European Commission

JRC TECHNICAL REPORT

M7.8 and M7.5 Earthquakes in Türkiye

Emergency Update#3

10 Feb 2023 19:00 UTC

GDACS RED ALERT

06 Feb 2023 01:17 UTC – 04:17 local time

GDACS ORANGE ALERT

06 Feb 2023 10:24 UTC – 13:24 local time

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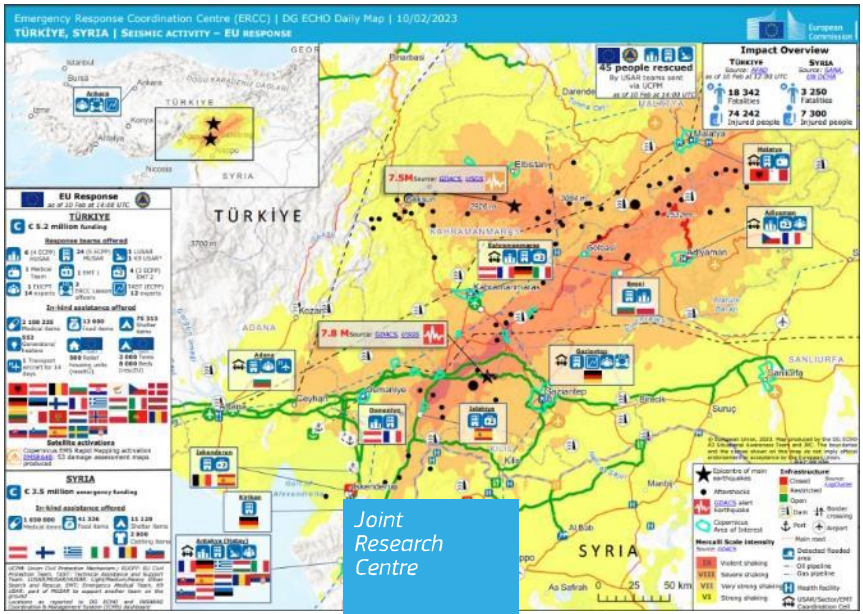
2023



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Abstract

This the fourth JRC emergency report on the ongoing earthquake crisis in Türkiye and Syria, which started 6 Feb 2023 at 01:17 UTC – 04:17 local time (previous reports published on 6, 7 and 8 February, respectively).

Along with updated figures on the humanitarian impact in both countries, this update provides information on the impact of the event on some critical infrastructures, including dams for which stability there are growing concerns.

The report provides also an overview on the first outcomes of the satellite mapping services activated on the area, i.e. Copernicus Emergency Management Service and UNOSAT, together with some information on the international support to the response operations.

Acknowledgements

The authors wish to thank the many colleagues who contributed to this report in record time. For the data collection authors would like to thank Giustolisi Luca and Panizio Emanuele for their effort in processing huge amount of data points in time for the production of this report.

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Executive summary

- Following the strong earthquake of **7.8 M** and the **second event with a M 7.5** occurred on 6 February **in southern Türkiye, close to the border with northern Syria,** as of 10 February 2023 05:30 UTC **1999 aftershocks** occurred along both of the fault systems, with 280 aftershocks of M > 4.
- The Disaster and Emergency Management Presidency of Türkiye (AFAD) reports, as of 10 February at 12.30 UTC, **18,991 fatalities**, **75,523 injured people** across 11 Provinces (Kahramanmaras, Gaziantep, Sanliurfa, Diyarbakir, Adana, Adiyaman, Osmaniye, Hatay, Kilis, Malatya, and Elazig) and a total of **81,415 displaced people**. AFAD also reports, as of 9 February at 20.38 UTC, that 28,044 of these people in need were evacuated outside the affected Provinces toward other Provinces due to the need of shelters. Additionally, in a previous press conference of 7 February, AFAD reported **6,444 confirmed collapsed buildings** and **11,302 buildings reported as collapsed.**
- In Syria, at least **1,347 people died and 2,295 sustained injuries**, as reported by the Syrian Arab News Agency (SANA). This information is assumed to refer only to government-controlled areas. The **White Helmets organisation in north-western Syria reported that 2,030 people died and more than 2,950 sustained injuries** in rebel-controlled areas, although the numbers are expected to rise significantly given the difficult context in which Search & Rescue operations are taking place.
- Additional information on **damaged dams in Syria** are emerging from the affected area. There are villages flooded along the Al-Aasi River (Orontes River), in Syria at the border with Türkiye potentially due to an affected dam. Currently, no images are available on the damaged dam. Hypothesis can be formulated regarding the **Yarseli Baraji Dam**, as it generates an affluent which reaches the Al-Aasi River (Orontes River) where the Al-Taloul village is located. The **Sultansuyu Dam in Türkiye and the Maydanki (Afrin) Dam are confirmed as affected**. An activation of the Copernicus Risk and recovery mapping has been requested to perform a detailed dam break and dam discharge scenario for the Maydanki (Afrin) Dam. Results should be available Thu 16 February.
- The **crude oil pipeline Baku-Tbilisi-Ceyhan (BTC) from Azerbaijan** (purple pipeline in Figure below) **was damaged** at the connection points of two berths. A damage assessment is carried out. A small leak was quickly fixed but the oil flow is still halted (force majeure notice). The pipeline was not expected to open until Wednesday or Thursday as also the control room at the terminal was also damaged. **Currently, there are no indications when the control room repairs will be finished**.
- **Türkiye and Syria are extensively under warning drought conditions** according to the Copernicus European Drought Observatory. A severe lack of precipitation affects both Türkiye and Syria with impacts already on soil moisture and rivers' flow. The compound effects of the catastrophic earthquake and the drought may exacerbate impacts on water availability for agriculture and energy.
- The **European Commission's Copernicus emergency satellite mapping system was activated** by the ERCC on 6 February at 04:43 UTC to support damage assessment (EMSR648). Optical satellite images of very high resolution (less than 1 meter) were acquired on 07, 08 and 09 February over 20 areas of interest (AOIs) located near the epicentres of the earthquakes. These areas, with a **total area of 664 km²**, are home to an estimated population of 3,950,866 people. So far, 33 products have been published. All results of the damage assessments can be visualised on the Activation Viewer.
- The **Post Disaster Needs Assessment (PDNA)** process should be a collective effort for the delivery of an effective and sustainable international response after disaster- and conflict-related crises. Moreover, the process would significantly benefit from the recent analysis performed to assess the damages and the needs in the area affected by recent crisis in Syria. In this report, a methodology is proposed to assess the building and cultural heritage damage, as well as **input for the detection and quantification of huge volumes of debris in the affected areas, which contribute to insecurity, population displacement and the interruption of public services.** The activation of the satellite Copernicus Risk & Recovery Mapping could accelerate the detection of the debris and monitoring of the removal process, as well as the reconstruction phase.
- **International assistance** was requested by the Republic of Türkiye shortly after the event. The DG ECHO Emergency Response Coordination Centre-ERCC is coordinating the mobilization of the EUCPM. UN OCHA activated the United Nations Disaster Assessment and Coordination (UNDAC) team to coordinate the activities of the teams on the field. On 8 February, **the Syrian government requested assistance through the EU civil protection mechanism** for search and rescue teams and equipment, shelter items and medicines.

1 Earthquake impacts

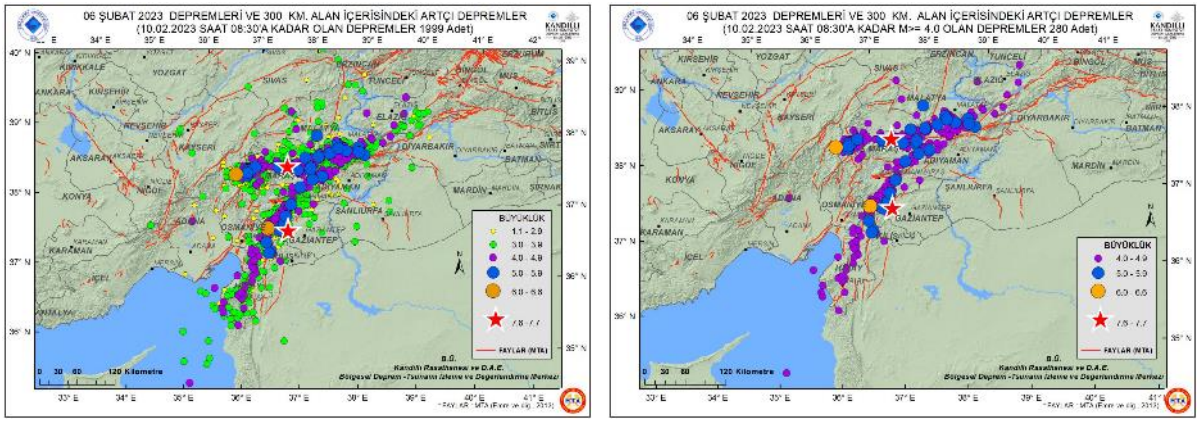
1.1 Situation overview

A series of earthquakes started on 6 February 2023 with a strong earthquake of 7.8 M (7.7 M as reported by Disaster and Emergency Management Presidency of Türkiye-AFAD) at a depth of 18 km occurred at 1.17 UTC (4.17 local time) in southern Türkiye (epicentral coordinates: 37.174°N 37.032°E), close to the border with northern Syria. The epicenter was located in Atalar town (Gaziantep Province, Southeastern Anatolia Region), and about 45 km north of the northern border of Aleppo Governorate in Syria.

A second event with a M 7.5 and 10 km depth occurred at 10:24 UTC at a distance of about 100 km from the first event (epicentral coordinates: 38.024°N 37.203°E), likely worsening the impact and the ongoing Search & Rescue operations.

Following the main shocks, as of 10 February 2023 05:30 UTC, **1999 aftershocks** occurred along both fault systems, with 280 aftershocks of M > 4. The possibility of aftershocks with M>6 cannot be excluded.

Figure 1. Main shock and aftershocks (left-all aftershocks, right aftershocks with M > 4) of 6 February 2023 earthquakes in Türkiye as of 10 February 2023 05:30 UTC (source: KOERI).



Sea-level rise and coastal inundation have been reported in the Iskenderun area after the earthquake. The source of this inundation is interpreted as related to the coastal subsidence due to the earthquake but is subject to verification. An activation of Copernicus RRM could be meaningful in this regard.

Figure 2. Coastal inundation in Iskenderun after the earthquake ([1]). Source of this inundation is interpreted as related to the coastal subsidence due to the earthquake but is subject to verification.

[1] https://www.mynet.com/galeri/hatay-da-deprem-sonrasi-deniz-seviyesi-yukseldi-sokaklar-sular-altinda-kaldi-araclar-guclukle-ilerledi-iste-o-fotograflar-110107094542/2

On 8 February, **the Syrian government requested assistance through the EU civil protection mechanism** for search and rescue teams and equipment, shelter items and medicines.

