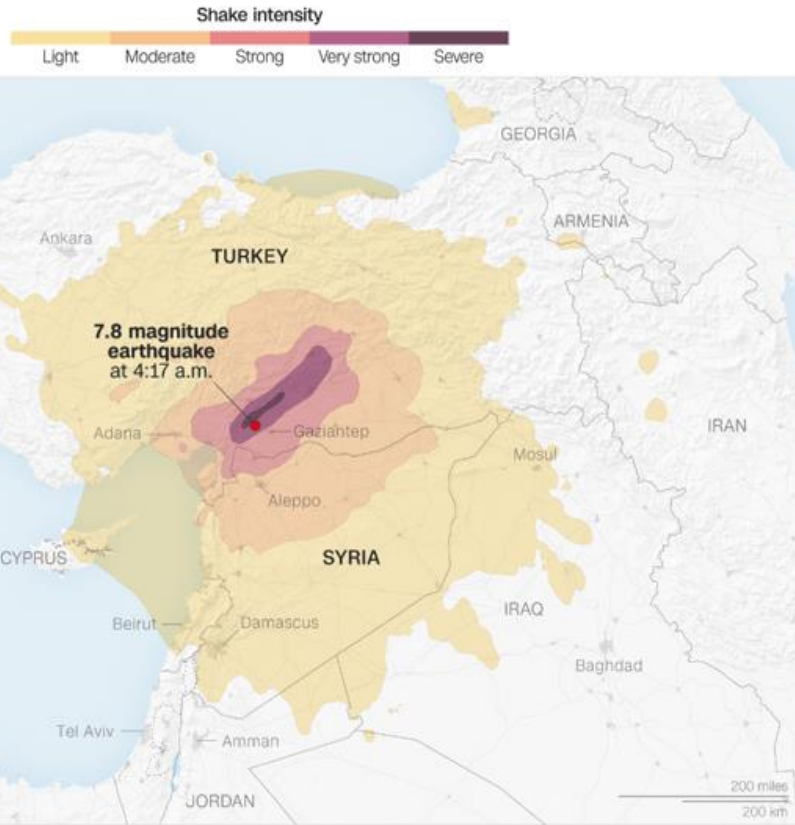




Report on Turkey-Syria Earthquakes



Sources: US Geological Survey, LandScan | Graphic: Henrik Pettersson, CNN

Figure 1. Epicenter map of the Turkey-Syria Earthquakes
<https://edition.cnn.com/2023/02/06/world/turkey-syria-earthquake-epicenter-maps-dg/index.html>

Basic Information

Occurrence Date: 06 February 2023
 Magnitude: 7.8
 Epicenter: Nurdağı, Gaziantep Province, Turkey

Impacts	Turkey	Syria
Est. No. of People Killed	50,090	7,250
Est. No. of People Injured	115,000	14,500
Est. No. of People Homeless	1.5 million	5.3 million
Est. Economic Damage	USD100 billion	USD 5.1 billion

Source: (USGS, 2023)
<https://earthquake.usgs.gov/earthquakes/eventpage/us6000jllz/impact>

GLIDE Number: [EQ-2023-000015-TUR](https://glidenumber.net/glide/public/search/details.jsp?glide=22790&record=34&last=7772)
<https://glidenumber.net/glide/public/search/details.jsp?glide=22790&record=34&last=7772>

GLIDE Number: [EQ-2023-000015-SYR](https://glidenumber.net/glide/public/search/details.jsp?glide=22791)
<https://glidenumber.net/glide/public/search/details.jsp?glide=22791>

Background

- Turkey joined ADRC in 2018 with AFAD (Disaster and Emergency Management Presidency under the Ministry of Interior, <https://en.afad.gov.tr/>) as counterpart
- On 6 February 2023, ADRC (on behalf of AFAD) made an *emergency observation request* at Sentinel Asia (<https://sentinel-asia.org/index.html>)
- On the same day, Sentinel Asia activated the request, and emergency observation satellite images were made available online: <https://sentinel-asia.org/EO/2023/article20230206TR.html>
- ADRC issued a GLIDE number for the earthquakes in Turkey ([EQ-2023-000015-TUR](#)) as well as for the earthquakes in Syria ([EQ-2023-000015-SYR](#)) so that all information of this event are integrated
- On 11 March 2023, **preliminary data on the impacts** were presented at the Asian Conference on Disaster Reduction (ACDR2022) – an annual event organized by ADRC – in Sendai, Japan

