

Report on Real Time Earthquake Location

**From: Earthquake Monitoring Center (EMC) of NCS
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Month: October 2023
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Report of Earthquakes occurred in the month of October 2023

1) Introduction:

National Center for Seismology maintains a National Seismological Network of **155 stations** each having state of art equipment and spreading all across the country (**Figure:1**). Using these stations during the period 01st – 31st October 2023 a total number of **231** earthquakes have been

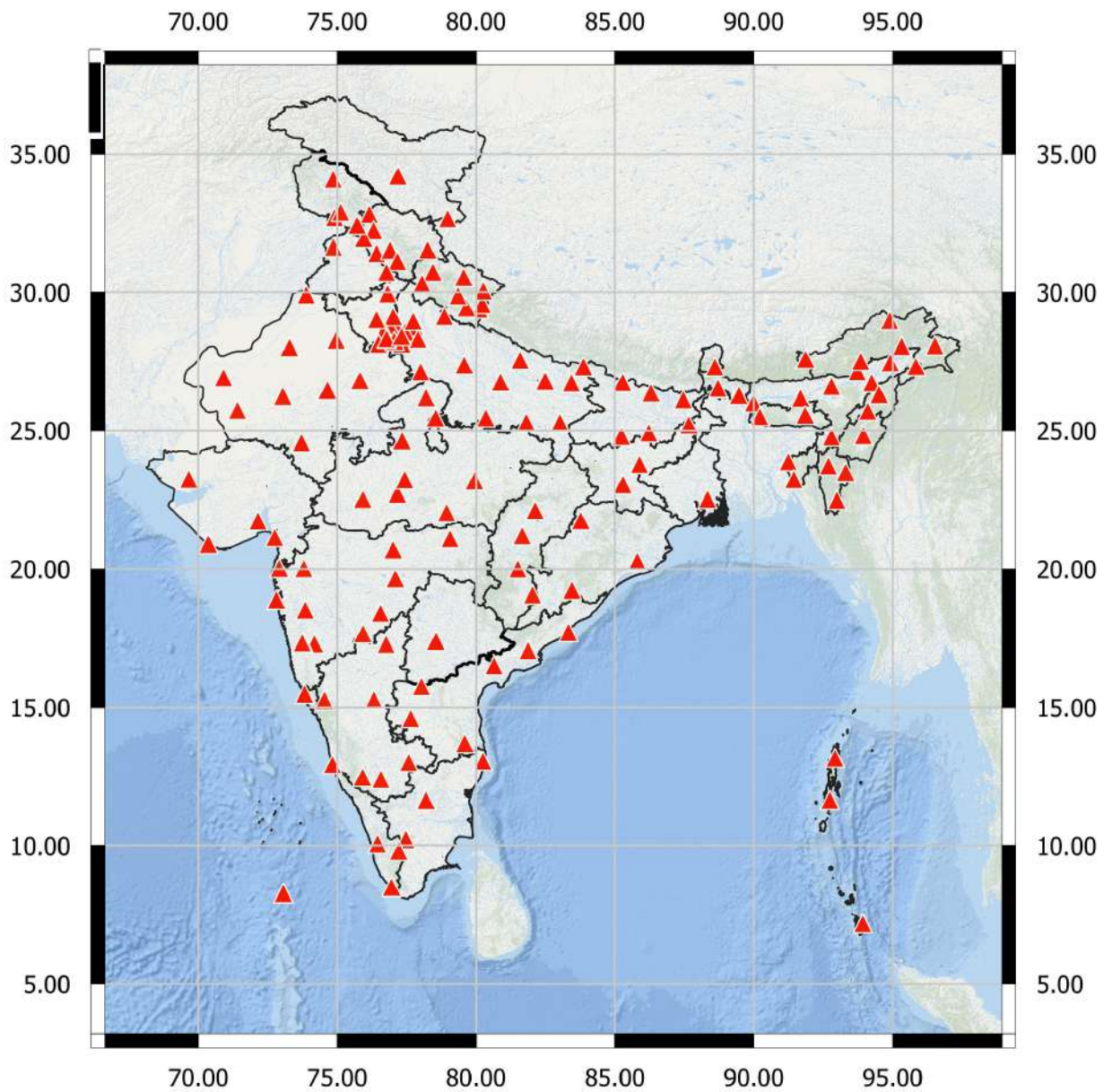


Figure 1: National Seismological Network (NSN) of 155 Stations