The republic of Türkiye requested international support soon after the first earthquake. **State of Emergency** (please refer to Annex I for further details) **for 3 months has been declared in Kahramanmaraş, Kilis, Diyarbakır, Adana, Osmaniye, Gaziantep, Şanlıurfa, Adıyaman, Malatya and Hatay Provinces**.

Turkish Reinsurance and Catastrophe Insurance Pool (DASK) announced that more than 30 000 damage reports have been received so far. DASK also declared that they have the ability of approximately **EUR 1 billion direct and EUR 6 billion indirect payment capability through reinsurance protection** (2).

1.1.1 Commentary on the seismological measurements

A discussion is ongoing among the seismological scientific community about the recorded peak ground acceleration (PGA) values in the region.

Station TK.4614 of the Turkish National Strong Motion Network of AFAD appears to have recorded PGA values of 2.1g (20.6 m/s^2). Internal communications with seismological experts in the Eastern Mediterranean agree that this value is too high, and that this point should be considered an outlier, possibly due to a simple technical malfunction or other problem with the recording device.

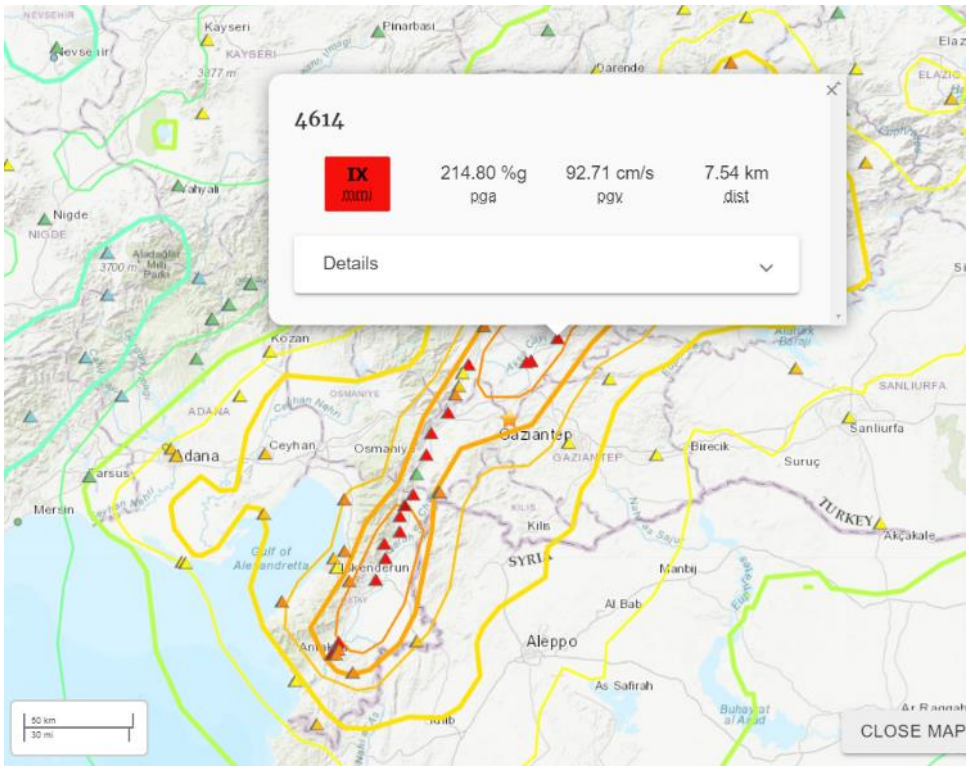
Notably, this recording station is omitted from the seismological and impact modelling published by the Kandilli Observatory and Earthquake Research Institute of Boğaziçi University in Türkiye, considered among the foremost experts on the topic. The different available models and consulted experts agreed on maximum PGA values around 0.8g, that might have been exceeded in some stations closest to the fault. It is at this point impossible to ascertain whether other stations may have had problems as well.

It needs to be pointed out that the USGS has *not* omitted this station from its calculations, and that the point appears to have some influence in the highest intensity contours of the most up to date Shakemap for the M7.8 event (version 6). This would imply that earthquake intensity may currently be overestimated in the area nearby the town of Pazarcik and the Kartalkaya Dam. The JRC has reached out to the USGS regarding this issue.

It is therefore advisable to consider an increased degree of uncertainty when making decisions on the basis of seismological models for this event.

[2] https://t24.com.tr/haber/dask-genel-muduru-eren-30-bini-askin-hasar-ihbari-isleme-alindi,1091217

Figure 3. Seismic stations (triangles) used by USGS for Shakemap calculations. The highlighted station is TK.4614, which has been the subject of exchanges.



1.2 Humanitarian impact

1.2.1 Current humanitarian situation in Türkiye and Syria

The preliminary humanitarian impact in both Türkiye and Syria is reported here below. The figures reflect the latest situation as at 10 February at 15:00 UTC:

Situation in Türkiye

The Disaster and Emergency Management Presidency of Türkiye (AFAD) reports, as of 10 February at 12.30 UTC, nearly 19 000 fatalities (18 991) and over 75 500 injured people (75 523) across 11 Provinces (Kahramanmaras, Gaziantep, Sanliurfa, Diyarbakir, Adana, Adiyaman, Osmaniye, Hatay, Kilis, Malatya, and Elazig) in southern Türkiye.

AFAD also reports nearly 81 500 displaced people (81 415) to safer areas across the aforementioned Provinces or to other Provinces (source: https://afad.gov.tr/kahramanmarasta-meydana-gelen-depremler-hk-basin-bulteni23). As of 9 February, at 20.38 UTC, a significant part of these people in need, namely 28,044 people, were already evacuated outside the affected Provinces toward other Provinces, as there is a need of shelters. The Gendarmerie units have created 23 accommodation/evacuation areas in order to collect the people in need. Specifically, 23,437 people were evacuated by means of flights, and further 4,607 by roads or railways (source: https://afad.gov.tr/28044-vatandasimiz-afet-bolgesinden-tahliye-edildi-basin-bulteni).

Situation in Syria

In Syria, at least 1 347 people died and 2 295 sustained injuries, as reported by the Syrian Arab News Agency (SANA). This information is assumed to refer only to government-controlled areas. The White Helmets organisation in north-western Syria reported that 2 030 people died and more than 2 950 sustained injuries in rebel-controlled areas, although the numbers are expected to rise significantly given the difficult context in which search and rescue operations are taking place.

JRC Global Human Settlement Layer (GHSL) estimates that almost 8 million people reside in the areas affected by the conflict out of which 2.5 million in the rebel-controlled areas[3].

According to the OCHA-HCT report of 09 February, 6 million people have been affected by the earthquake. More than 300 000 people have been displaced by the earthquake, in the government-controlled areas, according to state media.

UNRWA estimates that 90% of the Palestinian refugees living in Lattakia camp, Al Nayrab camp, Ein al Tal camp, and Hama camp need assistance as a result of the earthquake.

Health facilities are overwhelmed. The rural areas of Aleppo are facing water disruptions due to contamination. Water station, reservoirs and tanks have been damaged in many areas. With many bodies still trapped under buildings, and an ongoing cholera outbreak, a serious worsening of the already poor health situation is expected.

Protection risks have increased. Unexploded ordnances are present in many areas. Children and women from vulnerable families are at risk of exploitation. Millions of children need shelter, food and warm clothes.

The local and international response to the earthquake has been most complicated in north-western Syria, where there was an extreme need of humanitarian assistance and 90% of the population already relied on aid to meet basic needs, including food and non-food items, winter clothes, shelters, tents, blankets, first aid kits, cooking items, medical equipment. Heavy machines for debris removal, ambulances, fuel and transportation are heavily needed.

International organisations are already mobilizing staff and resources on the field to north-western Syria which remains the most isolated among the affected areas. However, access was delayed by damage to the road leading to the Bab Al Hawa border crossing, which is currently the only approved/viable crossing between Türkiye and Syria. A first batch of aid entered north-western Syria on 09 February. However, the White Helmets organisation mentioned that this is the regular aid that was temporarily stopped due to the earthquake and not the desperately needed search and rescue aid and equipment. The International Organization for Migration (IOM) reported that other 14 trucks carrying humanitarian aid and assistance had crossed into north-western Syria on 10 February directed to Idlib. Türkiye is pushing for the opening of Öncüpınar and Çobanbey border crossings for humanitarian aid transport.

1.2.2 Pre-existing humanitarian crisis in Syria due to the conflict

Since 2011, Syria has been the stage of a twelve year-long civil war between the Syrian regime and rebel forces, which caused extensive urban damage and population displacement. Infrastructure across the country is still in a fragile state due to years of airstrikes and shelling, as the post-war reconstruction effort is still underway.

In rebel-held north-western Syria, there is an especially high number of Internally Displaced People (IDPs), with nearly 1.7 million IDPs living in more than 1,400 camps under difficult living conditions. There are severe disruptions to services and infrastructure including severe electricity shortages, the situation in Aleppo being the worst in the country.

The humanitarian access is hampered by conflict and military operations. UN OCHA classifies 203 out of 270 sub-districts of Syria under severe, extreme or catastrophic conditions. At the end of January 2023, 4.7 million people were in need of humanitarian assistance in Aleppo, Ar-Raqqa and Al-Hasakeh alone.

Syria is also facing a cholera outbreak with 19,438 cases being registered in Aleppo (23% of the total) and 16,366 cases being registered in Ar-Raqqa (19% of the total), as of 31 January 2023.

[3] "Syrian potentially affected population estimations are based on census 2004 and adjusted based on the 2019 version of the World Population Prospect (WPP2019). Unaccounted population movements might locally over or underestimate population."

1.3 Impact on buildings

Situation in Türkiye

In a press conference of 7 February, AFAD reported **6,444 confirmed collapsed buildings and 11,302 buildings reported as collapsed** in Türkiye.

The nearly 2,000-year-old Gaziantep Castle in Türkiye, first built as a watch tower during Roman times and later transformed into a castle by the Byzantian Emperor Justinian I. in 6th century A.D., was also partially damaged by the earthquakes.

Figure 4. Images from the impact of the earthquakes in Türkiye on 6 February 2023**..**

Seismic demand on structures by the earthquakes of 6 February

The two main events of 6 February with updated magnitudes Mw of 7.7 and 7.6 (AFAD website as of 9 February) showcase very strong demand for seismic resistance of structures. For the first event PGA values are as high as 0.8 *g*, and even higher in some stations near the fault. The preliminary report of Boğaziçi University[4] compares the spectral values of the records with the spectral values of the seismic design map of TBDY 2018. For most of the records the spectral accelerations are much higher than those prescribed by the design Code, sometimes up to three times, in particular for the large periods spectral zone (T > 0.5 *s*), thus indicating strong seismic demand on the high-rise buildings. Some of the records exhibit very strong vertical component with PGA of 0.5 *g* and higher, thus questioning the resistance of the large-span structures and of the cantilever elements.

