



**HONG KONG**  
**THE THUNDERSTORM AND**  
**HEAVY RAIN**  
**WARNING SERVICE**

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**THE**  
**THUNDERSTORM AND HEAVY RAIN**  
**WARNING SERVICE**

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## 1. INTRODUCTION

The most intense rainfall in the world occurs in thunderstorms in the tropics; lightning associated with these storms causes damage to electrical installations and is a danger to people working with explosives. In 1966, three separate storms affecting Hong Kong caused a total loss of 86 lives and extensive damage to property. To reduce such losses, warnings of thunderstorms and heavy rain must reach, in good time, those persons responsible for taking the necessary precautions. The Royal Observatory has therefore introduced the Thunderstorm and Heavy Rain Warning Service in an attempt to minimize damage and loss of life caused by these meteorological hazards.

## 2. OBJECT OF THE THUNDERSTORM AND HEAVY RAIN WARNING SERVICE

The object of the Thunderstorm and Heavy Rain Warning Service provided by the Royal Observatory is to give short term notice of the likelihood of thunderstorms and heavy rain affecting any part of the Colony so that those who are most concerned can take precautionary measures. "Heavy rain" is taken to be a total rainfall of about 2 inches or more in any one hour, and "short term notice" is taken to mean that the warning will be issued 6 hours or less before the expected onset of the heavy rain or thunderstorms. These warnings supplement the routine weather forecasts issued by the Royal Observatory by drawing attention to thunderstorms and heavy rain, and in particular to those thunderstorms which develop suddenly and were not previously expected.

The Service is designed to assist such people as engineers in charge of dams or tunnels, contractors on construction sites, and anyone else who is likely to suffer loss due to heavy rain or thunderstorms.

## 3. THUNDERSTORMS AND HEAVY RAIN

Thunderstorms, which may or may not be accompanied by periods of heavy rain, are a localized phenomenon. It is possible for intense thunderstorms to pass very close to the borders of Hong Kong without affecting the Colony itself, and thunderstorms observed to be moving towards Hong Kong may die out before reaching here. Similarly, a thunderstorm affecting one part of the Colony may not affect other parts. A thunderstorm warning therefore may appear to be a false alarm on some occasions, the storm either not reaching Hong Kong or affecting only a limited area within the Colony. In order to keep the number of false alarms to a minimum, no attempt will be made to give more than 6 hours notice of these storms. In the case of unexpected thunderstorms that are observed by radar or other means the warning may be as little as 1 hour or even less.

Each year a large number of thunderstorms will form which are isolated, have a life of approximately 1 hour, do not cause heavy rain (as defined here) and are local in effect. Also worthy of mention is the fact that lightning at night may be visible in Hong Kong although the associated thunderstorms are located

many miles away over China or well out to sea. Neither of these two cases necessitate the implementation of precautions and thus flashes of lightning and isolated thunderstorms do not necessarily mean that a warning of thunderstorms will be issued by the Royal Observatory.

Prolonged heavy rain not accompanied by thunder and lightning is usually more widespread and associated with large-scale meteorological features more easily located and tracked than individual thunderstorms. Hence the arrival or development of heavy rain usually can be timed more precisely than can thunderstorms.

The following tables give statistical information on thunderstorms and rainfall recorded at the Royal Observatory. It will be noticed that in Hong Kong the heaviest rain and most thunderstorms occur in the summer months.

**MONTHLY NORMALS OF THUNDERSTORMS FOR THE 20 YEARS 1947—1966**

MONTH	No. of days with lightning observed	No. of days with thunderstorms	No. of thunderstorms
Jan.	<0.5	<0.5	<0.5
Feb.	<0.5	<0.5	<0.5
Mar.	1	1	3
Apr.	3	3	5
May	7	5	10
Jun.	9	6	9
Jul.	7	5	7
Aug.	10	6	8
Sep.	7	4	5
Oct.	1	1	1
Nov.	<0.5	<0.5	<0.5
Dec.	<0.5	0	0
YEAR	45	31	48

*Note:* The above statistics on thunderstorms relate to the Royal Observatory. The incidence of thunderstorms over the Colony as a whole will be higher than shown here.