located and disseminated from the center (**Figure:2**), out of which **221** earthquakes has occurred in India and its neighborhood region bounded by the coordinates 0° - 40° N & 60° - 100° E (**Figure:3**).

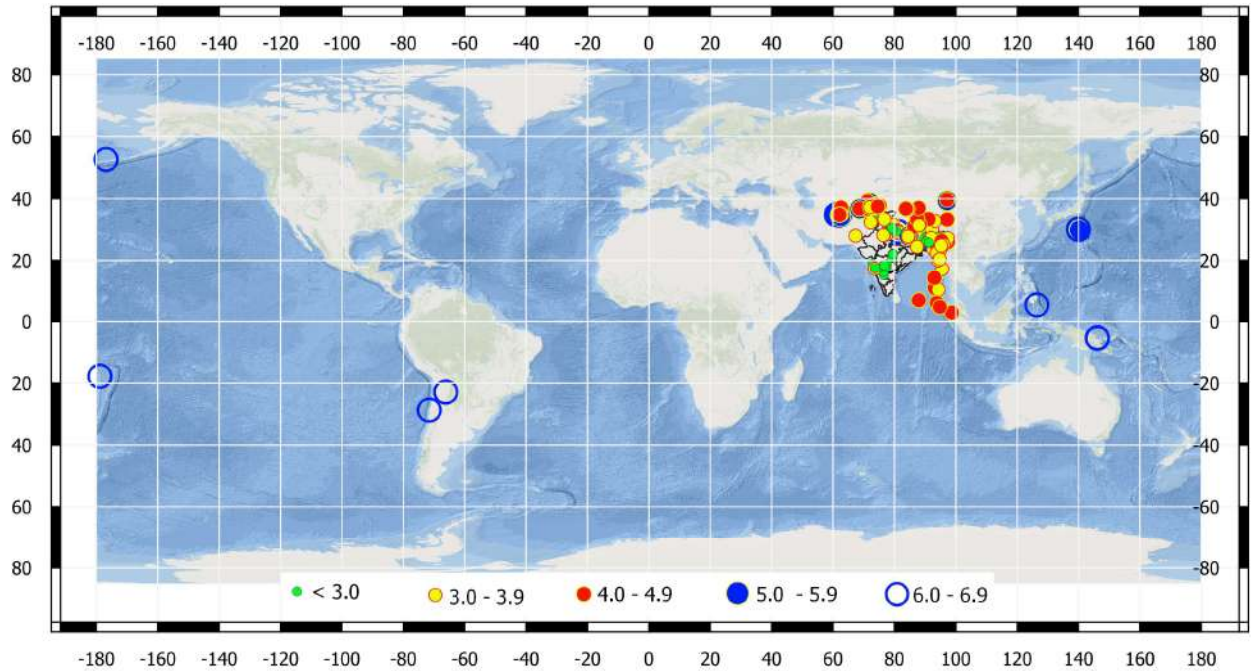


Figure 2: Earthquakes located and disseminated by NCS during 01st – 31st October 2023

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, 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 (Faridabad, Nuh, Rewari, Rohtak and Sonipat in Haryana), western (Raigad, Satara, Solapur, Latur, Nanded and Nagpur in Maharashtra); central (Seoni in Madhya Pradesh); eastern (Dumka in Jharkhand ; Alipurduar and Jalpaiguri in West Bengal) and southern (Bidar, Ballari, Kalaburagi and Raichur in Karnataka; Sangareddy in Telangana) part of country.