The case-by-case analysis of the structural damage, to be performed after the end of the rescue operations, will highlight the reasons for the extensive damage. The experience from previous strong earthquakes in Türkiye (mainly those from 1999) and other countries, shows that besides the excessive seismic demand in comparison to the seismic resistance accorded to old codes, damage is provoked by structural irregularities, such as uneven distribution of masses, stiffness and strength in plan and in height, elimination of structural elements during reconstruction and change of function of the buildings, compromises with the quality of design, execution and maintenance, etc.

Seismic design codes of Türkiye

The first official Turkish Seismic Code was introduced in 1940's, and since then the seismic design provisions are updated regularly to accommodate the new developments in earthquake engineering, new types of

[4] Suguolglu H, 2018. New Improvements in the 2018 Turkish Seismic Code. Proceedings of *fib* International Workshop on Advanced Materials and Innovative Systems in Structural Engineering: Seismic Practices 2018

structures, as well as the changing societal needs[5]. The latest Seismic Code (TBDY **2018**) introduced improvements of the 2007 Seismic Code with regards to the definition of site-specific design ground motions, and to the seismic design of tall buildings, base isolated buildings and pile foundations. The Kahramanmaras region is marked as one of the regions with highest seismicity expected, in both, the 1996 Seismic Zones Map and the 2018 Seismic Map, with peak ground acceleration (PGA) of 0.4 *g* or more.

The Eurocodes (the European design standards) are published as Turkish standards, but they are not compulsory. They are used as primary standards when there are no existing Turkish codes. In 2013 the Turkish National Strategic Action Plan for Reduction of Earthquake Losses put requirement for revision of seismic design code considering the Eurocodes.

Situation in Syria

According to the Syrian Observatory for Human Rights the earthquake of 06 February 2023 caused total or partial damage in 120 villages, towns and cities in Syria. On 06 February the International Charter was activated for damage assessment mapping in 22 areas of interest (see Chapter 4.1.2). As of 08 February, more than 2 000 buildings have been destroyed and more than 5 100 buildings have been damaged, leaving 11 000 families homeless.

The built-up environment in Syria is likely to be far more vulnerable than its Turkish counterpart. A cursory check of the pre-disaster situation shows that most small settlements fall inside the "informal settlement" typology, having been built without professional input, let alone earthquake-resistant design, and presenting a number of structural vulnerability factors that exacerbate earthquake damage, such as irregular shapes (likely to generate weak points that would accelerate collapse) and clustering of several buildings with different floor heights (making buildings pound into each, delivering shocks that structures are not prepared to receive).

Even in the urban areas with formal settlements, code-uptake is expected to be low, even if the code foresees designing for a PGA of 0.4 m/s2, which is below what was experienced.

Finally, many of these buildings have been exposed to impacts from the conflict, reducing their ability to withstand the shock of an earthquake, which may be the decisive factor.

The earthquake of 06 February 2023 caused extensive damage also to cultural heritage ad ancient sites in Syria which have already been affected by the conflict. On 07 February, UNESCO expressed its concerns about the situation in the Ancient city of Aleppo, already on the List of World Heritage in Danger. Significant damage was registered in the Old Citadel. The western tower of the old city wall collapsed, and several buildings were impacted. The entrance to the fort was heavily damaged while parts of the dome of the Ayyubid mosque inside the citadel fell off. The citadel is thought to have been built around the 3rd millennium BC.

Al-Marqab castle, located in Baniyas, northwest Syria, was also damaged by the earthquake. The castle was a Crusader fortress, and tremors have caused its circular towers to crumble. Archeological sites, including the Raqqa Wall, Castle Necmettin and Maiden's Castle in Raqqa, were also affected.

[5] Hancilar, U *et al.*: Kahramanmaraş - Gaziantep Türkiye M7.7 Earthquake, 6 February 2023 (04:17 GMT+03:00), version 3

Figure 5. Images of earthquake impact on Aleppo Old Citadel (left) and Al-Marqab castle (centre) in Syria.

1.4 Impact on critical infrastructures

1.4.1 Situation of the dams

Additional information about earthquake-related floods in Syria are emerging from the affected area.

Recent updates concern villages flooded along the Al-Aasi River (Orontes River), in Syria at the border with Türkiye. According to SOHR sources, Al-Aasi River flooded due to opening of a dam, forcing residents living near the river course, such as Al-Jameiyah neighbourhood in Jesr Al-Shughour, some houses in Dergoush and Al-Taloul village in Salqin countryside, to displace to nearby villages[6].

Currently, no images are available for the damaged dam. Hypotheses can be formulated regarding the Yarseli Baraji Dam, as it generates an affluent which reaches the Al-Aasi River (Orontes River) where the Al-Taloul village is located.

These dams join the list of previously reported earthquake-affected dams:

- Türkiye: the Sultansuyu Dam[7] (exposed to MMI VII).
- Syria: the Maydanki[8] (Afrin) Dam (exposed to MMI VII).

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[6] "https://www.syriahr.com/en/287891/"https://www.syriahr.com/en/287891/

"https://twitter.com/Levant_24_/status/1623577367569477632?s=20&t=dzcWi9GJX6pFDCiG_yworQ"https://twitter.com/Levant_24_/status/1623577367569477632?s=20&t=dzcWi9GJX6pFDCiG_yworQ

"https://www.syriahr.com/en/287888/"https://www.syriahr.com/en/287888/

[7] https://www.turkiyegazetesi.com.tr/gundem/malatya-valiligi-sultansuyu-baraji-tedbiren-kademeli-olarak-bosaltilacak-947241
https://www.aa.com.tr/tr/gundem/malatya-valiligi-sultansuyu-baraji-tedbiren-kademeli-olarak-bosaltilacak/2808680

[8] https://english.enabbaladi.net/archives/2023/02/turkey-syria-earthquake-maydanki-dam-cracked-what-is-the-consequence/

https://www.cbsnews.com/live-updates/earthquake-turkey-syria-death-toll-rescues-february-7-2023/

Figure 6. Image of the flooded area in the along Al-Taloul village, along the Al-Aasi River (Orontes River), in Syria. (source::@HussamHamoud)

Figure 7. Location of the flooded area (source: googlemap, modified).

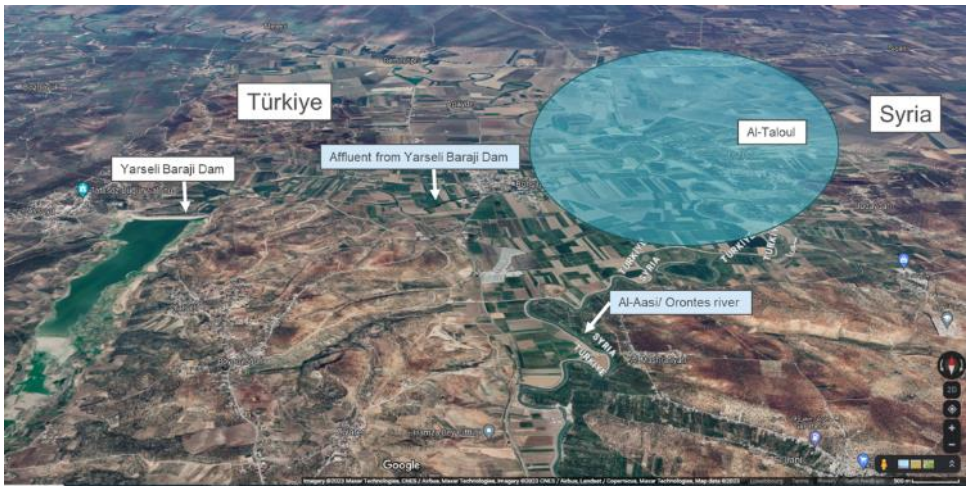
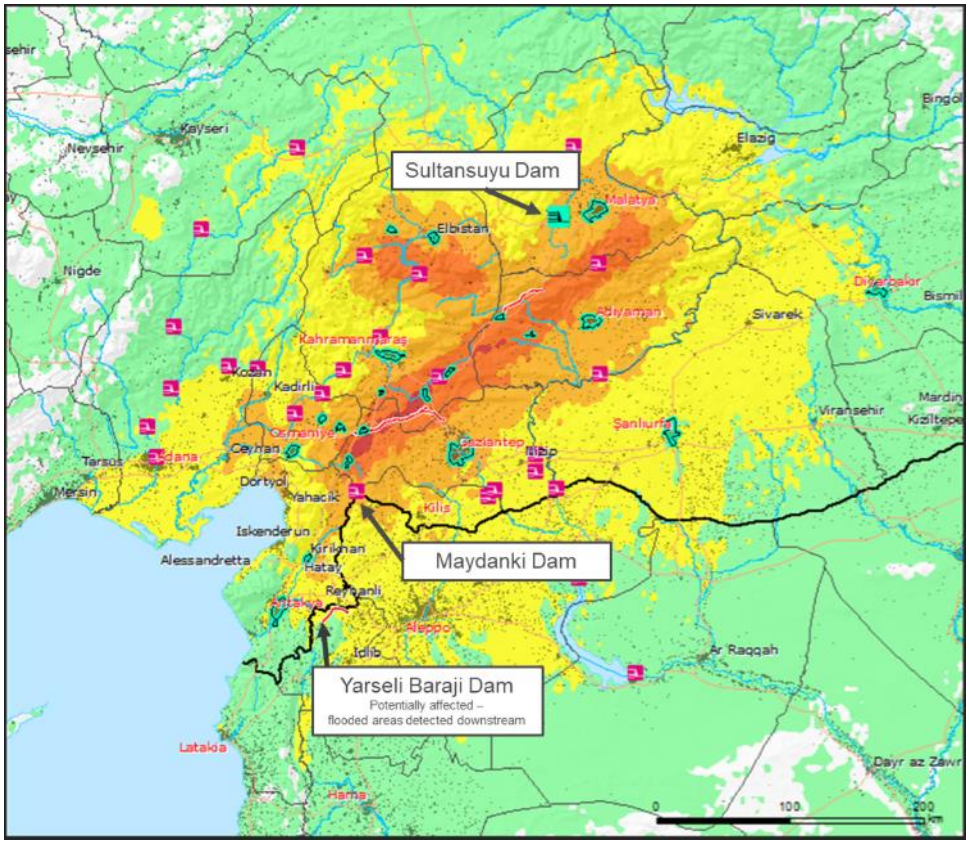


Figure 8. Location of the Sultansuyu Dam in Türkiye and the Maydanki (Afrin) Dam and the Yarseli Baraji Dam in Syria. In the map dams with reservoir capacity above 50k m3 exposed to MMI >= V are also located (MMI=V: green; MMI=VI: yellow; MMI=VII: light orange; MMI=VIII: dark orange; MMI=IX: red).



