भारत सरकार
GOVERNMENT OF INDIA
राष्ट्रीय भूकम्प विज्ञान केन्द्र
NATIONAL CENTER FOR SEISMOLOGY
पृथ्वी विज्ञान मंत्रालय
MINISTRY OF EARTH SCIENCES

# Report on Earthquake sequence in Andaman & Nicobar Islands Region

The Andaman & Nicobar region is situated between latitude 6° - 14°N and longitude 92°-94°E (Fig. 1). The region represents a complex topography comprising a volcanic arc system, back-arc spreading ridge, several sea-mounts and faults. A NE-SW trending spreading system, Andaman trench, West Andaman fault (WAF), Sumatra fault system, Eastern margin fault, Diligent Fault are the main active tectonic features in and around the A&N region. The region has been placed in Zone-V, the highest level of seismic hazard potential, according to the seismic zonation map of India (Bureau of Indian Standards (BIS), 2016).

## Earthquake swarm history and the present earthquake sequence of the Andaman Sea

The back-arc basin in the Andaman Sea region has experienced several swarm as well aftershocks activity in the past five decades with varying depth and magnitude. The present earthquake activity is not unusual and witnessed such activity in the past.

Three major phases of swarm activities, namely, during 1983–1984, 1993 and 2005 and major aftershocks activity of 2009-2010 has been reported. The 1983–1984 swarm consisted of about 50 seismic events ($3.5 < Mw < 5.5$). During the period of December 1983 to March 1984, the swarm clustered along the eastern side of the Alcock Rise (at around 12°N and 95° E) on the NE-SW oriented ASR. The 1993 swarm included only about 35 seismic events ($3.5 < Mw < 5$) that were clustered at the southwest segment of the central Andaman Spreading Ridge (ASR) (at about 10°N and 94.2°E). During the period of 26 January 2005 to 2 February 2005, the most intensive aggregate earthquake swarm called Nicobar cluster consisted of about 400 events of $3.9 < Mw < 5.9$ occurred in the Andaman Sea, the back-arc region of Sumatra- Andaman subduction zone, between the Car-Nicobar and Great Nicobar Islands of India (at about 8°N and 94°E). There are also some major Aftershocks activities during the period from June-Nov 2008, Aug 2009 to

June 2010 occurred at Andaman Trench and Andaman spreading Ridge, indicating the continuous release of seismic strain in the region from time to time.

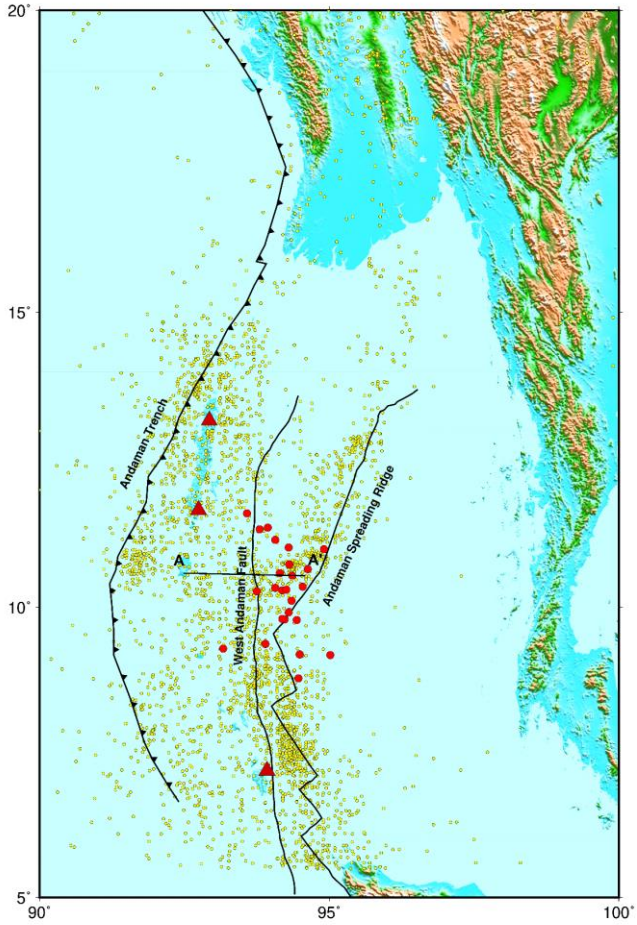


**Figure1.** The present earthquake sequence shown in Red color whereas past earthquake (1960-2021) shown in Yellow color. The Triangle shows the location of seismic station of National Centre for Seismology (NCS), New Delhi.

## Analysis of Seismological data

The recently occurred sub-oceanic earthquakes for the last 2-days were analyzed and found the distribution of earthquake epicentres are well corroborated with seismo-tectonic settings of the Andaman-Nicobar region as shown in Fig. 1.

The continuous occurrences of earthquakes in the magnitude range varying between M:3.8 and M:5.0 suggest the release of accumulated seismic strain due to the perturbation of the stress level in the areas of the subducting Indian plate and its surroundings.

**The salient features of recent activity are:**

- A total of 25 events of magnitude range between 3.8 and 5.0 during 4th and 5th July 2022 **(Table 1).**
- The epicentral locations of the earthquakes lies between West Andaman Fault (WAF) and Andaman Spreading Ridge (ASR) (Fig. 1).
- The present activity is adjacent to north of Nicobar swarm in year 2005.
- Most of the earthquakes show strike-slip and Normal faulting.
- The depth distribution of 2022 earthquakes sequence suggests that event is mostly concentrated at mid crustal depth and along back-arc spreading as shown in Fig. 2.

