# Report on Real Time Earthquake Location

**From: Earthquake Monitoring Center (EMC) of NCS**
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National Center for Seismology
Ministry of Earth Sciences
Government of India

Month: December2023
Technical Report No: NCS/2023/12

# Report of Earthquakes occurred in the month of December2023

## 1) Introduction:

National Center for Seismology maintains a National Seismological Network of **156 stations** each having state of art equipment and spreading all across the country **(Figure:1).** Using these stations during the period 01$^{st}$ – 31$^{st}$ December2023 a total number of **168** earthquakes have been located and disseminated from the center **(Figure:2)**, out of which **158** earthquakes have

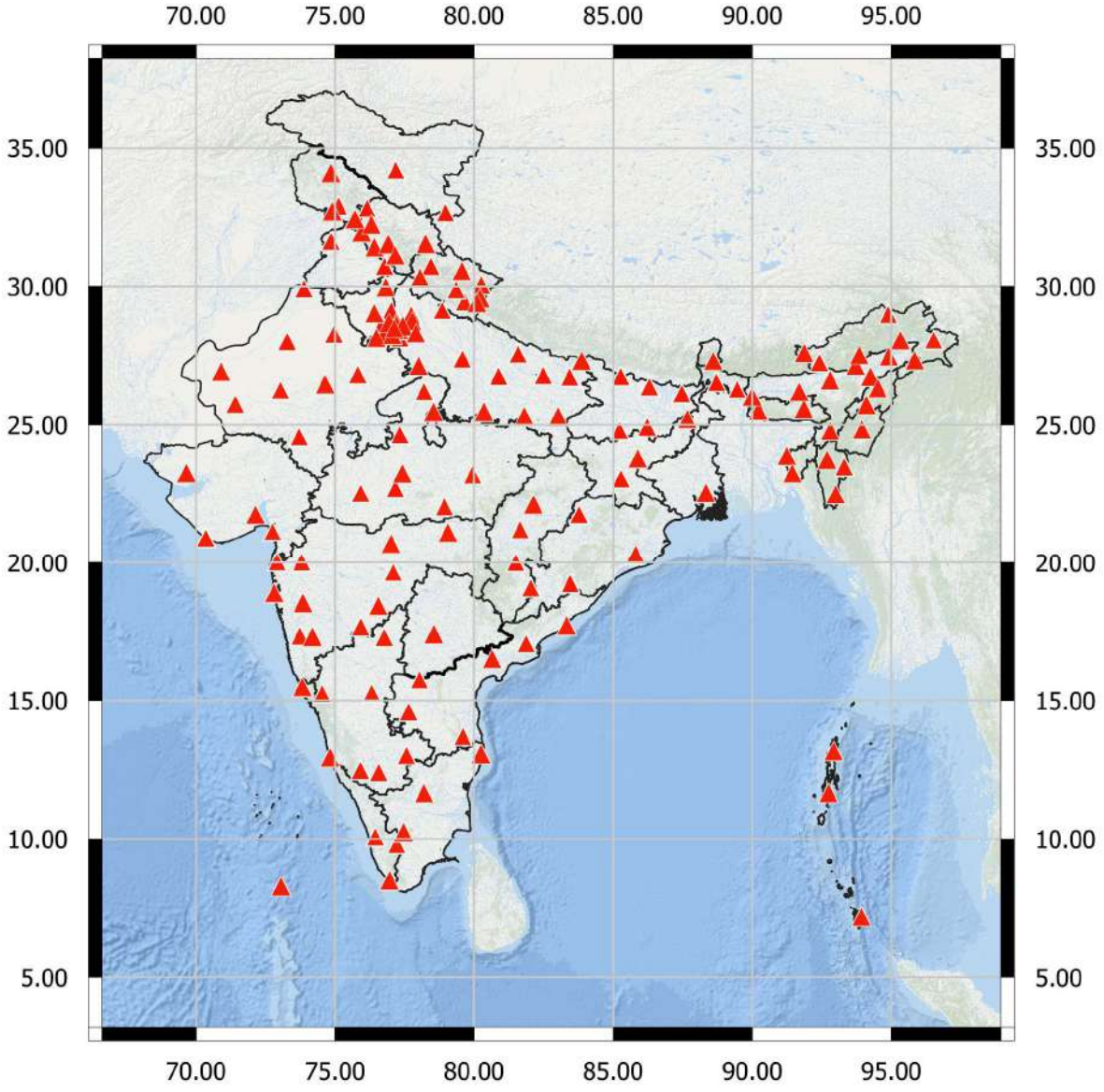


*Figure 1: National Seismological Network (NSN) of 156 Stations*

occurred in India and its neighborhood region bounded by the coordinates 0°- 40°N & 60°-100°E **(Figure:3)**.