1.4.2 CEMS Risk and Recovery mapping activation for the dam breach

An activation of the Copernicus Risk and recovery mapping has been requested in order to perform a detailed dam break and dam discharge scenario for the Maydanki (Afrin) Dam.

The following deliverables are foreseen: reference data set in the flood prone area including possible IDP camp locations, dam break modelling and flood inundation mapping, exposure assessment of citizens and infrastructure (including IDP camps if any).

The deadline for submitting technical offers by the CEMS RRM consortia is on Monday 13/02 and the deliverables and final results are expected two working days later (I.e. Wednesday 15/02).

As soon as these results are available, a comparison between the damage assessment obtained from the JRC modelling and the CEMS RRM will be conducted.

1.4.3 Impact on critical energy infrastructures

Turkish authorities are reporting blackouts in the following places: Osmaniye Bahçe-Düziçi, Kahramanmaraş city centre, Malatya; Akçadağ, Doğanşehir, Doğanyol are out of electricity.

Overall, the earthquake has damaged critical energy infrastructure in Türkiye. There is damage to both power transmission lines and natural gas transmission and distribution lines. Approximately 30 substations belonging to Türkiye's Electricity Transmission Corporation (TEIAŞ) suffered varying degrees of damage.

Natural gas pipeline rupture in Hatay Province

Due to the earthquake shaking, a state-owned **natural gas transmission pipeline** (operated by BOTAS), found at the southernmost Hatay Province in Türkiye, (Kahramanmaras-Gaziantep pipeline) **ruptured** in two sections (see Figure below), causing fires that have already been extinguished. The distance between the pipeline ruptures is roughly 3 km.

Figure 9. Excerpt from the BOTAS pipeline network in Türkiye showing the affected gas transmission pipeline influence area

The biggest damage pertains to the rupture of the natural gas line in the Turkoglu district, which is close to the epicentre. This line is part of the main transportation line that carries natural gas to Marash, Gaziantep, Hatay and Kilis. The Kilis pipeline has also been affected, but the supply continues. **The affected areas may experience power outages.**

- **Natural gas flows on the Kahramanmaras-Gaziantep gas transmission line were halted** to Gaziantep, Hatay and Kahramanmaras provinces and some other districts (Pazarcık, Narlı, Besni, Gölbaşı, Nurdağı, Islahiye, Reyhanlı, Kırıkhan and Hassa districts) near the epicentre as a result of the pipeline damage.
- **BOTAŞ technical teams are carrying out the necessary controls and interventions in the field.** In coordination with the natural gas distribution companies in the region, necessary studies are carried out to ensure safe gas flow to the citizens.
- All teams were immediately put on alert by BOTAŞ, and damage assessment studies were started by taking the necessary security measures.
- By establishing the necessary coordination with the natural gas distribution companies in the region, gas supply will continue to be provided by supplying CNG and LNG to critical facilities (such as hospitals, bakeries, etc.) through mobile power plants/ generators.

Ceyhan oil terminal

- Operations were suspended at the **Ceyhan oil terminal** (southern Türkiye, 150 km from the epicentre) and an emergency meeting was being held on the issue. There are reports about damage and spills from tanks at the terminal. BP, for instance, said a small leak from a crude storage tank at Ceyhan caused by the quake has now been stopped. Ceyhan is a major oil export terminal on Türkiye's Mediterranean coast. Inspections are carried out and operations at Ceyhan will resume once the damage assessment has been finalised.

Oil pipelines

- The **crude oil pipeline Baku-Tbilisi-Ceyhan (BTC) from Azerbaijan** (purple pipeline in Figure below) **was damaged** at the connection points of two berths. A damage assessment is carried out. A small leak was quickly fixed but the oil flow is still halted (force majeure notice). The pipeline was not expected to open until Wednesday or Thursday as also the control room at the terminal was also damaged. Currently, there are no indications when the control room repairs will be finished.
- The **Kerkur-Ceyhan crude oil pipelines carrying oil from Iraq resumed operations** in the evening of 7 February. The pipeline operator Botas confirmed that there was no damage to the main pipelines that carry crude oil from Iraq (green pipelines in Figure below).

Figure 10. Zoom on locations of oil pipelines from Azerbaijan and Irak.

Outlook

JRC will keep monitoring events over the next couple of days. Türkiye keeps experiencing a series of shallow earthquakes with high magnitude; this may also mean that **industrial structures and equipment that were damaged during the first earthquake shock but did not have any release so far, might start releasing with the aftershocks if further damage happens.**

1.4.4 Impact on ports

A major port in the Mediterranean coastal city of Iskenderun was damaged by the earthquake, with dozens of containers being toppled. As a consequence, a major fire erupted that brought all port operations to a halt (Figure below). The fire that engulfed hundreds of shipping containers had reportedly been extinguished on Tuesday according to the Turkish Ministry of Defence but then reignited. Today, the Turkish maritime authority stated that the fire had been extinguished and maritime operations had resumed in the region. Authorities also indicated that cooling of the containers would continue for another 3 days. More than a thousand containers which had caught fire are being separated and the rehabilitation of the port will begin swiftly.

The cause of the fire is still unknown. There are speculations over plastic raw material or chemicals that ignited. A source from a container broker said the fire most likely originated in a container filled with flammable industrial oil, judging by the flames and smoke. Other containers were toppled on their sides, hampering access for the emergency services. Authorities had tried in vain to tackle the fire by boat alone, with damage nearby from the quake hampering access to the site. The fire was eventually contained using combined efforts from land, sea and air.

Figure 11. View of the container fires at Iskenderun port.

2 Overview of satellite mapping activations

2.1 Outcomes of satellite activations

2.1.1 Copernicus EMS Rapid Mapping activation in Türkiye (EMSR648)

The European Commission's Copernicus emergency satellite mapping system was activated by the ERCC on 6 February at 04:43 UTC to support damage assessment (less than 4 hours after the M7.8. earthquake). The JRC Copernicus Mapping Team is providing technical support to the activity. All information and maps related to this activation are available here:

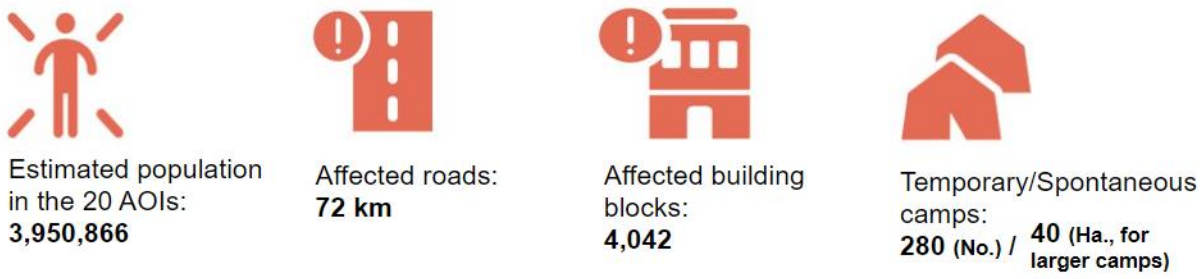
https://emergency.copernicus.eu/mapping/list-of-components/EMSR648

Optical satellite images of very high resolution (less than 1 meter) were acquired on 07, 08 and 09 February over 20 areas of interest (AOIs) located near the epicentres of the earthquakes. These areas, with a total area of 664 km^2, are home to an estimated population of 3,950,866 people.

Due to cloud coverage, it was necessary to order numerous satellite images in order to cover all areas. As of 09 February, 100% of the area covered by the 20 AOIs have been analysed (32% on 08 February).

So far, 33 products have been published showing a total of 4,042 building blocks and 72 km of roads as possibly damaged, damaged or destroyed. All results of the damage assessments can be visualised on the Activation Viewer.

Figure 12. Preliminary results of the damage assessments as performed by the Copernicus EMS Rapid Mapping team in the context of the EMSR648 activation. Situation as of 10 February at 10:00 CET.



New acquisitions of optical images over AOIs 03 and 12 are scheduled on 11 February. If weather conditions allow, these images will be used to consolidate the preliminary results over these areas. The results of the analysis will be published on the night of 11-12 February.

Additional sources of information, such as media and social media, have been used to support the analysis where possible. In parallel, it is also planned to analyse SAR imagery of very high resolution for specific AOIs to complement the analysis.

Figure 13. Activation Extent Map: overview of the areas of interest and map production. Latest update *here*

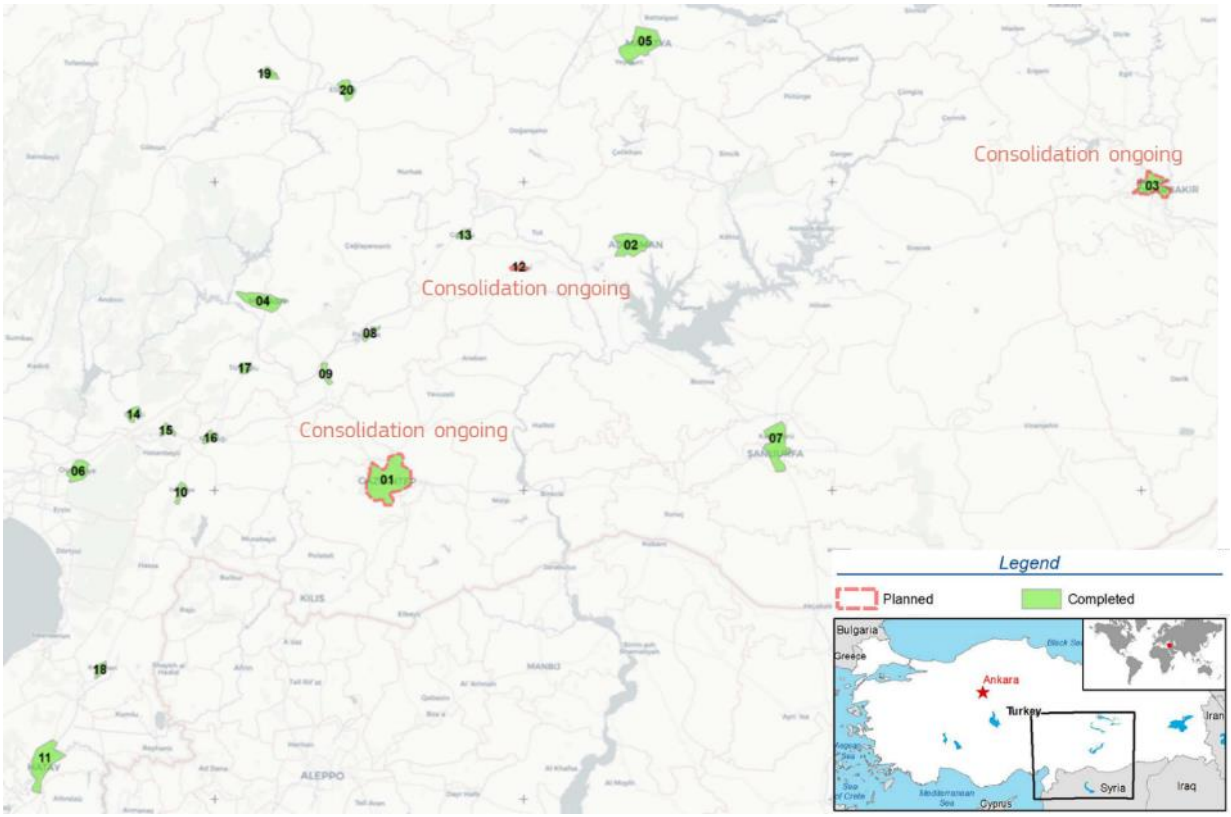


Figure 14. Detailed list of the areas of interest, production status and preliminary results

