING SIGNALS HOISTED IN HONG KONG AND NUMBER OF WARNING BULLETINS ISSUED IN 1994

SUMMARY

Signal	No. of occasions	Total duration
1	4	86 h 5 min
3	3	52 h 5 min
8 NORTHWEST	-	-
8 SOUTHWEST	-	-
8 NORTHEAST	-	-
8 SOUTHEAST	-	-
9	-	-
10	-	-
Total	7	138 h 10 min

DETAILS

Tropical cyclone	No. of warning bulletins issued	Signal	Hoisted Date	Hoisted Time*	Lowered Date	Lowered Time*
Severe Tropical Storm Russ	57	1	5 Jun	1010	6 Jun	2030
		3	6 Jun	2030	7 Jun	1545
Tropical Storm Sharon	21	1	24 Jun	1050	25 Jun	0630
Severe Tropical Storm Harry	39	1	25 Aug	2250	26 Aug	1615
		3	26 Aug	1615	27 Aug	1145
Tropical Storm Luke	30	1	11 Sep	0750	11 Sep	2230
		3	11 Sep	2230	12 Sep	1150

* Hong Kong Time (UTC + 8)

TABLE 4. FREQUENCY AND TOTAL DURATION OF DISPLAY OF TROPICAL CYCLONE WARNING SIGNALS: 1956-1994

Signals / Year	1	3	8 NW	8 SW	8 NE	8 SE	9	10	Total duration h	min
1956	5	4	0	0	0	0	0	0	191	25
1957	4	9	1	1	2	2	0	1	295	45
1958	4	5	0	0	1	0	0	0	214	5
1959	1	1	0	0	0	0	0	0	36	35
1960	11	7	0	2	2	2	1	1	432	35
1961	6	7	1	2	1	0	1	1	192	55
1962	4	3	0	1	1	0	1	1	158	10
1963	4	5	0	0	1	0	0	0	175	50
1964	11	14	1	3	5	3	3	2	570	15
1965	7	6	0	0	1	1	0	0	239	40
1966	6	5	0	0	2	2	0	0	284	40
1967	8	6	0	0	2	1	0	0	339	10
1968	7	7	0	1	1	0	1	1	290	10
1969	4	2	0	0	0	0	0	0	110	15
1970	6	8	2	1	2	0	0	0	286	45
1971	9	10	1	3	2	2	1	1	323	25
1972	8	6	0	0	1	1	0	0	288	20
1973	8	6	1	1	1	0	1	0	416	50
1974	12	10	0	0	2	1	1	0	525	20
1975	8	6	1	0	0	1	1	1	292	20
1976	6	6	0	0	1	2	0	0	351	30
1977	8	6	0	0	1	0	0	0	395	10
1978	8	9	1	1	3	2	0	0	462	10
1979	5	5	1	0	2	2	1	1	281	15
1980	10	8	0	0	1	1	0	0	414	5
1981	5	4	0	0	1	1	0	0	202	20
1982	7	4	0	0	0	0	0	0	247	35
1983	8	7	0	1	2	2	1	1	289	42
1984	6	6	0	0	1	0	0	0	280	2
1985	5	4	1	0	0	1	0	0	193	35
1986	6	7	0	1	1	0	0	0	305	0
1987	6	1	0	0	0	0	0	0	165	45
1988	6	4	0	0	0	0	0	0	204	10
1989	7	8	0	0	2	2	0	0	306	10
1990	6	4	0	0	0	0	0	0	245	10
1991	8	6	0	0	1	1	0	0	349	55
1992	5	5	0	0	1	1	0	0	167	5
1993	8	9	0	0	2	4	0	0	325	40
1994	4	3	0	0	0	0	0	0	138	10
Total	257	233	11	18	46	35	13	11	10988	59
Mean	6.6	6.0	0.3	0.5	1.2	0.9	0.3	0.3	281	46

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 : 1956-1994

Year	Number in Hong Kong's Area of responsibility	Number necessitating the display of signals in Hong Kong
1956	23	5
1957	12	6
1958	15	5
1959	18	2
1960	18	9
1961	24	6
1962	20	4
1963	13	4
1964	26	10
1965	16	6
1966	17	6
1967	17	8
1968	12	6
1969	11	4
1970	21	6
1971	20	9
1972	15	5
1973	17	9
1974	21	11
1975	12	7
1976	10	5
1977	10	8
1978	20	8
1979	18	6
1980	17	10
1981	15	5
1982	16	5
1983	15	7
1984	14	5
1985	15	5
1986	16	4
1987	12	5
1988	17	6
1989	17	7
1990	18	6
1991	14	6
1992	11	5
1993	14	9
1994	20	4
Total	637	244
Mean	16.3	6.3

TABLE 6. DURATION OF TROPICAL CYCLONE WARNING SIGNALS HOISTED IN HONG KONG : 1956-1994

Signal hoisted	Number of occasions	Duration of each occasion						Total duration per year					
		Mean		Maximum		Minimum		Mean		Maximum		Minimum	
		h	min	h	min	h	min	h	min	h	min	h	min
1 or higher	254	43	16	161	0	9	35	281	46	570	15	36	35
3 or higher	179	31	4	124	15	6	55	142	37	306	35	23	55
8 or higher	56	16	30	66	50	2	40	23	41	100	55	0	0
8 NW	11	6	51	15	45	1	30	1	56	15	45	0	0
8 SW	18	5	17	10	45	2	30	2	26	16	10	0	0
8 NE	46	8	31	35	35	2	35	10	3	40	20	0	0
8 SE	35	7	25	21	45	0	20	6	39	31	15	0	0
9 or higher	14	7	18	11	33	3	35	2	37	19	25	0	0
10	11	6	10	9	10	2	30	1	44	12	10	0	0

TABLE 7. A SUMMARY OF METEOROLOGICAL OBSERVATIONS RECORDED IN HONG KONG DURING THE PASSAGES OF TROPICAL CYCLONES IN 1994

(a)

Name of tropical cyclone	Month	Nearest approach to Hong Kong						Minimum M.S.L. pressure at the Royal Observatory				Maximum storm surge (metres)							
		Day	Hour*	Direction	Distance (km)	Movement (km/h)	Estimated minimum central pressure (hPa)	Month	Day	Hour*	Pressure (hPa)	Chi Ma Wan	Ko Lau Wan	Lok On Pai	Quarry Bay	Tai O	Tai Po Kau	Tsim Bei Tsui	Waglan Island
S.T.S. Russ	Jun	3	14	S	290	E 13	998	Jun	6	18	1002.8	0.50	0.35	-	0.53	-	0.61	0.52	-
T.S. Sharon	Jun	25	14	WNW	250	N 22	998	Jun	24	17	1002.3	0.41	0.23	-	0.39	-	0.47	0.63	-
S.T.S. Harry	Aug	26	23	S	270	NW 20	994	Aug	27	4	1004.4	0.47	0.61	-	0.60	-	0.56	0.46	-
T.S. Luke	Sep	12	2	SSE	230	SW 25	994	Sep	11	16	1003.9	0.55	-	-	0.61	-	0.63	0.40	-

* Hong Kong Time (UTC + 8)

(b)

Name of tropical cyclone	Month	Maximum 60-min mean wind in points and km/h				Maximum 10-min mean wind in points and km/h				Maximum gust peak speed in km/h with direction in points			
		King's Park		Waglan Island		King's Park		Waglan Island		King's Park		Waglan Island	
S.T.S. Russ	Jun	ESE	25	E	68	ESE	30	E	70	E,ESE	56	E	83
T.S. Sharon	Jun	ESE	22	ENE	52	ESE	25	ENE	58	ESE	52	ENE	72
S.T.S. Harry	Aug	ESE	25	ENE	65	ESE	31	ESE	79	SE	75	ESE	104
T.S. Luke	Sep	ENE	19	NE	76	ENE	23	ENE	79	E	62	NE	94

TABLE 8 (a). RAINFALL ASSOCIATED WITH TROPICAL CYCLONES THAT CAME WITHIN 600 KM OF HONG KONG (WITH OR WITHOUT HOISTING OF TROPICAL CYCLONE WARNING SIGNALS) IN 1994

Name of tropical cyclone	Period* when tropical cyclone within 600 km of Hong Kong (T_1 → T_2)	Rainfall at the Royal Observatory (mm)				
		(i) 600 km (T_1 → T_2)	(ii) 24 hours after T_2	(iii) 48 hours after T_2	(iv) 72 hours after T_2	(i) + (iv) Total T_1 → (T_2+72 hours)
S.T.S. Russ	(T_1) 3 Jun 1400 - (T_2) 9 Jun 1400	45.4	8.8	44.3	44.3	89.7
T.S. Sharon	(T_1) 24 Jun 0200 - (T_2) 25 Jun 1400	21.0	Trace	1.2	1.2	22.2
T.D. in Jul #	(T_1) 2 Jul 2300 - (T_2) 6 Jul 0200	94.0	12.2	29.4	69.0	163.0
T. Tim #	(T_1) 11 Jul 0500 - (T_2) 11 Jul 2300	Trace	97.4	125.2	171.6	171.6
T.S. Caitlin #	(T_1) 4 Aug 0300 - (T_2) 4 Aug 2300	9.5	45.9	79.8	100.4	109.9
S.T.S. Harry	(T_1) 25 Aug 2300 - (T_2) 28 Aug 1400	123.6	22.5	22.5	22.5	146.1
T.S. Luke	(T_1) 11 Sep 0700 - (T_2) 13 Sep 0400	32.8	0.1	3.3	3.3	36.1
T. Axel #	(T_1) 25 Dec 0200 - (T_2) 27 Dec 1400	22.9	Nil	Nil	Nil	22.9

N.B. # Tropical cyclones without hoisting of tropical cyclone warning signals.

* Hour in Hong Kong Time (UTC + 8)

(b). THE 10 WETTEST TROPICAL CYCLONES IN HONG KONG (1884-1939, 1947-1994)

Tropical Cyclone			Rainfall at the Royal Observatory (mm)				
Year	Month	Name	(i) 600 km	(ii) 24 hours	(iii) 48 hours	(iv) 72 hours	(i)+(iv)
*1926	Jul	-	34.8	534.0	561.1	562.2	597.0
*1916	Jun	-	494.8	27.9	59.4	67.2	562.0
1965	Sep	Agnes	404.6	8.9	64.3	126.1	530.7
1978	Jul	Agnes	502.4	12.3	12.3	16.6	519.0
1976	Aug	Ellen	90.7	394.2	421.0	425.4	516.1
1993	Sep	Dot	459.6	37.9	37.9	37.9	497.5
1982	Aug	Dot	41.2	322.5	403.1	450.5	491.7
*1904	Aug	-	446.5	Nil	3.7	26.7	473.2
1974	Oct	Carmen	307.6	150.3	161.7	162.1	469.7
*1960	Jun	Mary	427.5	Nil	2.6	13.3	440.8

N.B.:

(i) during the period in hours when the tropical cyclone was centred within 600 km of Hong Kong.

(ii) during the 24-hour period after the tropical cyclone moved outside (or dissipated within) the 600 km radius.

(iii) during the 48-hour period after the tropical cyclone moved outside (or dissipated within) the 600 km radius.

(iv) during the 72-hour period after the tropical cyclone moved outside (or dissipated within) the 600 km radius.

