सत्यमेव जयते

A Preliminary Earthquake Report of November 03, 2023, Karnali provinces, Western Nepal (M 6.4)

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An earthquake of magnitude M 6.4 occurred at 23:32:54 IST, located in the Jajarkot, Karnali province, Western Nepal, whose epicenter at 28.84°N and 82.19°E at a shallow depth of 10 km. The epicenter is 208 Km ESE of Pithoragarh; 317 Km SE of Joshimath; 253 Km NNE of Lucknow and 331 Km WNW of Kathmandu. Two aftershocks of magnitude M 3.5 and 3.8 is also occurred with the 10 Km radius of mainshock. The area is seismically very active associated with collisional tectonics where Indian platesubducts beneath the Eurasian Plate.

The event was well recorded by more than 60 broadband seismic stations installed by National Centre for Seismology. The analysis of seismic data shows that the events are occurred on North Almora Thrust (NAT) that provides a very apt location for triggering the mainshock due to appreciable structural heterogeneity in and around mainshock. The preliminary fault plane solution derived from moment tensor inversion suggests a thrust fault. The earthquake is 50 km NNE of recent M6.3 of 9th Nov 2022 event (**Fig. 1**). Felt reports of maximum Intensity VI (MMI scale) in epicentral region and minimum intensity of II (MMI Scale) have been reported from a distance of around 5 km and 500 km from the epicenter respectively (**Fig. 2**).