							Temporary/Spontaneous camps *	
AOI n.	**AOI name**	**Area (km²)**	**Estimated population ****	**Production status**	**Affected roads (km) ***	**Affected building blocks ***	No.	Ha (for larger camps)
1	Gaziantep	126	1,191,034	**Completed** (Consolidation ongoing)	0	26	11	5.8
2	Adiyaman	62	209,256	**Completed**	12	83	27	6.6
3	Diyarbakir	52	562,481	**Completed** (Consolidation ongoing)	-	48	14	
4	Kahramanmaras	56	384,404	**Completed**	21	927	4	

5	Malatya	87	423,295	**Completed**	6	229		10.3
6	Osmaniye	34	231 122	**Completed**	9	116	115	
7	Sanliurfa	60	501,655	**Completed**	-	3		
8	Pazarcik	7	25,477	**Completed**	-	79	6	
9	Cumhuriyet	12	16,653	**Completed**	0	8		
10	Islahiye	7	16,036	**Completed**	15	33	24	4.9
11	Antiochia	85	385,430	**Completed**	3	220		
12	Erdemoglu	6	12,077	**Completed** (Consolidation ongoing)	-	144		
13	Golbasi	6	31,431	**Completed**	-	57		
14	Duzici	10	33,556	**Completed**	0	5	2	0.2
15	Bahce	4	12,467	**Completed**	-	2		0.8
16	Nurdagi	4	12,258	**Completed**	2	64	44	11.1
17	Turkoglu	4	36,094	**Completed**	-	60		
18	Kirikhan	12	63,537	**Completed**	1	1,593	22	
19	Afsin	13	33,725	**Completed**	0	56		
20	Elbistan	18	97 658	**Completed**	2	289	11	
	TOTAL	**664**	**3,950,866**		**72**	**4,042**	**280**	**39.8**

* Source: Copernicus activation EMSR648. Sum of assets identified as Destroyed, Damaged and Possibly damaged
** The population density grids that were used to estimate the potentially affected population is based on the Turkish census 2011 and has been adjusted based on the 2019 version of the World Population Prospect (WPP2019).

On 10 February a report on the activation was published on the activation webpage as well as an Information Bulletin. It presents the main results of the damage assessments conducted, as well as satellite images.

2.1.2 International Charter for Space and Major Disasters, and UNOSAT activations in Türkiye and Syria

On 06 February (date of the M7.8 earthquake), the International Charter for Space and Major Disasters was also activated in Türkiye (activation 797), as well as in Syria (activation 798). Since then, several assessments have been conducted. Based on Pleiades very high-resolution satellite image acquired on 07 February 2023, UNOSAT produced a preliminary damage assessment over the town of **Latakia** in Syria (available here). From the report, damaged and potentially damaged buildings in some sectors of the city like **Raml al Janoubi** and **Dam Sarkho** neighbourhoods located south and north of the city respectively. Some potentially damaged buildings were also identified in the sector of **Tishreen University Hospital**. Based on Worldview-3 Very high-resolution satellite image acquired on 7 February 2023, a map (available here) illustrates potentially damaged structures/buildings in **Zayzafun** (Aykadah) village, **A'zaz** District in Aleppo Governorate. In **Lilawa** Village, **Jarablus** District, Aleppo Governorate, 30 damaged structured and 68 potentially damaged structures were identified (see map here).

UNOSAT is continuously updating its web map dedicated to this event which is available from this URL: https://experience.arcgis.com/experience/af8529245dbb4041ba532fab46ee02d2/page/UNOSAT/

2.2 Monitoring proposal for urban areas

GHS-BUILT-V depicts the distribution of built-up volumes, expressed as number of cubic meters. The data reports about the total built-up volume and the built-up volume allocated to dominant non-residential (NRES) uses, which can be used to estimate post-disaster debris volumes or corroborate damage and loss estimates. The GHS-BUILT-V raster dataset has been aggregated at building block level according to the degree of damage identified by Copernicus EMS Rapid Mapping for the activation in Türkiye (EMSR648).

Total Built-up Volume (m3)					
AOI Name	**AOI**	**MONIT.**	**Possibly damaged**	**Damaged**	**Destroyed**
Adiyaman	2	1	385706	1634555	551259
Diyarbakir	3		407932	987467	44137
Kahramanmaras	4		3713444	143204	943393
Malatya	5		1752270	3126466	629232
Osmaniye	6	1	912674	1479780	430720
Sanliurfa	7		98899	39617	0
Cumhuriyet	9		2314	51963	0
Islahiye	10	2	74811	282152	219503
Antiochia	11		4104244	1128126	70909
Nurdagi	16	1	585857	577917	58296
Turkoglu	17		53235	362439	24484
Total			**12771570**	**12417170**	**3729444**

Residential Built-up Volume (m3)					
AOI Name	**AOI**	**MONIT**	**Possibly damaged**	**Damaged**	**Destroyed**
Adiyaman	2	1	379911	1559845	545222
Diyarbakir	3		381956	925631	44137
Kahramanmaras	4		3592893	136522	928715
Malatya	5		1676459	2904742	598061
Osmaniye	6	1	890536	1476803	430720
Sanliurfa	7		98899	39617	0
Cumhuriyet	9		2314	51404	0
Islahiye	10	2	74811	278419	219503
Antiochia	11		3841385	1125988	70909
Nurdagi	16	1	584280	575624	58296
Turkoglu	17		36678	202921	22178
Total			**12237223**	**1180974 6**	**3650831**

Non-Residential Built-up volume (m3)					
AOI Name	**AOI**	**MONIT**	**Possibly damaged**	**Damaged**	**Destroyed**
Adiyaman	2	1	5795	74710	6036.861
Diyarbakir	3		25976	61837	0
Kahramanmaras	4		120551	6682	14678.16
Malatya	5		75811	221724	31170.58
Osmaniye	6	1	22138	2978	0
Sanliurfa	7		0	0	0
Cumhuriyet	9		0	559	0
Islahiye	10	2	0	3733	0
Antiochia	11		262859	2138	0
Nurdagi	16	1	1577	2293	0
Turkoglu	17		16557	159519	2306.4
Total			**534347**	**607424**	**78612**

GHS data source:
Pesaresi M., Politis P. (2022):
GHS-BUILT-V R2022A - GHS built-up volume grids derived from joint assessment of Sentinel2, Landsat, and global DEM data, for 1975-2030 (5yrs interval). European Commission, Joint Research Centre (JRC)
PID: http://data.europa.eu/89h/7a1f6b8a-d520-49a7-8f58-d5ac936b9c8a, doi:10.2905/7A1F6B8A-D520-49A7-8F58-D5AC936B9C8A

3 Ongoing drought event in Türkiye and Syria

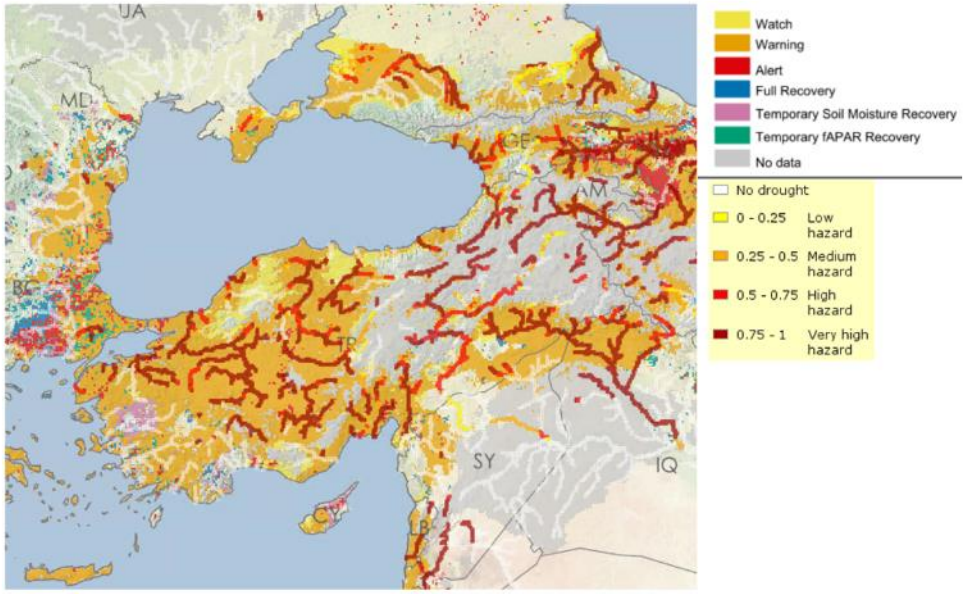
Türkiye and Syria are extensively under warning conditions according to the Copernicus European Drought Observatory. A severe lack of precipitation affects both Türkiye and Syria with impacts already on soil moisture and rivers' flow. The Combined Drought Indicator (CDI) reflects a severe lack of precipitation and drier than normal soil moisture conditions. Higher risk is detected in western Türkiye, Caucasus and southern Syria (see figure below).

The crop season has not started yet, but the current situation raises concerns for its potential impacts and risks. Monitoring the evolution of the drought is important to estimate potential impacts and support risk reduction strategies.

The compound effects of the catastrophic earthquake and the drought may exacerbate impacts on water availability for agriculture and energy.

More information is available in Appendix 1.

Figure 15. Combined Drought Indicator (CDI) and Low-Flow Index (LFI) at the end of January 2023. A Low-Flow Index of 0 corresponds to no drought and a value of 1 to the highest drought hazard (source: Copernicus EDO).