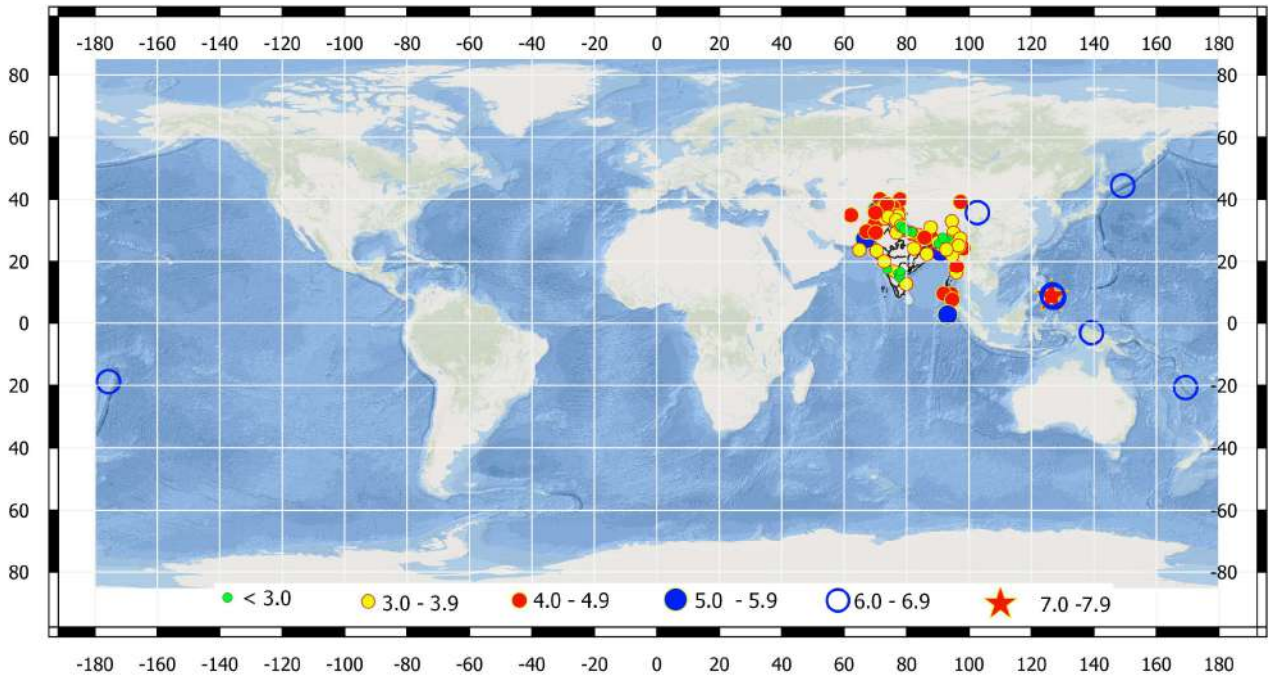


*Figure 2: Earthquakes located and disseminated by NCS during 01st – 31st December2023*

## 2)Seismicity:

During the period, the majority of earthquakes within India and its neighbourhood region bounded by the coordinates 0-40°N & 60-100°E; were located in Hindu Kush region, North India (Jammu and Kashmir, Ladakh, Himachal Pradesh and Uttarakhand) and North East India (Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram and Nagaland) as shown in **Figure 3**.

Few earthquakes of smaller magnitudes were also reported in northern (Panipat and Rohtak in Haryana), western (Kachh in Gujrat; Palghar, Kohlapur and Satara in Maharashtra); central (Singrauli in Madhya Pradesh); eastern (East Singhbhum in Jharkhand) and southern(Vijayapura and Raichur in Karnataka; Wanaparthy in Telangana; Ananthapuramu and Kurnool in Andhra Pradesh ) part of country.

