

# Occurrence of earthquake in the vicinity of Bangladesh from 2001-2024: Implications for disaster management and preparedness

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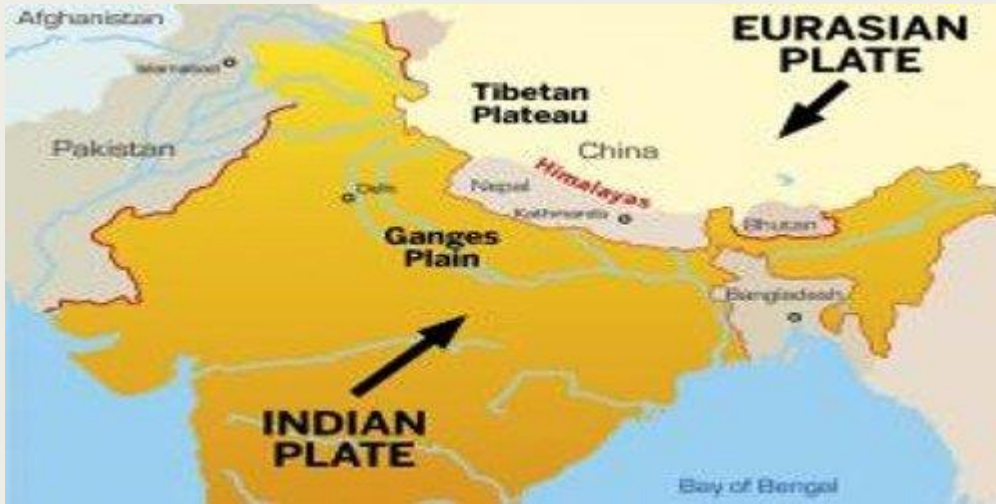


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## INTRODUCTION AND MAIN RESULTS

This poster presentation highlights the potential risks of the deadly catastrophe, Earthquake in Bangladesh. An earthquake distribution map was prepared using earthquake occurrence data of the last two decades from the United States Geological Survey (USGS) Earthquake Catalogue. These data will contribute to different awareness raising activities of Department of Environmental Science and Disaster Management, DIU in collaboration with CTBTO NDC-BD.

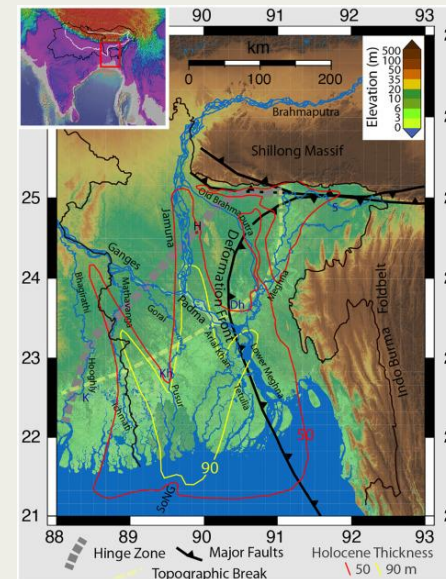
## Introduction



**Figure:** Tectonic map of Bengal Basin  
[https://en.banglapedia.org/index.php/Tectonic\\_Framework](https://en.banglapedia.org/index.php/Tectonic_Framework).

- Bangladesh, a major part of the Bengal Basin, is an Earthquake prone country due to its location at the junction of two major tectonic plates.
- In Bangladesh, earthquake counting as one of the hidden disasters as the country is tectonically located at the junction of three tectonic plates (Eurasian, Burma and Indian plate).

The complicated geology of this basin is responsible for occurring several major and minor earthquakes in Bangladesh and its adjacent areas.



**Figure:** Location map of Bangladesh and the Ganges Brahmaputra Delta showing major tectonic and sedimentary boundaries, and significant rivers (Steckler *et al.*, 2022).

To understand the risks of earthquakes in Bangladesh, an earthquake map was prepared using earthquake data from January, 2001 to December 2024. Earthquake data used in this study was collected from the United States Geological Survey (USGS) Earthquake Catalogue.



## **Data Collection and Sources**

Earthquake data used in this study was collected from the United States Geological Survey (USGS) Earthquake Catalogue. Data Parameters were represented by date, time, latitude, longitude, depth, magnitude and description of seismic events. In this research, only earthquakes of 4.0 or above magnitude were considered, which caused significant seismic activity in and around Bangladesh. The geographic context was added by downloading administrative boundary shapefiles for Bangladesh from publicly available repositories like GADM and Natural Earth.