4 Media analyses

4.1 Monitoring of impacts detected from social media

The Social media for Disaster Risk Management (SMDRM) platform has been triggered by GDACS system for 2 data collections. The main one refers to the event with GLIDE : **EQ-2023-000015-TUR**.

This section aims to show how social media users, specifically on the Twitter platform, discussed about the event and how description of impacts on people/infrastructures/services are witnessed or described over time in different administrative areas affecting the event. The JRC developed an artificial intelligence deep learning model for the automated multilingual classification of messages from social media in terms of impacts with the scope of supporting humanitarian aid. In a few hours, using an automated processing pipeline for filtering impact related tweets, the SMDRM (Social Media for Disaster Risk Management) platform aggregates and presents relevant information as well as some meaningful message and images that can help depicting the situation among population. Information with statement from authoritative sources is favoured.

Since the activation, the SMDRM Platform processed more than 1 million user-generated messages for the event in Türkiye. A second data collection has been launched on the February the 8th for locations in Syria. The analysis and geo-location of impacts is still on-going for the 30K more messages collected.

Figure 16. Number of tweets mentioning the event processed in near real time by the SMDRM platform for locations in Türkiye

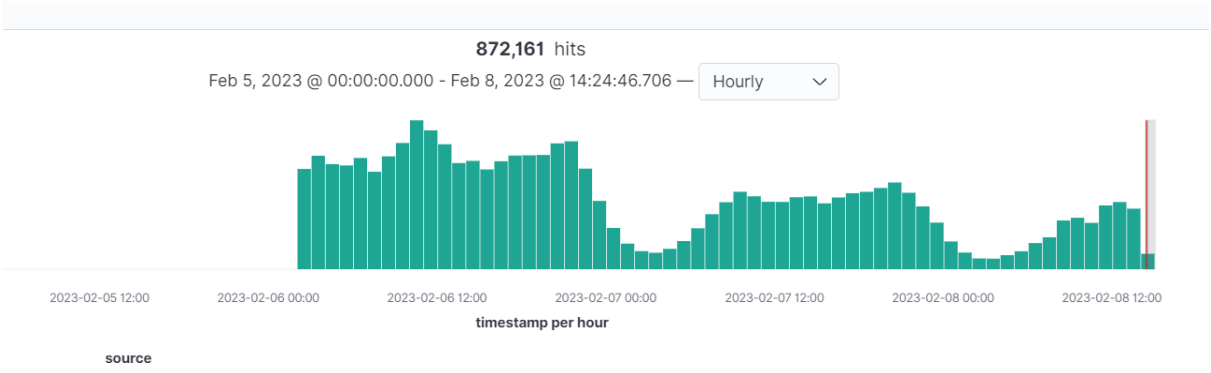


Figure 17. Number of tweets mentioning the event processed in near real time by the SMDRM platform for location s in Syria

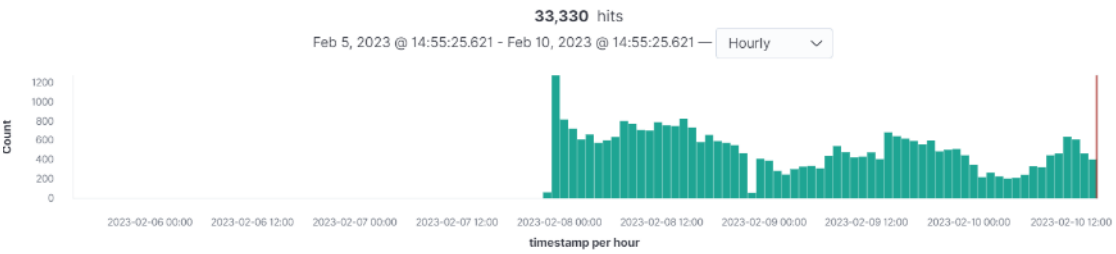


Figure 18. Country-wide image of non-duplicated georeferenced posts relevant to impacts aggregated by administrative regions.

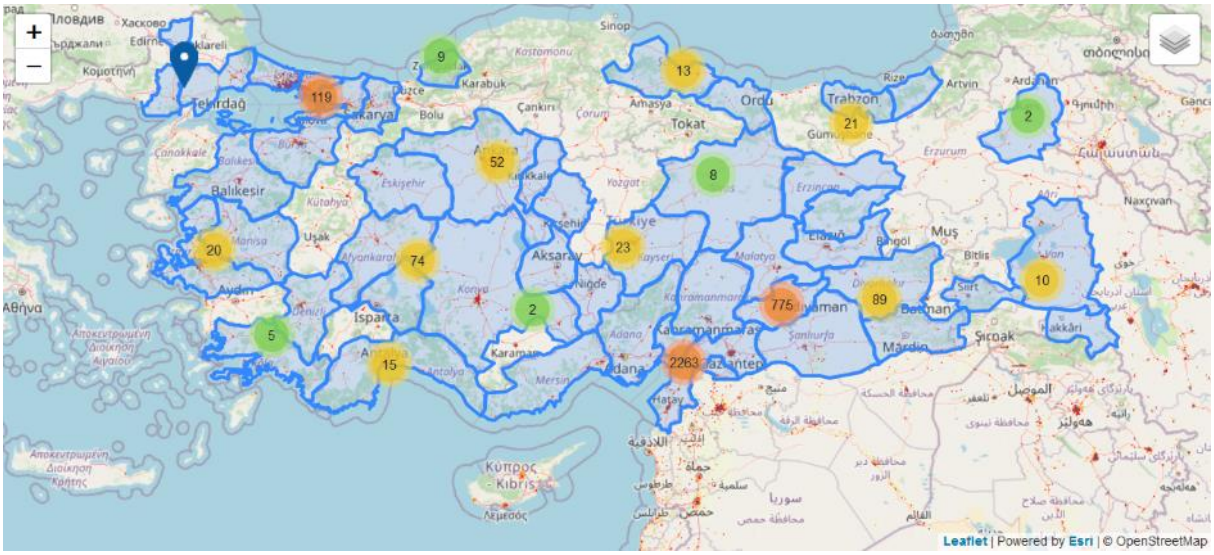
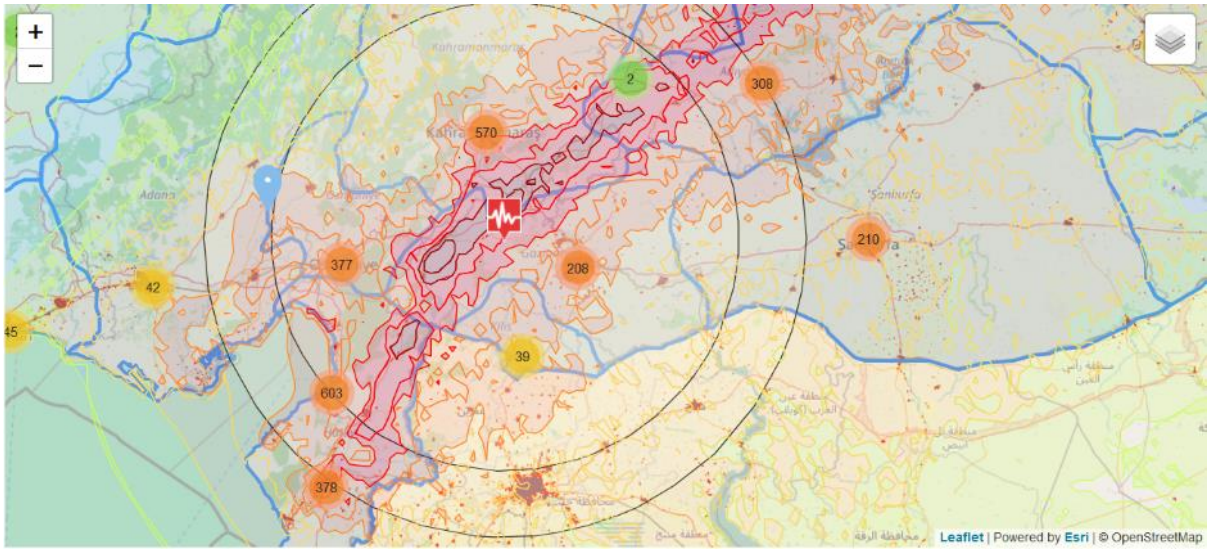
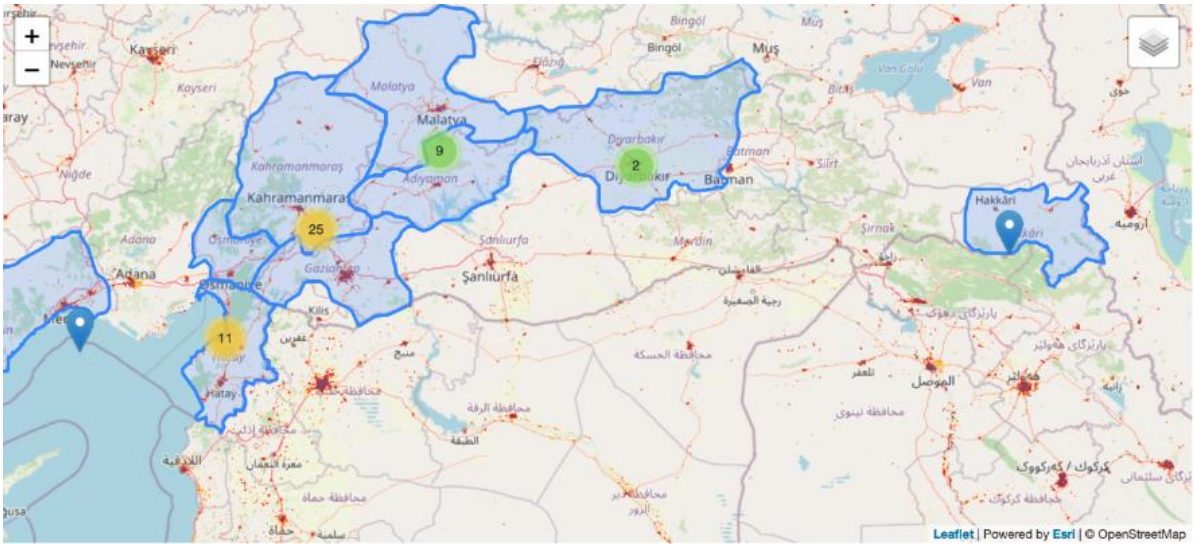


Figure 19. Detailed image of non-duplicated georeferenced posts relevant to impacts aggregated by administrative regions within the proximity of the epicentre



An effort to identify messages requesting for help has been done. Tweets mentioning keywords related to debris and help (enkaz altındayım, yardım edin) were identified. The system identified **more than 2.000 messages** relevant and containing request for help. Many messages mentioned specific location at the level of street or sub-urban area. The Figure below shows the messages requesting help georeferenced by the platform relevant to impacts aggregated by administrative regions.