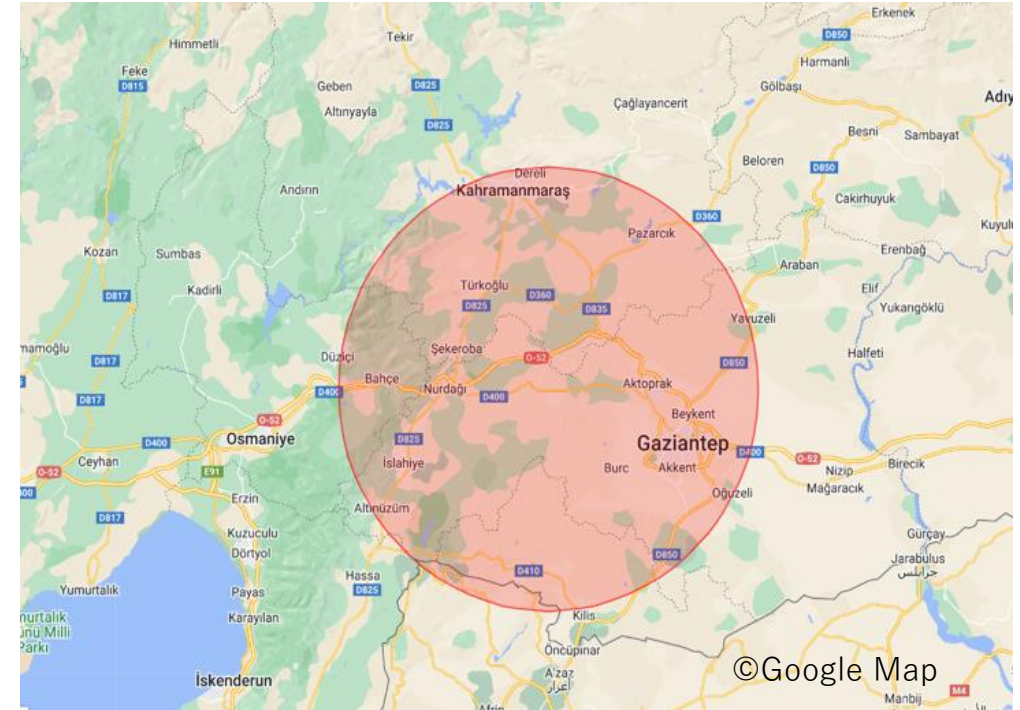
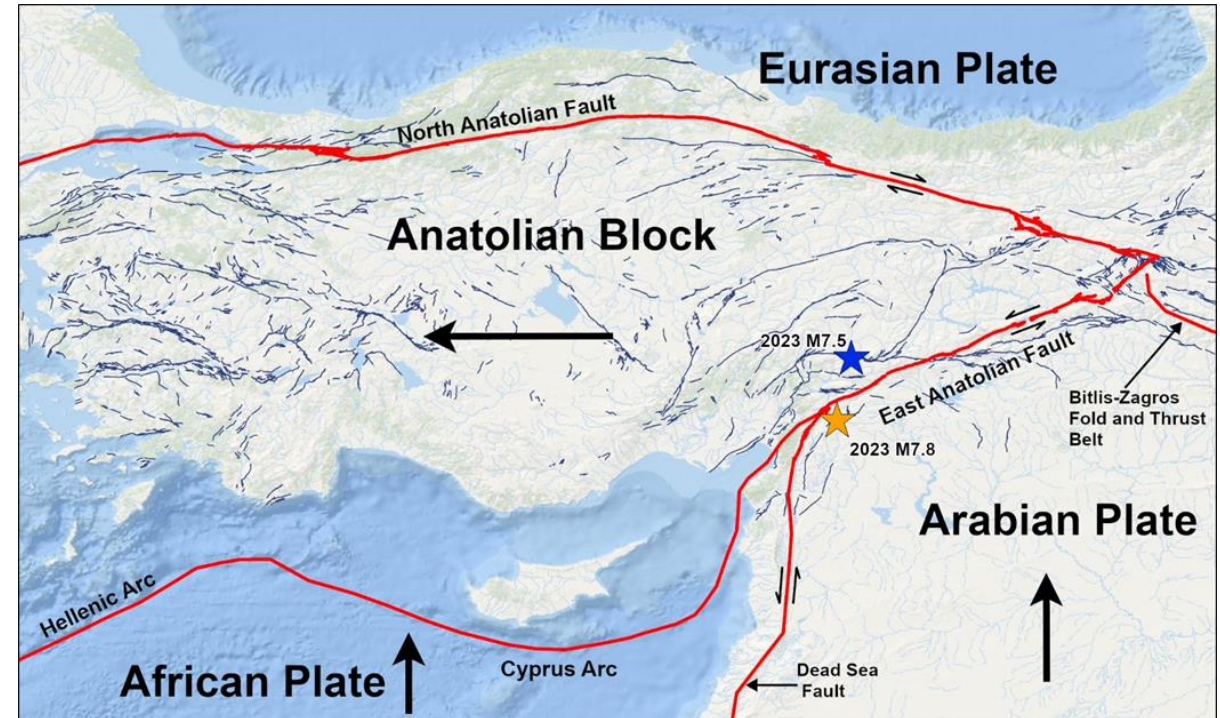