## **Data Pre-processing**

The dataset was pre-processed before visualisation to ensure it had the correct format. A careful inspection of the raw dataset concerning missing values, duplicates, and outliers was performed and any incomplete records were eliminated from the study in order to ensure data integrity. The earthquake events have been projected into the WGS 1984 Geographic Coordinate System to ensure spatial compatibility with the other geographic data layers, enabling their analysis and integration into broader research activities. Been divided the way we want and made some colour codes where 4.0 to 4.2, 4.2 to 4.4, 4.4 to 4.6, 4.6 to 4.9 and 4.9 to 6.2 in magnitude. The combination of these steps made sure the dataset was well-suited for mapping and analysis.

## **Visualisation and Mapping**

The processed data from the previous step was imported to ArcMap 10.8 for visualization and analysis, upon a structured workflow. The first step was converting the earthquake data to a point feature layer based on latitude and longitude coordinates and then including the administrative boundaries of Bangladesh to provide a base map for understanding where the earthquakes occurred in the country.



## Results & Discussions

During 2001 to 2024 more than 600 earthquakes were recorded in and around Bangladesh territory. The Eastern part of Bangladesh is identified as the earthquake prone area and the frequency also increased in recent time.

**Blue = 3.5-4.4, 450 Earthquakes**

**Yellow = 4.5-5, 170 Earthquakes**

**Orange = 5.5-6.4, 13 Earthquakes**

**Red = 6.5-7.5, 1 Earthquake**

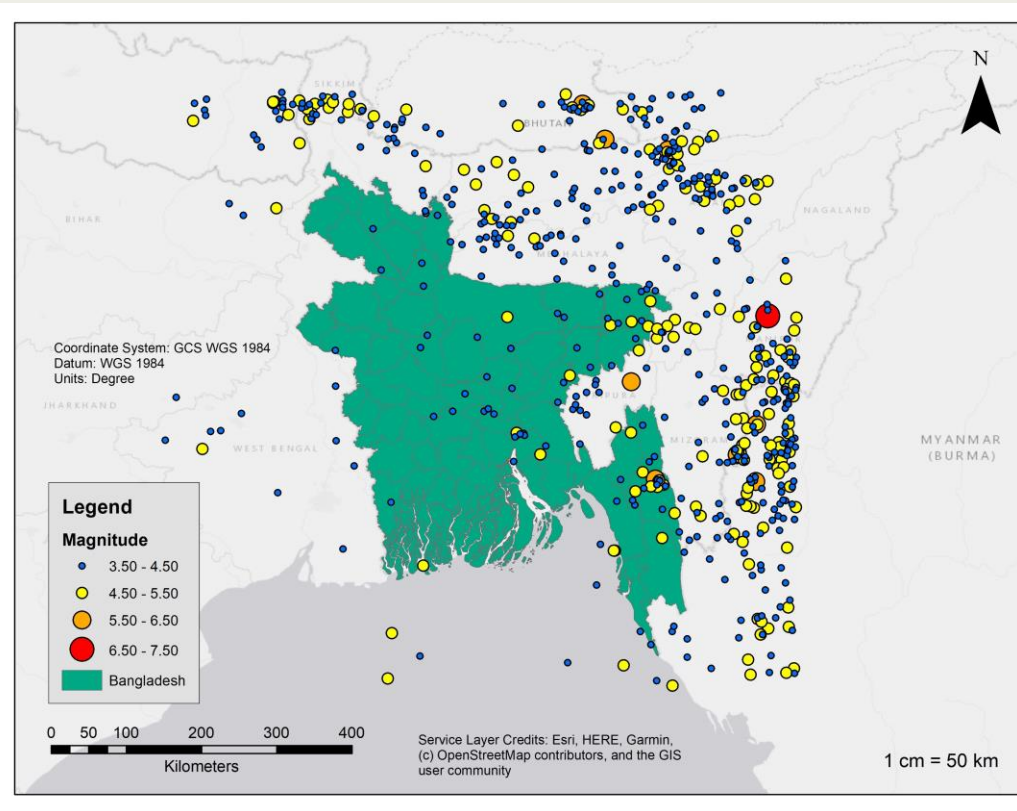


Figure shows the Earthquake occurred in the vicinity of Bangladesh from 2001-2024. Graduated symbols were used to display earthquake events, with colour indicating a magnitude range

## Conclusion

To reduce the risks of earthquake, different awareness raising activities can be introduced by the department of Environmental Science and Disaster Management, DIU in collaboration with the NDC of CTBTO, Bangladesh.