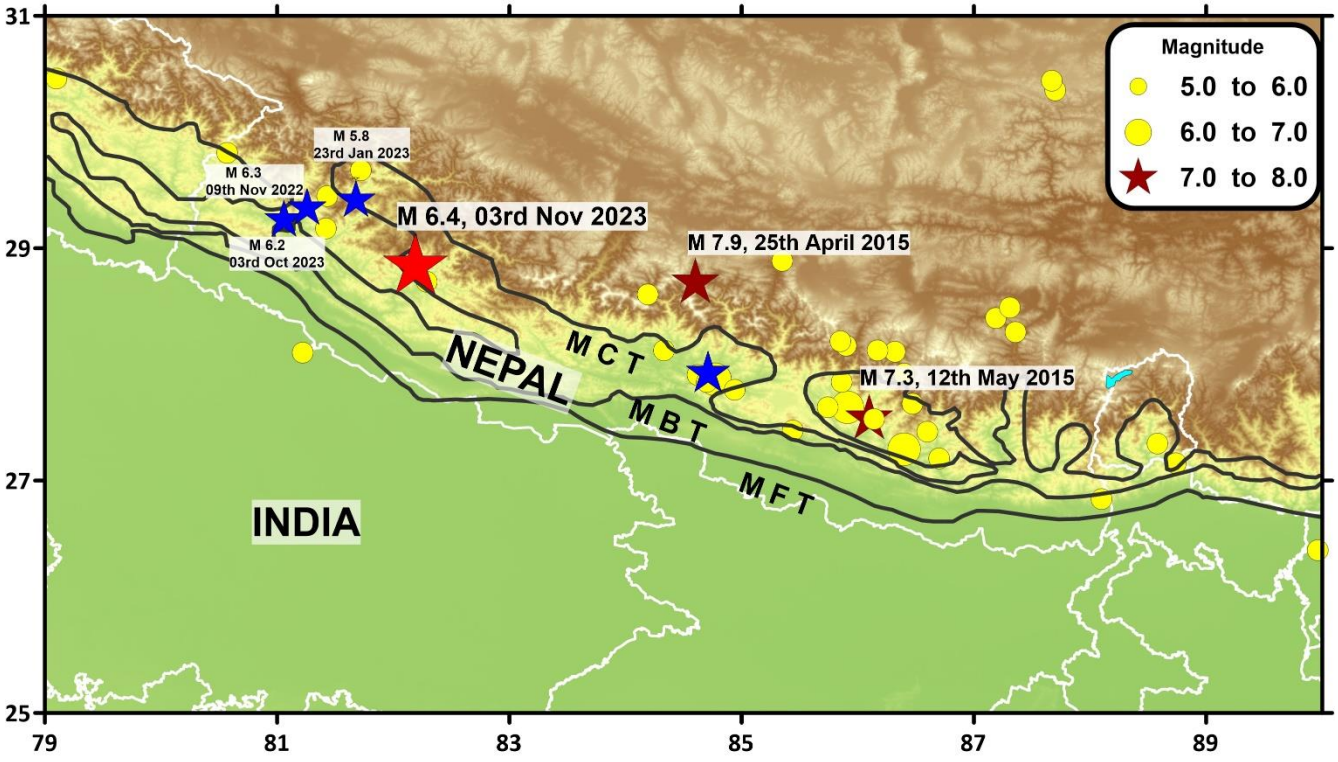

Figure 1: *The present earthquake (M 6.4) of 03rd November 2023 and seismicity (M > 5.0) in the epicentral and surrounding region (yellow star), (source:www.seismo.gov.in; NCS-MoES). The blue stars are the felt earthquake occurred in recent past. The geological faults and lineament were obtained from Bhukosh, GSI.*

The recorded earthquakes as per EQ Catalogue of NCS reveals that the region is associated with moderate to large earthquakes with varying magnitude (Fig.1) in the last 13 years.

In addition to the above, it is noteworthy that prior to the recent earthquake, there were three prominently events recorded on 09th November 2022 of M 6.3, 23th January 2023 of M 5.8 and 3rd October 2023 of M 6.2 occurred Northwest of the recent event. which were also felt with slightto moderate intensity in Delhi-NCR and others neighboring states. The occurrence of earthquakes inthe region is attributed mainly to the tectonic settings of the Himalaya comprising Himalayan FrontalThrust (HFT), Main Boundary Thrust (MBT) and Main Central Thrust (MCT) besides several local faults and geological demarcated lineaments. The preliminary fault plane solution derived from moment tensor inversion suggests a thrust fault.

Felt reports of maximum Intensity of VI (MMI scale) in the epicentral region and minimum intensity of II (MMI Scale) have been reported from a distance of around 500 km from the epicentre (Fig. 2).

Theearthquake is widely felt in Delhi-NCR region and neighboring states (**Fig. 3**). Within one hour morethan ~90 felt reports due to this earthquake, have been received from Delhi, Uttarakhand, Uttar Pradesh,Bihar, Haryana through NCS website and Mobile App having intensity ranging from I to III on Modified Mercalli Intensity (MMI) Scale (**Fig. 4)**.