**Fifty-two earthquakes** of smaller magnitude (**M < 3.0)** comprising **31%** of all earthquakes occurred during 01st to 31st December2023. **Five** earthquakes of magnitude **M:5.0 and above** occurred during the month in the region; as detailed in **Table:1**.

**Table:1 Earthquakes of M≥5.0 occurred during December2023 within India and its neighbourhood**

| SN | Date | Time (IST) | Lat($^0$N) | Long($^0$E) | D (KM) | M | Region |
|---|---|---|---|---|---|---|---|
| 1 | 2023-12-02 | 09:05:31 | 23.15 | 90.89 | 55 | 5.6 | Bangladesh |
| 2 | 2023-12-04 | 17:49:30 | 27.33 | 66.87 | 10 | 5.2 | Pakistan |
| 3 | 2023-12-12 | 07:35:44 | 36.33 | 70.70 | 120 | 5.2 | Afghanistan |
| 4 | 2023-12-18 | 15:48:53 | 33.41 | 76.70 | 10 | 5.5 | Zanskar, Kargil, Ladakh |
| 5 | 2023-12-30 | 10:49:29 | 02.58 | 93.16 | 10 | 5.6 | Indian Ocean |

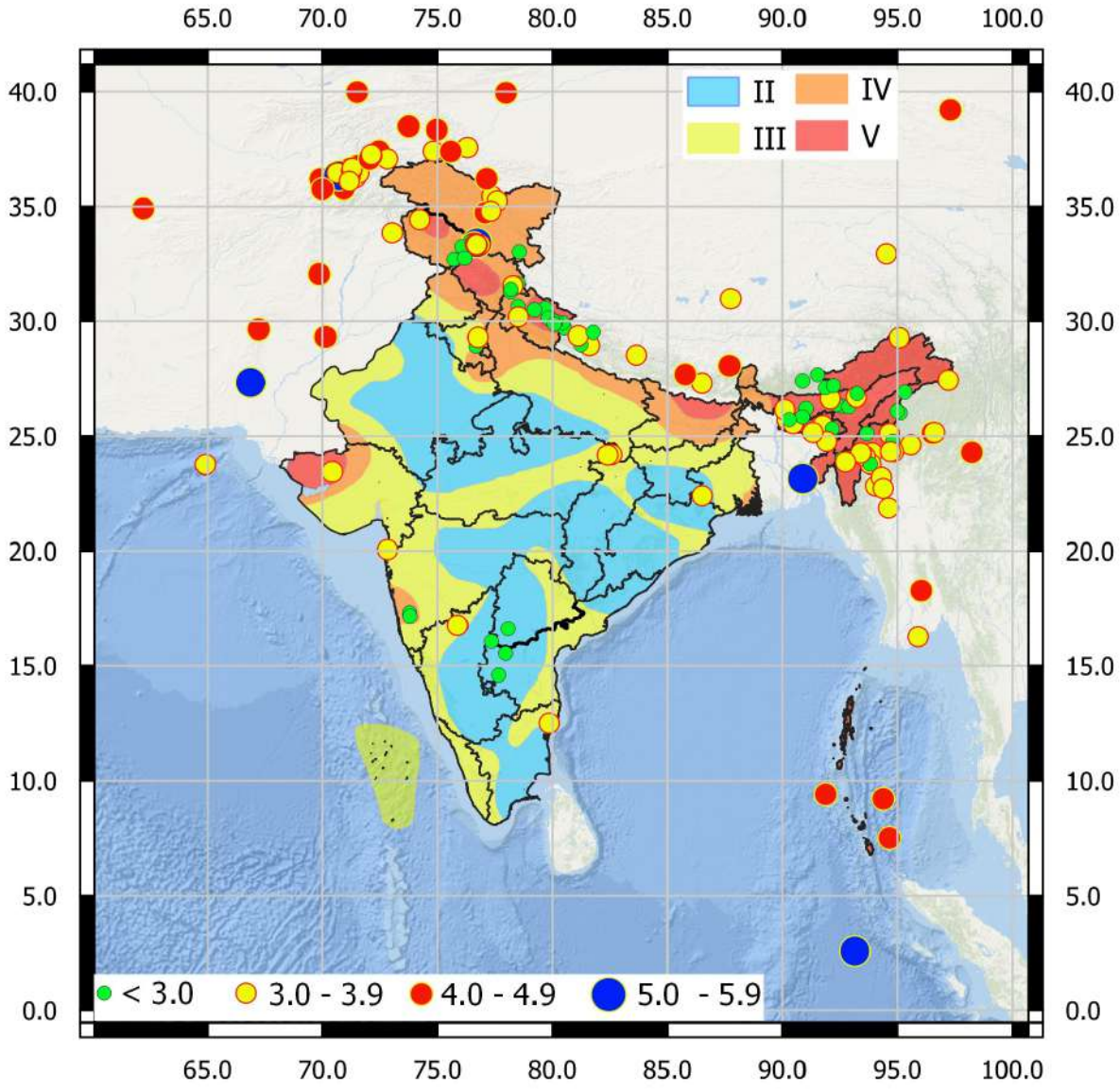


