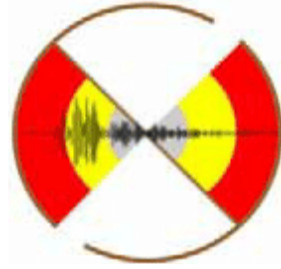




A Preliminary Report of March 21, 2023 Hindu Kush Region, Afghanistan Earthquake (M: 6.6)

(Report No.: NCS-NSN-EPG-05)



National Centre for Seismology
Ministry of Earth Sciences, Government of India
Mausam Bhavan Complex, Lodi Road, New Delhi - 110 003

An earthquake of magnitude M 6.6 occurred at 22:17:27 IST, epicenter at 36.09° N and 71.35° E at a focal depth of 156 km. The epicenter is in Hindu Kush Region, Afghanistan and is 571 Km NW of Alchi; 723 Km NW of Srinagar; and 988 Km NW of Delhi. The area is seismically very active associated with collisional tectonics where Indian plate subducts beneath the Eurasian Plate.

The event was well recorded by more than 100 broadband seismic stations installed by National Centre for Seismology (Figure 1). The analysis of seismic data shows that the event was occurred near the Herat Fault (Figure 2). The preliminary fault plane solution derived from moment tensor inversion suggests that the earthquake is associated with thrust fault mechanism. Felt reports of maximum Intensity V (MMI scale) in epicentral region and minimum intensity of II (MMI Scale) have been reported from around 5 km and 1000 km from the epicenter respectively.