Figure 20. Details of the geocoded requests for help in the area near the epicentre during the first 24h.



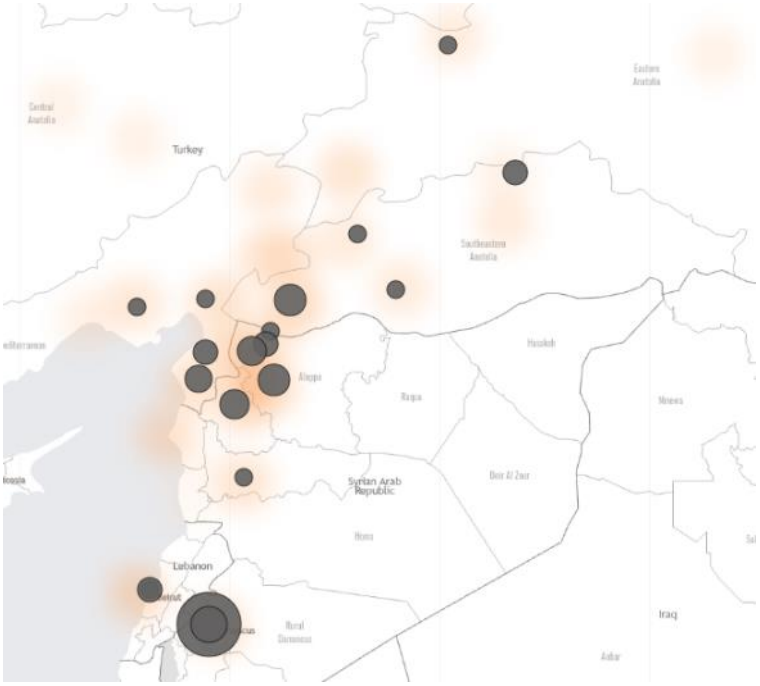
The platform could geocode only a fraction of them at the level of the administrative area. An additional analysis has been triggered with the help of digital volunteers (VOST Europe) to determine the location of such requests and it is ongoing.

4.2 Health-related news

The JRC is monitoring the situation with a specific filter defined in the Epidemic Intelligence from Open Sources (EIOS) system.

At the moment, no information is available related to new emerging diseases or outbreaks, beside the reference to the known cholera outbreak in Syria. Also, reports from media and NGOs focus on the overwhelmed medical capacity in Northern Syria (see https://www.msf-azg.be/fr/news/tremblements-de-terre-turquiesyrie-besoins-m%C3%A9dicaux-et-humanitaires-imm%C3%A9diat).

Figure 21. Mentioned locations in media reports about possible health-related issues in connection to the earthquake emergency (Source; Epidemic Intelligence from Open Sources system).



5 International Assistance

Situation in Türkiye

International assistance was requested by the Republic of Türkiye on 6 February just 1.5 hours after the first (7.8 M) event.

Reception and Departure Centre (**RDC**, coordinates: 36.983613, 35.296541) for incoming international assistance was established on 6 February in Adana Sakirpasa Airport by the UN Disaster Assessment and Coordination (UNDAC) team.

On 6 February the **UCPM** was activated by Türkiye and the Emergency Response Coordination Centre (**ERCC**) is coordinating the mobilization and as of 10 February, at 14:00 UTC, the European Commission is providing **EUR 5.2 million** in emergency humanitarian funding to respond to the consequences of the earthquake. This funding is allocated to humanitarian partners to address urgent needs.

In addition, further Request for Assistance (RfA) were submitted, as of 8 February, namely from Türkiye (consisting in further request for shelter items, medical consumables, medical devices and transportation means for the medical evacuation of the wounded from affected areas to hospitals within the country) and from the UNEP/OCHA Joint Environmental Unit (**JEU**) requested two environmental experts to be associated with the UNDAC team.

On 09 February 2023, the World Bank announced an initial USD 1.78 billion for Türkiye's recovery & reconstruction efforts after earthquake disaster (9).

As at 10 February at 11:00 UTC the situation of UCPM mobilization in terms of offered and accepted in-kind assistance, response teams, transportation means for medical evacuations and an EU Civil Protection team (EUCPT, with ERCC LO and TAST) is reported here below. Additionally, the RescEU capacity was deployed, as of 8 February.

- **UCPM in-kind assistance**: on 7 February, the ERCC received a request for shelter items (50 000 family winter tents, 100 000 blankets and 50 000 heaters). On the same day, Türkiye accepted additional shelter items offered by the MS/PS. In response to this request, 6 EU Member States (DE, EL, HR, LT, LV and SI) offered more than 125 300 (125 353) items (currently already accepted or under pending acceptance status).
- **UCPM response teams**: as of 9 February at 18.00 UTC, 21 EU Member States (AT, BE, BG, HR, CY, CZ, DE, EE, FR, EL, HU, IT, LT, MT, NL, PL, PT, RO, SK, SI, ES) and three UCPM Participating States (AL, ME, RS) offered a total of 38 teams (32 USAR and 6 medical teams), consisting in a total amount of 1 651 pax and 106 search and rescue dogs.
  - **UCPM search and rescue teams**: 31 **USAR** teams including six Heavy USAR (AT, CZ, FR x2, NL, PL), 24 Medium USAR (AL, AT, BG x4, HR, EE, DE x2, EL x2, HU, IT, LT, MT, ME, PT, RO x2, RS, SK, ES x2), one Light USAR (CY) and one canine K-9 SAR (SI) were offered. 31 USAR teams have been accepted by Türkiye and AFAD is identifying bases of operations in four locations (Hatay, K'maras, Adiyaman and Gaziantep). So far, 45 people have been rescued by the search and rescue teams deployed via the UCPM.
  - **UCPM medical teams**: one EMT (Emergency Medical Team) 1 (RO), four EMT 2 (BE, FR, IT, ES) and one medical team (AL) were offered. The national EMT Coordination Cell has been established in country with a physical presence (Adana). On 9 February, the Ministry of Health for Türkiye confirmed they received sufficient international EMT capacities.
- **RescEU**: on 8 February, the ERCC mobilised 500 Relief Housing Units (RHUs) from the rescEU reserve hosted by Sweden, as well as 2 000 tents and 8 000 beds hosted by Romania to be deployed to Türkiye.
- **UCPM transportation means** for medical evacuations: offered by 1 EU Member States (NL) and consisting in one C130 transport aircraft. The offer was accepted by Türkiye.
- EU Civil Protection Team (**EUCPT**): an EUCPT consisting of 11 experts (3 from FI and 1 from FR, LV, NO, NL, PL, RO, SE and SI) has deployed to support the local and national authorities with the coordination

[9] https://reliefweb.int/report/turkiye/world-bank-announces-initial-178-billion-turkiyes-recovery-reconstruction-efforts-after-earthquake-disaster#:~:text=WASHINGTON%2C%20Feb.%209%2C%202023,in%20and%20around%20southeastern%20T%C3%BCrkiye.

of incoming EU assistance. The EUCPT is accompanied by two **ERCC Liaison Officers** and a Technical Assistance Support Team (**TAST**) of 12 experts (4 each from DK, FI and SE). The team started to arrive on 7 February and is ensuring field presence in Besni, Hatay, Ankara and Adana in close cooperation with AFAD.

Furthermore, as of 9 February, the ERCC launched a call for nominations for 2 additional logistics experts and 1 information management expert to reinforce the current team.

In addition to the teams deployed through the UCPM as at 10 February, 15:00 UTC, 39 USAR teams from 27 countries have already been deployed. Another 15 USAR teams from 11 countries are mobilising.

Situation in Syria

On 08 February, the UCPM was activated by Syria. The Syrian government requested assistance in the form of search and rescue teams and equipment, shelter items and medicines. An additional request arrived from WFP for search and rescue equipment, shelter and non-food items, medical equipment and medicines.

By 10 February at 14:00 UTC, **Austria, Finland, Greece, Italy, Romania** and **Slovenia** had offered assistance, including 1 650 000 Medical Items, 41 336 Food Items, 11 1. The assistance is pending acceptance.

The European Commission mobilised **EUR 3.5 million in emergency humanitarian assistance for Syria**, to help people in need and to support the search and rescue operations. The EU is closely cooperating with the humanitarian partners on field to support affected medical facilities with medical kits, provide food and shelter and repair damaged infrastructure. Various EU Member States have offered financial assistance to the UN and/or other international organisations on the field.

A UNDAC team was expected to arrive in Aleppo on 09 February. USAR teams from **Armenia, Algeria, Tunisia** and **Spain** are reportedly operating on field.

International organisations are already mobilizing staff and resources on the field.

Several countries have offered financial support to Syria and/or international and national organisations operating in Syria. In-kind assistance and relief teams have already arrived on field, as reported by SANA and other open-source media, from the following countries:

- **Algeria** offered 115 tons of assistance, including food and medical supplies, tents and blankets.
- 32 tons of food and medical supplies and medicines from **Armenia** reached Aleppo on 09 February.
- The Red Cross Society of **China** sent on 09 February a team of rescue workers and medical supplies. A contribution of USD 200,000 has been made to the Red Crescent Organization.
- Two planes of aid from **India** arrived in Syria.
- **Iran** offered more than 70 tons of humanitarian and relief aid, including blankets, tents, and foodstuffs. Six planes have already reached Syria, an additional one with medical supplies should arrive by 12 February.
- **Iraq** sent 140 tons of aid and 28 fuel tankers.
- **Jordan** offered humanitarian and medical aid which reached Damascus on 08 and 10 February.
- **Lebanon** announced the opening of Lebanese airspace and ports to facilitate the arrival of aid and rescue teams
- **Libya** offered 40 tons of humanitarian and relief aid.
- **Malaysia** offered humanitarian aid.
- **Oman** announced the setting up of an air bridge to transport relief and medical aid. A plane loaded with aid reached Syria on 09 February.
- Humanitarian, relief and nutritional assistance offered by **Pakistan** arrived in Damascus on 08 February.
- **Palestine** announced sending a relief team to support the efforts of rescue operations. The team was expected to arrive on 09 February.
- **Russia** expressed readiness to send aid and to help with the reconstruction process. On 07 February, 60 units of military and special equipment were involved in clearing rubble in several settlements in the province of Latakia.
- 9 tons of medicines, blankets, food items, and medical devices from **Tunisia** arrived in Aleppo on 10 February.
- **Qatar** offered humanitarian aid.

- **United Arab Emirates (UAE)** offered more than 200 tons of relief aid, which includes tents, food and medical supplies. The assistance arrived in Syria. Additionally, the UAE plans to send USD 50 million to support Syria and announced its intention to establish a field hospital and send a search and rescue team.
- **Venezuela** offered 15 tons of food and medical aid. A team of experts of 25 aid workers plus equipment arrived in Damascus on 08 February.