*Figure 3: Map showing the seismicity during the period 01$^{st}$ – 31$^{st}$ December2023 occurred in India and its neighbourhood region along with the seismic zone of India.*

Out of total **168** earthquakes; **43%** and **17%** earthquakes occurred in the magnitude range **3.0-3.9** and **4.0 - 4.9** respectively; whereas **five** earthquakes in the magnitude range **5.0 - 5.9**

occurred

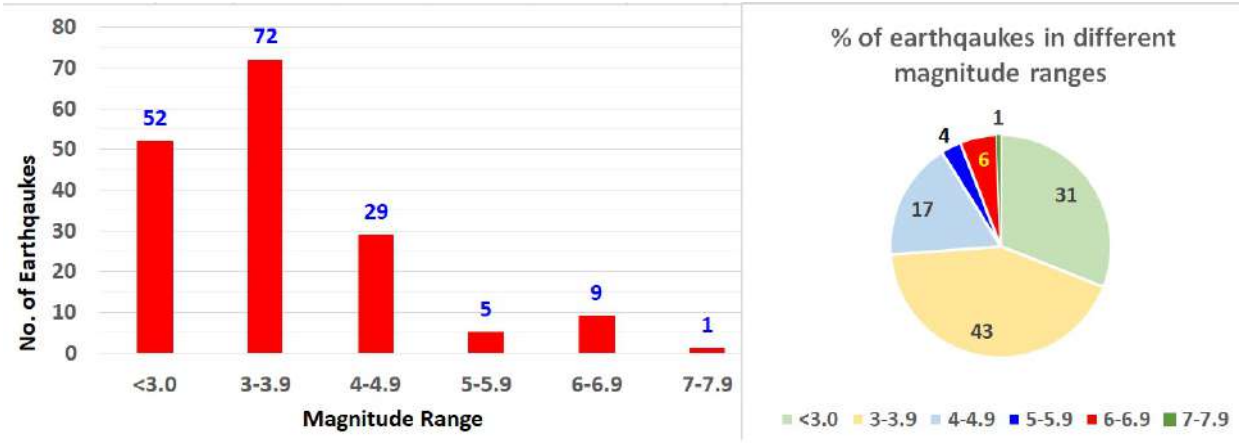


*Figure 4: Distribution of earthquakes in the different magnitude range during 01st–31st December 2023.*

**within** the grid of 0-40°N & 60-100°E during the period as shown in **Figure:3** and **Figure:4. Nine earthquakes** occurred in the magnitude range of **6.0-6.9** and **one** earthquake of magnitude of M:**7.4** were **outside** the grid of 0- 40°N & 60-100°E as shown in **Figure:2** and **Figure:4.** Detail list of earthquakes occurred during the month is available at www.seismo.gov.in