**MEAN NUMBER OF HOURS WITH RAINFALL AT THE ROYAL OBSERVATORY  
OF SPECIFIED INTENSITY**

MONTH	NUMBER OF HOURS WITH RAINFALL AT RATE OF	
	10 mm per hour or more	50 mm per hour or more
Jan.	0.23	0.00
Feb.	0.35	0.00
Mar.	1.03	0.00
Apr.	2.91	0.07
May	7.01	0.23
Jun.	9.66	0.34
Jul.	8.82	0.20
Aug.	8.96	0.15
Sep.	7.23	0.07
Oct.	2.45	0.07
Nov.	0.79	0.00
Dec.	0.20	0.01
YEAR	49.64	1.14

**MONTHLY NORMALS OF RAINFALL FOR THE 70 YEARS 1884—1939 & 1947—1960  
EXTREME VALUES FOR 1884—1939 & 1947—1966**

RAINFALL MONTH	Total		Duration of rain hr	No. of days with measur- able rain	Extreme daily maximum		Extreme hourly maximum	
	mm	in.			mm	in.	mm	in.
Jan.	31.7	1.25	50	6	99.6	3.92	21.8	0.86
Feb.	46.9	1.85	66	8	86.1	3.39	24.6	0.97
Mar.	72.2	2.84	84	11	96.1	3.79	39.9	1.57
Apr.	135.8	5.35	82	12	190.2	7.49	67.6	2.66
May	292.7	11.52	91	16	520.6	20.49	86.4	3.40
Jun.	401.2	15.80	87	21	382.6	15.06	108.2	4.26
Jul.	371.7	14.63	72	19	534.0	21.03	100.7	3.97
Aug.	370.8	14.60	72	17	282.8	11.13	71.1	2.80
Sep.	278.8	10.98	59	15	325.5	12.81	84.0	3.31
Oct.	99.2	3.91	32	8	292.2	11.51	71.6	2.82
Nov.	43.1	1.70	31	5	149.2	5.87	44.2	1.74
Dec.	24.9	0.98	37	5	90.9	3.58	51.7	2.03
YEAR	2168.8	85.39	763*	143	534.0	21.03	108.2	4.26

\* Includes unregistered drizzle.

#### 4. **TIME OF ISSUE OF WARNINGS**

A warning will be issued when thunderstorms or heavy rain are expected OR are occurring in any part of Hong Kong and are likely to persist and affect other areas within the Colony.

A warning of thunderstorms or heavy rain will not be issued when Local Storm Signals are hoisted because it may lead to confusion. It should be noted that precautions against heavy rain should always be taken when such Local Storm Signals are in force.

#### 5. **CONTENT OF WARNINGS**

The warning will specify:

- (a) Whether it is a warning  
of THUNDERSTORMS  
or of HEAVY RAIN  
or of THUNDERSTORMS and HEAVY RAIN,
- (b) The time the thunderstorms and/or heavy rain are first expected to affect the Colony,

and (c) The period for which the warning is effective.

If thunderstorms and/or heavy rain are likely to persist beyond the time stated in the warning then it will be renewed. Whenever possible the warning will be issued from 3 to 6 hours before the start of the thunderstorms or heavy rain but, as explained above, in the case of thunderstorms which develop unexpectedly, the warning may be as short as 1 hour or even less. Warnings will not be issued for the isolated type of thunderstorm described in para. 3 above.

#### 6. **METHOD OF DISSEMINATION OF WARNINGS**

A warning issued by the Royal Observatory will be passed to:—

- (a) the Hong Kong Telephone Company who will contact everyone who subscribes to the telephone calling service,
- (b) the Government Information Service for issue to radio stations and to the press if the warning period makes it relevant.

#### 7. **TELEPHONE CALLING SERVICE**

In order to reduce loss of life and damage it is essential that warnings of thunderstorms and heavy rain should reach those persons responsible for taking the necessary precautions without delay. Such people are often at work on construction sites or in offices away from radios and the latest newspapers. Thus special methods are required to ensure the timely receipt of warning messages.



This is achieved by the "Telephone Calling Service" whereby the Telephone Company undertakes to pass all warnings of thunderstorms and/or heavy rain issued by the Royal Observatory directly and with the minimum of delay to those who subscribe to the service.

The charge made by the Telephone Company for this service is HK\$20.00 per annum and those who wish to subscribe should apply to the Company, stating whether they require a full 24-hour service or specifying between which hours of the day or night warnings are required.

8.

#### NOTE

The introduction of the Thunderstorm and Heavy Rain Warning Service is one of many attempts by the Royal Observatory to increase the meteorological information available to the public. This particular service has been designed to meet the requirements of those who are likely to suffer loss of life or damage due to thunderstorms or heavy rain, enabling them to take the necessary precautions in good time. This service is new and the Royal Observatory will be pleased to consider any suggestions for improving its usefulness.