Sixty-three earthquakes of smaller magnitude ($M < 3.0$) comprising **27%** of all earthquakes occurred during 01st to 31st October 2023. **Fourteen** earthquakes of magnitude $M:5.0$ and **above** occurred during the month in the region; as detailed in **Table:1**.

Out of total **231** earthquakes; **31%** earthquakes occurred in the each magnitude range **3.0-3.9** and **4.0 - 4.9**; whereas **ten** earthquakes in the magnitude range **5.0-5.9** occurred during the period of which **nine** were **within** the grid of 0-40°N & 60-100°E as shown in **Figure:3** and **Figure:4**. **Fourteen** earthquakes occurred in the magnitude range of **6.0-6.9** of which **eight** 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.

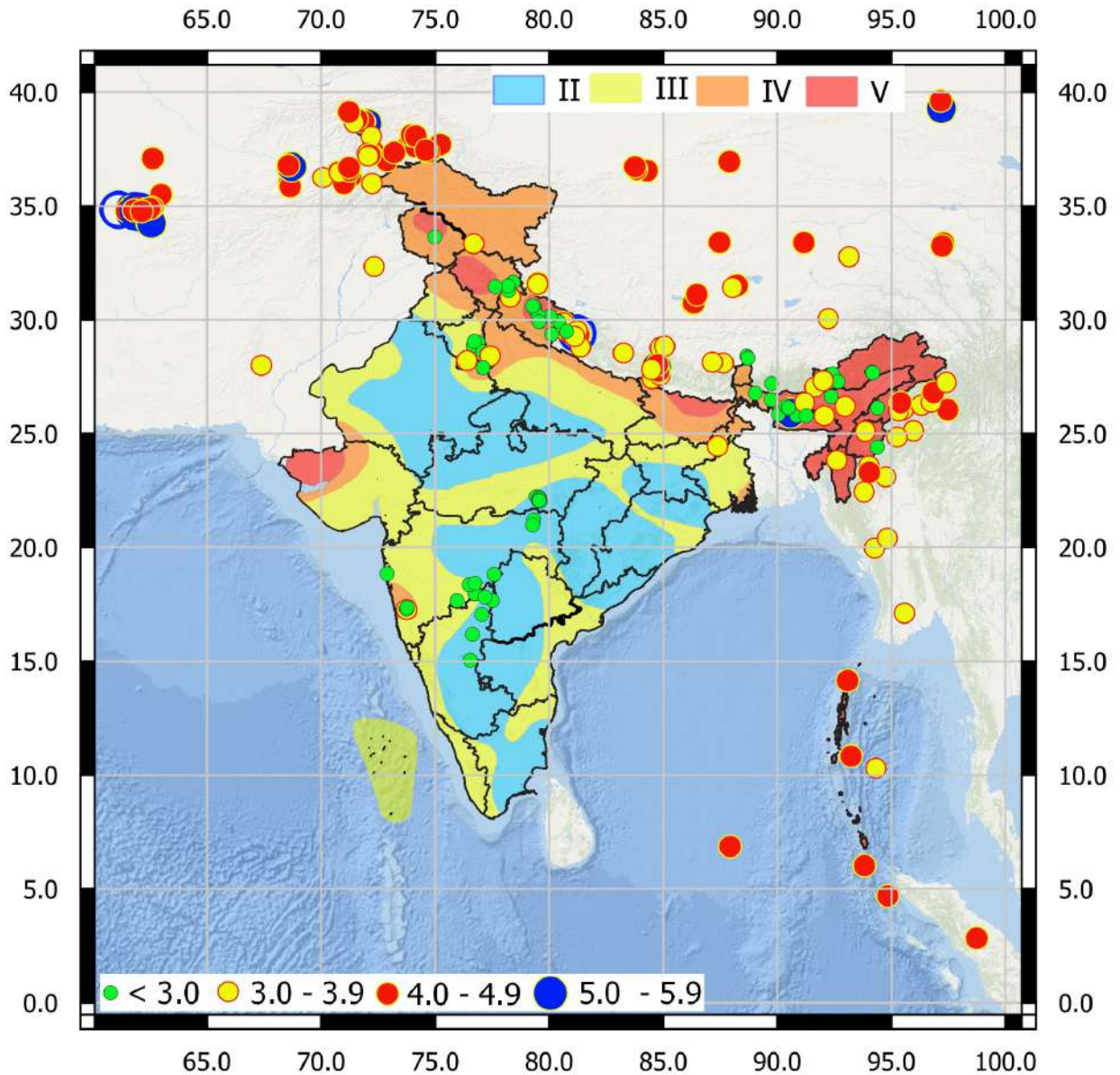


Figure 3: Map showing the seismicity during the period 01st – 31st October 2023 occurred in India and its neighbourhood region along with the seismic zone of India.