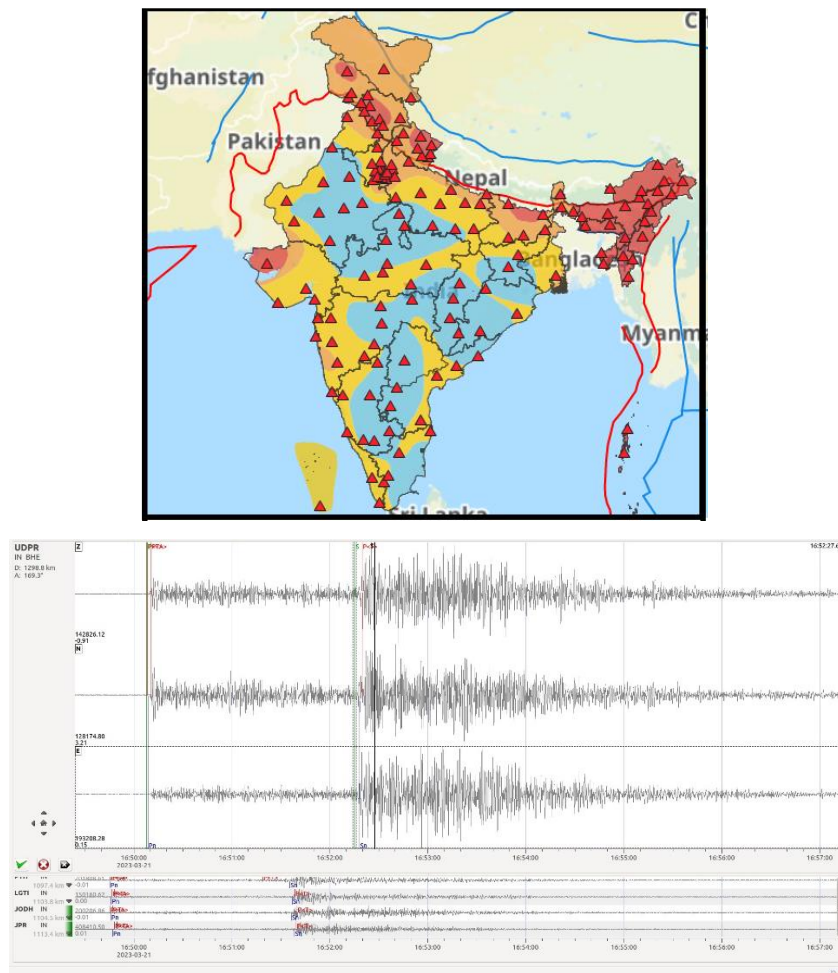


Figure 1: Waveform record of Udaipur seismological observatory

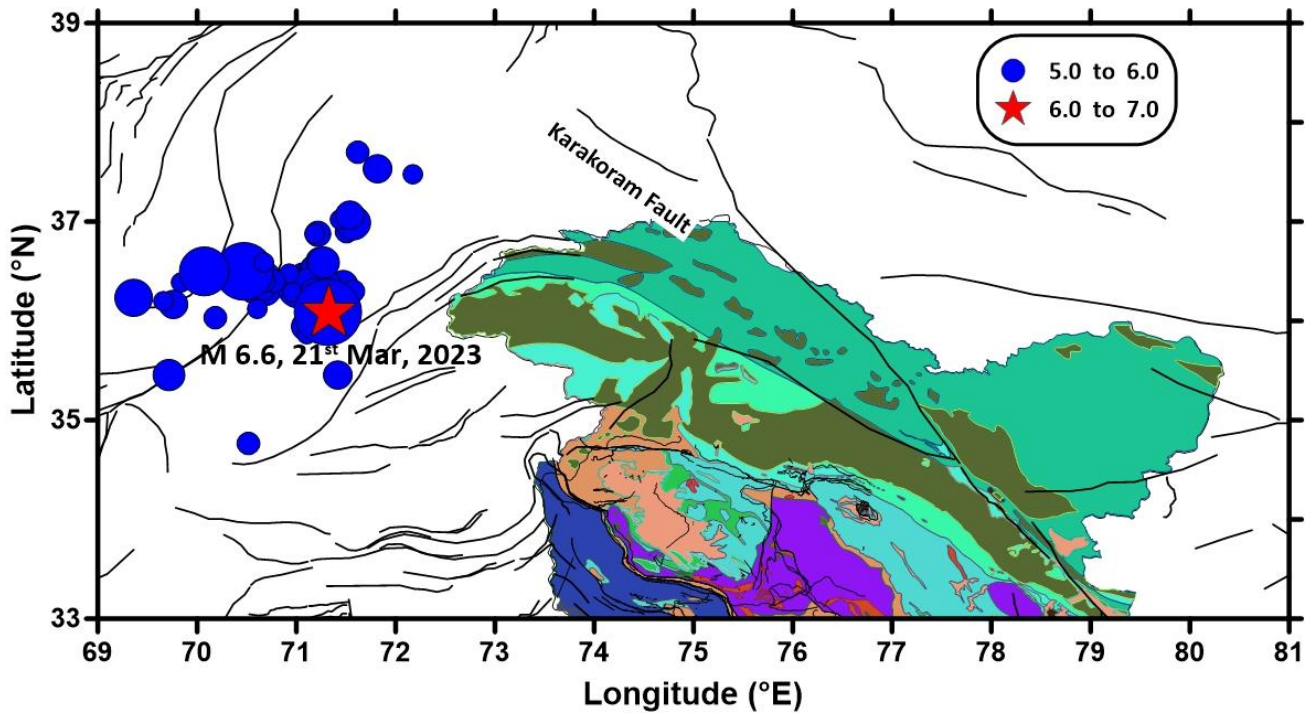


Figure 2: The present earthquake (M 6.6) of 21th March 2023 and the past four years seismicity (21-03-2019 to 21-03-2023) in the epicentral and surrounding region. (source: www.seismo.gov.in; NCS-MoES). The geological faults and lineament were obtained from Bhukosh, GSI. The red triangles represent the location of seismograph stations of NCS.

The recorded earthquakes as per EQ Catalogue of NCS reveals that the region is associated with moderate to large earthquakes with varying magnitude (Fig.2) in the last 4 years (between 21st Mar 2019 and 21th Mar 2023) in and around 200km of the present source zone.

In addition to the above, it is noteworthy that prior to this event, there were an event (M: 6.3) recorded on 20th Dec, 2019 occurred 88 NW of the present event which was felt with slight to moderate intensity. The occurrence of earthquakes in the region is attributed mainly to the tectonic settings of the Himalaya comprising Herat Fault, Himalayan Frontal Thrust (HFT), Main Boundary Thrust (MBT) and Main Central Thrust (MCT) besides several local faults and geological demarcated lineaments.

Expected intensity of this earthquake is assimilated by NCS, MoES as shown in **Figure 3**. The earthquake is widely felt in Delhi-NCR region and neighboring states. More than 70 felt reports due to this earthquake, have been received from Jammu and Kashmir, Delhi, Uttarakhand, Uttar Pradesh, Himachal Pradesh, Rajasthan, Haryana, Punjab, and Gujarat through NCS website and Mobile App having intensity ranging from I to IV on Modified Mercalli Intensity (MMI) Scale (**Figure 4**).

