

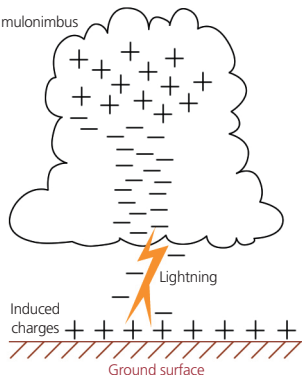
# The formation & threats of Thunderstorms



## What are thunderstorms?

**THUNDERSTORMS** are intense convective weather phenomena which commonly occur during April to September in Hong Kong. Thunderstorms are characterized by flashes of lightning and claps of thunder.

Cumulonimbus



Due to vigorous turbulence inside a cumulonimbus cloud, water droplets and ice pellets in the cloud will become electrically charged in the convective motion. When the electric field arising from the piling up of charges reaches a certain breakdown value, lightning discharges take place between clouds or between cloud and the earth's surface. The explosive expansion of the surrounding air produces the rolling sound of thunder.

Since light travels much faster than sound, if the sound of thunder reaches an observer three seconds after a lightning flash, the thunderstorm is about 1 kilometre away.

Thunderstorm can generate a violent form of downdraft called the microburst - a strong downrush of winds which often radiate outward from the thunderstorm upon striking the ground surface. Microburst is short-lived and relatively compact, but it is hazardous to aircraft during landing and take-off.

## Points to note during thunderstorms



**Stay indoors.** Seek shelter in buildings if you are working outdoor.

**Beware of lightning strike,** don't stand on hill tops or near any highly conductive objects. Keep away from trees or masts which are likely to be struck by lightning.

Since lightning current is conducted away through the ground, you should not lie down especially when the ground is wet. Instead you should crouch down to minimize the area of contact between you and the ground.

**Don't swim** or engage in other water sports. Leave the water & seek shelter. Don't take shower too.

**Managers of outdoor sports facilities, playgrounds, lifeguards at swimming pools** should be vigilant about changes of weather, make reference to "Lightning Location Information" webpage, and give appropriate instructions to users of the facilities.

**Avoid using telephone** or other plugged-in electrical appliances, including computers.

## What are the dangers of thunderstorms?

**THUNDERSTORMS** will bring about the risk of lightning strikes. Severe weather phenomena such as rainstorms, hails, intense gusts or violent gusts (derecho), and even waterspouts or tornadoes may also come with thunderstorms.

## Rainstorms



Most thunderstorms form in cumulonimbus clouds and are normally associated with heavy downpours. In the vicinity of active weather systems such as low pressure troughs, cumulonimbus clouds may develop continually, and thunderstorms will be more widespread and persistent. Under certain favorable meteorological conditions, cumulonimbus clouds may merge to form severe thunderstorms and rainstorms, which will further trigger disasters such as flooding, flash flood and landslips.



Amber 黃



Red 紅



Black 黑

## POINTS TO NOTE

**Heavy rain may bring about flash floods.** People should stay away from watercourses.

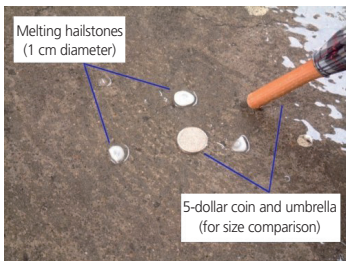
**Flooding may occur in some low-lying and poorly drained areas,** people who are likely to be affected should take necessary precautions.

**Hikers and people engaging in outdoor activities** should be aware of the latest weather information issued by the Observatory and change or cancel the activities as necessary.

**Don't get close to steep slopes and retaining walls.** Drivers should avoid driving in hilly areas or on roads with landslide warning signs.



## Hail



Hailstones observed at the Observatory headquarters on 9 April 2001

Hailstones are hard pellets of ice usually of only a few millimeters in diameter though larger stones occasionally occur. They are formed in well-developed thunder-bearing cumulonimbus clouds. Hails mainly occur in spring and the average frequency of occurrence is once every one to two years.

### POINTS TO NOTE

**Seek shelter in buildings.** Large hailstones can damage crops, break windows, glass houses and windscreens of cars.

## Waterspout / Tornado



Waterspout was reported near the Hong Kong International Airport on 8 June 2020 (Courtesy of Samuel Tai)

Under very unstable weather conditions, severe convection in thunderstorms facilitates the formation of intense columnar vortices in the shape of funnel clouds. When the vortices touch the ground, they are called tornadoes, while those touching the sea surface are called waterspouts. Winds are very strong with very low pressure near the centre of the vortices. Waterspouts or tornadoes are not common in Hong Kong and there is one report of tornado every one to two years on average.