Table:1 Earthquakes of $M \geq 5.0$ occurred during October 2023 within India and its neighbourhood

SN	Date	Time (IST)	Lat($^{\circ}$ N)	Long($^{\circ}$ E)	D (KM)	M	Region
1	2023-10-02	18:15:18	25.90	90.57	10	5.2	North Garo Hills, ,Meghalaya
2	2023-10-02	19:33:45	38.62	72.00	60	5.2	Tajikistan
3	2023-10-03	14:51:04	29.39	81.23	5	6.2	Nepal
4	2023-10-07	12:11:02	34.78	61.81	21	6.1	Afghanistan
5	2023-10-07	12:19:45	34.81	61.99	38	5.6	Afghanistan
6	2023-10-07	12:42:50	34.83	61.12	34	6.2	Afghanistan
7	2023-10-07	13:10:30	34.80	62.12	10	5.9	Afghanistan
8	2023-10-07	14:57:25	34.68	61.95	70	5.0	Afghanistan
9	2023-10-11	06:11:56	34.71	62.13	10	6.1	Afghanistan
10	2023-10-15	09:06:03	34.76	62.02	70	6.2	Afghanistan
11	2023-10-15	09:26:34	34.24	62.55	10	5.4	Afghanistan
12	2023-10-22	07:24:20	27.92	84.71	10	5.3	Nepal
13	2023-10-24	17:02:13	39.29	97.19	10	5.2	Gansu, China
14	2023-10-27	22:42:08	36.72	68.70	106	5.0	Hindu Kush Region, Afghanistan