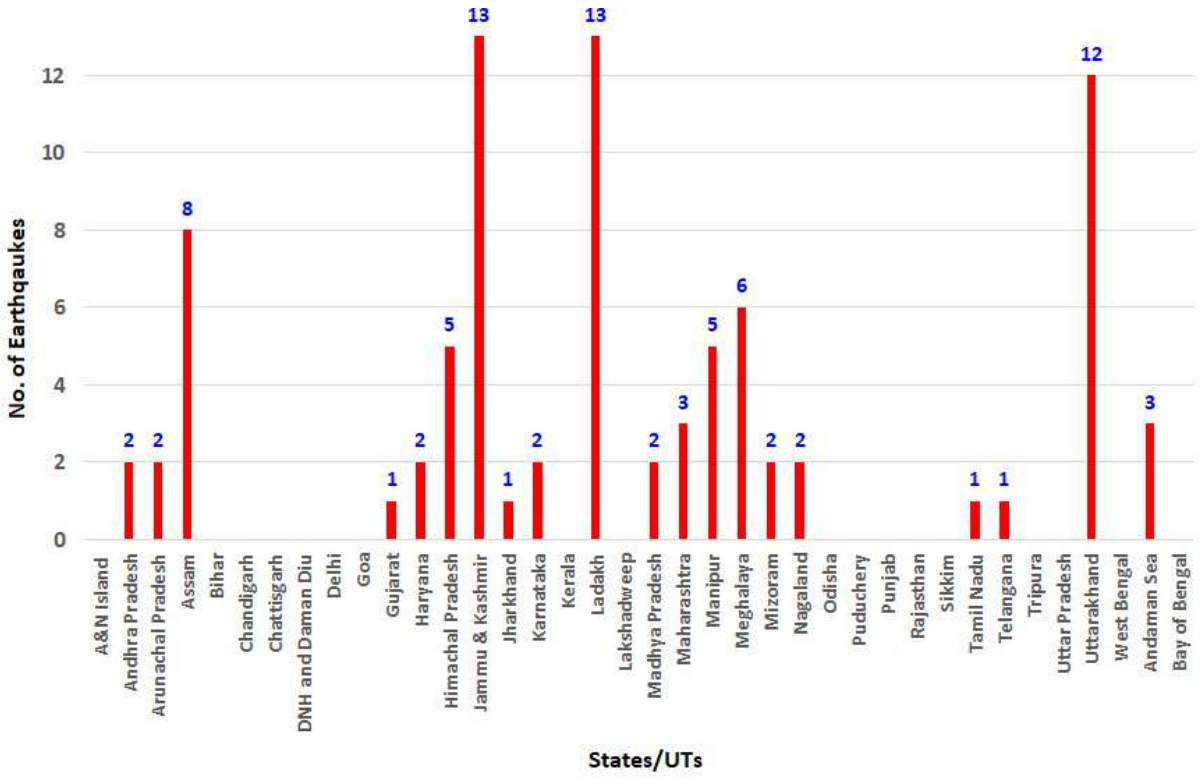


*Figure 5: State wise distribution of earthquakes during the period 01st – 31st December2023.*

Total **83** earthquakes occurred within Indian territory; of which 13 earthquakes occurred each in Jammu & Kashmir and Ladakh and 12 were in Uttarakhand during the period. Out of 83 earthquakes **45** and **25** earthquakes occurred in **North** and **North-East** region respectively. State/UT and region wise distribution of earthquakes occurred during 01st – 31st December2023 is shown in **Figure 5** and **Figure 6** respectively.

