



Lightning: Biggest natural disaster-linked killer in India

Context:

Nearly 68 were reportedly struck dead by lightning on a single day in Uttar Pradesh, Rajasthan and Madhya Pradesh, according to reports from States in July 2021.

Relevance:

GS-III: Disaster Management, GS-I: Geography (Climatology, Important Geophysical Phenomenon)

Dimensions of the Article:

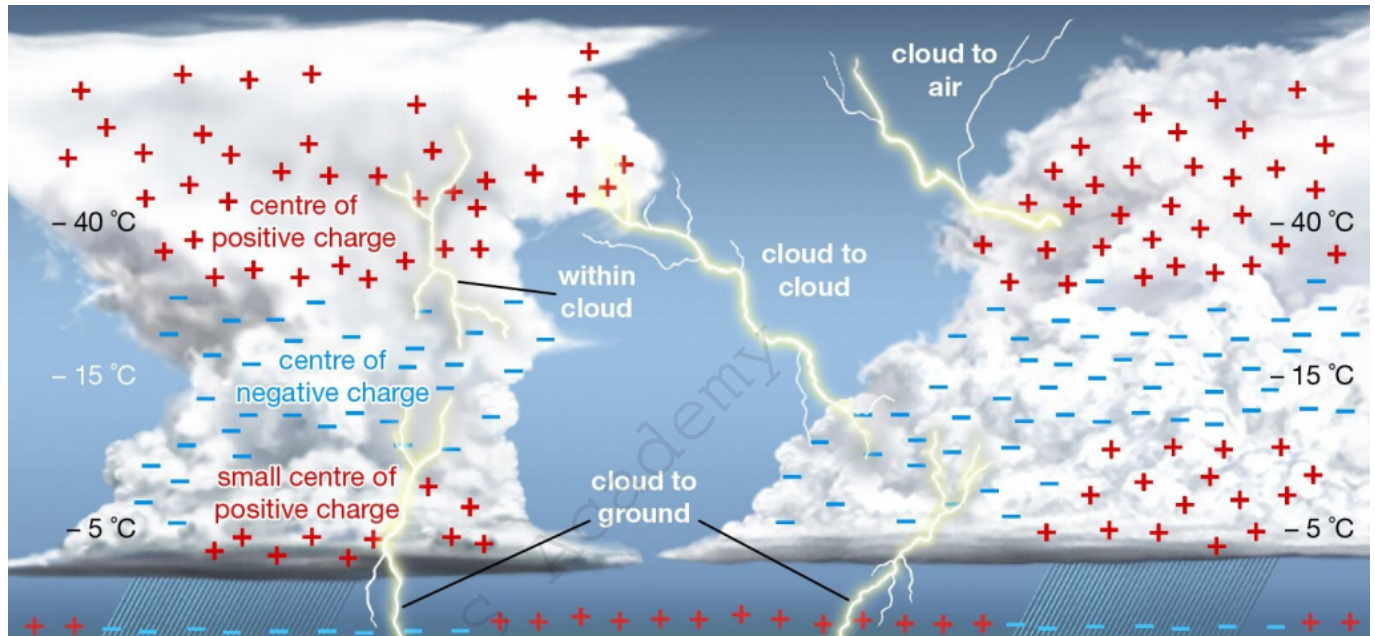
1. What is Lightning?
2. More about Clouds that generate lightning and how they are formed
3. What happens when lightning strikes Earth's Surface?
4. About Lightning Strikes in India

What is Lightning?

- Lightning is a natural 'electrical discharge of very short duration and high voltage between a cloud and the ground or within a cloud', accompanied by a bright flash and sound, and sometimes thunderstorms.
- In simple words, it is a very rapid and massive discharge of electricity in the atmosphere.
- It happens as a result of the difference in electrical charge between the top and bottom of a cloud, or between 2 clouds or between clouds and the ground.
- Inter cloud or intra cloud (IC) lightning are visible and harmless.



- Cloud to ground (CG) lightning is harmful as the 'high electric voltage and electric current' leads to electrocution.



More about Clouds that generate lightning and how they are formed

- The lightning-generating clouds are typically about 10-12 km in height, with their base about 1-2 km from the Earth's surface. The temperatures at the top range from -35°C to -45°C .
- As water vapour moves upwards in the cloud, it condenses into water due to decreasing temperatures. A huge amount of heat is generated in the process, pushing the water molecules further up.
- As they move to temperatures below zero, droplets change into small ice crystals. As they continue upwards, they gather mass, until they become so heavy that they start descending.
- It leads to a system where smaller ice crystals move upwards while larger ones come down. The resulting collisions trigger release of electrons, in a process very similar to the generation of electric sparks. The moving free electrons cause more collisions and more electrons leading to a chain reaction.
- The process results in a situation in which the top layer of the cloud gets positively charged while the middle layer is negatively charged.
- In little time, a huge current, of the order of lakhs to millions of amperes, starts to flow between the layers.



What happens when lightning strikes Earth's Surface?

- The Earth is a good conductor of electricity. While electrically neutral, it is relatively positively charged compared to the middle layer of the cloud. As a result, an estimated 20-25% of the current flow is directed towards the Earth. It is this current flow that results in damage to life and property.
- Lightning has a greater probability of striking raised objects on the ground, such as trees or buildings.
- Lightning Conductor is a device used to protect buildings from the effect of lightning. A metallic rod, taller than the building, is installed in the walls of the building during its construction.
- The most lightning activity on Earth is seen on the shore of Lake Maracaibo in Venezuela.

About Lightning Strikes in India

- **The Home Ministry's statistics consistently cited lightning as the biggest natural disaster-linked killer in India.**
- Several thousand thunderstorms occur over India every year. Each can involve several — sometimes more than a hundred — lightning strikes.
- Occurrences of lightning are not tracked in India. There is simply not enough data for scientists to work with.
- Lightning is the biggest contributor to accidental deaths due to natural causes.
- In 2019, an analysis by Skymet reported that five States accounted for half the lightning strikes that year, led by Odisha with 9,37,462 strikes or about 16% of the cloud-to-ground strikes. There were 20 million lightning strikes in that period with over 72% of them being instances of “in-cloud” lightning.

-Source: The Hindu