* For years prior to 1961, (i) is the sum of daily rainfall on those days when tropical cyclone was centred within 600 km of Hong Kong, (ii) to (iv) are correspondingly the sum of daily rainfall figures of the following days.

TABLE 9. TYPHOONS REQUIRING THE HOISTING OF THE HURRICANE SIGNAL NO. 10 DURING THE PERIOD 1946-1994

Name of typhoon	Date	Nearest approach to Royal Observatory (km)	Minimum M.S.L. pressure (hPa)		Maximum 60-min mean wind in points and km/h							Maximum gust peak speed in km/h with direction in points						
			Hourly	Inst.	Royal Observatory	King's Park	Hong Kong Airport	Waglan Island	Cheung Chau	Tate's Cairn	Green Island	Royal Observatory	King's Park	Hong Kong Airport	Waglan Island	Cheung Chau	Tate's Cairn	Green Island
-	18 Jul 1946	S 70	985.7	-	NE -	-	-	-	-	-	-	-	-	-	-	-	-	-
Gloria	22 Sep 1957	SW 55	986.2	984.3	ESE 115	-	ESE 72	E 113	-	-	-	E 187	-	ENE 158	ENE 185	-	-	-
Mary	9 Jun 1960	WNW 10	974.3	973.8	SSE 96	-	SSE 92	SSW 112	-	-	-	SSE 191	-	SE 164	SSW 194	-	-	-
Alice	19 Ma 1961	0	981.6	981.1	ENE 83	-	E 70	ESE 90	ENE 76	-	-	E 166	-	ENE 139	SW 128	ENE 135	-	-
Wanda	1 Sep 1962	SSW 20	955.1	953.2	N 133	-	N 108	NW 148	NW 118	SE 189	-	N 259	-	N 229	NNW 216	NW 232	ESE 284	-
Ruby	5 Sep 1964	SW 30	971.0	968.2	E 110	-	N 118	ENE 148	NE 113	ESE 167	-	NNE 227	-	NW 203	E 230	NNE 216	E 268	-
Dot	13 Oct 1964	E 35	978.9	977.3	NNW 88	-	N 67	N 117	NNW 96	NNE 157	-	N 175	-	N 198	N 184	WNW 205	NE 220	-
Shirley	21 Aug 1968	0	968.7	968.6	N 68	-	N 75	NNE 124	SSW 90	NNE 126	-	N 133	-	N 161	NE 209	SSW 167	NNE 203	-
Rose	17 Aug 1971	WSW 20	984.5	982.8	SE 103	-	SE 122	ESE 140	SE 131	S 148	-	ESE 224	-	ESE 211	ESE 189	SE 194	S 221	-
Elsie	14 Oct 1975	S 50	996.4	996.2	ENE 58	N 75	NNW 67	NNE 118	N 106	NE 130	NNW 118	NE 140	N 137	N 140	ENE 176	NE 158	NNE 180	NE 167
Hope	2 Aug 1979	NNW 10	961.8	961.6	W 75	WNW 79	W 115	SW 144	SSW 117	NW 115	W 108	W 175	WNW 166	WNW 182	SW 198	WSW 185	WNW 229	W 167
Ellen	9 Sep 1983	SW 45	983.9	983.1	E 92	E 88	E 112	ESE 169	ESE 171	E 126	S 137	E 185	E 167	E 203	E 227	SSE 238	ENE 218	S 220*

* estimated, exceeding upper limit of anemogram.

TABLE 10. DAMAGE CAUSED BY TROPICAL CYCLONES IN HONG KONG, 1994

Name of tropical cyclone	Month	Damage in physical terms					Damage in monetary terms (million HK$)					
		Agricultural	Public works facilities	Public utilities	Private property	Landslip & collapse of slope	Agricultural	Public works facilities	Public utilities	Private property	Others	Total
T.S. Sharon	Jun	-	-	-	1 unit	-	-	-	-	-	-	-
S.T.S. Harry	Aug	-	-	tram service: 1 site	12 units	-	1.0	-	-	-	-	1.0

N.B. Based on information supplied by relevant government departments and public utility companies. Damage reports in the local press were also examined and collated.

TABLE 11. CASUALTIES AND DAMAGE CAUSED BY TROPICAL CYCLONES IN HONG KONG : 1965-1994

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
1965	6 - 16 Jul	T. Freda	0	1	0	2	0	16
	25 - 28 Sep	T.S. Agnes	0	0	0	5	0	3
1966	12 - 14 Jul	S.T.S. Lola	0	*	6	1	0	6
1967	19 - 22 Aug	S.T.S. Kate	3	1	0	0	0	3
1968	17 - 22 Aug	T. Shirley	1	*	3	0	0	4
1969	22 - 29 Jul	T. Viola	0	3	0	0	0	0
1970	1 - 3 Aug	T.D.	0	0	0	2 +	0	0
	8 - 14 Sep	T. Georgia	2	0	*	0	0	0
1971	15 - 18 Jun	T. Freda	8	0	0	2	0	30
	16 - 22 Jul	T. Lucy	10	2	13	0	0	38
	10 - 17 Aug	T. Rose	34	303	*	110	5	286
1972	4 - 9 Nov	T. Pamela	3	0	0	1	0	8
1973	14 - 20 Jul	T. Dot	14	*	*	1	0	38
1974	7 - 14 Jun	T. Dinah	1	*	*	0	0	0
	18 - 22 Jul	T. Ivy	2	*	*	0	0	0
	15 - 19 Oct	T. Carmen	5	*	*	1	0	0
	21 - 27 Oct	T. Della	2	*	*	0	0	0
1975	10 - 14 Aug	T.D.	3	1	*	2	1	0
	9 - 14 Oct	T. Elsie	7	2	1	0	0	46
	16 - 23 Oct	S.T.S. Flossie	1	*	*	0	0	0
1976	22 Jun - 4 Jul	T. Ruby	0	0	0	3	2	2
	21 - 26 Jul	S.T.S. Violet	0	0	0	2	1	1
	5 - 6 Aug	S.T.S. Clara	0	0	0	0	0	4
	21 - 24 Aug	T.S. Ellen	0	4	7	27	3	65
	15 - 21 Sep	T. Iris	6	0	1	0	0	27
1977	4 - 6 Jul	T.D.	0	0	0	0	0	2
	3 - 5 Sep	T.S. Carla	1	0	0	0	0	1
	22 - 25 Sep	S.T.S. Freda	2	0	0	1	0	37
1978	24 - 30 Jul	S.T.S. Agnes	0	25	42	3	0	134
	9 - 12 Aug	T.S. Bonnie	2	0	0	0	0	0
	23 - 28 Aug	S.T.S. Elaine	8	5	8	1	0	51
	22 - 26 Sep	S.T.S. Kit	0	1	0	0	7	0
	7 - 16 Oct	S.T.S. Nina	0	0	0	0	0	2
	17 - 29 Oct	T. Rita	1	5	0	0	0	3
1979	1 - 6 Jul	T. Ellis	0	2	0	0	0	0
	26 - 30 Jul	T.S. Gordon	0	2	0	0	0	0
	28 Jul - 3 Aug	T. Hope	29	167	207	12	0	260
	6 - 9 Aug	T.D.	0	3	0	0	0	0
	16 - 24 Sep	S.T.S. Mac	2	12	0	1	0	67
1980	5 - 12 Jul	S.T.S. Ida	1	0	0	0	0	0
	18 - 23 Jul	T. Joe	4	0	1	2	1	59
	20 - 28 Jul	T. Kim	0	2	1	0	0	0
	29 Oct - 2 Nov	T.S. Cary	0	0	2	0	0	0
1981	3 - 7 Jul	S.T.S. Lynn	0	0	3	0	0	32
1982	27 Jun - 2 Jul	T.S. Tess	0	1	0	0	0	16
	22 - 30 Jul	T. Andy	0	0	1	0	0	0
	5 - 16 Sep	T. Irving	0	0	2	0	0	0

TABLE 11. (cont'd)

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
1983	12 - 19 Jul	T. Vera	0	1	0	0	0	0
	29 Aug - 9 Sep	T. Ellen	44	135	225	10	12	333
	10 - 14 Oct	T. Joe	2	0	3	0	0	58
	20 - 26 Oct	S.T.S. Lex	0	0	1	0	0	0
1984	27 Aug - 7 Sep	T. Ike	0	0	0	0	0	1
1985	19 - 25 Jun	T. Hal	0	4	2	0	1	13
	1 - 7 Sep	T. Tess	6	1	3	2	0	12
	13 - 22 Oct	T. Dot	0	0	0	0	0	1
1986	3 - 12 Jul	T. Peggy	3	0	3	1	0	26
	9 - 12 Aug	T.D.	0	1	5	0	0	3
	18 Aug - 6 Sep	T. Wayne	0	3	0	3	1	15 +
	11 - 19 Oct	T. Ellen	1	2	1	0	0	4
1987	16 - 27 Oct	T. Lynn	0	0	0	0	0	1
1988	14 - 20 Jul	T. Warren	1	2	1	0	1	12
	19 - 22 Sep	T. Kit	0	0	1	0	0	0
	18 - 23 Oct	T. Pat	0	0	0	2	0	1
	21 - 29 Oct	T. Ruby	0	0	0	0	0	4
1989	16 - 21 May	T. Brenda	0	3	5	6	1	119
	11 - 19 Jul	T. Gordon	1	0	8	2	0	31
	8 - 14 Oct	T. Dan	1	0	1	0	0	0
1990	15 - 19 May	T. Marian	0	0	1	0	0	0
	15 - 19 Jun	S.T.S. Nathan	1	0	2	5	1	1
	21 - 30 Jun	T. Percy	0	0	0	1	0	0
	27 - 31 Jul	S.T.S. Tasha	0	1	0	0	0	1
	25 - 30 Aug	T. Becky	0	0	0	0	1	0
	10 - 20 Sep	T. Ed	0	0	0	0	0	1
1991	15 - 20 Jul	T. Amy	1	0	2	0	0	1
	20 - 24 Jul	S.T.S. Brendan	1	1	13	0	0	17
	13 - 18 Aug	T. Fred	0	1	0	0	0	0
1992	9 - 14 Jul	T. Eli	0	0	1	0	0	23
	17 - 18 Jul	T.S. Faye	1	0	3	2	0	24
	19 - 23 Jul	S.T.S. Gary	2	0	0	0	0	18
1993	21 - 28 Jun	T. Koryn	0	0	2	0	0	183
	16 - 21 Aug	T. Tasha	0	0	7	0	0	35
	9 - 14 Sep	T. Abe	0	0	0	1	0	0
	15 - 17 Sep	S.T.S. Becky	0	0	10	1	0	130
	23 - 27 Sep	T. Dot	0	1	0	0	1	48
	28 Oct - 5 Nov	T. Ira	0	1	0	2	0	30
1994	23 - 25 Jun	T.S. Sharon	0	1	1	0	0	5
	25 - 29 Aug	S.T.S. Harry	0	0	2	1	0	2

N.B. Based on information supplied by relevant government departments and public utility companies. Damage reports in the local press were also examined and collated.

* Data unavailable

\+ Struck by lightning

Section 5

TROPICAL CYCLONE POSITION AND INTENSITY DATA, 1994

Six-hourly position and intensity data are tabulated for the following tropical cyclones in 1994 in the western North Pacific and the South China Sea (i.e. the area between the equator and 45°N, and between 100°E and 180°).