Figure 2. Turkey Earthquakes, 6 February 2023 (Sentinel Asia, 2023)
<https://sentinel-asia.org/EO/2023/article20230206TR.html>

Tectonic Summary

- The preliminary location of the earthquake places it within the vicinity of a triple-junction between the Anatolia, Arabia, and Africa plates.
- The mechanism and location of the earthquake are consistent with the earthquake having occurred on either the East Anatolia fault zone or the Dead Sea transform fault zone.
- The East Anatolia fault accommodates the westward extrusion of Turkey into the Aegean Sea, while the Dead Sea Transform accommodates the northward motion of the Arabia peninsula relative to the Africa and Eurasia plates.



Source: USGS, 2023

<https://earthquake.usgs.gov/storymap/index-turkey2023.html>

Source: USGS, 2023



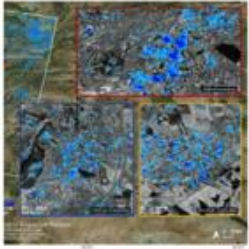

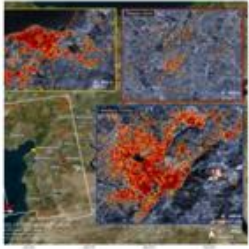



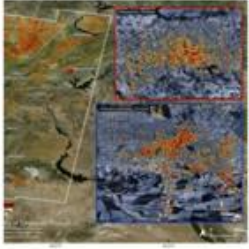

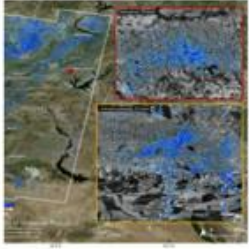

<https://earthquake.usgs.gov/earthquakes/eventpage/us6000jllz/executive>

Emergency Observation Satellite Imageries

Satellite imageries of the 2023 Earthquakes in Turkey can be viewed and downloaded on the Sentinel Asia website.

** 71 products (analyzed map) and 107 satellite images are provided by Sentinel Asia members (as of 6 April 2023)*

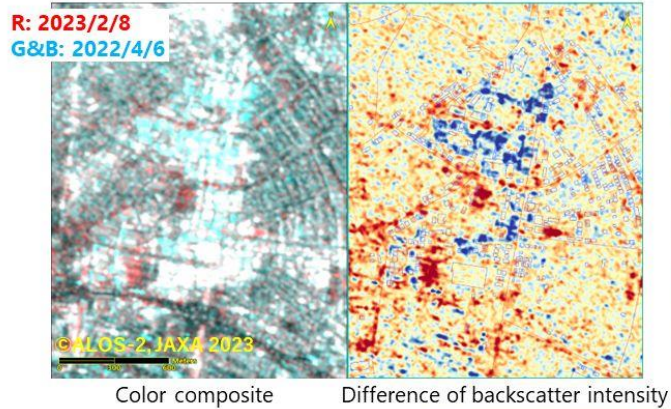
EOS

					
2023-02-13 EOS-RS Damage Proxy Map: Turkey and Syria, Earthquake, 8 Feb 2023, v1.2	2023-02-13 EOS-RS Damage Proxy Map: Turkey and Syria, Earthquake, 8 Feb 2023, v1.2	2023-02-13 EOS-RS Damage Proxy Map: Turkey and Syria, Earthquake, 8 Feb 2023, v1.2	2023-02-13 EOS-RS Damage Proxy Map: Turkey and Syria, Earthquake, 8 Feb 2023, v1.2	2023-02-13 EOS-RS Damage Proxy Map: Turkey and Syria, Earthquake, 9 Feb 2023, v1.2	2023-02-13 EOS-RS Damage Proxy Map: Turkey and Syria, Earthquake, 9 Feb 2023, v1.2
DOWNLOAD VIEW	DOWNLOAD	DOWNLOAD VIEW	DOWNLOAD	DOWNLOAD VIEW	DOWNLOAD
					