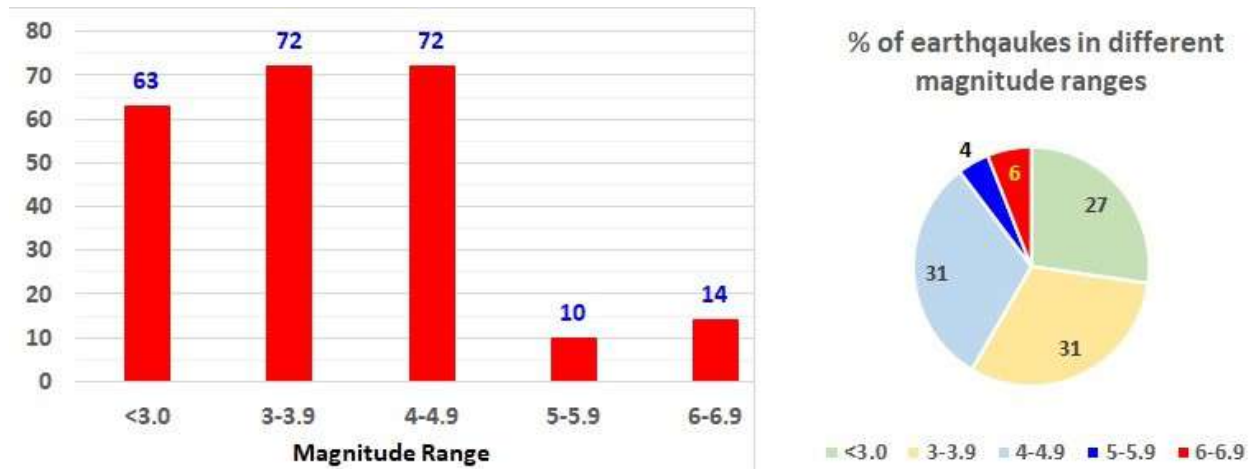


Figure 4: Distribution of earthquakes in the different magnitude range during 01st-31st October 2023.

Total **74** earthquakes occurred within Indian Territory; of which 12 earthquakes were occurred in Maharashtra and 9 each were in Uttarakhand and Madhya Pradesh during the period. Out of 74 earthquakes **22** and **16** earthquakes occurred in **North** and **North-East** region respectively. State/UT and region wise distribution of earthquakes occurred during 01st – 31st October 2023 is shown in **Figure 5** and **Figure 6** respectively.

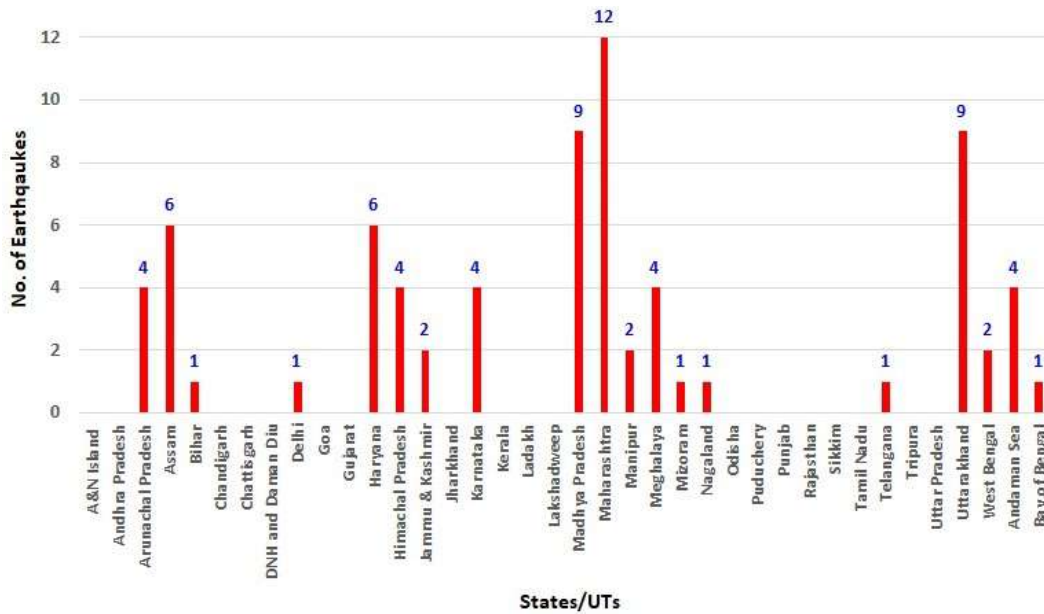


Figure 5: State wise distribution of earthquakes during the period 01st – 31st October 2023.

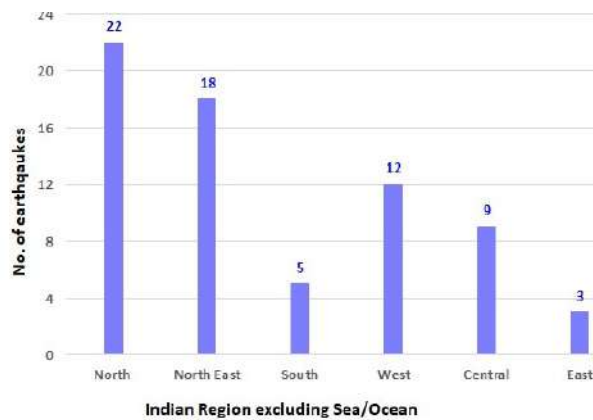


Figure: 6 Region wise distribution

3) Significant Activity:

A. Nepal Earthquake: An earthquake of **M:6.2** occurred at **14:51:04 IST** of **03rd October 2023** in western Nepal at 29.39°N and 81.23°E with focal depth of 5 km. The epicentre is 302 Km E of Haridwar; 206 Km SE of Joshimath; 296 Km ESE of Rishikesh and 434 Km NW of Kathmandu. Two aftershocks of magnitude M:3.6 and 3.1 is also occurred with the 10 Km radius of mainshock. The area is seismically very active associated with collisional tectonics where Indian plate colliding with Eurasian Plate.

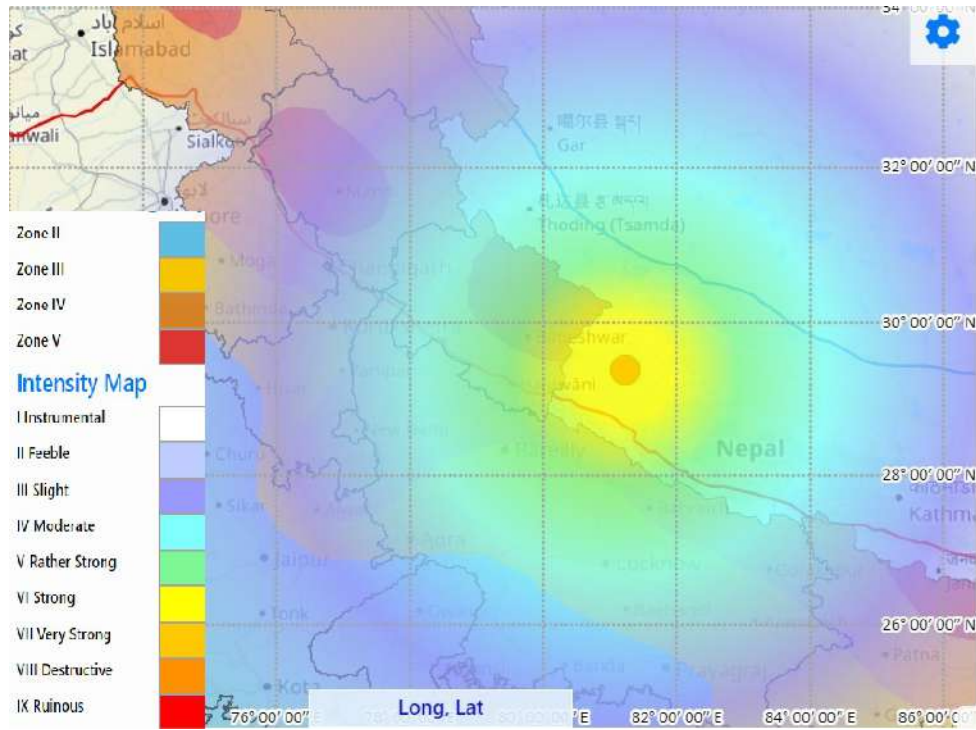


Figure 7: Intensity map of M:6.2 Nepal Earthquake

Figure 7 depicts the expected intensity of this earthquake around the source zone. This earthquake was widely felt in North part of the country as per the felt responses received through our website and mobile app (Figure 8). The URL <https://riseq.seismo.gov.in/riseq/earthquake/event/K2YzOU9wOGZ6SXITdUppYW hndDFtdz09/Reviewed> may be visited for more information.



Figure 8: Felt response of M:6.2 Nepal earthquake

B. **Earthquakes in Afghanistan:** Total 34 earthquakes (Annexure-I) occurred in the Afghanistan; of which **22** occurred in **Herat** region of Afghanistan (**Figure: 9**) during the period 01st -31st October 2023. Out of 22; **four** earthquakes of **M \geq 6.0** occurred on 07th, 11th and 15th Oct 2023 as detailed in **Table:1**.