Surface winds in this section refer to wind speeds averaged over a period of 10 minutes given in the unit of m/s. (Note: 1 m/s is about 2 knots or 4 km/h)

SIX-HOURLY POSITION AND INTENSITY DATA OF THE TROPICAL DEPRESSION OF 4-5 JANUARY

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface winds (m/s)	Lat. ^{o} N	Long. ^{o} E
Jan	4	0000	T.D.	1004	13	8.8	132.6
		0600	T.D.	1002	16	9.2	130.8
		1200	T.D.	1002	16	9.5	129.0
		1800	T.D.	1002	16	9.7	127.5
	5	0000	T.D.	1000	16	10.1	126.7
		0600	T.D.	1000	16	10.5	126.0

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF SEVERE TROPICAL STORM OWEN (9401)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface winds (m/s)	Lat. ^{o} N	Long. ^{o} E
Mar	31	1200	T.D.	1005	13	10.9	134.5
		1800	T.D.	1000	16	11.2	133.6
Apr	1	0000	T.S.	998	18	11.4	132.9
		0600	T.S.	998	18	11.5	132.2
		1200	T.S.	998	18	11.6	131.5
		1800	T.S.	998	18	11.7	130.7
	2	0000	T.S.	996	21	11.7	130.2
		0600	T.S.	996	21	11.6	129.7
		1200	T.S.	996	21	11.4	129.2
		1800	T.S.	990	23	11.1	128.6
	3	0000	T.S.	990	23	10.8	128.0
		0600	S.T.S.	985	25	10.6	127.5
		1200	S.T.S.	985	25	10.4	127.0
		1800	S.T.S.	985	25	10.3	126.5
	4	0000	S.T.S.	980	31	10.3	125.9
		0600	S.T.S.	980	31	10.3	124.6
		1200	S.T.S.	985	28	10.4	123.4
		1800	T.S.	996	23	10.5	122.4
	5	0000	T.S.	998	21	10.7	121.4
		0600	T.S.	998	21	11.0	120.4
		1200	T.S.	998	21	11.4	119.4
		1800	T.S.	996	23	11.8	118.4
	6	0000	T.S.	996	23	12.2	117.6
		0600	T.S.	996	23	12.7	116.8
		1200	T.S.	996	23	13.2	116.2
		1800	T.S.	996	23	13.6	115.8
		0000	T.S.	996	23	14.1	115.7
		0600	T.S.	996	23	14.6	115.8
		1200	T.S.	996	23	15.1	116.1
		1800	T.S.	996	23	15.6	116.3
	8	0000	T.S.	996	23	16.1	116.5
		0600	T.S.	1000	18	16.5	116.7
		1200	T.S.	1000	18	17.1	117.1
		1800	T.D.	1002	16	17.7	117.5
	9	0000	T.D.	1005	13	18.4	118.0
			Dissipated				

SK-HOURLY POSITION AND INTENSITY DATA OF TYPHOON PAGE (9402)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface winds (m/s)	Lat. ^{o} N	Long. ^{o} E
May	11	1800	T.D.	1000	16	11.3	140.7
	12	0000	T.D.	1000	16	11.8	139.2
		0600	T.D.	1000	16	12.4	137.8
		1200	T.S.	995	18	13.0	136.9
		1800	T.S.	995	18	13.7	136.3
	13	0000	T.S.	995	18	14.2	135.8
		0600	T.S.	990	23	14.9	135.4
		1200	T.S.	990	23	15.5	135.0
		1800	T.S.	990	23	16.2	134.8
	14	0000	T.S.	990	23	16.6	135.4
		0600	S.T.S.	985	25	17.0	136.0
		1200	S.T.S.	985	28	17.6	136.6
		1800	S.T.S.	975	31	18.4	137.1
	15	0000	T.	970	33	19.4	137.2
		0600	T.	965	36	20.3	137.3
		1200	T.	965	36	21.2	137.7
		1800	T.	965	36	22.2	138.3
	16	0000	T.	970	33	23.1	139.2
		0600	T.	970	33	24.0	140.4
		1200	S.T.S	975	31	24.8	142.0
		1800	S.T.S.	980	28	25.8	143.8
	17	0000	T.S.	990	23	27.2	145.6
		0600	T.S.	995	21	29.1	146.8
		1200	T.S.	995	21	30.8	148.4
		1800	T.S.	995	21	32.2	150.2

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF THE TROPICAL DEPRESSION OF 25-26 MAY

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface winds (m/s)	Lat. °N	Long. ° E
May	25	1800	T.D.	1002	13	14.0	116.2
	26	0000	T.D.	1000	16	14.4	113.8
		0600	T.D.	1000	16	15.1	111.6
		1200	T.D.	1002	13	16.2	109.6
			Dissipated				

SIX-HOURLY POSITION AND INTENSITY DATA OF SEVERE TROPICAL STORM RUSS (9403)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface winds (m/s)	Lat. ^{o} N	Long. ^{o} E
Jun	3	0600	T.D.	998	16	19.7	114.0
		1200	T.S.	996	18	19.7	114.7
		1800	T.S.	996	18	19.7	115.3
	4	0000	T.S.	996	18	19.8	115.8
		0600	T.S.	994	21	19.9	116.2
		1200	T.S.	994	21	20.0	116.5
		1800	T.S.	990	23	20.1	116.8
	5	0000	S.T.S.	985	25	20.1	117.0
		0600	S.T.S.	980	28	20.0	117.0
		1200	S.T.S.	980	28	19.9	116.7
		1800	S.T.S.	980	28	19.7	116.4
	6	0000	S.T.S.	980	28	19.6	115.9
		0600	S.T.S.	980	28	19.5	115.3
		1200	S.T.S.	985	25	19.4	114.7
		1800	T.S.	995	21	19.3	114.1
	7	0000	T.S.	995	21	19.3	113.4
		0600	T.S.	990	23	19.4	112.7
		1200	S.T.S.	985	25	19.6	112.1
		1800	S.T.S.	985	25	19.9	111.5
	8	0000	S.T.S.	985	25	20.3	110.9
		0600	S.T.S.	980	28	21.0	110.5
		1200	S.T.S.	980	28	21.7	110.2
		1800	T.S.	990	23	22.4	110.0
	9	0000	T.S.	994	18	23.2	109.9
		0600	T.D.	998	13	23.9	109.9
			Dissipated				

SK-HOURLY POSITION AND INTENSITY DATA OF TROPICAL STORM SHARON (9404)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface winds (m/s)	Lat. °N	Long. °E
Jun	23	0600	T.D.	1000	16	15.9	119.6
		1200	T.D.	998	16	16.6	118.0
		1800	T.S.	996	18	17.3	116.3
	24	0000	T.S.	994	21	18.1	114.8
		0600	T.S.	994	21	18.8	113.7
		1200	T.S.	994	21	19.8	112.5
		1800	T.S.	996	18	20.8	111.8
	25	0000	T.D.	998	13	21.6	111.7
		0600	T.D.	998	13	22.8	111.8

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF THE TROPICAL DEPRESSION OF 2-5 JULY

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface winds (m/s)	Lat. °N	Long. ° E
Jul	2	1200	T.D.	1000	13	18.5	118.6
		1800	T.D.	1000	13	18.7	116.9
	3	0000	T.D.	994	16	18.8	115.2
		0600	T.D.	994	16	19.1	114.0
		1200	T.D.	994	16	19.5	112.9
		1800	T.D.	994	16	19.9	112.3
	4	0000	T.D.	994	16	20.3	111.8
		0600	T.D.	994	16	20.9	111.6
		1200	T.D.	994	16	21.6	111.4
		1800	T.D.	994	16	22.2	111.2
	5	0000	T.D.	994	16	22.4	110.7
		0600	T.D.	996	13	22.6	110.0
		1200	T.D.	996	13	22.7	109.4

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON TIM (9405)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface winds (m/s)	Lat. ^{O}N	Long. ^{O}E
Jul	7	0000	T.D.	1000	16	12.9	131.6
		0600	T.S.	998	18	13.5	131.1
		1200	T.S.	998	18	14.1	130.7
		1800	T.S.	998	18	14.8	130.3
	8	0000	T.S.	994	21	15.5	129.9
		0600	S.T.S.	985	25	16.1	129.3
		1200	S.T.S.	975	31	16.6	128.6
		1800	T.	970	33	17.2	127.9
	9	0000	T.	960	39	17.9	127.0
		0600	T.	945	46	18.5	126.1
		1200	T.	935	51	19.2	125.2
		1800	T.	935	51	19.9	124.3
	10	0000	T.	935	51	20.8	123.4
		0600	T.	935	51	21.9	122.5
		1200	T.	950	43	23.3	121.4
		1800	T.	960	39	24.4	119.7
	11	0000	T.	970	33	25.2	118.0
		0600	S.T.S.	980	25	26.0	116.5
		1200	T.S.	985	18	26.7	115.3

Dissipated

SIX-HO URLY POSITION AND INTENS ITY DATA OF TROPICAL STORM VANESSA (9406)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface winds (m/s)	Lat. ^{O}N	Long. ^{O}E
Jul	9	0000	T.D.	1000	16	15.9	115.5
		0600	T.S.	995	18	15.7	115.2
		1200	T.S.	995	18	15.3	115.1
		1800	T.S.	995	18	15.1	115.7
	10	0000	T.S.	990	21	15.1	116.6
		0600	T.S.	990	21	15.6	117.8
		1200	T.S.	990	21	16.7	119.1
		1800	T.S.	985	23	18.5	120.3
	11	0000	T.S.	990	21	20.0	120.1
		0600	T.S.	995	18	21.4	119.4

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON WALT (9407)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface winds (m/s)	Lat. °N	Long. °E
Jul	14	0000	T.D.	1002	16	11.3	130.1
		0600	T.D.	1002	16	11.6	128.6
		1200	T.D.	1002	16	12.3	127.5
		1800	T.D.	1002	16	13.0	126.6
	15	0000	T.D.	1002	16	13.6	125.8
		0600	T.D.	1002	16	14.1	125.0
		1200	T.D.	1002	16	14.5	124.1
		1800	T.D.	1002	16	14.9	123.7
	16	0000	T.D.	1002	16	15.1	124.2
		0600	T.S.	1000	18	15.1	124.7
		1200	T.S.	1000	18	15.1	125.3
		1800	T.S.	995	21	15.2	126.0
	17	0000	T.S.	990	23	15.5	127.0
		0600	T.S.	990	23	16.0	128.0
		1200	S.T.S.	985	25	16.5	128.9
		1800	S.T.S.	980	28	17.1	129.7
	18	0000	S.T.S.	975	31	18.0	130.4
		0600	T.	970	33	18.8	131.0
		1200	T.	965	36	19.6	131.5
		1800	T.	960	39	20.2	132.0
	19	0000	T.	955	41	20.9	132.5
		0600	T.	930	51	21.6	133.0
		1200	T.	920	54	22.4	133.7
		1800	T.	930	51	23.1	134.5
	20	0000	T.	930	51	23.8	135.5
		0600	T.	940	49	24.6	136.5
		1200	T.	945	46	25.4	137.3
		1800	T.	950	43	26.3	137.9
	21	0000	T.	955	41	27.0	138.2
		0600	T.	955	41	27.8	138.2
		1200	T.	960	39	28.5	138.1
		1800	T.	965	36	29.2	137.7
	22	0000	T.	965	36	29.5	136.8
		0600	T.	970	33	29.5	135.7
		1200	T.	970	33	29.6	134.6
		1800	S.T.S.	975	31	29.7	133.6
	23	0000	S.T.S.	975	31	29.7	132.9
		0600	S.T.S.	980	28	29.8	132.4
		1200	S.T.S.	980	28	30.1	132.3
		1800	S.T.S.	980	28	30.5	132.4
	24	0000	S.T.S.	980	28	30.7	132.6
		0600	S.T.S.	980	28	30.9	132.8
		1200	S.T.S.	980	28	31.2	133.0
		1800	S.T.S.	980	28	31.6	133.2
	25	0000	S.T.S.	980	28	32.1	133.2
		0600	S.T.S.	985	25	33.1	132.8
		1200	T.S.	990	23	33.9	132.0
		1800	T.S.	992	21	34.0	130.3
	26	0000	T.S.	994	18	34.0	130.0
		0600	T.D.	996	16	34.0	129.8
		1200	T.D.	998	13	34.0	129.6
		1800	T.D.	998	13	34.0	129.4
	27	0000	T.D.	998	13	34.0	129.0