2023-02-13 EOS-RS Damage Proxy Map: Turkey and Syria, Earthquake, 9 Feb 2023, v1.2	2023-02-13 EOS-RS Damage Proxy Map: Turkey and Syria, Earthquake, 9 Feb 2023, v1.2	2023-02-14 EOS-RS Damage Proxy Map: Turkey and Syria, Earthquake, 9 Feb 2023, v1.2	2023-02-14 EOS-RS Damage Proxy Map: Turkey and Syria, Earthquake, 9 Feb 2023, v1.2	2023-02-14 EOS-RS Damage Proxy Map: Turkey and Syria, Earthquake, 9 Feb 2023, v1.2	2023-02-14 EOS-RS Damage Proxy Map: Turkey and Syria, Earthquake, 9 Feb 2023, v1.2
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satellite images

<https://sentinel-asia.org/EO/2023/article20230206TR.html>

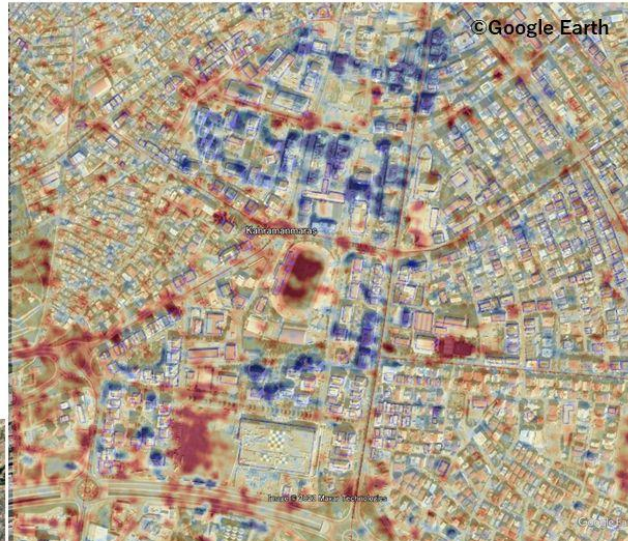
Utilization of satellite imageries for disaster response



2023 Turkey earthquake

Location: Kahramanmaraş City, Turkey
Sensors: ALOS-2 PALSAR-2

Comparison of backscatter intensity difference and color composite (HH polarization). The buildings with the decrease of backscatter intensity (blue color) may be collapsed. Red color in open space and gymnasium may be caused by evacuation. The red lines are city blocks and blue polygons are buildings, downloaded from the OpenStreetMap. ALOS-2 images were owned by JAXA (6.25m/pixel).



Chiba University

products (analyzed map)

