Cloudburst

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Why is in news? Cloudburst washes away road stretch in J&K's Doda

A powerful cloudburst struck Kota Nullah in the Doda district of Jammand Kashmir early Saturday morning washed away a stretch of the Thaleela- Chirala link road, and created a flood-like situation.

The cloud burst coupled with heavy rain resulted in mudslides and a flood-like situation in Kota Nullah. However, no loss of life or injury was reported.

Meanwhile, torrential rains continued in most parts of the Doda and Kishtwar districts on the third day on Saturday, resulting in a rise in water bodies including the Chenab River and its major tributaries like Neerand Kalnai.

District administration Doda has advised people to remain cautious and stay away from Streams, Rivers, and other vulnerable spots.

A cloudburst refers to an **extreme amount of rain that happens in a short period**, **sometimes accompanied by hail and thunder**, and this has a precise definition.

The **India Meteorological Department** (IMD) defines **it as unexpected precipitation exceeding 100mm** (or 10 cm) **per hour over a geographical region** of approximately 20 to 30 square km

By this definition, **5 cm of rainfall in a half-hour period over the same area** would also be categorized as a cloudburst.

Where do they occur?

They are **more likely to occur in mountainous zones** mainly because of terrain and elevation.

A cloudburst occurs when moisture-carrying air moves up a hilly terrain, **forming a vertical column of clouds** known as '**cumulonimbus' clouds**.

Such clouds usually cause rain, thunder and lightning. This upward motion of the clouds is known as an ' **orographic lift'.**

These unstable clouds cause an intense rainstorm over a small area after becoming heavy enough and locked in the ridges and valleys between the hills.

The energy necessary for the cloudburst comes from the upward motion of air. Cloudbursts mostly occur at elevations between 1,000-2,500 metres above sea level.

Is the cloudburst more common?

Cloudbursts are **not uncommon events**, particularly during the monsoon months.

Most of these happen in the **Himalayan states** where the local topology, wind systems, and temperature gradients between the lower and upper atmosphere facilitate the occurrence of such events.

However, not every event that is described as a cloudburst is actually, by definition, a cloudburst. That is because these **events are highly localized**.

Because of the nature of terrain, the heavy rainfall events often trigger landslides and flash floods, causing extensive destruction downstream.