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF TROPICAL STORM YUNYA (9409)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface winds (m/s)	Lat. °N	Long. °E
Jul	17	0000	T.D.	1000	13	14.9	115.3
		0600	T.D.	1000	13	15.0	116.1
		1200	T.D.	998	16	15.3	116.8
		1800	T.D.	998	16	15.6	117.4
	18	0000	T.D.	998	16	15.9	118.0
		0600	T.S.	996	18	16.2	118.5
		1200	T.S.	994	21	16.6	119.1
		1800	T.S.	990	23	17.2	119.8
	19	0000	T.S.	990	23	17.9	120.5
		0600	T.S.	994	21	18.7	121.0
		1200	T.S.	996	18	19.6	121.6
		1800	T.D.	998	16	20.1	122.2
	20	0000	T.D.	998	16	20.1	123.5
		0600	T.D.	998	16	20.0	125.0
		1200	T.D.	1000	13	20.0	126.6

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF SEVERE TROPICAL STORM ZEKE (9408)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface winds (m/s)	Lat. °N	Long. °E
Jul	17	0600	T.D.	1002	13	21.4	135.4
		1200	T.D.	1002	13	21.8	136.2
		1800	T.D.	1000	16	22.2	137.0
	18	0000	T.S.	998	18	23.1	138.3
		0600	T.S.	996	21	24.3	139.8
		1200	T.S.	996	21	25.0	141.6
		1800	T.S.	996	21	25.5	143.5
	19	0000	T.S.	998	18	26.2	145.3
		0600	T.S.	998	18	26.9	146.7
		1200	T.S.	998	18	27.4	147.6
		1800	T.S.	998	18	27.6	148.2
	20	0000	T.S.	998	18	27.5	148.8
		0600	T.S.	998	18	27.2	149.4
		1200	T.S.	998	18	27.0	150.1
		1800	T.S.	998	18	27.0	150.9
	21	0000	T.S.	998	18	27.0	151.7
		0600	T.S.	998	18	27.1	152.3
		1200	T.S.	998	18	27.3	152.8
		1800	T.S.	994	21	27.6	153.5
	22	0000	T.S.	990	23	28.0	154.2
		0600	S.T.S.	985	25	28.7	154.8
		1200	S.T.S.	985	25	29.5	154.8
		1800	S.T.S.	985	25	30.4	154.7
	23	0000	S.T.S.	985	25	31.3	154.6
		0600	S.T.S.	985	25	32.4	154.5
		1200	S.T.S.	985	25	33.6	154.4
		1800	S.T.S.	985	25	35.0	154.2
	24	0000	S.T.S.	985	25	36.4	154.2
		0600	S.T.S.	985	25	37.8	154.3
		1200	T.S.	990	23	39.1	155.3
		1800	T.S.	995	21	40.2	157.2

Became Extratropical

SIX-HOURLY POSITION AND INTENSITY DATA OF THE TROPICAL DEPRESSION OF 25-27 JUL

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface winds (m/s)	Lat. ^{O}N	Long. ^{O}E
Jul	25	0000	T.D.	1000	13	13.5	147.5
		0600	T.D.	1000	13	15.1	146.8
		1200	T.D.	1000	13	16.8	146.3
		1800	T.D.	998	16	18.6	146.1
	26	0000	T.D.	996	16	20.6	146.0
		0600	T.D.	996	16	22.0	146.0
		1200	T.D.	996	16	23.5	146.0
		1800	T.D.	996	16	24.9	146.0
	27	0000	T.D.	996	16	26.2	145.6
		0600	T.D.	996	16	26.8	144.3

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF TROPICAL STORM BRENDAN (9411)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface winds (m/s)	Lat. °N	Long. °E
Jul	26	0600	T.D.	998	16	15.2	129.2
		1200	T.D.	998	16	15.6	128.2
		1800	T.D.	998	16	15.8	127.2
	27	0000	T.D.	998	16	16.0	126.4
		0600	T.D.	998	16	16.1	125.8
		1200	T.D.	998	16	16.4	125.2
		1800	T.D.	998	16	16.8	125.1
	28	0000	T.D.	998	16	17.2	125.1
		0600	T.D.	998	16	17.8	125.4
		1200	T.D.	998	16	18.2	125.9
		1800	T.D.	998	16	18.7	126.4
	29	0000	T.D.	998	16	19.2	126.9
		0600	T.D.	998	16	19.9	127.4
		1200	T.D.	998	16	20.8	128.0
		1800	T.S.	996	18	21.8	128.4
	30	0000	T.S.	996	18	22.8	128.8
		0600	T.S.	996	18	23.9	129.0
		1200	T.S.	996	18	25.1	128.6
		1800	T.S.	992	21	26.4	127.6
	31	0000	T.S.	992	21	27.8	126.6
		0600	T.S.	990	23	29.6	125.5
		1200	T.S.	990	23	31.6	125.3
		1800	T.S.	992	21	33.5	125.5
Aug	1	0000	T.S.	994	18	35.3	125.9
		0600	T.S.	994	18	36.7	127.3
		1200	T.S.	994	18	38.0	129.4
		1800	T.S.	994	18	39.2	131.8
	2	0000	T.S.	994	18	40.1	134.3
		0600	T.S.	994	18	40.7	137.0
		1200	T.S.	994	18	40.9	139.8
		1800	T.S.	994	18	41.0	142.1
		0000	T.D.	998	16	41.1	143.9
		0600	T.D.	998	16	41.1	145.2

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF TROPICAL STORM AMY (9410)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface winds (m/s)	Lat. ^{o}N	Long. ^{o}E
Jul	28	0000	T.D.	994	16	20.7	108.5
		0600	T.D.	994	16	20.7	108.8
		1200	T.S.	990	18	20.6	109.0
		1800	T.S.	990	18	20.3	108.9
	29	0000	T.S.	990	18	19.8	108.7
		0600	T.S.	985	21	19.0	108.4
		1200	T.S.	990	18	18.9	108.9
		1800	T.S.	990	18	19.1	109.1
	30	0000	T.S.	990	18	19.1	108.4
		0600	T.S.	990	18	19.1	107.5
		1200	T.S.	990	18	19.4	106.6
		1800	T.S.	990	18	19.7	105.5
	31	0000	T.D.	994	16	19.6	104.4

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF TROPICAL STORM CAITLIN (9412)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface winds (m/s)	Lat. °N	Long. °E
Aug	1	1800	T.D.	1002	13	19.1	127.9
	2	0000	T.D.	1000	16	19.3	127.0
		0600	T.D.	1000	16	19.6	126.0
		1200	T.S.	998	18	20.0	125.0
		1800	T.S.	994	21	20.6	124.0
	3	0000	T.S.	990	23	21.4	123.0
		0600	T.S.	990	23	22.4	122.1
		1200	T.S.	990	23	23.8	121.1
		1800	T.S.	992	21	24.0	119.5
	4	0000	T.S.	992	21	24.1	117.9
		0600	T.D.	994	16	24.5	116.5
		1200	T.D.	994	16	25.2	115.4

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON DOUG (9413)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface winds (m/s)	Lat. ^{O}N	Long. ^{O} E
Aug	2	1200	T.D.	1000	16	15.5	140.6
		1800	T.S.	998	18	15.5	140.1
	3	0000	T.S.	994	21	15.5	139.6
		0600	T.S.	990	23	15.5	139.0
		1200	S.T.S.	985	25	15.4	138.3
		1800	S.T.S.	980	28	15.3	137.5
	4	0000	S.T.S.	975	31	15.1	136.4
		0600	T.	970	33	15.1	135.3
		1200	T.	965	36	15.1	134.2
		1800	T.	960	39	15.1	133.1
	5	0000	T.	950	43	15.3	132.0
		0600	T.	945	46	15.7	131.0
		1200	T.	935	51	16.2	129.7
		1800	T.	925	54	16.8	128.5
	6	0000	T.	935	51	17.5	127.3
		0600	T.	935	51	18.2	126.2
		1200	T.	935	51	19.1	125.3
		1800	T.	940	49	20.0	124.5
	7	0000	T.	940	49	21.0	123.8
		0600	T.	940	49	22.2	123.3
		1200	T.	940	49	23.6	122.9
		1800	T.	945	43	24.8	122.2
	8	0000	T.	950	41	25.7	121.8
		0600	T.	955	39	26.4	121.6
		1200	T.	960	36	27.1	121.8
		1800	T.	965	33	28.0	122.4
	9	0000	S.T.S.	970	31	29.0	123.1
		0600	S.T.S.	975	28	30.2	123.5
		1200	S.T.S.	975	28	31.1	123.7
		1800	S.T.S.	980	25	32.0	123.7
	10	0000	T.S.	985	23	32.8	123.7
		0600	T.S.	985	23	33.6	123.6
		1200	T.S.	985	23	34.0	124.1
		1800	T.S.	985	23	34.1	124.7
	11	0000	T.S.	985	23	34.2	125.2
		0600	T.S.	990	21	34.2	125.6
		1200	T.S.	990	21	34.1	125.8
		1800	T.S.	994	18	34.0	125.4
	12	0000	T.D.	996	16	33.9	124.8
		0600	T.D.	1000	13	33.5	123.6
				Dissipated			

