

Cloudburst, Phenomena, Occurance, Properties, Effects

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Cloudburst is a spontaneous phenomena with heavy rainfall that is localised in nature over a short period of time. This phenomenon is very common in mountainous regions where sharp temperature contrasts with upper and lower atmospheric layers turning into cumulonimbus clouds. This also includes thunderstorms and occurrence of strong upward air currents that prevent raindrops from falling, causing huge amounts of moisture to collect and release rapidly as a heavy downpour. In this article, we are going to cover cloudburst, their composition and properties and effects of cloudburst.

Cloudburst Phenomena

Cloudburst are caused by intense bursts of extreme rainfall. So much water dropping within a short period of time triggers flash floods and landslides. Sometimes this also includes thunderstorms and hailstorms. Cloudburst are a common phenomena seen in mountainous regions like Himachal Pradesh, Sikkim, etc.

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Cloudburst Occurance

In India, cloudburst frequently occur in the mountainous regions of the Northeast and the upper and middle Himalayas, particularly during the months of June and July when the southwest monsoon winds arrive from the Arabian Sea and Bay of Bengal. These winds often bypass the plains and move directly towards the hilly terrains of northern India.

Cloudburst typically begin when moisture-laden clouds are prevented from releasing rainfall due to the presence of intense upward currents of hot air. These currents cause raindrops to grow larger and rise instead of falling. Combined with high humidity, low temperatures, and slow wind speeds, rapid condensation takes place within cumulonimbus clouds. The warm air below suppresses rainfall temporarily, allowing massive moisture build-up. Eventually, this leads to a sudden and intense downpour over a small area within a very short time.

Such events are most common during the southwest monsoon season. States and Union Territories like Himachal Pradesh, Uttarakhand, Jammu & Kashmir, Ladakh, Sikkim, and Arunachal Pradesh often face severe damage to life and property as a result of these unpredictable and intense weather phenomena.

Cloudburst Properties

Cloudburst can be detected by following properties:

- A cloudburst is measured by rainfall amounting more than 10cm or 100mm within 60 minutes.
- The geographic area is 20 to 25 square km.
- The Langmuir precipitation process is followed during cloudburst when small rainfall droplets collect together and form large droplets.
- Flash floods are a consequence of cloudburst after intense spells of rainfall.

Cloudburst Effects

Cloudburst can trigger several devastating consequences, particularly in hilly and ecologically sensitive regions. One of the most immediate impacts is landslides—the sudden downhill movement of large sections of land, often leading to loss of life and disruption of road connectivity.

- Another common outcome is mudslides, where a fast-moving flow of debris and soil becomes even more dangerous when mixed with high volumes of water. These flows can sweep away everything in their path.
- Cloudburst also cause severe damage to the biodiversity of affected areas. Torrential rains can flood forested regions, leading to the death of animals and uprooting of trees, thereby disturbing the ecological balance.
- Land subsidence, or the sudden sinking of the Earth's surface, is another major aftereffect, often caused by the weakening of the ground due to excessive water absorption.
- Additionally, the destruction of homes and infrastructure often leads to mass displacement of people. Large-scale migration becomes inevitable, posing significant challenges for authorities to provide timely relief, rehabilitation, and resettlement for the affected population.

Source: <https://vajiramandravi.com/upsc-exam/cloudburst/>

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