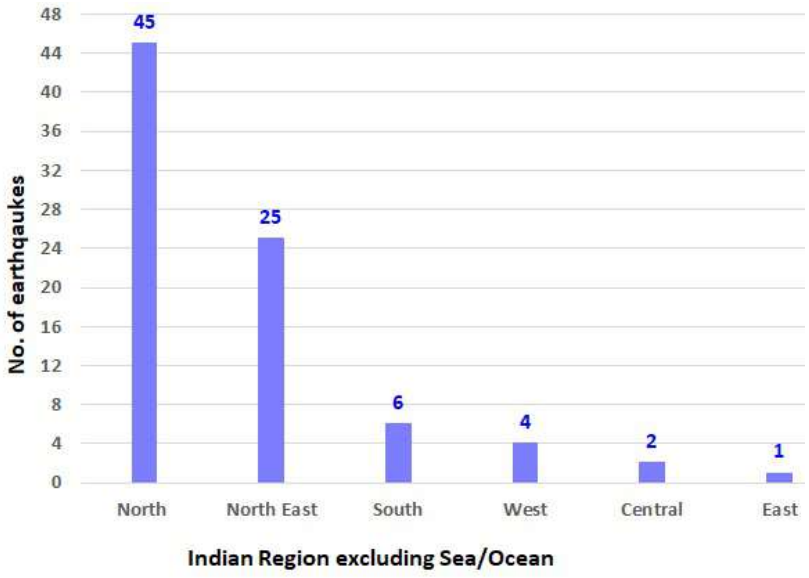


*Figure: 6 Region wise distribution*

## 3)Significant Activity:

A. **Bangladesh Earthquake:** An earthquake of **M:5.6** occurred at **09:05:31 IST** of **02nd December 2023** in Bangladesh at 23.15°N and 90.89°E with focal depth of 55 km. The epicentre is about 80 Km SE of Dhaka,Bangladesh and SW of Agartala, Tripura, India; 190 Km WSW of Aizwal; 220 Km NW of Cox's Bazar, Bangladesh and 270 Km ENE of Kolkata. This earthquake occurred in the eastern regions of Bangladesh, which is situated within an actively seismic zone, closely linked to the subduction of the Indian plate. **Figure 7** depicts the expected intensity of this earthquake around the source zone. This earthquake was widely felt in West Bengal, Bangladesh, Jharkhand, and Tripura as per the felt responses received through our website and mobile app.

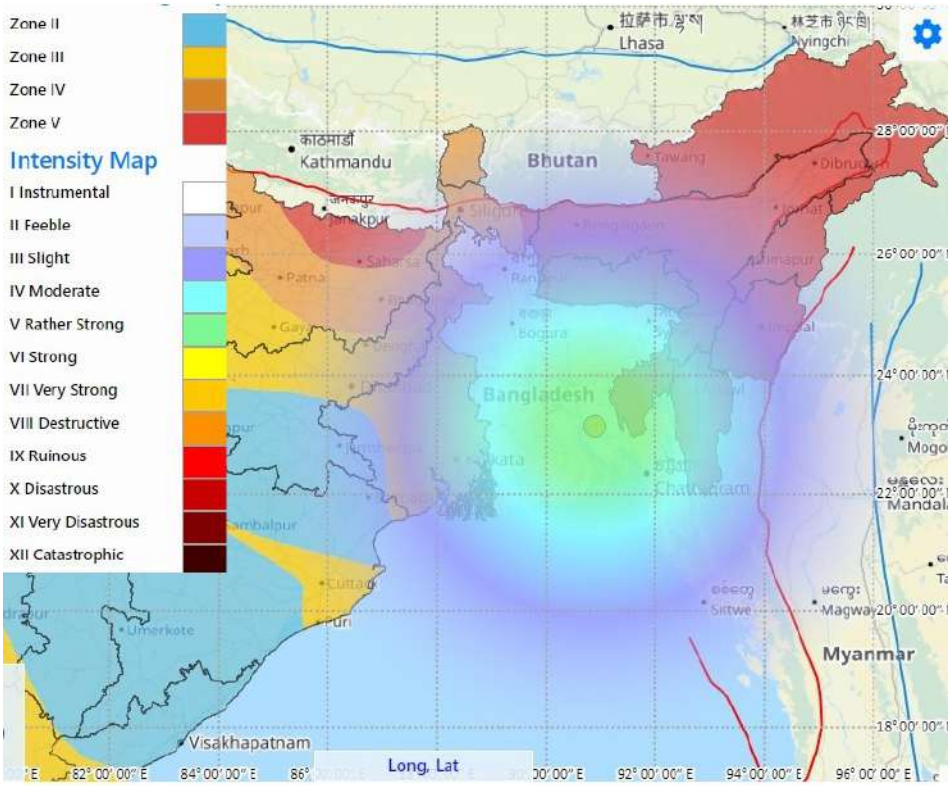


*Figure 7: Intensity map of M: 5.6 Bangladesh Earthquake occurred on 2nd December 2023*

More detailed information about this earthquake is available at the URL **https://riseq.seismo.gov.in/riseq/earthquake/event/Y0lucDNPTW4zZnVkUXJ1UldOZnhSUT09/Reviewed** .