Like all forecasts, a warning of thunderstorms or heavy rain represents the most likely development in the weather and is subject to the usual errors of probability. There may be occasions when thunderstorms and associated periods of heavy rain develop suddenly and affect parts of the Colony before a warning is issued. It should be understood that whilst the Royal Observatory staff will do their best to avoid such occurrences, they cannot be held responsible for the result of either unwarned thunderstorms and/or heavy rain, or for the consequences of a false alarm.

ROYAL OBSERVATORY, HONG KONG.

*June, 1967.*



# 雷暴及大雨警告制度

## 1. 簡 介

世界上最強烈的暴雨都是在熱帶地區的雷暴中產生的；而雷暴中的閃電現象往往能破壞電力設備和威脅那些與使用爆炸品有關的工作人員的安全。以香港為例，在一九六六年內的三次大雷雨中，便有八十六人喪生和巨大的財產損失。若要減少此類災害，雷暴及大雨警告必須及時送達有關人仕，以便採取必要的預防措施。天文台現已實施的“雷暴及大雨警告服務”就是試圖將由這些惡劣天氣引致的生命和財產損失減至最低限度。

## 2. 雷暴及大雨警告服務的目 的

天文台提供的“雷暴及大雨警告服務”的目的是當雷暴，大雨或大雷雨，可能影響本港任何地區時，在短促的時間內，通知急於獲得此項情報的人仕，使能採取適當的防範措施。“大雨”的定義是在任何60分鐘內的總雨量為二英吋或以上。“短促時間通知”的意思是表示該等警告將在大雨或雷暴可能出現前六小時或以內發出。這類警告是用來補充天文台日常發出的天氣預測，特別是使有關人仕對雷暴和大雨，尤其是那些突然形成而並非在意料中的雷暴加以注意。

此項服務的主要對象為一般可能因大雨或雷暴而蒙受損失的人仕，如主理堤壩或隧道的工程師，或在建築地盤工作的營造商等。

## 3. 雷 暴 和 大 雨

雷暴是一種地區性的現象，因此它並非一定會帶來大雨。一場猛烈的雷暴可能在邊境附近掠過而本港却毫不受影響。一個正向本港移動的雷暴也可以於未抵達前消散。同樣地，一場雷暴又可以祇影響本港一部份地區。故當上述情況發生時，天文台發出的警告可能被認為不準確。為了將預報錯誤減至最低限度，天文台將不會在雷暴或大雨出現前六小時或更早時間發出通知。有時從雷達或其他方法探測到有雷暴突然形成時，警告可能在雷暴出現前一小時或甚至更短時間內發出。

在香港，每年都會出現很多次的零散雷暴；其壽命大約祇有一小時；其影響亦限於局部地區，且通常不會帶來大雨。值得一提的是港內很多時在晚上見到的閃電，都是由位於多哩外的內陸或遠處海洋上的雷暴所產生的。因此，對此等閃電現象或局部地區性雷暴，天文台並無警告的必要。

長時間而又不帶有雷電的大雨，一般是影響較大地區並且和較龐大的氣象系統有關。產生這類大雨的雲層是較個別雷暴易於探測和跟蹤。因此，對其發展和影響本港地區時間的斷定，準確程度比雷暴較高。

下列各表是用來提供一些根據天文台記錄所得的雷暴和雨量而作出的統計資料。由表中可以見到本港最大降雨和大部份雷暴都是出現在夏季的月份。

### 二十年(1947—1966)雷暴現象的統計

月 份	閃電現象出現日數	雷暴出現日數	雷暴出現次數
一 月	<0.5	<0.5	<0.5
二 月	<0.5	<0.5	<0.5
三 月	1	1	3
四 月	3	3	5
五 月	7	5	10
六 月	9	6	9
七 月	7	5	7
八 月	10	6	8
九 月	7	4	5
十 月	1	1	1
十一月	<0.5	<0.5	<0.5
十二月	<0.5	0	0
全 年	45	31	48