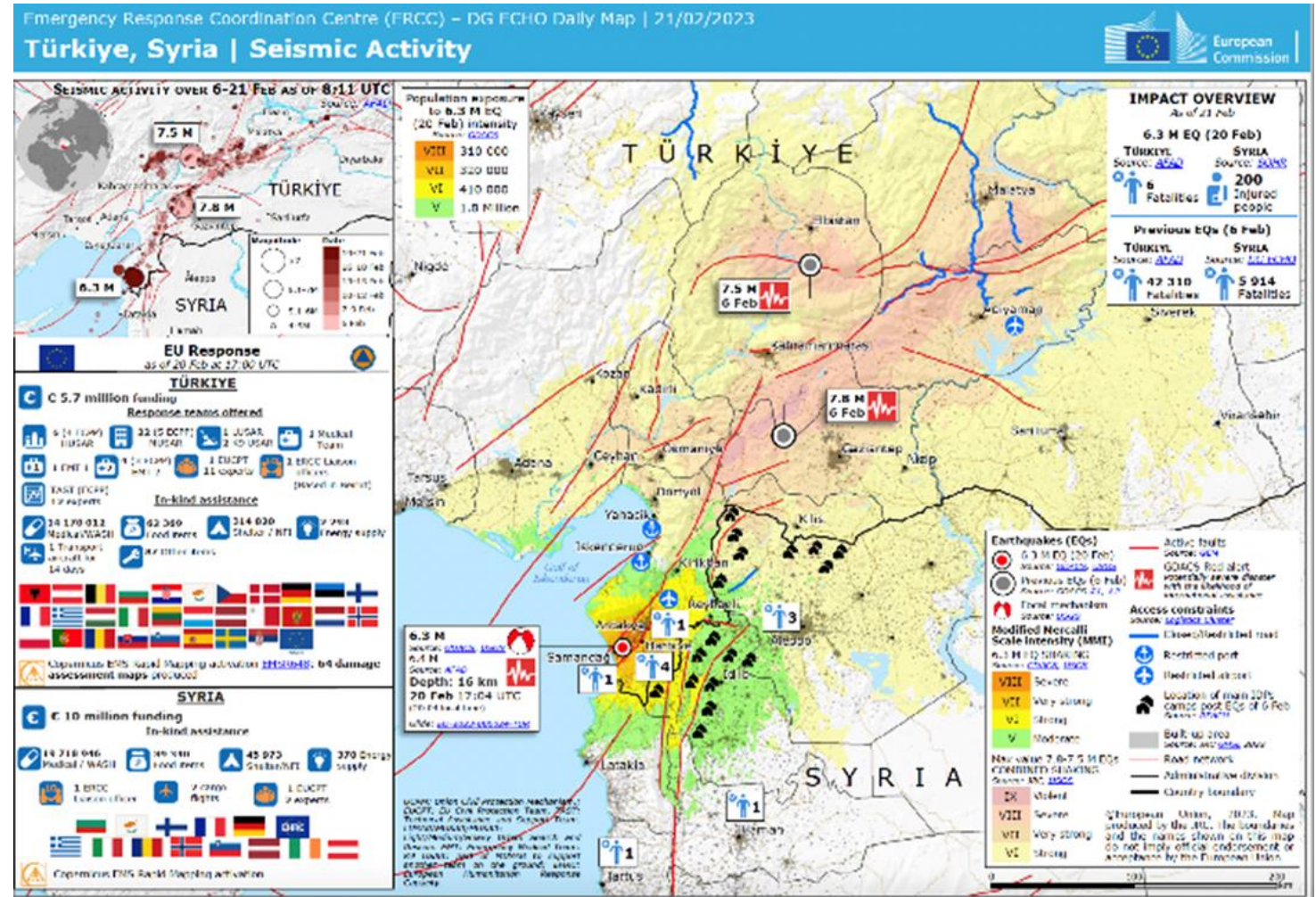
<https://sentinel-asia.org/EO/2023/article20230206TR.html>

<p>Earthquake strikes in Turkey near Syrian border on 06 February 2023. Observed on Sentinel images on the 08 of February 2023.</p>		
<p>Location</p>		<p>Legend</p> <p>■ Significant Change</p>
<p>Description</p> <p>Strong 7.8 magnitude earthquake strikes in Turkey near Syrian border. Massive quake hits near southern city of Kahramanmaraş and is felt in Syria and Lebanon, with fears of widespread destruction and casualties.</p>		<p>Data Source</p> <p>Pre-disaster image: Sentinel1A_IW_SLC_1SDV, acquired on 29 January, 2023 at T: 03: 35: 19. Post-disaster image: Sentinel1A_IW_SLC_1SDV, acquired on 10 February, 2023 at T:03:34:54 Note: The resulted outputs had not been verified with any ground truth observation.</p>



Initial Assessment

- The earthquake occurred close to the border of Turkey and Syria
- In Turkey, it was initially assessed that 10 out of 81 provinces were affected by the earthquakes



Source: DG-ECHO https://civil-protection-humanitarian-aid.ec.europa.eu/where/europe/turkiye_en

Disaster Response in Turkey

Disaster Damages

- 11,020 after shocks.
- Death 45,089 Injury 108,368
- 1.9 million people have been evacuated
- Disaster shelters 358,037 tent cities 332points
- Container city installation 10 provinces, 162 points