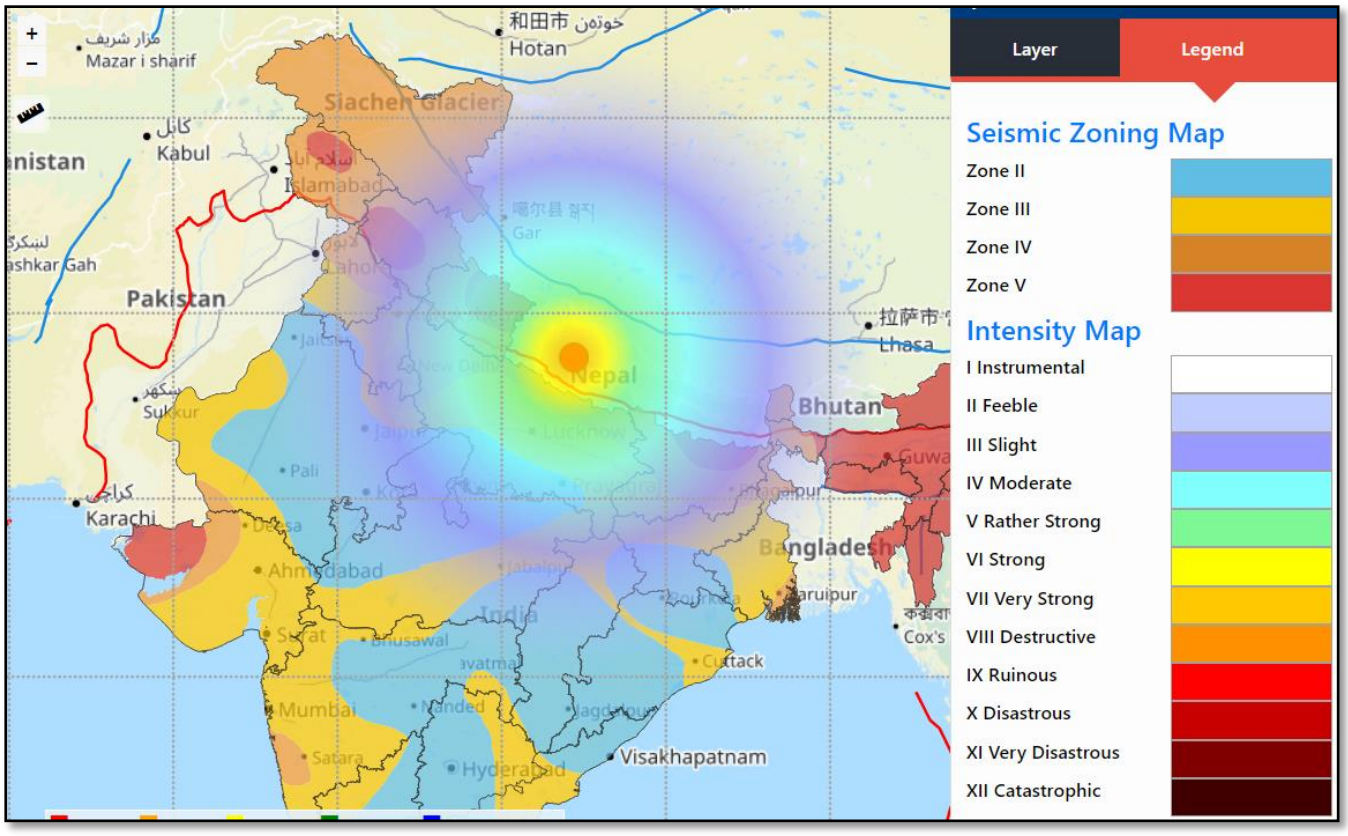

Figure 2: Estimated earthquake Intensity Map *of the earthquake of M:6.4 of 03rd November 2023.*

Figure 3: Felt responses (squares) of the 03rd November 2023 earthquake M:6.4 (circle) from different users reported on www.seismo.gov.in and BhooKamp mobile-app. More than 80 responses were received within one hours from the time of occurrence of earthquake.

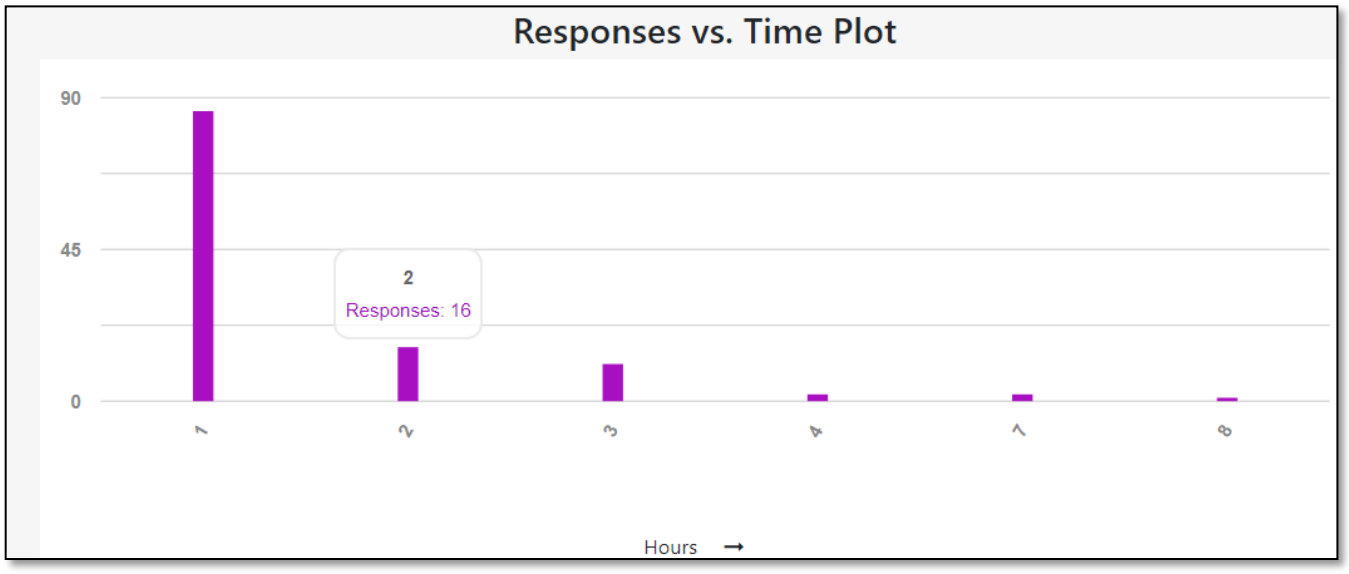

Figure 4: Number of felt responses with respect to time lapses