註： 上列有關雷暴的統計祇應用天文台本身記錄的資料。若將全港各區雷暴資料加入計算，則出現次數將較頻密。

### 不同強度降雨的平均時數

月 份	時 數	
	強度在每小時10毫米或以上	強度在每小時50毫米或以上
一 月	0.23	0.00
二 月	0.35	0.00
三 月	1.03	0.00
四 月	2.91	0.07
五 月	7.01	0.23
六 月	9.66	0.34
七 月	8.82	0.20
八 月	8.96	0.15
九 月	7.23	0.07
十 月	2.45	0.07
十一月	0.79	0.00
十二月	0.20	0.01
全 年	49.64	1.14

從七十年(1884—1939, 1947—1960)雨量記錄算出的月平均值及七十六年來(1884—1939, 1947—1966)日雨量, 時雨量的最大值

月份	降雨		降雨時數 小時	有雨量記 錄日數	最大日雨量		最大時雨量	
	毫米	吋			毫米	吋	毫米	吋
一月	31.7	1.25	50	6	99.6	3.92	21.8	0.86
二月	46.9	1.85	66	8	86.1	3.39	24.6	0.97
三月	72.2	2.84	84	11	96.1	3.79	39.9	1.57
四月	135.8	5.35	82	12	190.2	7.49	67.6	2.66
五月	292.7	11.52	91	16	520.6	20.49	86.4	3.40
六月	401.2	15.80	87	21	382.6	15.06	108.2	4.26
七月	371.7	14.63	72	19	534.0	21.03	100.7	3.97
八月	370.8	14.60	72	17	282.8	11.13	71.1	2.80
九月	278.8	10.98	59	15	325.5	12.81	84.0	3.31
十月	99.2	3.91	32	8	292.2	11.51	71.6	2.82
十一月	43.1	1.70	31	5	149.2	5.87	44.2	1.74
十二月	24.9	0.98	37	5	90.9	3.58	51.7	2.03
全年	2168.8	85.39	763*	143	534.0	21.03	108.2	4.26

\* 包括有“微量”記錄時數。

#### 4. 警告發出時間

當預料或已知有雷暴或大雨出現於本港任何地區, 且可能持續和影響其他地區時, 天文台將發出警告。當有颱風訊號懸掛時, 為避免引起混淆起見, 天文台將不會另發雷暴或大雨警告。但在風球高懸的情況下, 仍應採取各種防範大雨的措施。

#### 5. 警告內容

天文台所發出警告將包括:

- (甲) 所警告現象為雷暴或大雨或大雷雨,
- (乙) 開始影響本港時間的估計,
- 及(丙) 警告有效時限。

當雷暴或大雨或大雷雨在警告有效期限終止後, 仍可能繼續影響本港時, 警告將重新發出。在可能範圍內, 警告將於雷暴或大雨出現前三至六小時發出, 但如上文所述, 對於突然形成的雷暴, 則祇能給予一小時或以下的通告; 至於在第三節所提及的零散雷暴, 天文台將不會警告。

## 6. 警告傳送方法

天文台發出的警告將傳達：

- (甲) 香港電話公司，以便將消息供給參與“電話通知服務”的用戶。
- (乙) 政府新聞處，以便將消息轉達各電台；若警告的有效時限遲於報章出版時間，本港各報亦將獲通知以便將消息刊載。

## 7. 電話通知服務

爲了減少生命及財產的損失，雷暴及大雨警告必須迅速地交與各負責採取預防措施人員，例如那些大部份時間在建築地盤工作或辦事處內並無當日報章或收聽廣播設備的人仕。現由電話公司辦理的“電話通知服務”，其任務就是將警告以最短時間直接通知參與此項服務的用戶。

主辦此項服務的電話公司每年收費二十元。用戶可直接向該公司申請，同時並說明是否需要二十四小時服務或祇需在規定時間內接受通知。

## 8. 備註

“雷暴及大雨警告服務”的實施是天文台試圖加強對市民供給氣象情報的許多項目之一。該服務專爲適應所有受雷暴或大雨影響的人仕而設，使能及早作適當的預防。此項服務僅在最近開始，各界人仕如有任何足以增進服務效率的建議，天文台均樂意予以考慮。

正如其他預測一樣，雷暴及大雨警告祇代表最可能發生的天氣情況，因此有時發生錯誤是自不能免。例如，在發出警告前，突然形成的雷暴和隨之而來的大雨可能經已影響本港部份地區。這種情況，天文台各工作人員當然都會盡力避免使其發生，但對因未能及時警告的雷暴，大雨及大雷雨的出現或發出的警告不準確而引致的後果，他們是不負法律上的責任。

香港天文台

一九六七年六月







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