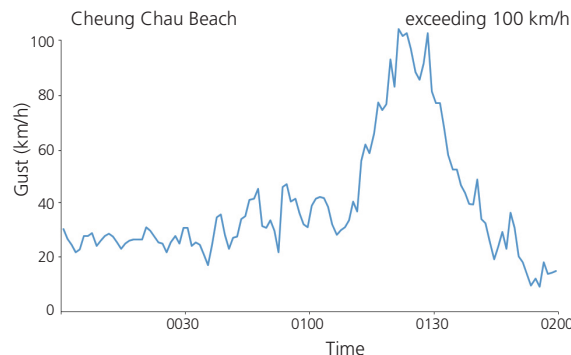
### POINTS TO NOTE

**People on small boats** on the open sea should watch out for the approach of squalls or waterspouts.

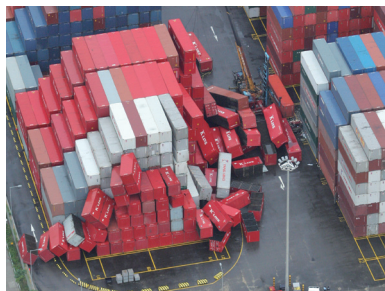
**If you encounter a tornado**, seek shelter in a sturdy building. Stay away from windows, crouch to the floor and protect your head with your arms or thick padding. In the outdoors, stay away from trees, cars and other things that can be blown up by the tornado.

## “Shi Hu Feng” (Derecho)

“Shi Hu Feng” is a local description of the intense gusts or violent gusts associated with squall lines. A squall line is a cluster of severe thunderstorms or storm cells along a line. Squall lines are fast moving and destructive, and will lead to sudden changes in the wind direction with an abrupt increase in wind speed. The violent gusts associated with squall lines can reach 88 kilometres per hour or above, but usually is not persistent.



Gusts exceeding 100 km/h were recorded at Cheung Chau Beach during passage of a squall line over Hong Kong on 25 August 2019



Under the influence of “Shi Hu Feng” on 9 May 2005, dozens of containers blown off by squalls at the Container Terminal in Kwai Chung (Photo by Wen Wei Po)

### POINTS TO NOTE

**Pay attention to the special announcements issued by the Observatory.** In case of **violent gusts**, people outdoors should seek shelter in buildings **immediately**.

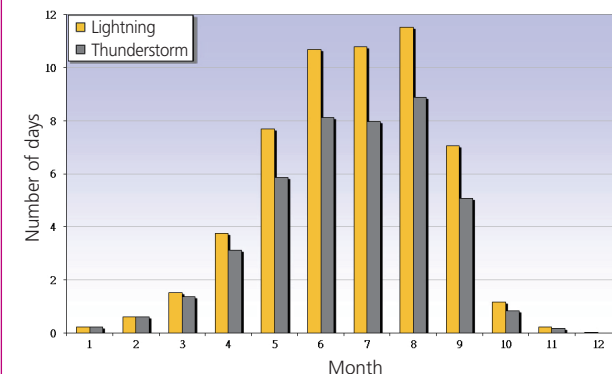
**Secure all loose objects**, particularly on balconies and roof tops. Secure hoardings, scaffoldings and temporary structures.

**Container terminal operators should secure all stacks of containers**, different cranes and lock all containers.

**Drivers** using highways/flyovers should be alert to violent gusts.

**People on small boats** should take precautions to prevent their boats from capsizing due to the approaching squalls.

## Monthly mean number of days with lightning/thunderstorm (1991-2020)



## Hong Kong Observatory Information

Take note of the latest weather information through the following means:

- Broadcasts on radio and TV
- “Dial-a-Weather” Information Enquiry System: 1878 200
- Hong Kong Observatory Websites  
<http://www.weather.gov.hk/en/> or <http://www.hko.gov.hk/en/>
- Lightning Location Information webpage  
[https://www.hko.gov.hk/en/wxinfo/llis/gm\\_index.htm](https://www.hko.gov.hk/en/wxinfo/llis/gm_index.htm)
- “MyObservatory”  
<http://www.weather.gov.hk/en/myobservatory.htm>  
or use a QR code reader to scan the QR code below



iPhone



Android



Windows Phone

- For further information on Thunderstorm Warnings, please refer to  
<https://www.weather.gov.hk/en/wservice/warning/thunder.htm>

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