Türkiye, situated on the highly active Mediterranean-Alpine-Himalayan seismic belt (Box 1), is susceptible to frequent powerful earthquakes. This newsletter presents an overview of earthquake data and their impact on the country over the last century.

Earthquakes can have devastating consequences worldwide, as reported by EM-DAT. Since 1900, the five most destructive earthquakes have resulted in the loss of approx. one million lives (see Table 1).

Certain countries are particularly susceptible to earthquakes, especially if they are located on active fault lines. From 1900 to 2020, Türkiye experienced 1,796 potentially damaging earthquakes, i.e., quakes of a magnitude five or higher, indicating the region’s active seismicity. In Türkiye, earthquakes are among the most devastating disasters, accounting for over 60% of all disaster-related fatalities.

A recent tragedy that began on February 6, 2023 with two powerful earthquakes measuring 7.8 and 7.5 on the moment magnitude scale (Mw, Box 1), resulted in the loss of 50,783 lives (Box 2, Fig. 1, Table 2). These quakes affected 11 provinces and impacted approximately 14 million people, which represents 16.4% of the total population. Aftershocks are ongoing and will likely continue to occur for months if not years.

**Box 2: Earthquakes in Türkiye in 2023**

On 06.02.2023, two powerful earthquakes of a magnitude Mw 7.8 and Mw 7.5 struck Pazarık (Kahramanmaraş) and Elbistan (Kahramanmaraş), respectively. These earthquakes were strongly felt in several provinces, causing extensive damage and loss of life. An area of 108,812 km² spanning 11 provinces in the Eastern and Southeastern Anatolia Region was affected, compelling three million individuals to evacuate their homes (see Fig. 2). Informal settlements now house around 1.6 million people. Moreover, approximately 800,000 people were residing in officially structured temporary sites as of June 2023.

**Table 1. The Deadliest Earthquakes Worldwide (1900-2022)**

<table>
<thead>
<tr>
<th>Date</th>
<th>Country</th>
<th>Magnitude*</th>
<th>N° of Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>28 Jul 1976</td>
<td>China</td>
<td>7.8</td>
<td>242,000</td>
</tr>
<tr>
<td>12 Jan 2010</td>
<td>Haiti</td>
<td>7.0</td>
<td>222,570</td>
</tr>
<tr>
<td>16 Dec 1920</td>
<td>China</td>
<td>8.3</td>
<td>180,000</td>
</tr>
<tr>
<td>26 Dec 2004</td>
<td>Indonesia**</td>
<td>9.1</td>
<td>165,708</td>
</tr>
<tr>
<td>01 Sep 1923</td>
<td>Japan</td>
<td>7.9</td>
<td>143,000</td>
</tr>
</tbody>
</table>

* Moment Magnitude scale (Mw)
** Indian Ocean tsunami affecting 12 countries with a total of 226,408 deaths

**Table 2. The Deadliest Earthquakes in Türkiye (1900 - August 2023)**

<table>
<thead>
<tr>
<th>Date</th>
<th>Province</th>
<th>Magnitude*</th>
<th>N° of Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>06 Feb 2023</td>
<td>Kahramanmaraş</td>
<td>7.8 &amp; 7.5</td>
<td>50,783</td>
</tr>
<tr>
<td>26 Dec 1939</td>
<td>Erzincan</td>
<td>7.8</td>
<td>32,700</td>
</tr>
<tr>
<td>17 Aug 1999</td>
<td>Kocaeli</td>
<td>7.6</td>
<td>17,118</td>
</tr>
<tr>
<td>24 Nov 1976</td>
<td>Van</td>
<td>7.0</td>
<td>5,000</td>
</tr>
<tr>
<td>26 Nov 1943</td>
<td>Samsun</td>
<td>7.5</td>
<td>4,020</td>
</tr>
</tbody>
</table>

* Moment Magnitude scale (Mw, Box 1)
CRED Updates and Recent Publications

• M. Tonnelier (CRED) has been accepted by the ‘Fonds Spéciaux de Recherche (FSR)’ for her PhD project: Disability-Adjusted Life Years due to disasters: the Health Burden of Disasters, a composite indicator for measuring post-disaster mortality and morbidity.


• UCLouvain received the Africa-Europe CoRE award, a partnership between ARUA and The Guild of European Universities. The “Africa-Europe Cluster for Pandemics and Shocks” will be led by Rhoda Wanyenze from Makerere University and Niko Speybroeck from UCLouvain.

• The EM-DAT Public Data Portal received an update on September 26, 2023, which includes a new documentation website.

Analysis & Writing: Cagri Ozbeyaz*, Cinzia Lanfredi Sofia, Metin Hasde, Damien Delforge, Regina Below, Ilan Noy, Bishal Raj Gurung, Aleeza Wilkins, Lindsay Davis, Niko Speybroeck. * This newsletter is based on a report prepared by Cagri Ozbeyaz during his internship at CRED-UCLouvain.

EM-DAT: The BHA/CRED International Disaster Database. Data are subject to change, for enquiries: contact@emdat.be

Centre for Research on the Epidemiology of Disasters (CRED), Institute of Health & Society (IRSS), UCLouvain

Reviewed Sources

We collated data from multiple sources, including the NCEI/WDS Global Significant Earthquake Database, covering earthquake activity from 2150 BC to now. We also consulted Bogazici University's Kandilli Observatory and the Earthquake Research Institute database, focusing on major earthquakes in the region. Additionally, data provided by The Republic of Türkiye's Ministry of Interior through their Disaster and Emergency Management Presidency were incorporated, specifically concerning earthquakes causing casualties and property damage.3

Results

Between 1900 and 2022, Türkiye experienced a total of 90 earthquakes classified as disasters according to the inclusion criteria used in EM-DAT.6 These earthquakes led to 96,721 fatalities (see Fig. 2 and Table 2). Notable seismic events during this period include the Burdur earthquake in 1914, the Erzincan earthquake in 1939, and the Kocaeli earthquake in 1999, each causing significant loss of life. The Eastern Anatolia Region faced the highest number of deaths during this period, accounting for about 60% of total fatalities.3

Conclusions

Türkiye’s geographical location in a seismically active region poses a considerable risk to its population. Due to its proximity to the Eastern Anatolian and Northern Anatolian Fault Lines, the Eastern Anatolia Region is especially vulnerable. The recent devastating earthquakes in February 2023 have been among the deadliest earthquakes in Türkiye’s history.

References

3. The Republic of Türkiye, Ministry of Interior, The Disaster and Emergency Management Presidency (Turkish: Afet ve Acil Durum Yönetimi Başkanlığı, also abbreviated as AFAD), Official Data
4. The Republic of Türkiye, Ministry of Interior, The Disaster and Emergency Management Presidency (Turkish: Afet ve Acil Durum Yönetimi Başkanlığı, also abbreviated as AFAD), Overview of 2019 and Statistics of Natural Events within the Scope of Disaster Management (in Turkish)

Fig. 2. Total Number of Deaths Due to Earthquakes, Classified According to EM-DAT Criteria As Disasters, by Regions in Türkiye Between 1900 and 2022