The White Helmets called for international support in north-western Syria. They reported that only **Egypt** sent a technical team of specialists to support rescue operations and doctors to provide medical care, while no other international aid was received so far.

6 Post Disaster Needs Assessment (PDNA) – preliminary reflection on the built environment in Syria building on previous studies by JRC

Since 2013, JRC has been performing post conflict assessments over many cities in Syria, developing a large set of remote sensing data and analyses.

The following preliminary proposal has been drafted in anticipation of a post-disaster needs assessment (PDNA) to help assess the reconstruction and rehabilitation needs and make an estimate of the overall costs.

The post-disaster setting is a complex and demanding environment, where the most urgent tasks are:

- to promptly assess humanitarian needs and provide life-saving relief assistance to those affected;
- an assessment of the damages and losses caused by the disaster;
- and the development of a comprehensive recovery plan that would lead back to a sustainable development process where risk reduction in the face of disasters is explicitly considered.[10]

Additionally, the area affected by the earthquake has also been directly or indirectly affected by the Syrian conflict. Therefore, the needs assessment process should represent a collective effort to deliver an effective and sustainable international response considering the effects of both the disaster and the pre-existing conflict-related crisis.

The following paragraphs outline the analysis previously performed in Syria on conflict-related damage in urban areas, which could be usefully compared to the outcomes of the Copernicus rapid mapping activation (see below for details).

Finally, a possible activation of the satellite-based service of Copernicus Risk & Recovery Mapping could detect the presence and volume of debris and monitor the removal process, as well as the reconstruction phase.

6.1 Damage assessment in Syria

Over the years, JRC has conducted the following post-conflict analyses in several Syrian cities:

1. Land Use / Land Cover (LU/LC) classifications;

2. Multi-temporal Damage Assessments (DAs) in cities and towns affected by the conflict and on cultural and heritage sites;

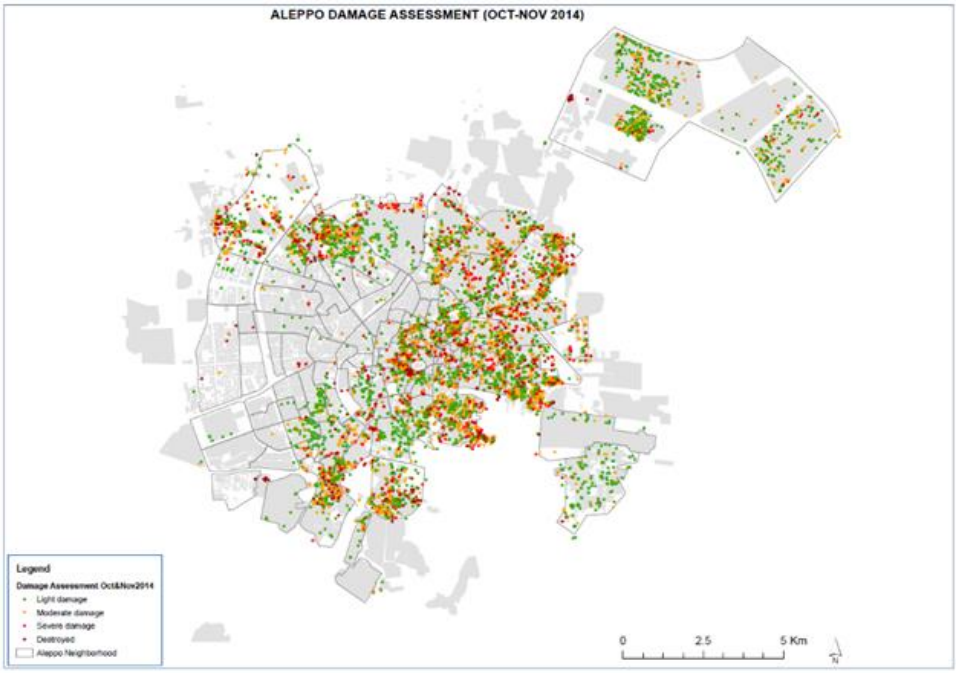
3. Assessment and monitoring of reconstruction activity.

The analyses were conducted using high resolution satellite imagery through manual observation and validation. Within the LU/LC analyses, building blocks of affected cities were digitized and divided in detailed classes and sub-classes, distinguishing, among others, between formal and informal structures, and individual and attached multi storey buildings.

The DAs were performed according to a fixed set of rules designed to identify the presence of affected buildings and the level of structural damage observed based on visual analysis of pre-2011 and during/post-conflict satellite imagery. Four classes of damage were defined (slight, moderate, severe, destroyed/razed to the ground). Each damaged building corresponds to a damage point. New classes were added at a later stage to account for the reconstruction efforts taking place in some cities and identify new or repaired buildings.

[10] Post-Disaster Needs Assessment Guidelines. European Union, World Bank and the members of the United Nations Development Group: FAO, ILO, UNDP, UNEP, UNESCO, UN Habitat, UNICEF, UN Women and the WHO. 2013

Figure 22. Damage assessment in Aleppo.

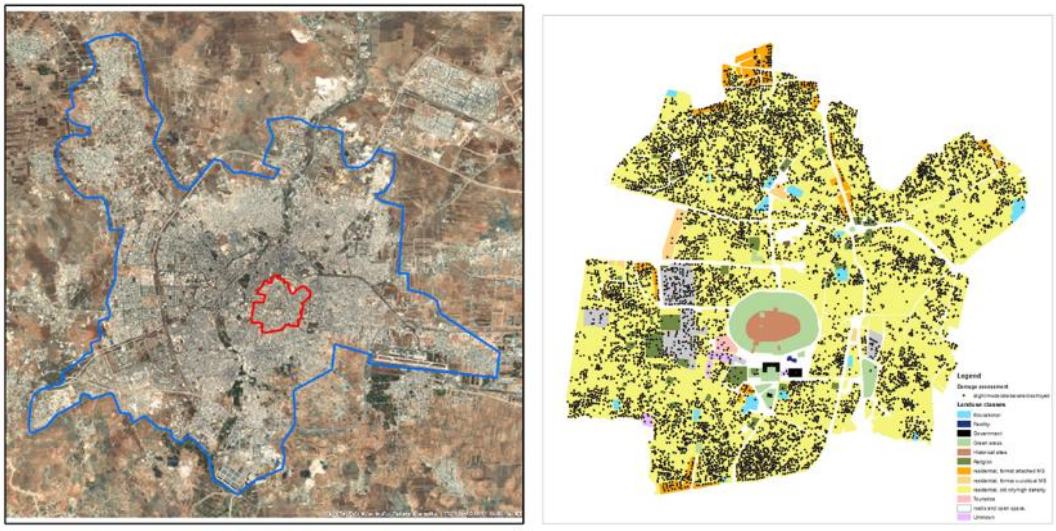


Existing data on conflict damage and LU/LC classification can be overlaid with new earthquake damage data to identify the most vulnerable buildings and areas. This would give a complete picture of layered damage and provide further understanding of the earthquake's impact on pre-existing conflict-related vulnerabilities.

JRC also focused on the state of old city centres and cultural heritage sites in Syrian cities after the war. The analysis was conducted by focusing on the extent of the historic city centres to assess the number of damaged buildings, the size of affected areas as well as the percentage of damage to heritage sites compared to the whole LU/LC class extent.

A precise mapping of post-conflict urban functionality in old cities - essential to support investments in urban heritage restoration – is provided by breaking down the estimated number of affected structures according to LU/LC categories. For instance, the old city of Aleppo suffered extensive damage from the conflict. Residential areas and religious sites were the most damaged. In fact, 83% of religious sites in the old city of Aleppo were damaged to some extent, while 77% of residential buildings were either slightly or severely damaged.

Figure 23. Aleppo old city extent and LU/LC analysis and damage assessment.



7 Expected Updates

The report will be updated upon need to monitor the event and the response activities.

Annexes

Annex 1. Information regarding State of Emergency (SoE) in Türkiye

Republic of Türkiye declared State of Emergency (SoE) on 8 February 2023 based on the Article 3a of the Law #2935 applicable in the event of one or more of the natural disasters, dangerous epidemics or severe economic depression. SoE was approved at the Turkish Parliament on 9 Feb 2023

According to Article 119 of the Constitution of Republic of Türkiye, the President is entitled to declare State of Emergency (SoE - OHAL in Turkish) in the whole or in one region of the country for a period not exceeding six months in case of the emergence of natural disasters, dangerous epidemics, or severe economic depression[11].

Declaration of SoE can be renewed as long as necessary for periods not exceeding 4 months.

The last time a SoE was declared in Türkiye was after the 2016 Turkish coup d'état attempt (based on the Article 3b of the Law #2935). It had been renewed for three months several times and was permanently lifted in July 2018.

Obligations and measures to be taken in Natural Disasters under SoE:

- Public institutions and organizations and legal and real persons within the region where a SoE have been declared are obliged to give the land, building, facility, vehicle, equipment, food, medicine and medical equipment, clothing and other items that will be requested or imposed on them.

- All citizens between the ages of 18 and 60 in regions where a SoE has been declared are obliged to perform the tasks assigned to them due to the state of emergency.

- the following additional measures can be taken:

a) Prohibiting settlement in certain parts of the region, restricting entry to and exiting certain settlements, evacuating certain settlements or transferring them to other places,

b) Suspending education in public and private education and training institutions of all degrees and closing student dormitories temporarily or indefinitely,

c) Inspecting entertainment or recreational/touristic accommodation facilities and opening and closing them, and to use these places according to the necessities of the SoE

d) Limiting or removing the annual leave of the personnel responsible for the execution of the emergency services in the region,

e) Making use of all communication tools and equipment within the boundaries of the SoE and temporarily seizing them for this purpose, when necessary,

f) Demolish dangerous buildings; destroying movable and immovable properties, which are found to threaten health, and foodstuffs and crops that are harmful to health,

g) To control, limit or, if necessary, prohibit the removal or introduction of certain foodstuffs, animal and animal feed and animal products out of the zone,

h) Arranging the distribution of essential goods deemed necessary,

i) Food items and goods and all kinds of fuels necessary for the nutrition, heating, cleaning and enlightenment of the public, drugs, chemicals, tools and other things used in the protection of health, treatment and medicine, goods and materials used in construction, industry, transportation and agriculture, to take necessary measures for the production, sale, distribution, storage and trade of other goods, tools, equipment and all kinds of materials necessary for the shutting down the workplace, if it is not vital for the place where the workplace is located, taking into account the way or nature of the act about those who stop or slow down,

j) to take measures regarding land, sea, and air traffic order, to register or prohibit the entry and exit of transportation vehicles to the region.

[11] The declaration of a SoE due to the prevalence of violence and serious disruption of public order is defined in Article 120.

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