



Earthquake Concentrations in Dharchula Region

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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.