B. **Ladakh Earthquake:** An earthquake of **M:5.5** occurred at **15:48:53 IST** of **18th December 2023** in Zanskar, Kargil, Ladakh at 33.41°N and 76.77°E with focal depth of 10 km. The epicentre is about 16 Km SW of Padum; 110 Km NE of Chamba; 115 Km SW of Pathankot and 230 Km N of Shimla. Total 11 aftershock events in the magnitude range of M:2.8 to M:4.8 occurred within 24 hours of the occurrence of this earthquake. **Figure 8** depicts the expected intensity of this earthquake around the source zone. This earthquake was widely felt in Jammu & Kashmir and Punjab as per the felt responses received through our website and mobile app.

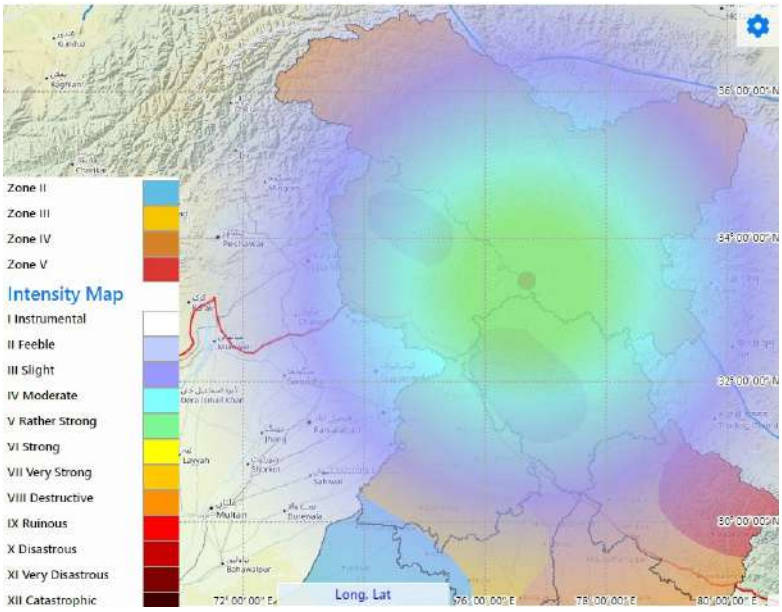


*Figure 8: Intensity map of M: 5.5 Ladakh Earthquake occurred on 18th December 2023*

More detailed information about this earthquake is available at the URL **https://riseq.seismo.gov.in/riseq/earthquake/event/MXlyZlVQSG9xVWZONytnTFVKcFNTUT09/ Reviewed** .

## 4) Dissemination Performance:

About **90%** earthquakes **of M<5.0** occurred within India and its neighbourhood region bounded by the coordinates 0-40°N & 60-100°E were disseminated within 10 Minutes. About **90%** earthquakes **of M≥5.0** occurred within India and its neighbourhood region bounded by the coordinates 0-40°N & 60-100°E were disseminated within 15 minutes as shown in **Figure 9**.

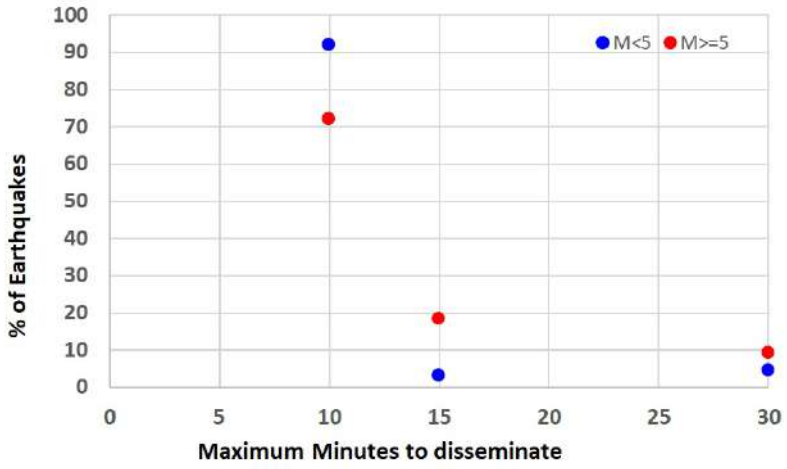


*Figure 9: Dissemination of earthquakes within different time ranges (in minutes) during 01st –31st December2023.*