



KAMARAJ IAS ACADEMY
Only IAS Academy by Grandson of "Per. unthalaivar Kamarajar"

Volcanic Lightning

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Volcanic lightning is a powerful electrical discharge produced within the plume of an erupting volcano, rather than in a conventional thunderstorm.

Causes / Mechanism:

During an eruption, ash particles, rock fragments, and ice crystals are violently ejected into the atmosphere.

Collisions and friction between these particles lead to charge separation, generating static electricity within the volcanic plume.

When the charge difference becomes large enough, it is released as lightning discharges.

Near the ground, ash particle collisions dominate, while at higher altitudes, ice-particle interactions (similar to thunderclouds) contribute.

Significance

Early warning indicator: The occurrence of volcanic lightning can signal ongoing or imminent eruptions, detectable even through dense ash clouds.

Monitoring tool: Helps scientists track ash plume dynamics, eruption intensity, and aviation hazards using satellite or ground-based sensors.

Atmospheric insights: Provides clues about charge generation processes in particulate plumes and aerosol-cloud interactions.

Example: Observed during eruptions of Mount Sakurajima (Japan), Eyjafjallajökull (Iceland) and Taal Volcano (Philippines).

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