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON ELLIE (9414)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface winds (m/s)	Lat. °N	Long. °E
Aug	7	0600	T.D.	1004	13	25.6	145.0
		1200	T.D.	1004	13	25.4	144.7
		1800	T.D.	1002	16	25.3	144.3
	8	0000	T.S.	1000	18	25.2	143.9
		0600	T.S.	1000	18	25.2	143.5
		1200	T.S.	1000	18	25.2	143.0
		1800	T.S.	995	21	25.2	142.3
	9	0000	T.S.	990	23	24.9	141.5
		0600	T.S.	990	23	24.6	140.6
		1200	S.T.S.	985	25	24.5	139.8
		1800	S.T.S.	985	25	24.3	139.1
	10	0000	S.T.S.	985	25	23.8	138.6
		0600	S.T.S.	985	25	23.2	138.5
		1200	S.T.S.	980	28	23.1	138.9
		1800	S.T.S.	975	31	23.5	139.1
	11	0000	S.T.S.	975	31	24.0	139.0
		0600	S.T.S.	975	31	25.0	138.3
		1200	S.T.S.	975	31	25.8	137.4
		1800	S.T.S.	975	31	26.6	136.4
	12	0000	T.	970	33	27.3	135.3
		0600	T.	965	36	28.1	134.1
		1200	T.	965	36	28.7	132.9
		1800	T.	965	36	29.3	131.6
	13	0000	T.	965	36	29.9	130.3
		0600	T.	965	36	30.5	128.8
		1200	T.	965	36	31.1	127.4
		1800	T.	965	36	31.6	126.0
	14	0000	T.	965	36	32.0	124.7
		0600	T.	970	33	32.3	123.6
		1200	S.T.S.	980	28	32.6	122.6
		1800	S.T.S.	980	25	33.0	122.0
	15	0000	S.T.S.	980	25	33.8	121.8
		0600	S.T.S.	980	25	35.1	121.9
		1200	S.T.S.	980	25	36.4	122.0

Became Extratropical

SIX-HOURLY POSITION AND INTENSITY DATA OF TROPICAL STORM LI (9415)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface winds (m/s)	Lat. °N	Long. ° E
Aug	12	1800	T.S.	996	21	12.8	179.9
	13	0000	T.S.	996	21	13.0	179.0
		0600	T.S.	998	18	13.4	178.2
		1200	T.D.	1000	16	13.7	177.4
		1800	T.D.	1000	16	14.0	176.4
	14	0000	T.D.	1000	16	14.5	175.3
		0600	T.D.	1000	16	14.9	174.3
		1200	T.D.	1000	16	15.3	173.3
		1800	T.D.	1000	16	15.6	172.6
	15	0000	T.D.	1000	16	15.9	171.9
		0600	T.D.	1000	16	16.4	171.3
		1200	T.D.	1000	16	17.0	171.0
		1800	T.D.	1000	16	17.8	170.7
	16	0000	T.D.	1000	16	18.6	170.5
		0600	T.D.	1000	16	19.1	170.3
		1200	T.D.	1000	16	19.2	169.9
		1800	T.D.	1000	16	19.0	169.3
	17	0000	T.D.	1000	16	18.8	168.8
		0600	T.D.	1000	16	18.5	168.5
		1200	T.D.	1000	16	18.4	168.9
		1800	T.D.	1000	16	18.4	169.4
	18	0000	T.D.	1000	16	18.5	169.9

Dissipated

WC-HOURLY POSITION AND INTENSITY DATA OF TYPHOON FRED (9416)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface winds (m/s)	Lat. ^{O}N	Long. ^{O}E
Aug	14	0000	T.D.	998	16	17.5	146.7
		0600	T.D.	998	16	17.7	145.6
		1200	T.S.	996	18	17.9	144.6
		1800	T.S.	996	18	18.1	143.6
	15	0000	T.S.	996	18	18.3	142.6
		0600	T.S.	994	21	18.5	141.6
		1200	T.S.	990	23	18.5	140.6
		1800	S.T.S.	985	25	18.3	139.7
	16	0000	S.T.S.	980	28	17.9	138.9
		0600	S.T.S.	980	28	17.6	138.0
		1200	S.T.S.	975	31	17.5	137.0
		1800	S.T.S.	975	31	17.6	136.0
	17	0000	S.T.S.	975	31	17.8	135.0
		0600	T.	970	33	18.1	134.0
		1200	T.	970	33	18.4	133.0
		1800	T.	965	36	18.7	132.1
	18	0000	T.	965	36	19.0	131.3
		0600	T.	960	39	19.5	130.6
		1200	T.	955	41	20.2	129.8
		1800	T.	950	43	20.8	128.9
	19	0000	T.	940	49	21.3	127.9
		0600	T.	925	54	21.8	127.0
		1200	T.	925	54	22.2	126.0
		1800	T.	925	54	22.5	125.3
	20	0000	T.	925	54	23.0	124.9
		0600	T.	930	51	23.6	124.7
		1200	T.	935	49	24.5	124.4
		1800	T.	940	46	25.6	123.9
	21	0000	T.	945	43	26.4	123.0
		0600	T.	955	41	27.0	122.0
		1200	T.	970	33	27.7	121.0
		1800	S.T.S.	980	25	28.3	120.0
	22	0000	T.S.	990	21	28.8	118.6
		0600	T.D.	995	16	29.1	117.1
		1200	T.D.	1000	13	29.6	115.7

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON GLADYS (9417)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface winds (m/s)	Lat. ^{O}N	Long. ^{O} E
Aug	23	0600	T.D.	1005	13	24.3	158.1
		1200	T.D.	1005	13	24.1	157.6
		1800	T.D.	1005	13	24.0	157.1
	24	0000	T.D.	1000	16	23.9	156.6
		0600	T.D.	1000	16	23.8	156.2
		1200	T.S.	998	18	23.8	155.8
		1800	T.S.	994	21	23.8	155.4
	25	0000	T.S.	994	21	23.8	154.9
		0600	T.S.	994	21	23.9	154.3
		1200	T.S.	990	23	24.0	153.7
		1800	S.T.S.	985	25	24.1	153.1
	26	0000	S.T.S.	980	28	24.3	152.4
		0600	S.T.S.	985	25	24.4	151.7
		1200	S.T.S.	985	25	24.5	151.0
		1800	S.T.S.	985	25	24.5	150.1
	27	0000	T.S.	990	23	24.5	149.0
		0600	T.S.	990	23	24.5	147.9
		1200	T.S.	990	23	24.5	146.8
		1800	T.S.	994	21	24.2	145.8
	28	0000	T.S.	994	21	23.6	144.9
		0600	T.S.	998	18	23.0	144.0
		1200	T.S.	998	18	22.3	143.0
		1800	T.S.	998	18	21.6	141.7
	29	0000	T.S.	998	18	21.4	140.4
		0600	T.S.	998	18	21.4	139.1
		1200	T.S.	998	18	21.5	137.8
		1800	T.S.	998	18	21.6	136.4
	30	0000	T.S.	998	18	21.7	134.9
		0600	T.S.	994	21	21.8	133.3
		1200	T.S.	990	23	21.9	131.6
		1800	S.T.S.	980	28	22.0	129.9
	31	0000	S.T.S.	975	31	22.2	128.2
		0600	T.	965	36	22.6	126.6
		1200	T.	960	39	23.0	125.0
		1800	T.	950	43	23.5	123.6
Sep		0000	T.	960	39	24.0	122.4
		0600	T.	970	33	24.8	121.1
		1200	S.T.S.	985	25	25.4	119.7
		1800	T.S.	995	18	26.1	118.5

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF SEVERE TROPICAL STORM HARRY (9418)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface winds (m/s)	Lat. ^{O}N	Long. ^{O}E
Aug	25	0600	T.D.	1002	13	17.6	119.1
		1200	T.D.	1000	16	17.9	118.1
		1800	T.S.	998	18	18.2	117.2
	26	0000	T.S.	998	18	18.6	116.2
		0600	T.S.	994	21	19.1	115.2
		1200	T.S.	994	21	19.7	114.2
		1800	T.S.	990	23	20.0	113.1
	27	0000	T.S.	990	23	20.2	112.2
		0600	S.T.S.	985	25	20.3	111.4
		1200	S.T.S.	985	25	20.3	110.7
		1800	S.T.S.	985	25	20.3	110.0
	28	0000	T.S.	988	23	20.3	109.4
		0600	T.S.	988	23	20.6	108.7
		1200	T.S.	988	23	21.0	107.8
		1800	T.S.	988	23	21.1	106.7
	29	0000	T.D.	996	16	21.1	105.6,

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON IVY (9419)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface winds (m/s)	Lat. °N	Long. °E
Aug	27	1200	T.D.	1004	13	19.1	163.0
		1800	T.D.	1000	16	19.9	163.1
	28	0000	T.S.	998	18	20.6	163.2
		0600	T.S.	998	18	21.3	163.3
		1200	T.S.	994	21	22.1	163.3
		1800	T.S.	994	21	23.0	163.2
	29	0000	T.S.	990	23	23.8	162.8
		0600	T.S.	990	23	24.6	162.4
		1200	T.S.	990	23	25.3	161.7
		1800	T.S.	990	23	26.0	161.0
	30	0000	S.T.S.	985	25	26.5	160.1
		0600	S.T.S.	980	28	26.9	159.5
		1200	S.T.S.	980	28	27.3	159.1
		1800	S.T.S.	975	31	27.7	159.0
	31	0000	T.	960	39	28.2	158.9
		0600	T.	960	39	28.8	158.9
		1200	T.	960	39	29.5	158.9
		1800	T.	965	36	30.2	158.9
Sep	1	0000	T.	970	33	30.8	159.1
		0600	T.	970	33	31.4	159.5
		1200	S.T.S.	975	31	32.0	160.0
		1800	S.T.S.	975	31	32.5	160.5
	2	0000	S.T.S.	980	28	33.0	160.7
		0600	S.T.S.	980	28	33.6	160.8
		1200	T.S.	985	23	34.3	161.0
		1800	T.S.	985	23	35.0	161.3
	3	0000	T.S.	985	23	35.7	161.9
		0600	T.S.	985	23	37.1	162.9
		1200	T.S.	985	23	38.6	163.7
		1800	T.S.	985	23	40.0	164.6
	4	0000	T.S.	985	23	41.4	165.6
		0600	T.S.	985	23	42.5	167.1

Became Extratropical

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON JOHN (9420)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface winds (m/s)	Lat. ^{O}N	Long. ^{O}E
Aug	28	1200	T.	950	43	22.2	179.3
		1800	T.	950	43	22.7	178.2
	29	0000	T.	950	43	23.3	177.1
		0600	T.	950	43	23.8	176.2
		1200	T.	950	43	24.3	175.5
		1800	T.	955	41	24.8	174.9
	30	0000	T.	960	39	25.2	174.4
		0600	T.	965	36	25.6	174.0
		1200	T.	970	33	26.0	173.6
		1800	S.T.S.	975	31	26.4	173.3
	31	0000	S.T.S.	980	28	26.8	173.1
		0600	S.T.S.	980	28	27.1	173.1
		1200	S.T.S.	985	25	27.4	173.1
		1800	T.S.	990	23	27.7	173.3
Sep	1	0000	T.S.	990	23	27.9	173.6
		0600	T.S.	992	21	27.9	173.9
		1200	T.S.	996	18	27.9	174.2
		1800	T.S.	996	18	27.8	174.6
	2	0000	T.S.	996	18	27.7	175.0
		0600	T.S.	996	18	27.6	175.4
		1200	T.S.	996	18	27.5	175.8
		1800	T.S.	996	18	27.4	176.2
	3	0000	T.S.	996	18	27.3	176.6
		0600	T.S.	992	21	27.1	177.0
		1200	T.S.	992	21	26.9	177.3
		1800	T.S.	992	21	26.7	177.7
	4	0000	T.S.	992	21	26.5	178.0
		0600	T.S.	992	21	26.3	178.3
		1200	T.S.	992	21	26.0	178.5
		1800	T.S.	990	23	25.8	178.3
	5	0000	T.S.	990	23	25.9	177.9
		0600	T.S.	990	23	26.2	177.6
		1200	T.S.	990	23	26.5	177.3
		1800	T.S.	992	21	26.8	177.1
	6	0000	T.S.	992	21	27.1	176.8
		0600	T.S.	990	23	27.6	176.2
		1200	T.S.	990	23	28.0	175.6
		1800	S.T.S.	985	25	28.5	175.1
	7	0000	S.T.S.	985	25	28.9	175.0
		0600	S.T.S.	985	25	29.2	175.2
		1200	S.T.S.	985	25	29.5	175.6
		1800	S.T.S.	985	25	29.7	176.4
	8	0000	S.T.S.	980	28	30.0	177.4
		0600	S.T.S.	980	28	30.4	178.5
		1200	S.T.S.	980	28	31.0	179.8