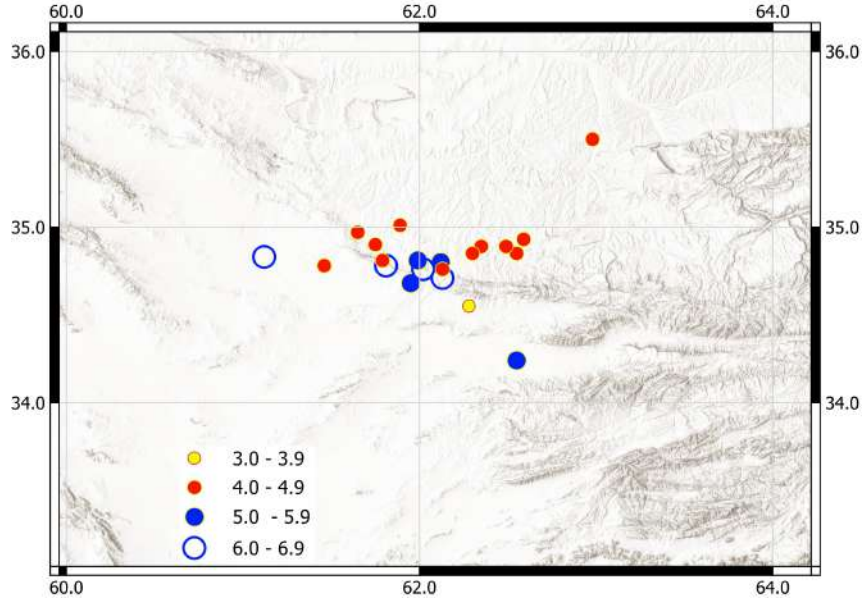


Figure 9: Earthquakes in Herat, Afghanistan during 01st –31st October 2023.

4) Dissemination Performance:

More than **80%** earthquakes of **M<5.0** and more than **90%** earthquakes of **M \geq 5.0** occurred within India and its neighbourhood region bounded by the coordinates 0-40°N & 60-100°E were

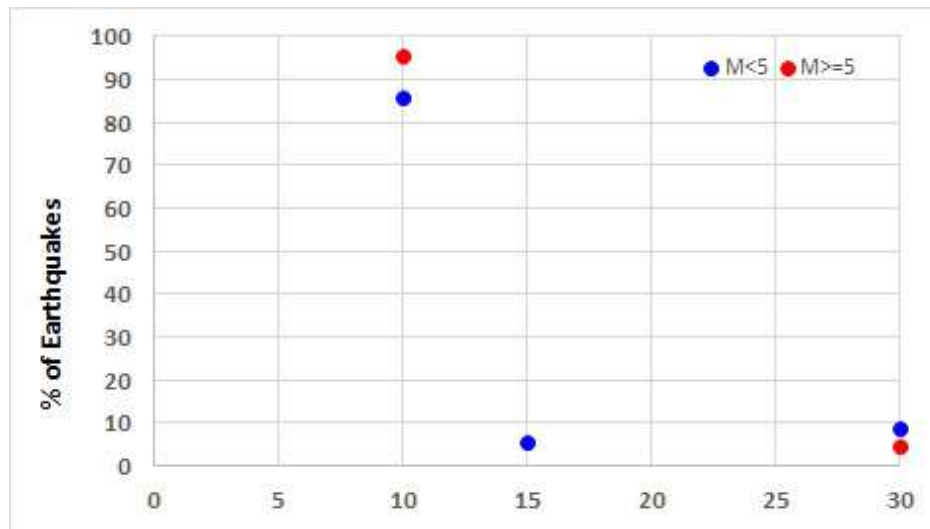


Figure 10: Dissemination of earthquakes within different time ranges (in minutes) during 01st – 31st October 2023.