

## Thunderstorm safety rules

- Postpone outdoor activities if thunderstorms are imminent;
- Move to a sturdy building or car, do not (under no circumstances) take shelter in small sheds or under isolated trees;
- Get out of boats and away from water if possible;
- Telephone lines and metal pipes can conduct electricity, hence avoid using electrical appliances and unplug those, not in use. Use telephones only in an emergency;
- Turn off air conditioners, since power surges from lightning can overload the compressors;
- Shelter in a low spot that is not subjected to flooding, away from trees, fences and poles;
- If you are in a forest area, take shelter under shorter trees;
- If you feel your skin tingle or your hair stand on end, squat low to the ground, place your hands on your knees with your head between them, making yourself as small as possible, and make sure you minimize your contact with the ground;
- If you are boating or swimming, get to land and find shelter immediately.

## Forecasting Thunderstorms at MDS

The Meteorological Department St. Maarten (MDS) communicates significant weather events through its daily forecasts for St. Maarten. This is the lowest level of alert at the MDS. In the case of an unusual weather event, that causes general inconvenience or public concern that cannot be adequately captured in the daily weather forecasts, the MDS issues Special Bulletins.

### Bulletins issued for Thunderstorms at MDS:

#### Cautionary statement

Statement in Daily Forecast giving a "heads up" that conditions are forecast to be conducive to the occurrence of thunderstorms.

#### Severe Thunderstorm Advisory

Conditions are conducive to the development of thunderstorms within the next 6 hours. Develop a plan and stay tuned for updates.

#### Severe Thunderstorm Watch

Thunderstorms are imminent (within the next 1-3 hrs), but expected conditions are not as bad as previously forecasted. Thunderstorms still pose a threat to the community or may cause inconvenience.

#### Severe Thunderstorm Warning

Thunderstorms are imminent within 1-3 hrs. or are already occurring.

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Ministry of Tourism, Economic Affairs,  
Traffic & Telecommunications

# Thunderstorms



*Thundercloud developing just northwest of*



**Meteorological Department  
St. Maarten**

***Protecting lives and property  
against natural hazards***

# Thunderstorms

## ◆ Thunderstorms explained ◆

A thunderstorm is defined as one or more sudden electric discharges, manifested by a flash of light (**lightning**) and a rumbling sound (**thunder**). It develops in a very unstable and moist atmosphere. Warm and moist air from the surface is lifted due to buoyancy to higher altitudes where it starts to condense, marking the formation of a cumulus cloud (A).

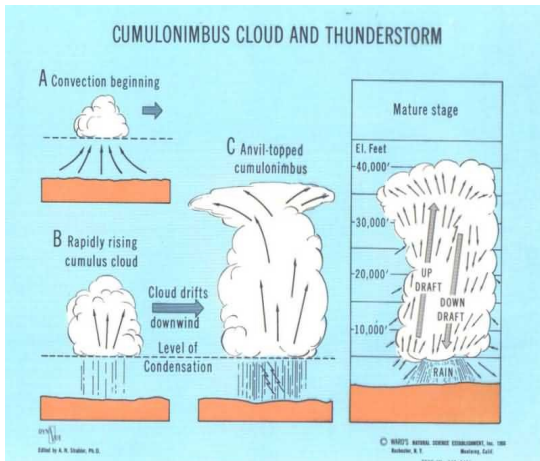


Diagram showing the beginning (A), rapid rising (B), formation of a Cumulonimbus (C), and mature stage of the Thunderstorm. The arrows within and beneath the clouds indicate the airflow.

Source: Principles of Earth & Environmental Systems.

As more warm and moist air rises, this cumulus grows laterally and vertically (B) into a large dense cloud, called a cumulonimbus (CB), with strong turbulence within the cloud and strong outflow of air below the base of the cloud (C).

Single thunderstorm cells last about 15 to 30 minutes, but may last longer when they are clustered (squall line), since their outflow will form a front and generate new cells.

Thunderstorms are common in St. Maarten, especially during the rainfall season (August - December). Showers occur most often during the late afternoon hours.

September is the peak month for thunderstorm activity with on average 3.9 days of thunder, followed by October (3.5 days on average) and August (3.0 days on average).

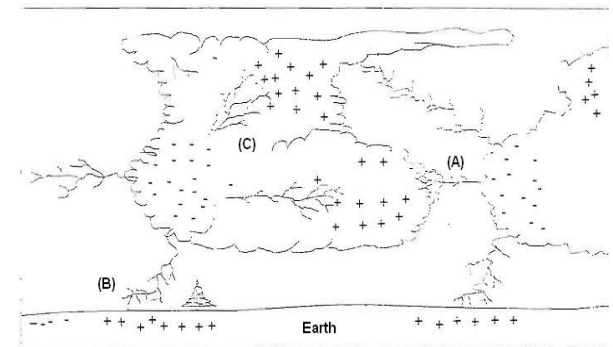
Notwithstanding their relatively small sizes, all thunderstorms pose some danger to the community, due to:

- **Heavy rains** — which can lead to flash flooding and landslides;
- **Strong winds** — which can turn loose objects into projectiles;
- **Downbursts** (a downburst is a small area of rapidly descending air beneath a thunderstorm). These winds reach very high speeds and can cause significant damage along their path. They are especially dangerous for aircrafts during take off, approach and landing); and
- **Lightning**.

## ◆ Explaining lightning and thunder ◆

A cumulonimbus cloud is comprised of water droplets, ice crystals and hail stones — which are transported within the cloud by an ascending and a descending airflow.

The action of this rising and descending air within the cloud causes friction between the ice particles which separates positive and negative charge within the cloud. The Earth's electric charge causes a charge alignment within the cloud and hence produces an electric field. As the difference between the clouds electric charge and the Earth's electric charge becomes large enough to overcome the insulating effects of air, an electric discharge is produced. This electric discharge is known as lightning.



Different possibilities for the occurrence of lightning, namely between two clouds (A), between the Earth's surface and a cloud (B), and within a cloud (C).

Lightning can occur from one cloud to another (A), between the Earth's surface and the cloud (B), and within a cloud (C). The air near an electric discharge is heated up to very high temperatures, causing the air around the lightning channel to expand and push the much cooler air surrounding it at a speed higher than the speed of sound in the cooler air. This causes a shock wave, which is experienced like a rumbling sound, much like a sonic boom caused by an F-16 traveling at supersonic speeds.