Moved east of 180^{O}

SIX-HOURLY POSITION AND INTENSITY DATA OF SEVERE TROPICAL STORM JOEL (9422)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface winds (m/s)	Lat. ^{O}N	Long. ^{O}E
Sep	3	0000	T.D.	1000	16	15.2	114.8
		0600	T.S.	996	18	15.4	114.0
		1200	T.S.	996	18	15.6	113.2
		1800	T.S.	996	18	16.1	112.3
	4	0000	T.S.	996	18	16.5	111.5
		0600	T.S.	996	18	16.8	111.0
		1200	T.S.	996	18	16.9	110.5
		1800	T.S.	996	18	16.8	110.0
	5	0000	T.S.	994	21	16.5	109.5
		0600	T.S.	994	21	16.4	109.1
		1200	T.S.	994	21	16.6	108.9
		1800	T.S.	994	21	17.0	109.0
	6	0000	T.S.	990	23	17.7	109.3
		0600	S.T.S.	985	25	18.5	109.4
		1200	S.T.S.	985	25	19.2	108.5
		1800	S.T.S.	985	25	19.6	108.1
	7	0000	S.T.S.	985	25	20.0	107.7
		0600	S.T.S.	985	25	20.5	107.2
		1200	T.S.	990	23	21.0	106.7
		1800	T.S.	994	21	21.6	106.0
	8	0000	T.D.	1000	16	22.1	105.3
		0600	T.D.	1000	16	22.7	104.7
		1200	T.D.	1000	16	23.4	104.2
		1800	T.D.	1005	13	24.2	103.6

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON KINNA (9421)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface winds (m/s)	Lat. ^{O}N	Long. ^{O}E
Sep	5	0600	T.D.	1004	13	20.4	140.8
		1200	T.D.	1000	16	21.4	140.8
		1800	T.D.	1000	16	22.3	140.8
	6	0000	T.S.	998	18	23.1	140.8
		0600	T.S.	998	18	23.8	140.8
		1200	T.S.	994	21	24.3	140.7
		1800	T.S.	994	21	24.6	140.5
	7	0000	T.S.	994	21	24.9	140.3
		0600	T.S.	994	21	25.2	140.1
		1200	T.S.	994	21	25.5	139.9
		1800	T.S.	994	21	25.8	139.8
	8	0000	T.S.	990	23	26.3	139.7
		0600	S.T.S.	985	25	26.9	139.6
		1200	S.T.S.	985	25	27.4	139.6
		1800	S.T.S.	975	31	27.8	139.6
	9	0000	T.	970	33	28.2	139.8
		0600	T.	965	36	28.5	139.9
		1200	T.	965	36	28.8	140.0
		1800	T.	965	36	29.3	139.9
	10	0000	T.	965	36	29.8	139.6
		0600	T.	960	39	30.4	139.1
		1200	T.	960	39	31.0	139.3
		1800	T.	965	36	31.6	139.8
	11	0000	T.	970	33	32.5	140.8
		0600	T.	970	33	33.8	142.3
		1200	S.T.S.	980	28	35.2	144.0
		1800	S.T.S.	985	25	37.1	145.9
	12	0000	T.S.	990	23	39.2	148.2
			Became Extratropical				

SIX-HOURLY POSITION AND INTENSITY DATA OF TROPICAL STORM LUKE (9423)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface winds (m/s)	Lat. °N	Long. °E
Sep	7	1200	T.D.	1002	13	14.1	129.5
		1800	T.D.	1000	16	14.2	128.9
	8	0000	T.S.	996	18	14.3	128.4
		0600	T.S.	996	18	14.5	127.9
		1200	T.S.	996	18	14.8	127.2
		1800	T.S.	996	18	15.4	126.6
	9	0000	T.S.	996	18	16.1	126.1
		0600	T.S.	996	18	16.9	125.6
		1200	T.S.	996	18	17.7	124.8
		1800	T.S.	994	21	18.2	123.8
	10	0000	T.S.	994	21	18.6	122.7
		0600	T.S.	994	21	18.8	121.6
		1200	T.S.	994	21	18.9	121.0
		1800	T.S.	994	21	19.0	120.0
	11	0000	T.S.	994	21	19.9	119.1
		0600	T.S.	994	21	20.7	117.7
		1200	T.S.	994	21	20.6	116.3
		1800	T.S.	994	21	20.3	114.9
	12	0000	T.S.	994	21	19.9	113.5
		0600	T.S.	990	23	19.3	112.2
		1200	T.S.	990	23	19.0	111.1
		1800	T.S.	990	23	18.9	110.0
	13	0000	T.S.	994	21	18.9	108.9
		0600	T.S.	994	21	18.9	107.8
		1200	T.S.	994	21	18.9	106.8
		1800	T.D.	1000	16	19.0	105.9

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON MELISSA (9424)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface winds (m/s)	Lat. ^{O}N	Long. ^{O}E
Sep	11	0000	T.D.	1004	13	9.3	160.9
		0600	T.D.	1000	16	9.6	159.8
		1200	T.D.	1000	16	10.0	158.7
		1800	T.S.	998	18	10.6	157.8
	12	0000	T.S.	994	21	11.2	157.2
		0600	T.S.	990	23	11.8	156.8
		1200	T.S.	990	23	12.3	156.7
		1800	S.T.S.	985	25	12.7	157.0
	13	0000	S.T.S.	980	28	13.1	157.4
		0600	S.T.S.	975	31	13.5	157.8
		1200	S.T.S.	975	31	14.0	158.2
		1800	T.	970	33	14.5	158.5
	14	0000	T.	965	36	15.0	158.9
		0600	T.	960	39	15.5	159.2
		1200	T.	955	41	16.0	159.6
		1800	T.	950	43	16.9	159.8
	15	0000	T.	940	49	18.0	159.8
		0600	T.	930	54	19.1	159.7
		1200	T.	930	54	20.2	159.6
		1800	T.	930	54	21.4	159.2
	16	0000	T.	930	54	22.7	158.5
		0600	T.	930	54	24.0	157.7
		1200	T.	935	51	25.5	156.9
		1800	T.	940	49	27.0	156.0
	17	0000	T.	945	43	28.5	155.0
		0600	T.	950	41	30.0	153.8
		1200	T.	960	36	31.5	152.7
		1800	S.T.S.	970	31	33.0	151.6
	18	0000	S.T.S.	970	31	34.7	150.2
		0600	S.T.S.	970	31	36.4	149.2
		1200	S.T.S.	970	31	38.0	148.7
		1800	S.T.S.	975	28	39.2	148.5
	19	0000	S.T.S.	975	28	40.3	148.5
		0600	S.T.S.	975	28	41.4	148.7

Became Extratropical

SIX-HOURLY POSITION AND INTENSITY DATA OF TROPICAL STORM NAT (9425)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface winds (m/s)	Lat. ^{O}N	Long. ^{O}E
Sep	15	0000	T.D.	1002	13	12.6	140.3
		0600	T.D.	1002	13	13.4	141.6
		1200	T.D.	1002	13	14.0	143.0
		1800	T.D.	998	16	14.5	144.5
	16	0000	T.D.	998	16	14.8	146.0
		0600	T.D.	998	16	15.0	147.6
		1200	T.S.	994	18	15.1	149.1
		1800	T.S.	994	18	15.3	150.6
	17	0000	T.S.	994	18	15.7	152.2
		0600	T.S.	994	18	16.8	154.0
		1200	T.S.	994	18	18.4	155.4
		1800	T.S.	994	18	19.9	156.1
	18	0000	T.S.	994	18	21.0	156.2
		0600	T.S.	994	18	22.0	156.0
		1200	T.S.	994	18	23.0	155.5
		1800	T.S.	992	21	23.6	154.5
	19	0000	T.S.	992	21	24.0	153.3
		0600	T.S.	992	21	24.5	152.2
		1200	T.S.	992	21	25.0	151.2
		1800	T.S.	992	21	25.6	150.3
	20	0000	T.S.	994	18	26.3	149.7
		0600	T.D.	998	16	27.1	149.2
		1200	T.D.	998	16	27.8	149.0
		1800	T.D.	998	16	28.5	149.1
	21	0000	T.D.	998	16	29.3	149.5
		0600	T.D.	1002	13	29.8	150.3
		1200	T.D.	1002	13	30.3	151.2

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON ORCHID (9426)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface winds (m/s)	Lat. °N	Long. °E
Sep	18	1200	T.D.	1002	13	11.8	141.1
		1800	T.D.	1000	16	12.0	141.8
	19	0000	T.S.	998	18	12.4	142.4
		0600	T.S.	998	18	12.9	142.9
		1200	T.S.	994	21	13.5	143.2
		1800	T.S.	994	21	14.2	143.4
	20	0000	T.S.	994	21	14.9	143.3
		0600	T.S.	994	21	15.5	142.7
		1200	T.S.	994	21	16.0	141.8
		1800	T.S.	990	23	17.0	141.3
	21	0000	T.S.	990	23	18.0	141.4
		0600	T.S.	990	23	18.8	141.5
		1200	T.S.	990	23	19.4	141.0
		1800	S.T.S.	985	25	19.1	140.2
	22	0000	S.T.S.	985	25	18.7	139.5
		0600	S.T.S.	985	25	18.2	139.0
		1200	S.T.S.	980	28	17.8	138.6
		1800	S.T.S.	975	31	17.4	138.4
	23	0000	S.T.S.	975	31	17.2	138.1
		0600	T.	970	33	17.3	137.9
		1200	T.	965	36	17.8	137.8
		1800	T.	955	41	18.4	137.5
	24	0000	T.	945	46	18.9	137.0
		0600	T.	940	49	19.2	136.8
		1200	T.	930	51	19.4	136.7
		1800	T.	925	54	19.7	136.7
	25	0000	T.	925	54	20.2	136.6
		0600	T.	925	54	20.7	136.5
		1200	T.	925	54	21.2	136.4
		1800	T.	925	54	21.8	136.2
	26	0000	T.	925	54	22.5	135.7
		0600	T.	925	54	23.3	135.0
		1200	T.	925	54	24.0	134.1
		1800	T.	925	54	24.4	133.6
	27	0000	T.	930	51	24.9	133.1
		0600	T.	940	49	25.5	132.7
		1200	T.	940	49	26.1	132.5
		1800	T.	940	49	26.7	132.4
	28	0000	T.	945	46	27.3	132.4
		0600	T.	945	46	27.9	132.6
		1200	T.	945	46	28.6	132.9
		1800	T.	950	43	29.6	133.4
	29	0000	T.	955	41	30.8	134.0
		0600	T.	960	39	32.2	134.8
		1200	T.	965	36	34.1	135.8
		1800	S.T.S.	980	28	36.6	136.5