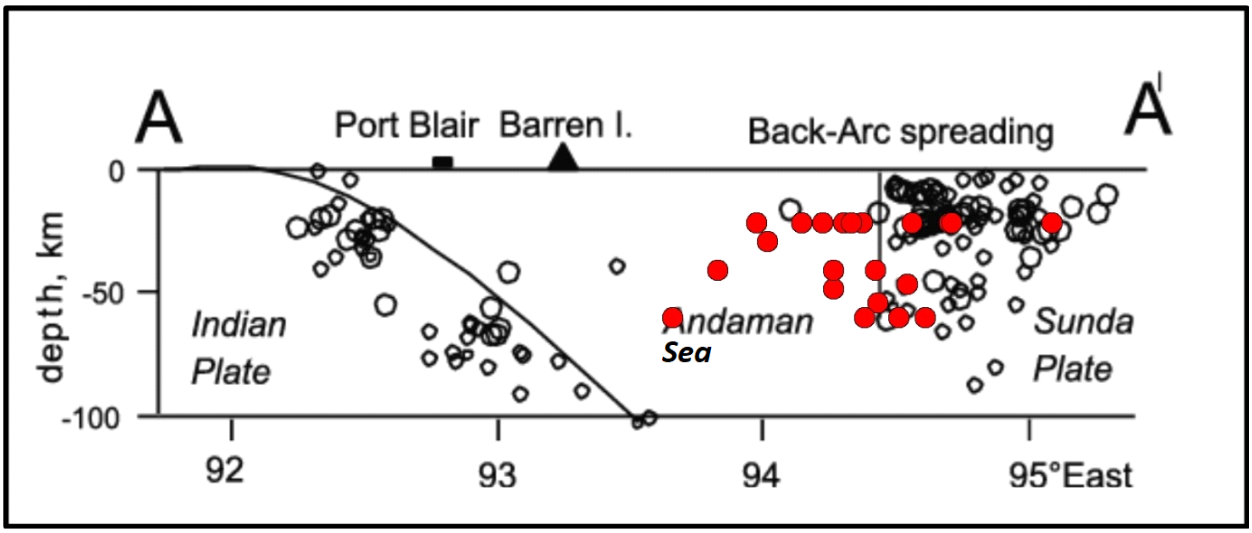


**Figure 2.** The Depth profile of the recent earthquake sequence (Red circles) and past earthquake (black open circles).

**Table1.** *Earthquakes occurred in Andaman Sea region during 4 to 5 July 2022*

| S.No | Origin Time (IST) | Longitude ( degree E) | Latitude (degree N) | Magnitude | Depth (km) |
|---|---|---|---|---|---|
| 1. | 2022-07-05 11:36:31 | 93.80 | 11.33 | 5.0 | 32 |
| 2. | 2022-07-05 08:05:04 | 93.75 | 10.27 | 4.3 | 30 |
| 3. | 2022-07-05 05:57:04 | 94.36 | 10.54 | 5.0 | 44 |
| 4. | 2022-07-05 04:45:07 | 94.47 | 8.78 | 4.5 | 36 |
| 5. | 2022-07-05 02:54:49 | 94.35 | 10.11 | 4.4 | 30 |
| 6. | 2022-07-05 02:34:10 | 93.94 | 11.36 | 4.4 | 18 |
| 7. | 2022-07-05 02:13:44 | 94.49 | 9.19 | 4.4 | 10 |
| 8. | 2022-07-05 01:48:12 | 94.23 | 9.79 | 4.4 | 10 |
| 9. | 2022-07-05 01:30:41 | 93.90 | 9.37 | 4.5 | 10 |
| 10. | 2022-07-05 01:07:05 | 94.19 | 9.80 | 4.5 | 38 |
| 11. | 2022-07-05 00:46:59 | 94.31 | 10.73 | 4.3 | 50 |
| 12. | 2022-07-05 00:03:30 | 94.19 | 10.29 | 4.6 | 30 |
| 13. | 2022-07-04 23:37:53 | 93.17 | 9.29 | 4.1 | 40 |
| 14. | 2022-07-04 23:34:50 | 94.91 | 10.99 | 4.2 | 45 |
| 15. | 2022-07-04 23:01:27 | 94.63 | 10.65 | 4.4 | 10 |
| 16. | 2022-07-04 19:49:42 | 94.44 | 9.78 | 4.3 | 50 |
| 17. | 2022-07-04 17:50:42 | 94.54 | 10.35 | 4.4 | 50 |
| 18. | 2022-07-04 17:18:24 | 94.07 | 11.15 | 4.6 | 10 |
| 19. | 2022-07-04 15:39:25 | 93.58 | 11.60 | 3.8 | 50 |
| 20. | 2022-07-04 15:25:24 | 94.07 | 10.33 | 4.6 | 10 |
| 21. | 2022-07-04 15:02:41 | 94.30 | 9.91 | 4.4 | 10 |
| 22. | 2022-07-04 14:37:07 | 94.30 | 11.02 | 4.7 | 10 |
| 23. | 2022-07-04 14:06:23 | 94.15 | 10.58 | 4.6 | 10 |
| 24. | 2022-07-04 13:55:31 | 94.26 | 10.30 | 4.5 | 10 |
| 25. | 2022-07-04 11:05:42 | 95.02 | 9.18 | 4.4 | 10 |