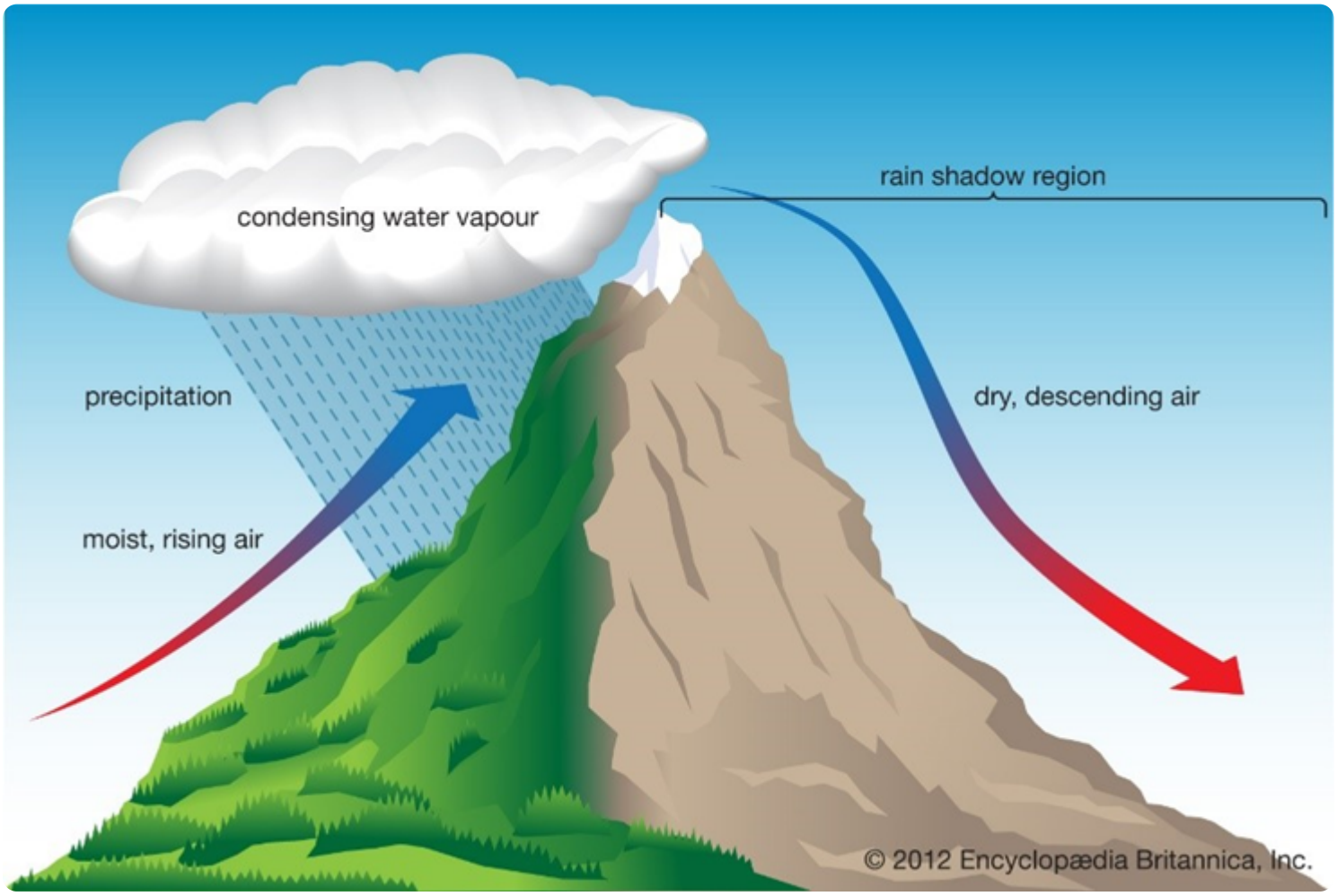
Is it possible to forecast cloudburst?

The India Meteorological Department **forecasts rainfall events well in advance**, but it **does not predict the quantum of rainfall** — in fact, no meteorological agency does.

The forecasts are for a relatively large geographical area, usually a region, a state, a meteorological sub-division, or at best a district. As they zoom in **over smaller areas, the forecasts get more and more uncertain**.)

Therefore, **specific cloudburst events cannot be forecast.**

No forecast ever mentions a possibility of a cloudburst. But there are warnings for heavy to very heavy rainfall events, and these are routinely forecast four to five days in advance.



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Why forecasting cloudbursts is a challenge

Efforts to monitor and forecast cloudbursts are still at a nascent stage

1 As per the IMD definition, over **100 mm of rainfall in one hour** is called a cloudburst. It usually occurs over a small geographical region (20-30 sq. km)

2 Rainfall of 100 mm per hour translates to **100 litres for every square metre** where a cloudburst occurs. For a small region of 20 sq. km, it is about **two billion litres of water** in an hour

3 Tall cumulonimbus clouds causing cloudbursts can develop quickly (in about **30 minutes**) as the moisture updraft happens rapidly — 60-120 km/hr

4 Cloudbursts occur mostly over the rugged terrains over **the Himalayas, Western Ghats**, and northeastern hill States of India

5 In India, cloudbursts often occur during the monsoon season, when the **SW monsoon winds bring in** copious amounts of moisture inland

6 Satellites fail to detect cloudburst systems as the **resolution of the precipitation radars** are much smaller than the area of individual cloudburst events

7 Multiple doppler weather radars can **monitor moving cloud droplets** and help to provide forecast for the next three hours. But **radars are expensive** and installing them widely may not be feasible

8 The change in monsoon extremes and cloudbursts are in response to the **1-degree Celsius rise** in global surface temperature