# 6 February 2023 M 7.8 Marash/Antep (Kehramanmarash) Earthquake, Preliminary Satellite-Based Comprehensive Damage Assessment Report

Latakia, Aleppo, and Idleb Governorates
Syrian Arab Republic

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# I. Overview

On the 6th of February 2023, the Marash/Antep earthquake, also called the Kahramanmaras earthquake sequence, struck southern Türkiye and north-western parts of Syria. The mainshock measured a magnitude of 7.8 and occurred at a crucial moment, 4.15 am local time, when most people were at home sleeping. It was a shallow depth earthquake with an epicentre located about 35 km north-west of the Turkish city of Gaziantep. The 7.8 magnitude earthquake was followed by two large-scale earthquakes the same day, measuring a magnitude of 7.5 and 6.7. More than 10,000 aftershocks were recorded and felt all over the area. In the aftermath of the mainshock earthquake there were reports of collapsed infrastructures and buildings in several areas in Southern Türkiye and Syria's major north-western cities such as Idleb, Aleppo, Latakia and Jebleh. On the 20th of February 2023, another strong earthquake was recorded in the south of Hatay province (Türkiye) close to the city of Samandag and the Syrian borders. The consequences were another set of destructions and damage to infrastructures.

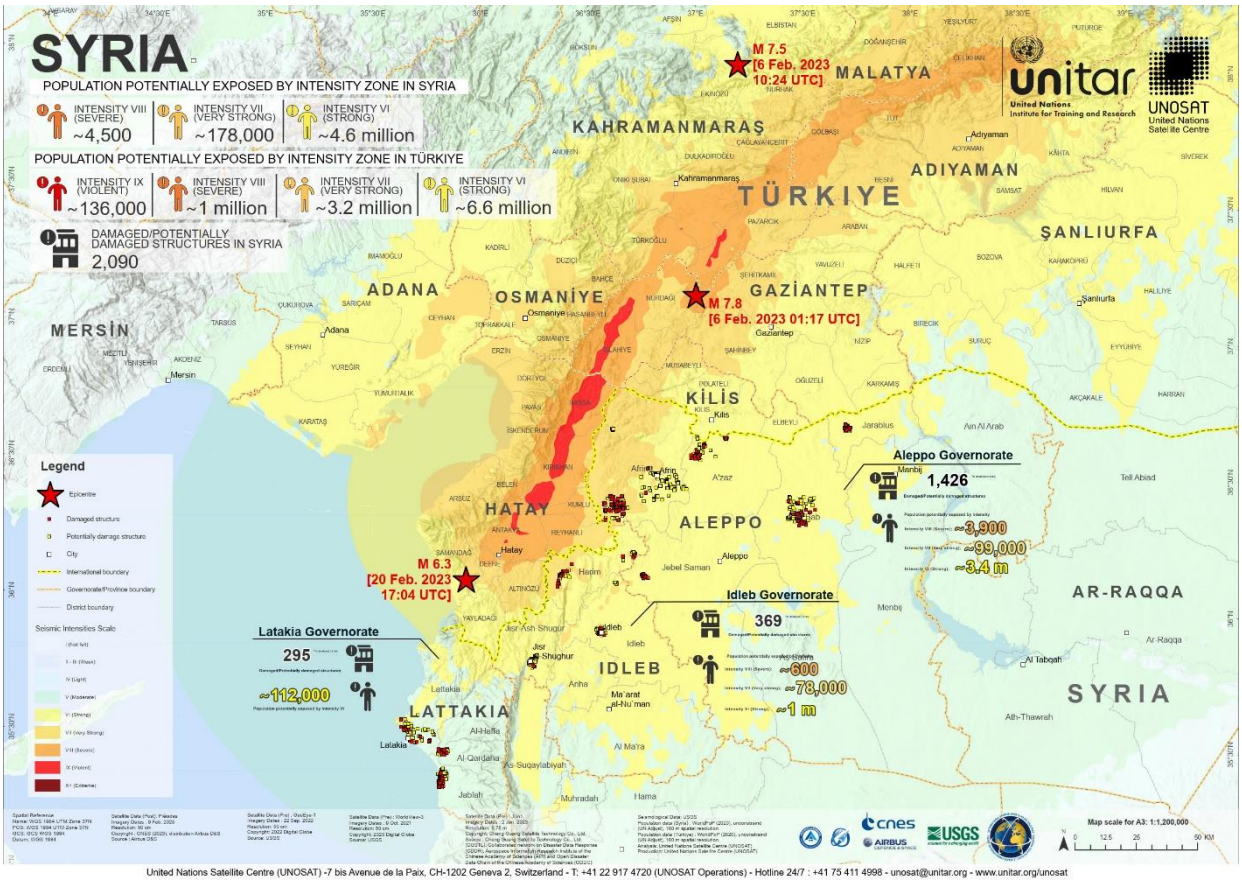


*Figure 1, This map illustrates Comprehensive satellite-detected building damage overview in Syrian Arab Republic and Seismological data of Marash/Antep earthquake (6 February 2023, M 7.8) UNOSAT and partners' preliminary analysis MSF identifies a total of 2,090 buildings/structures as damaged/Potentially damaged structures constraints within Latakia, Aleppo, and Idleb Governorates.*

The major earthquakes and the numerous aftershocks that struck southern and central Türkyie and northern and western Syria resulted in the deaths of more than 46,000 people in Türkyie, over 4,500 in northwest Syria (OCHA). The humanitarian community estimated that 8.8 million people live in areas most affected by the earthquake in Syria. Overall, 170 sub-districts in 43 districts in 10 of Syria's governorates have been impacted by the earthquake. Prior to the earthquake more than 15 million people in Syria were already in need of assistance in 2023.

Syria's current complex humanitarian emergency is among the largest humanitarian crises in the world and the earthquake has exacerbate the situation and vulnerabilities. One obstacle in providing aid quickly in Syria is that the government does not control all of the northwest, the area

hardest hit by the earthquake. Coordinated assistance by the UN to Syria's northwest arrives across the border from Türkyie, while Damascus is where assistance is coordinated within the rest of government-controlled Syria.

