



# Earthquake Concentrations in Dharchula Region

## Why in News

Recently, scientists at [Wadia Institute of Himalayan Geology](#) (WIHG) have unearthed large concentrations of micro and moderate magnitude [earthquakes](#) in the Dharchula region and adjoining areas of Kumaon Himalaya.

- WIHG is an autonomous institute under the [Department of Science and Technology](#) (DST), Government of India.

## Key Points

### ▪ Location:

- The major concentration is in an area **around 45 km from the [new Kailash Mansarovar road](#)**, connecting **Dharchula in Uttarakhand to Lipu Lekh on the China border**.
- The region is known as the **Central Seismic Gap (CSG) region**, despite the [Himalayas](#) being one of the most tectonically and seismically active regions in the country.
  - A gap is a term used to **denote an area with little tectonic activity**.

### ▪ Methodology:

- Scientists started investigating and mapping the region precisely to find out the **reason behind the occurrence of crowded** (closely located and frequently felt) **earthquakes**.
- They **established a seismological network of 15 broadband seismological stations** along the [Kali River](#) valley to investigate the subsurface configuration in the Kumaon Himalaya region with support from the Ministry of Earth Sciences.

### ▪ Findings:

- These large concentrations of earthquakes are **“release of stress”** building up in the region and the geological structure behind it.
- The Dharchula region **falls between two knee-like structures**, which **traps the stress in this region**.
- This is the reason why there have been crowded earthquakes here within a span of years and numerous smaller earthquakes have occurred here and the stress keeps building up.
- For the stress to be finally released, there is a **likelihood of a high magnitude earthquake in the region**. However it is not possible to predict the scale or the exact time that an earthquake will occur.

## Earthquake

- An earthquake in simple words is the **shaking of the earth**. It is a **natural event which is caused due to release of energy**, which generates **seismic waves** that travel in all directions.
- The location below the earth's surface where the earthquake starts is called the **hypocenter**, and the location directly above it on the surface of the earth is called the **epicenter**.
- **Types of Earthquakes:**

- Based on **reasons behind their origins:**

- Fault Zones Earthquake.
- Tectonic Earthquake.
- Volcanic Earthquake.
- Human Induced Earthquakes.

- Based on the **depth of focus:**

- Shallow Earthquakes (0-70 km deep)
- Intermediate Earthquakes (70-300 deep)
- Deep Earthquakes (300-700 km deep).

#### ▪ **Measurement of Earthquakes:**

- **Seismometers** detects seismic waves below the instrument and records them as a series of zig-zags.

- Scientists can determine the time, location and intensity of an earthquake from the information recorded by a seismometer. This record also provides information about the rocks the seismic waves traveled through.

- The earthquake events are **scaled either according to the magnitude or intensity of the shock.**

- The **magnitude scale is known as the Richter scale.** The magnitude relates to the energy released during the quake. The magnitude is **expressed in absolute numbers, 0-10.**

- The **intensity scale is named after Mercalli**, an Italian seismologist. The intensity scale takes into account the visible damage caused by the event. The **range of intensity scale is from 1-12.**

#### **Earthquakes in India**

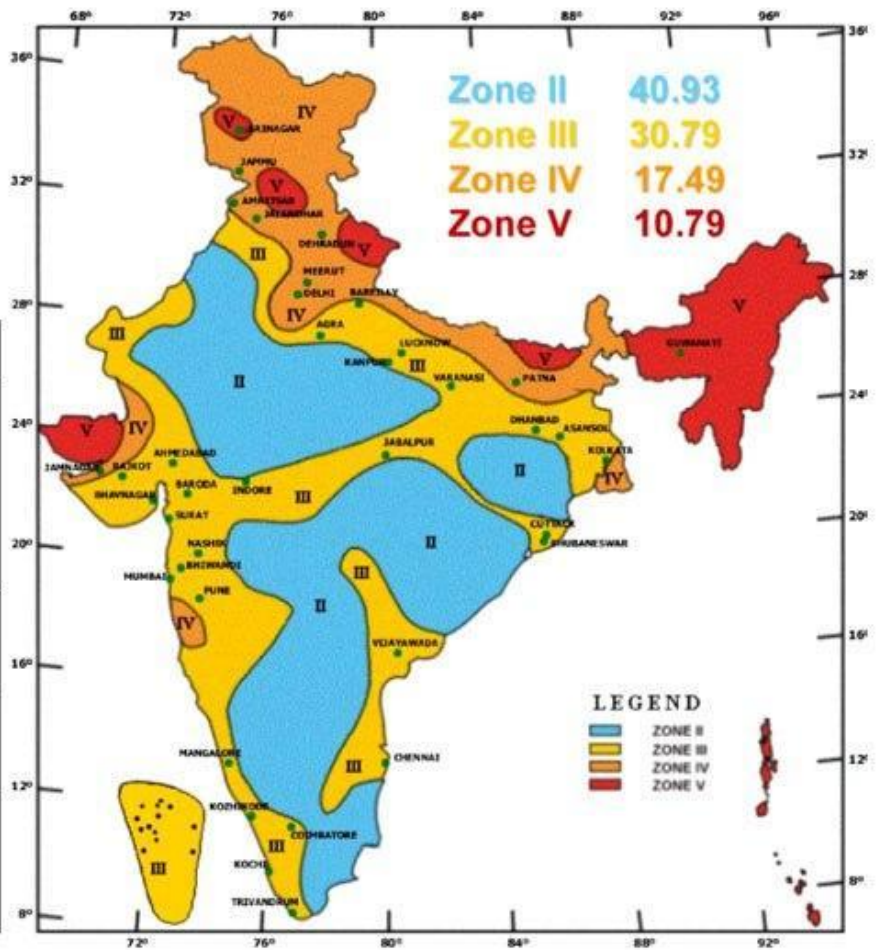
- India is **one of the highly earthquake affected countries** because of the presence of **tectonically active young fold mountains, Himalayas.**
- India has been divided into **four seismic zones (II, III, IV, and V)** based on scientific inputs relating to seismicity, earthquakes occurred in the past and tectonic setup of the region.

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## Seismic Zone Map of India: -2002

About 59 percent of the land area of India is liable to seismic hazard damage

Zone	Intensity
Zone V	<b>Very High Risk Zone</b> Area liable to shaking Intensity IX (and above)
Zone IV	<b>High Risk Zone</b> Intensity VIII
Zone III	<b>Moderate Risk Zone</b> Intensity VII
Zone II	<b>Low Risk Zone</b> VI (and lower)



Source: IE

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