Became Extratropical

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON PAT (9427)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface winds (m/s)	Lat. ^{O}N	Long. ^{O}E
Sep	21	0000	T.D.	1005	13	14.9	167.5
		0600	T.D.	1005	13	14.8	166.5
		1200	T.D.	1000	16	14.8	165.6
		1800	T.S.	998	18	15.0	164.9
	22	0000	T.S.	998	18	15.7	164.3
		0600	T.S.	998	18	16.6	163.9
		1200	T.S.	994	21	17.8	163.7
		1800	T.S.	990	23	19.4	163.4
	23	0000	S.T.S.	975	31	20.7	163.1
		0600	T.	965	36	22.0	162.7
		1200	T.	965	36	23.2	162.3
		1800	T.	965	36	24.3	161.8
	24	0000	T.	965	36	25.1	161.1
		0600	T.	965	36	25.7	160.3
		1200	T.	965	36	26.3	159.4
		1800	T.	970	33	27.3	157.9
	25	0000	S.T.S.	975	31	28.1	155.8
		0600	S.T.S.	980	28	28.3	153.0
		1200	S.T.S.	985	25	27.9	151.4
		1800	T.S.	992	23	27.6	150.7
	26	0000	T.S.	992	23	28.0	150.7
		0600	T.S.	992	23	29.2	150.9
		1200	T.S.	992	23	31.2	150.4
		1800	T.S.	992	23	32.2	149.7
	27	0000	T.S.	992	23	33.3	149.4
		0600	T.S.	992	23	34.4	149.6
		1200	T.S.	992	23	35.4.	150.2
		1800	T.S.	992	23	36.5	151.4
	28	0000	T.S.	992	23	37.5	153.0
		0600	T.S.	996	21	38.3	154.7
		1200	T.S.	1000	18	39.0	157.0

Became Extratropical

SIX-HOURLY POSITION AND INTENSITY DATA OF TROPICAL STORM RUTH (9428)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface winds (m/s)	Lat. °N	Long. °E
Sep	23	1800	T.D.	1002	13	19.2	153.2
	24	0000	T.D.	1000	16	19.9	153.9
		0600	T.D.	1000	16	20.6	154.5
		1200	T.D.	1000	16	21.4	155.1
		1800	T.S.	996	18	22.2	155.7
	25	0000	T.S.	996	18	23.3	156.3
		0600	T.S.	996	18	24.8	156.4
		1200	T.S.	992	21	26.3	156.0
		1800	T.S.	992	21	28.5	154.6
	26	0000	T.S.	996	18	30.3	152.5
		0600	T.D.	1000	16	30.6	149.6

Merged with typhoon Pat

SIX-HOURLY POSITION AND INTENSITY DATA OF THE TROPICAL DEPRESSION OF 28 SEPTEMBER - 3 OCTOBER

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface winds (m/s)	Lat. ^{O}N	Long. ^{O}E
Sep	28	1800	T.D.	1000	16	26.2	163.0
	29	0000	T.D.	1000	16	26.9	161.7
		0600	T.D.	1000	16	27.8	160.6
		1200	T.D.	1000	16	28.4	159.9
		1800	T.D.	1000	16	29.0	159.4
	30	0000	T.D.	1000	16	29.5	159.1
		0600	T.D.	1005	13	29.8	159.0
		1200	T.D.	1005	13	30.1	158.8
		1800	T.D.	1005	13	30.3	158.7
Oct	1	0000	T.D.	1005	13	30.5	158.5
		0600	T.D.	1005	13	30.8	158.3
		1200	T.D.	1005	13	31.1	158.0
		1800	T.D.	1005	13	31.4	157.4
	2	0000	T.D.	1005	13	31.6	156.4
		0600	T.D.	1000	16	31.6	155.9
		1200	T.D.	1000	16	31.5	155.5
		1800	T.D.	1000	16	31.4	156.0
	3	0000	T.D.	1000	16	31.5	156.7
		0600	T.D.	1000	16	31.7	157.8
		1200	T.D.	1000	16	32.0	159.2

Became Extratropical

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON SETH (9429)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface winds (m/s)	Lat. ^{O}N	Long. ^{O}E
Oct	2	1800	T.D.	1004	13	8.9	157.5
	3	0000	T.D.	1004	13	9.5	155.3
		0600	T.D.	1000	16	10.1	153.9
		1200	T.S.	998	18	10.6	152.5
		1800	T.S.	994	21	11.1	151.0
	4	0000	T.S.	994	21	11.4	149.4
		0600	T.S.	990	23	11.5	147.8
		1200	T.S.	990	23	11.5	146.2
		1800	S.T.S.	985	25	11.6	144.6
	5	0000	S.T.S.	985	25	12.0	143.0
		0600	S.T.S.	985	25	12.4	141.3
		1200	S.T.S.	985	25	12.8	139.6
		1800	S.T.S.	980	28	13.3	137.8
	6	0000	S.T.S.	975	31	13.8	136.0
		0600	T.	970	33	14.4	134.4
		1200	T.	965	36	15.0	132.9
		1800	T.	960	39	15.6	131.4
	7	0000	T.	950	43	16.1	129.9
		0600	T.	940	49	16.9	128.5
		1200	T.	920	57	17.6	127.3
		1800	T.	925	54	18.3	126.3
	8	0000	T.	925	54	19.0	125.6
		0600	T.	925	54	19.8	125.0
		1200	T.	925	54	20.6	124.5
		1800	T.	930	51	21.3	124.1
	9	0000	T.	935	49	22.0	124.0
		0600	T.	935	49	23.0	123.9
		1200	T.	940	46	24.2	123.7
		1800	T.	945	43	25.2	123.2
	10	0000	T.	950	41	25.8	122.7
		0600	T.	955	39	26.4	122.7
		1200	T.	960	36	27.2	122.8
		1800	T.	965	33	28.2	123.1
	11	0000	S.T.S.	970	31	29.4	123.6
		0600	S.T.S.	975	28	30.6	124.2
		1200	S.T.S.	980	25	32.0	125.1
		1800	S.T.S.	980	25	33.9	126.5
	12	0000	S.T.S.	980	25	36.8	129.2

Became Extratropical

SK-HOURLY POSITION AND INTENSITY DATA OF TYPHOON VERNE (9431)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface winds (m/s)	Lat. °N	Long. °E
Oct	15	1200	T.D.	1005	13	10.0	166.4
		1800	T.D.	1005	13	10.2	165.0
	16	0000	T.D.	1005	13	10.5	163.7
		0600	T.D.	1005	13	10.9	162.2
		1200	T.D.	1005	13	11.3	160.7
		1800	T.D.	1005	13	11.8	159.0
	17	0000	T.D.	1005	13	12.3	157.2
		0600	T.D.	1000	16	12.9	155.4
		1200	T.D.	1000	16	13.6	153.6
		1800	T.S.	998	18	14.0	152.0
	18	0000	T.S.	998	18	14.2	150.5
		0600	T.S.	998	18	14.4	149.0
		1200	T.S.	994	21	14.4	147.6
		1800	T.S.	990	23	14.4	146.2
	19	0000	S.T.S.	985	25	14.4	144.8
		0600	S.T.S.	985	25	14.6	143.4
		1200	S.T.S.	985	25	14.9	142.0
		1800	S.T.S.	980	28	15.1	140.5
	20	0000	S.T.S.	975	31	15.3	139.0
		0600	S.T.S.	975	31	15.6	137.4
		1200	S.T.S.	975	31	16.0	135.9
		1800	T.	970	33	16.4	134.6
	21	0000	T.	970	33	16.7	133.8
		0600	T.	970	33	17.0	133.2
		1200	T.	970	33	17.3	132.7
		1800	T.	970	33	17.6	132.2
	22	0000	T.	965	36	17.9	131.7
		0600	T.	965	36	18.2	131.3
		1200	T.	965	36	18.5	130.9
		1800	T.	965	36	18.5	130.6
	23	0000	T.	960	39	18.5	130.4
		0600	T.	955	41	18.4	130.2
		1200	T.	950	43	18.1	130.0
		1800	T.	950	43	18.0	129.9
	24	0000	T.	950	43	17.8	129.8
		0600	T.	950	43	17.6	129.7
		1200	T.	950	43	17.2	129.7
		1800	T.	950	43	16.7	129.7
	25	0000	T.	950	43	16.2	129.7
		0600	T.	950	43	15.9	129.5
		1200	T.	950	43	15.7	129.3
		1800	T.	950	43	15.5	129.2
	26	0000	T.	955	41	15.3	129.1
		0600	T.	960	39	15.1	129.1
		1200	T.	965	36	15.1	129.3
		1800	T.	970	33	15.3	129.5
	27	0000	S.T.S.	975	31	15.5	129.7
		0600	S.T.S.	975	31	15.8	129.9
		1200	S.T.S.	980	28	16.2	130.2
		1800	S.T.S.	985	25	16.6	130.5
	28	0000	S.T.S.	985	25	17.2	130.8
		0600	S.T.S.	985	25	18.0	131.0
		1200	S.T.S.	985	25	18.7	131.0
		1800	S.T.S.	985	25	19.2	131.1

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON VERNE (9431) (Cont.)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface winds (m/s)	Lat. °N	Long. °E
Oct	29	0000	S.T.S.	985	25	19.6	131.4
		0600	S.T.S.	985	25	20.2	131.9
		1200	S.T.S.	985	25	21.1	132.6
		1800	S.T.S.	985	25	22.0	133.4
	30	0000	T.S.	990	23	22.8	134.2
		0600	T.S.	990	23	23.6	135.0
		1200	T.S.	990	23	24.4	135.8
		1800	T.S.	990	23	25.1	136.8
	31	0000	T.S.	990	23	25.7	137.8
		0600	T.S.	990	23	26.3	139.1
		1200	T.S.	990	23	26.8	140.4
		1800	T.S.	990	23	27.3	141.7

Became Extratropical

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON TERESA (9430)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface winds (m/s)	Lat. ^{O}N	Long. ^{O}E
Oct	16	0000	T.D.	1005	13	16.0	147.3
		0600	T.D.	1005	13	15.7	145.8
		1200	T.D.	1005	13	15.6	144.2
		1800	T.D.	1000	16	15.7	142.6
	17	0000	T.D.	1000	16	15.9	141.1
		0600	T.S.	998	18	16.1	139.8
		1200	T.S.	994	21	16.4	138.5
		1800	T.S.	994	21	16.4	137.2
	18	0000	T.S.	994	21	16.1	135.9
		0600	T.S.	994	21	15.8	134.5
		1200	T.S.	990	23	15.5	133.1
		1800	S.T.S.	985	25	15.4	131.6
	19	0000	S.T.S.	980	28	15.4	130.2
		0600	T.	970	33	15.5	128.9
		1200	T.	965	36	15.6	127.6
		1800	T.	955	41	15.7	126.5
	20	0000	T.	955	41	15.6	125.4
		0600	T.	955	41	15.5	124.4
		1200	T.	955	41	15.3	123.5
		1800	T.	960	39	15.1	122.7
	21	0000	T.	965	36	14.8	122.0
		0600	S.T.S.	975	31	14.5	121.1
		1200	S.T.S.	980	28	14.2	120.0
		1800	S.T.S.	985	25	13.8	119.0
	22	0000	S.T.S.	985	25	13.3	118.0
		0600	S.T.S.	985	25	12.8	117.0
		1200	S.T.S.	980	28	12.2	116.0
		1800	S.T.S.	980	28	11.6	115.0
	23	0000	S.T.S.	975	31	11.1	114.3
		0600	S.T.S.	975	31	10.7	113.7
		1200	S.T.S.	980	28	10.6	113.2
		1800	S.T.S.	980	28	10.6	112.8
	24	0000	S.T.S.	980	28	10.7	112.4
		0600	S.T.S.	980	28	10.8	112.0
		1200	S.T.S.	980	28	10.9	111.6
		1800	S.T.S.	980	28	11.0	111.2
	25	0000	S.T.S.	980	28	11.0	110.8
		0600	S.T.S.	985	25	11.0	110.3
		1200	T.S.	992	21	11.0	109.8
		1800	T.S.	996	18	11.0	109.5
	26	0000	T.D.	1000	16	11.0	109.3

