

Thunderstorm Warning

Thunderstorms

Thunderstorms commonly occur in spring and summer months in Hong Kong. On average, thunderstorms are reported at the Hong Kong Observatory in 5 to 6 days per month during April to September.

Most thunderstorms form in cumulonimbus cloud. A cumulonimbus cloud typically covers an area of a few kilometres in diameter with a vertical extent of ten kilometres or more, like a tower hanging in the sky. The typical life span of a cumulonimbus cloud is a couple of hours.

In the vicinity of active weather systems such as low pressure troughs, cumulonimbus clouds may form one after another. Such thunderstorms are more widespread and persistent. Occasionally, cumulonimbus clouds merge to form severe thunderstorms called supercells.

On a summer day that sets off with fine weather, insolation may trigger the growth of cumulonimbus clouds and the formation of thunderstorms. Such thunderstorms are often localized and short lived. The weather may even be sunny not far away from the storms. Sometimes, the cumulonimbus clouds will drift with the wind and affect other areas. The areas of formation of the clouds may also vary with time.

Thunderstorms are characterized by flashes of lightning and claps of thunder. In an unstable and moist atmosphere, water droplets and ice pellets in the cloud will become electrically charge in 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. As a rule of thumb, if the sound of thunder reaches an observer three seconds after a lightning flash, the thunderstorm is about one kilometre away from the observer. The distance of thunderstorms for different time delay of the thunder sound can be estimated similarly.

Heavy downpour, lightning and squalls often occur with thunderstorms. Outbreaks of heavy rain can be dangerous to people engaged in outdoor activities. Lightning can damage electrical installations, cause fire and kill by electrocution. Apart from direct strokes, people can also get hurt by electric shock when using or in contact with conductors or electrical appliances which come under the influence of these strokes. Squalls or violent gusts often occur with thunderstorms. They bring about abrupt increases in wind speed and drastic changes in wind direction. Boats are known to have capsized in thunderstorm related squalls in local and nearby waters. Wind shear associated with squall lines is also a potential hazard to aircraft during landing and take-off.

Under certain favourable conditions, thunderstorms are accompanied by tornadoes (over land) and waterspouts (over sea). They are intense columnar vortices in the shape of funnel clouds with very strong winds and very low pressure near the centre. During the passage of tornadoes or waterspouts, the direct impact of very strong winds and the difference in pressure between the interior and outside of a building can shatter weak structures, and even blow away trees and vehicles. There have been reports of small boats capsizing in nearby waters on encountering waterspouts. Although much less frequent, tornadoes or waterspouts reaching the coast have caused damage to buildings in Hong Kong.

Hailstones are hard pellets of ice usually of only a few millimetres in diameter although larger stones occasionally occur. They are formed in well-developed cumulonimbus clouds associated with thunderstorms, mainly in spring. Large hailstones can damage crops, and break windows, glass houses and windscreens of cars.

Tornadoes, waterspouts and hailstorms are infrequent in Hong Kong. On average, there is one report of tornadoes or waterspouts every one to two years. The frequency of hailstorm occurrence is also about one every one to two years.

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Thunderstorm warnings issued by the Hong Kong Observatory are intended to give short-term (within one to a few hours) notice of the likelihood of thunderstorms affecting any part of Hong Kong. Once issued, the warning is broadcast over radio and television, and announced on the Observatory's website, the "MyObservatory" mobile app and the Dial-a-Weather system (1878200).

Thunderstorm warnings are issued irrespective of whether thunderstorms are widespread or isolated. For isolated thunderstorms, the warning issued by the Observatory will indicate the regions that will be affected during the warning period to alert members of the public to take appropriate precautions. If thunderstorms are expected to persist or affect other parts of the territory, the warning will be extended. When thunderstorms are widespread or the areas being affected vary, it will be mentioned in the thunderstorm warning that Hong Kong will be affected by thunderstorms without specific reference to individual regions.

When inclement weather comes with thunderstorms, the Observatory will mention "severe squally thunderstorms" and the associated high-impact weather information in the Thunderstorm Warning with regard to the circumstances, including:

- Violent gusts
- Hail
- Waterspout
- Tornado

The development, movement and dissipation of thunderstorms can be quite rapid and fairly localized. Thunderstorm warnings supplement the forecast of thunderstorms in routine weather forecasts by drawing people's attention to thunderstorms that are about to or have already taken place, or to warn people of thunderstorms not previously expected. The warning is intended to assist engineers, contractors or other people who

are likely to be affected by thunderstorms. It also alerts relevant government departments and organizations to take appropriate actions.

While a thunderstorm warning is in force, managers of outdoor sports facilities, playgrounds or lifeguards at swimming pools should be vigilant about changes of the state of sky and give appropriate instructions to users of the facilities.

Members of the public are advised to take the following precautions when thunderstorms occur:

1. Seek safe shelter immediate or as soon as possible if you are staying outdoors.
2. Leave the water. Do not swim outdoors or engage in other outdoor water sports.
3. Do not stand on high grounds. Keep away from highly conductive objects, trees or masts.
4. Take precautions against intense or violent gusts. Beware of flying debris and falling objects.
5. Drivers using highways and flyovers should reduce speed and be alert to intense or violent gusts.
6. If you witness a tornado or waterspout:
 - Do not attempt to approach it. Stay calm. Quickly move away and seek a safe shelter such as a sturdy building.
 - If the tornado or waterspout is too close to avoid, quickly lie down in low-lying areas and stay away from advertising signs, lamp posts, and large trees as far as possible.
 - If you are indoors, stay away from windows, crouch down on the ground, and protect your head with your hands or a thick cushion.
 - If you are outdoors, stay away from trees, cars, and other objects that could be picked up by the tornado.
7. People on small boats on the open sea should watch out for the approach of squalls or waterspouts.
8. Evacuate from heavy rain affected low-lying areas with poor drainage to avoid flooding.