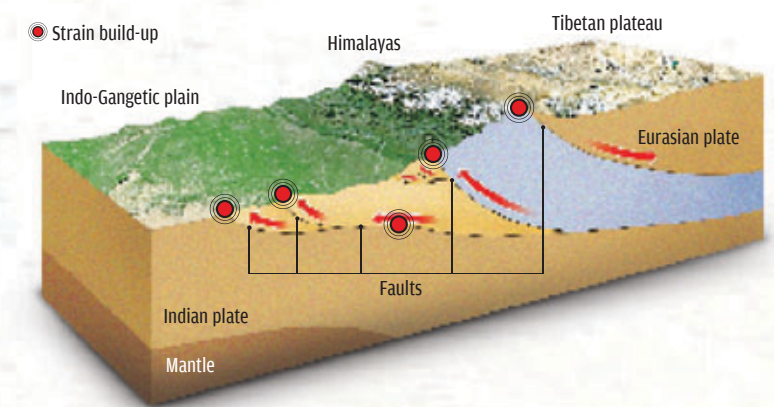


Mapping the gaps

How earthquakes occur in the Himalayas



The collision of the Indian plate with the Eurasian plate has caused the former to slide under the latter at a rate of 45 mm per year. This process has created thrust faults in the Earth's crust. The pressure built up in these faults is often released in the form of earthquakes. When the strain accumulates over centuries, a seismic gap is created. By identifying these gaps, seismologists can map vulnerable areas.

Kashmir

October 8, 2005

Epicentre: Muzaffarabad (Pakistan Occupied Kashmir)
Magnitude: 7.6

Impact: Over 87,000 dead, 2.8 million displaced

Baramulla

May 30, 1885

Epicentre: Located at few miles west of Srinagar
Magnitude: 7
Impact: More than 3,000 lives lost and 10,000 houses destroyed across the state

Garhwal

September 1, 1805

Epicentre: Between Chamoli and Uttarkashi
Magnitude: Between 7.5 to 8
Impact: No records of casualties. Delhi's Qutub Minar partly damaged

Nepal

August 26, 1833

Epicentre: West of Kathmandu
Magnitude: 7.5
Impact: 4,600 buildings collapsed and 500 deaths recorded

Kangra

April 4, 1905

Epicentre: 3.5 km from Pathyar town in Kangra valley
Magnitude: 8
Impact: 20,000 lives lost; 100,000 buildings collapsed; 53,000 cattle lost. Kangra, Mcleodganj and Dharamshala saw extensive losses

Dhubri

July 3, 1930

Magnitude: 7.1
Epicentre: West of Dhubri
Impact: Structural damage with 30 reported deaths

Shillong

June 12, 1897

Magnitude: 8.7
Epicentre: Shillong
Impact: 1,542 casualties; buildings in Bhutan, Kolkata and Myanmar suffered heavy damages.

Upper Assam, Arunachal Pradesh and Tibet

July 29, 1947

Epicentre: Arunachal-Tibet border
Magnitude: 7.7
Impact: While there were no reported casualties, the earthquake damaged several buildings in Assam and Tibet

Assam-Arunachal Pradesh and Tibet

August 15, 1950

Epicentre: Arunachal-Tibet border
Magnitude: 8.7
Impact: 3,300 deaths across the region

Seismic gaps in the Himalayas

Seismic gap of category-1 (magnitude >8)

Seismic gap of category-2 (magnitude 6-8)

- 1 Kashmir seismic gap
- 2 Jammu seismic gap
- 3 West Himachal Pradesh seismic gap
- 4 East Himachal Pradesh seismic gap
- 5 Uttarakhand-Dharachula seismic gap
- 6 Western Nepal seismic gap
- 7 Central Nepal-Bihar seismic gap
- 8 Sikkim Bhutan seismic gap
- 9 Arunachal seismic gap
- 10 Shillong seismic gap

Urban population

- 2 million
- 500,000
- 200,000

Earthquakes in past 100 years

- 8.0-9.0 magnitude
- 7.0-8.0 magnitude
- 6.0-7.0 magnitude

Sources: Geological Society of India; Discriminatory characteristics of seismic gaps in Himalayas, a research paper by H N Srivastava, Ministry of Earth Sciences; Census 2011; Roger Bilham University of Colorado