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON WILDA (9432)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface winds (m/s)	Lat. °N	Long. °E
Oct	19	1800	T.D.	1004	13	13.4	164.0
	20	0000	T.D.	1004	13	13.4	163.3
		0600	T.D.	1004	13	13.4	162.6
		1200	T.D.	1000	16	13.4	161.9
		1800	T.S.	998	18	13.6	161.1
	21	0000	T.S.	994	21	13.9	160.3
		0600	T.S.	990	23	14.2	159.6
		1200	S.T.S.	985	25	14.6	158.9
		1800	S.T.S.	985	25	15.0	158.2
	22	0000	S.T.S.	980	28	15.4	157.5
		0600	S.T.S.	975	31	15.8	156.7
		1200	T.	970	33	16.2	155.6
		1800	T.	965	36	16.5	154.4
	23	0000	T.	960	39	16.8	153.2
		0600	T.	960	39	17.0	152.0
		1200	T.	955	41	16.9	150.9
		1800	T.	955	41	16.6	149.9
	24	0000	T.	950	43	16.3	149.0
		0600	T.	950	43	15.9	148.2
		1200	T.	950	43	15.7	147.7
		1800	T.	945	46	15.5	147.3
	25	0000	T.	945	46	15.7	147.2
		0600	T.	950	43	15.9	147.3
		1200	T.	955	41	16.2	147.5
		1800	T.	960	39	16.7	147.9
	26	0000	T.	960	39	17.3	148.4
		0600	T.	960	39	18.0	148.9
		1200	T.	960	39	18.8	149.5
		1800	T.	960	39	19.6	150.0
	27	0000	T.	960	39	20.1	150.4
		0600	T.	960	39	20.5	150.7
		1200	T.	960	39	21.0	151.0
		1800	T.	960	39	21.5	151.3
	28	0000	T.	960	39	22.3	151.5
		0600	T.	960	39	23.0	151.5
		1200	T.	960	39	23.6	151.5
		1800	T.	960	39	24.2	151.3
	29	0000	T.	960	39	24.8	151.1
		0600	T.	960	39	25.2	150.8
		1200	T.	960	39	25.6	150.4
		1800	T.	960	39	26.0	150.0
	30	0000	T.	965	36	26.4	149.9
		0600	T.	965	36	27.0	150.0
		1200	T.	965	36	27.6	150.2
		1800	T.	970	33	28.8	150.7
	31	0000	T.	970	33	30.4	151.4
		0600	S.T.S.	985	31	32.2	152.7
		1200	S.T.S.	985	31	34.2	155.1

Became Extratropical

SIX-HOURLY POSITION AND INTENSITY DATA OF TROPICAL STORM YURI (9433)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface winds (m/s)	Lat. °N	Long. °E
Oct	22	1800	T.D.	1000	16	24.5	179.0
	23	0000	T.S.	998	18	24.1	176.3
		0600	T.S.	994	21	23.8	173.8
		1200	T.S.	994	21	23.9	171.2
		1800	T.S.	998	18	24.0	168.6
	24	0000	T.S.	998	18	24.2	166.2
		0600	T.S.	998	18	24.5	163.8
		1200	T.S.	998	18	25.0	161.8
		1800	T.S.	998	18	25.6	160.2
	25	0000	T.D.	1000	16	26.0	158.6
		0600	T.D.	1000	16	26.0	157.2
		1200	T.D.	1000	16	26.0	156.1
		1800	T.D.	1000	16	26.0	155.3
	26	0000	T.D.	1000	16	26.1	154.5

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON ZELDA (9434)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface winds (m/s)	Lat. °N	Long. °E
Oct	28	0600	T.D.	1004	13	16.9	166.9
		1200	T.D.	1004	13	16.3	166.3
		1800	T.D.	1000	16	15.7	165.6
	29	0000	T.D.	1000	16	15.1	164.9
		0600	T.D.	1000	16	14.6	164.2
		1200	T.D.	1000	16	14.1	163.5
		1800	T.D.	1000	16	13.7	162.7
	30	0000	T.D.	1000	16	13.2	161.9
		0600	T.D.	1000	16	12.7	161.2
		1200	T.D.	1000	16	12.1	160.2
		1800	T.S.	998	18	11.3	158.7
	31	0000	T.S.	994	21	10.5	157.1
		0600	T.S.	994	21	10.1	155.6
		1200	T.S.	994	21	9.9	154.5
		1800	T.S.	990	23	9.7	153.5
Nov	1	0000	T.S.	990	23	9.6	152.5
		0600	S.T.S.	985	25	9.7	151.6
		1200	S.T.S.	985	25	10.0	150.8
		1800	S.T.S.	980	28	10.5	150.1
	2	0000	S.T.S.	975	31	11.2	149.5
		0600	S.T.S.	975	31	12.0	148.8
		1200	T.	970	33	13.0	148.1
		1800	T.	970	33	14.1	147.3
	3	0000	T.	965	36	15.1	146.5
		0600	T.	955	41	16.1	145.8
		1200	T.	955	41	17.0	144.9
		1800	T.	950	43	17.7	143.8
	4	0000	T.	950	43	18.1	142.6
		0600	T.	945	46	18.3	141.4
		1200	T.	940	49	18.4	140.2
		1800	T.	930	51	18.6	139.0
	5	0000	T.	920	57	19.0	137.7
		0600	T.	920	57	19.8	136.4
		1200	T.	930	51	20.8	135.3
		1800	T.	940	49	21.8	134.3
	6	0000	T.	945	46	22.8	133.6
		0600	T.	950	43	23.7	133.2
		1200	T.	955	41	24.7	133.2
		1800	T.	960	39	25.8	133.7
	7	0000	T.	965	36	27.1	134.5
		0600	T.	970	33	28.2	135.5
		1200	S.T.S.	975	31	29.2	137.0

Became Extratropical

SIX-HOURLY POSITION AND INTENSITY DATA OF TYPHOON AXEL (9435)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface winds (m/s)	Lat. ^{O}N	Long. ^{O}E
Dec	15	1800	T.D.	1002	13	7.0	146.9
	16	0000	T.D.	1000	16	7.2	146.1
		0600	T.D.	1000	16	7.4	145.2
		1200	T.D.	1000	16	7.7	144.1
		1800	T.D.	1000	16	8.1	142.9
	17	0000	T.S.	996	18	8.5	141.7
		0600	T.S.	996	18	8.9	140.6
		1200	T.S.	992	21	9.3	139.6
		1800	T.S.	990	23	9.6	138.8
	18	0000	T.S.	990	23	10.0	138.0
		0600	T.S.	990	23	10.3	137.2
		1200	S.T.S.	985	25	10.6	136.4
		1800	S.T.S.	980	28	11.0	135.6
	19	0000	S.T.S.	975	31	11.3	134.8
		0600	T.	970	33	11.4	133.9
		1200	T.	965	36	11.4	132.9
		1800	T.	960	39	11.3	131.8
	20	0000	T.	960	39	11.2	130.7
		0600	T.	955	41	11.2	129.6
		1200	T.	950	43	11.2	128.6
		1800	T.	950	43	11.2	127.6
	21	0000	T.	950	43	10.9	126.8
		0600	T.	955	41	10.7	126.0
		1200	T.	960	39	10.9	125.3
		1800	T.	965	36	11.1	124.5
	22	0000	T.	970	33	11.5	123.4
		0600	S.T.S.	975	31	11.9	122.1
		1200	S.T.S.	985	25	12.3	120.8
		1800	S.T.S.	985	25	12.7	119.7
	23	0000	S.T.S.	985	25	13.2	118.7
		0600	S.T.S.	985	25	13.8	118.0
		1200	S.T.S.	985	25	14.4	117.4
		1800	T.S.	990	23	15.0	116.8
	24	0000	T.S.	990	23	15.7	116.3
		0600	T.S.	994	21	16.3	115.8
		1200	T.S.	998	18	16.8	115.3
		1800	T.D.	1002	16	17.3	114.9
	25	0000	T.D.	1002	16	17.9	114.8
		0600	T.D.	1002	16	18.5	114.9
		1200	T.D.	1006	13	19.0	115.3
		1800	T.D.	1006	13	19.2	115.6
	26	0000	T.D.	1006	13	19.1	115.8
		0600	T.D.	1006	13	19.0	115.9
		1200	T.D.	1006	13	18.7	115.9
		1800	T.D.	1006	13	18.3	115.8

Dissipated

SIX-HOURLY POSITION AND INTENSITY DATA OF TROPICAL STORM BOBBIE (9436)

Month	Day	Time UTC	Intensity	Estimated minimum central pressure (hPa)	Estimated maximum surface winds (m/s)	Lat. ^{O}N	Long. ^{O}E
Dec	18	0600	T.D.	1000	13	6.2	167.0
		1200	T.D.	998	16	5.5	165.5
		1800	T.S.	996	18	5.2	163.8
	19	0000	T.S.	996	18	5.3	162.2
		0600	T.S.	996	18	5.6	161.3
		1200	T.S.	996	18	6.1	160.6
		1800	T.S.	996	18	7.2	160.0
	20	0000	T.S.	996	18	8.4	159.7
		0600	T.S.	996	18	9.6	159.6
		1200	T.S.	996	18	10.6	159.0
		1800	T.S.	996	18	11.6	158.2
	21	0000	T.S.	996	18	12.3	157.1
		0600	T.S.	996	18	12.8	155.9
		1200	T.S.	992	21	13.3	154.7
		1800	T.S.	992	21	13.7	153.4
	22	0000	T.S.	992	21	14.1	152.1
		0600	T.S.	992	21	14.6	150.8
		1200	T.S.	992	21	15.0	149.6
		1800	T.S.	992	21	15.5	148.3
	23	0000	T.S.	992	21	15.9	147.2
		0600	T.S.	992	21	16.2	146.0
		1200	T.S.	992	21	16.5	144.8
		1800	T.S.	990	23	16.7	143.6
	24	0000	T.S.	990	23	17.0	142.4
		0600	T.S.	990	23	17.4	141.2
		1200	T.S.	994	21	17.9	140.0
		1800	T.S.	998	18	18.4	138.8
	25	0000	T.D.	1000	16	19.0	137.6
		0600	T.D.	1000	16	19.5	136.4

Dissipated