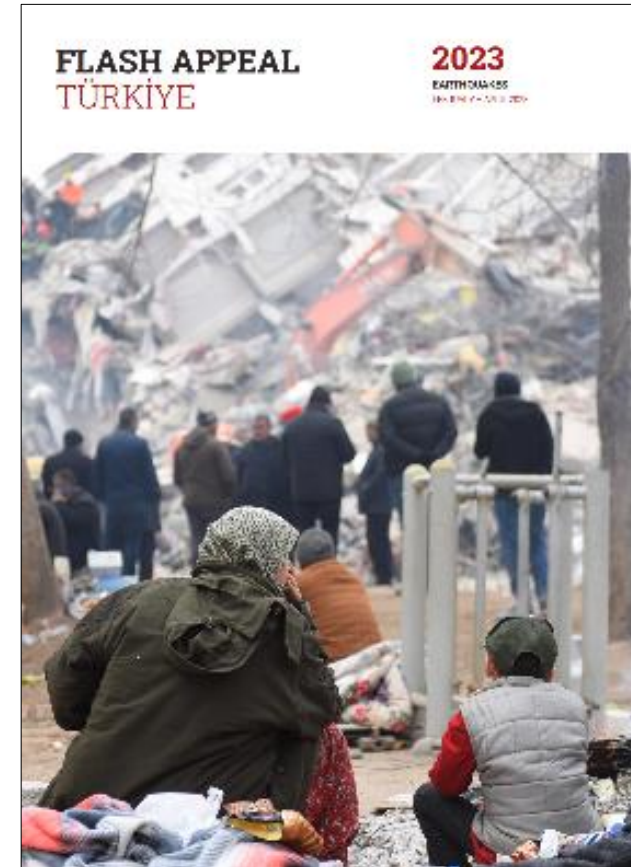
Source: Disaster and Emergency Management Presidency (AFAD) Press Briefing No.36
<https://en.afad.gov.tr/press-bulletin-36-about-the-earthquake-in-kahramanmaras>

International Humanitarian Assistance

- Quick request for International Humanitarian Assistance from AFAD to UNDAC for USAR (1 hour after of the first earthquake)
- Quick coordination with international community
- 16 February 2023 Flash Appeal



<https://en.afad.gov.tr/>




<https://reliefweb.int/report/turkiye/>

Situation Report as of 23 March 2023

- There are 11 earthquake-affected provinces in Turkey
- The total population of the 11 earthquake-affected provinces is **14,013,496** (which is 16.4% of the national population of 85,279,553 people)
- Situation Report of the Turkey 2023 Earthquake is available online:

<https://reliefweb.int/report/turkiye/turkiye-2023-earthquakes-situation-report-no-11-23-march-2023-entr>

Province	Total
Adana	2,274,106
Adıyaman	635,169
Diyarbakır	1,804,880
Elazığ	591,497
Gaziantep	2,154,051
Hatay	1,686,043
Malatya	812,580
Kahramanmaraş	1,177,436
Şanlıurfa	2,170,110
Kilis	147,919
Osmaniye	559,405
Total Region	14,013,196
Men	7,049,219
Women	6,963,977
Total Türkiye	85,279,553
Men	42,704,112
Women	42,575,441



Türkiye: 2023 Earthquakes

Situation Report No. 11
As of 23 March 2023

This report is produced by the OCHA mission in Türkiye in collaboration with humanitarian partners and covers the humanitarian situation and earthquake response in Türkiye. It covers the period from 15 to 23 March 2023.

HIGHLIGHTS

- On 20 March, Türkiye's Disaster and Emergency Management Presidency (AFAD) reported that the **death toll** from the devastating earthquakes on 6 February has increased to **50,096**. There have been 107,204 injuries.
- IOM reports that 3 million people have been displaced by the earthquakes in Türkiye.
- An estimated **1.7 million** people live in **informal settlements**, mostly in makeshift shelters or tents with **extremely basic living conditions**. Some of these settlements **lack proper water and sanitation services** and also require immediate assistance with basic household items and shelter support.
- The **heavy and deadly rains** that caused **flash floods** in Adıyaman and Şanlıurfa, two cities that were already impacted by the earthquakes, exacerbated already challenging conditions for the people living in the camps. UN agencies and partners **mobilized resources to address the urgent needs** with efforts focused on enhancing the resilience of shelters.
- To date, UN agencies and humanitarian partners have reached close to **535 thousand people** with support for **improved living spaces**, including tents, Relief Housing Units (RHUs) and tarpaulins. **1.4 million people** received **support for water, sanitation and hygiene**, and about **47 thousand people** received **health support**. Over **345 organizations** are **distributing hot meals** to approximately **1.25 million people every day**.
- Turkish Minister of Health stated that there are **no indications of an epidemic** in the earthquake affected region.
- The United Nations Food and Agriculture Organization (FAO) said Tuesday that the earthquakes caused **\$6.7 billion** in **losses and damage to crops**, livestock production, food stocks and agricultural infrastructure and assets.
- A total of **€7 billion** were **pledged** by the international community at the International Donors' Conference for Türkiye and Syria on 20 March. Out of this total, **€6.05 billion** was **pledged** in grants and loans for Türkiye.
- Turkish President said the earthquakes caused about **\$103.6 billion** of damage.
- The UN launched a **Flash Appeal** for US\$1 billion to assist 5.2 million people affected by the earthquakes. As of 23 March, it is only **18.8%** funded with \$189.7M.