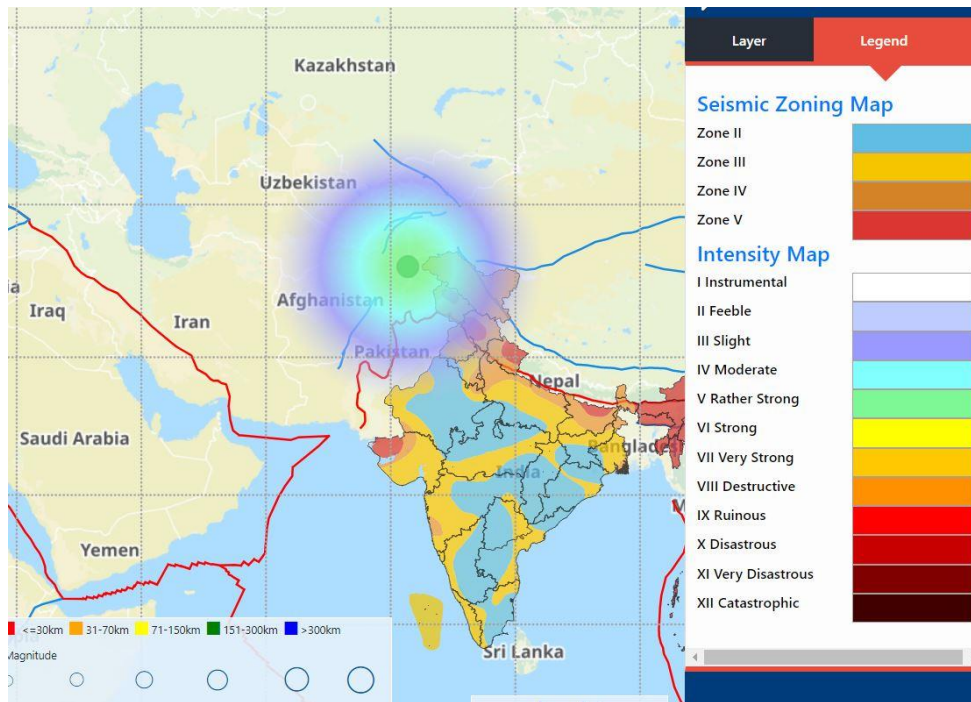


Figure 3: Estimated earthquake Intensity Map of the earthquake of M:6.6 of 21th Mar 2023.

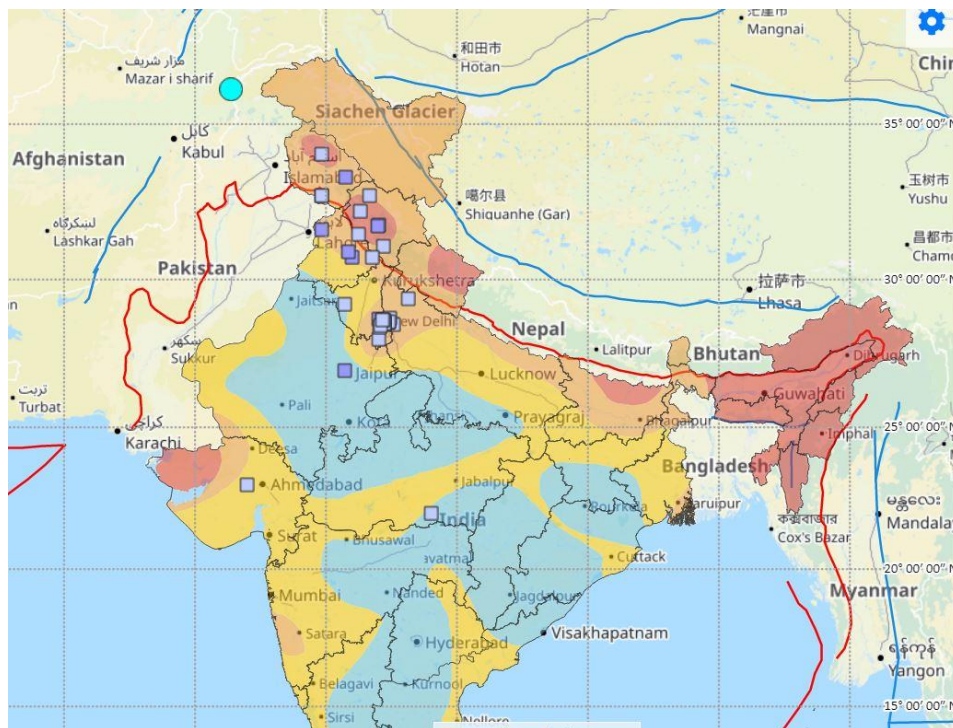


Figure 4: Felt responses (squares) of the 21th March 2023 earthquake M:6.6 (circle) from different users reported on www.seismo.gov.in and BhooKamp mobile-app. More than 70 responses were received within one hour from the time of occurrence of the earthquake.

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