On 22 March in Adıyaman, Büşra Gürsoy and her 1.5-year-old son, who live in an informal site, received blankets from IOM. Büşra says this support is very important for them, particularly after heavy rains dampened their blankets and comforters.
©UNOCHA/Gizem Yarbil Gürol

9.1M

people directly affected

50K

people killed

107K

people injured

3M

people displaced

Initial Disaster Response Fund

After the earthquake, an initial fund of **87 billion Turkish Lira** (TRY) was earmarked from the emergency appropriation to respond to emergency expenditures of public agencies including particularly, AFAD, MoEUCC, and MoAF. It is appropriated under Law No.2935 on State of Emergency

Source: Strategy and Budget Office (SBO) of the Turkish Presidency

Additional Funds Earmarked under Law No. 2935 on State of Emergency

Agency	Additional Funding (billion TRY)	Description
AFAD	50.0	To cover for appropriations required by all types of activities, works and procedures to alleviate earthquakes damage and provide aid in kind and in cash to families residing in the earthquake-affected provinces.
MoEUCC	5.5	To cover the repair and rehabilitation of infrastructure damage, identification of new settlement areas, preparation of geological and geotechnical study reports, conduct of soil studies, making development and land-plotting plans, and assistance of rent, moving and goods to beneficiaries under the Law No. 6306 on Transformation of Spaces under Disaster Risk.
AFAD	30.0	For transfer to TOKI to cover disaster housing units to be built through TOKI in the earthquake-affected provinces.
MoAF	1.5	To be used as animal fodder disbursements in the provinces hit by the earthquake of 06.02.2023 and declared a disaster zone by the Presidential Decree No. 6808 of 16.02.2023 to ensure the continuity of livestock breeding, improve productivity, secure animal health and well-being.

Source: SBO

Preliminary Post-Disaster Needs Assessment (PDNA)

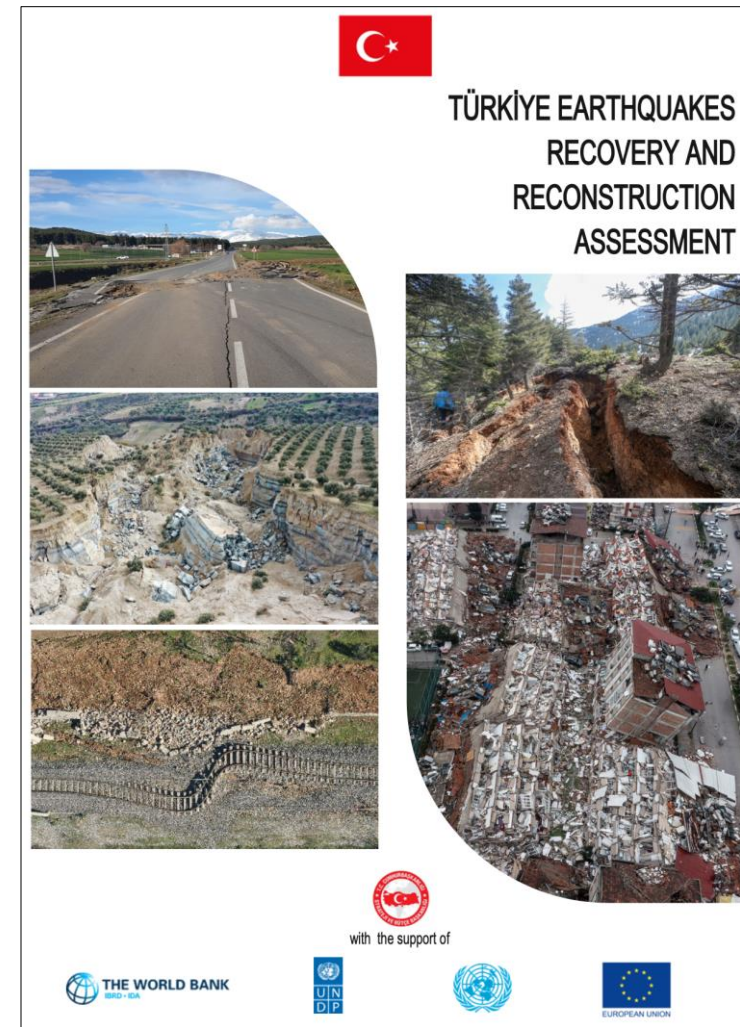
The Government of Turkey collaborated with the United Nations Development Programme (UNDP), the World Bank, and the European Union (EU) in preparing a preliminary PDNA for a donor conference for the people of Türkiye and Syria on 20 March 2023.

PDNA covered the following sectors:

- **Social sectors** (i.e., housing, education, culture, and health)
- **Infrastructure sectors** (i.e., water & sanitation services, energy, transportation, and communication)
- **Economic sectors** (i.e., agriculture, mining, manufacturing, and tourism)
- **Cross-cutting sectors** (i.e., employment & social protection, and environment)

The document, “Türkiye Earthquakes Recovery and Reconstruction Assessment” is available online:

<https://www.sbb.gov.tr/wp-content/uploads/2023/03/Turkiye-Recovery-and-Reconstruction-Assessment.pdf>



Estimated Total Funding Needs based on the PDNA

	billion TRY	billion USD	Rate of GDP (%)
Estimated Total Costs (1)			
Emergency Expenditures	128.0	6.8	0.6
Estimated Public Damage (2)	242.5	12.9	1.1
Estimated Private Damage (3)	222.4	11.8	1.0
Estimated Housing Damage (requiring urgent demolition + collapsed + severely damaged)	1,073.9	56.9	5.0
Costs of Domestic Goods	58.5	3.1	0.3
Cost of Excavation (100-120 million m3) + Crusher (Public + Private)	41.9	2.2	0.2
Damage to Private Motor Vehicles (4)	6.1	0.3	0.0
Subtotal	1,773.2	94.0	8.2
Cost of Motor Vehicle Insurance Compensation (4)	1.2	0.1	0.0
DASK (5)	36.4	1.9	0.2
Revenue Loss by Tradespersons (6)	13.9	0.7	0.1
GDP Output Loss (7)	130	6.9	0.6
Grand Total	1,955	103.6	9.0

<https://www.sbb.gov.tr/wp-content/uploads/2023/03/Turkiye-Recovery-and-Reconstruction-Assessment.pdf>

Frequently Asked Questions about the 2023 Earthquakes in Turkey

USGS compiled the following FAQs to provide quick basic answers to many questions about the earthquakes, and can be accessed online:

<https://www.usgs.gov/programs/earthquake-hazards/science/frequently-asked-questions-about-2023-earthquakes-turkiye>

What is the name of the Türkiye earthquake(s)?

Kahramanmaraş Earthquake Sequence

When did the Kahramanmaraş Earthquake Sequence occur?

On February 06, 2023, at 1:17 UTC, a **magnitude 7.8 earthquake** struck south-central Türkiye near the Syrian border. The earthquake was relatively shallow. A **magnitude 6.7 aftershock** followed 11 minutes later followed by a **magnitude 7.5 aftershock** about 9 hours after that. Aftershock earthquakes in the sequence extend for 402 km (200 mi) from the Mediterranean coast inland to Malatya, Türkiye.

Where were these earthquakes felt?

The earthquakes were felt by people throughout Türkiye, Syria, and surrounding countries, including Israel, Jordan, Egypt, Armenia, Georgia, and Iraq.

How much damage did the earthquakes cause?

The **USGS PAGER** loss estimation indicated that economic and fatality losses would be high, with widespread and extensive damage. Earthquakes of this magnitude in this region could lead to tens of thousands of deaths and billions of dollars worth of damage and economic losses. As of the end of March 2023, the death toll was over 57,000. (**Reliefweb**)

Why was there so much damage?

The population in this region typically resides in structures that are extremely vulnerable to earthquake shaking, although some more resilient structures exist. The vulnerable buildings were older low- to mid-rise concrete frames constructed with infill or unreinforced masonry.

Were there other geologic hazards triggered by the earthquakes?

Yes, there were both landslides and liquefaction across a significant area. While aerial reconnaissance and on-the-ground investigations can authoritatively map out these locations, the **USGS Ground Failure Report** provides an estimate of where they're most likely to have occurred.

How long did the shaking last?

Scientists are able to estimate the time it took for the earthquake to complete its rupture. In the case of the M7.8 earthquake, this time was about 85 seconds. The duration and intensity of shaking felt by individuals depends on many different factors, most importantly how far away they are from the fault. During the M7.8 earthquake, some people experienced intense shaking for 30 seconds or more.