In northwest Syria, 4.1 million people depend on humanitarian assistance, the majority of whom are women and children. While countries have offered to support Türkyie, and the country has disaster management structures to support the response, getting aid to affected Syrians is likely to be more difficult, considering the country is not controlled by one authority.

More than 86,000 displacement movements were recorded in northwest Syria, with people mostly coming from Jandairis, where at least 1,000 people have died from the earthquakes. Movements continue to be registered in the direction of the northern Syrian border and east Syria. Türkyie is the world's largest refugee hosting country, where 1.75 million refugees are estimated to live within the worst affected areas of the earthquake (source: UNHCR).

The World Bank has at the moment of this report estimated that the economic losses in Türkiye exceed 34 billion US dollars, which corresponds to 4% of the country's GDP. More than 50 percent of the loss is related to residential buildings, while 28% is related to non-residential buildings. In Syria, the total physical loss is estimated to as much as 5,1 billion US dollars, which corresponds to almost 10% of the country GDP. However, the final economic impact from the earthquake is still unknown, as the estimated loss do not consider the recovery or reconstruction nor the impact on economic disruption.

# II. Comprehensive Satellite-Detected Building Damage Assessment

On 6 February 2023, the United Nations Satellite Centre (UNOSAT) activated the International Charter for Space and Major Disasters (Space Charter) on behalf of the International Federation of Red Cross and Red Crescent Societies. The activation of the Space Charter was triggered by the UNOSAT team just few hours after the Mw 7.8 earthquake occurred in southern Türkyie to support with satellite imagery analysis the planning and coordination of rescue and response operations in Syria.
UNOSAT was nominated Project Manager (PM) for the Charter Call in Syria (Activation ID: 798) and worked closely with several other satellite mapping groups nominated as Value-Adders (VA) including Copernicus-EMS, Médecins Sans Frontières, EMERCOM, IPGP, the British Geological Survey to provide satellite-derived analysis and mapping products to all humanitarian actors involved in the rescue and response operations in Syria following the earthquake event.

In order to monitor and frequently update the ongoing damage analyses carried out by the different satellite mapping groups, UNOSAT published a dedicated *UNOSAT Damage Assessment Live Map* that allows users to view and download damage analyses (such as building damage points) covering all defined areas of interest for both the Syria and Türkyie charter calls.

In addition, to facilitate overall technical coordination between the various satellite mapping groups involved and to provide the end user with a good overview of planned, ongoing and completed satellite analyses, UNOSAT published and shared the GDACS-Satellite Mapping and Coordination System (SMCS). The SMCS platform also provides links to the end products published.

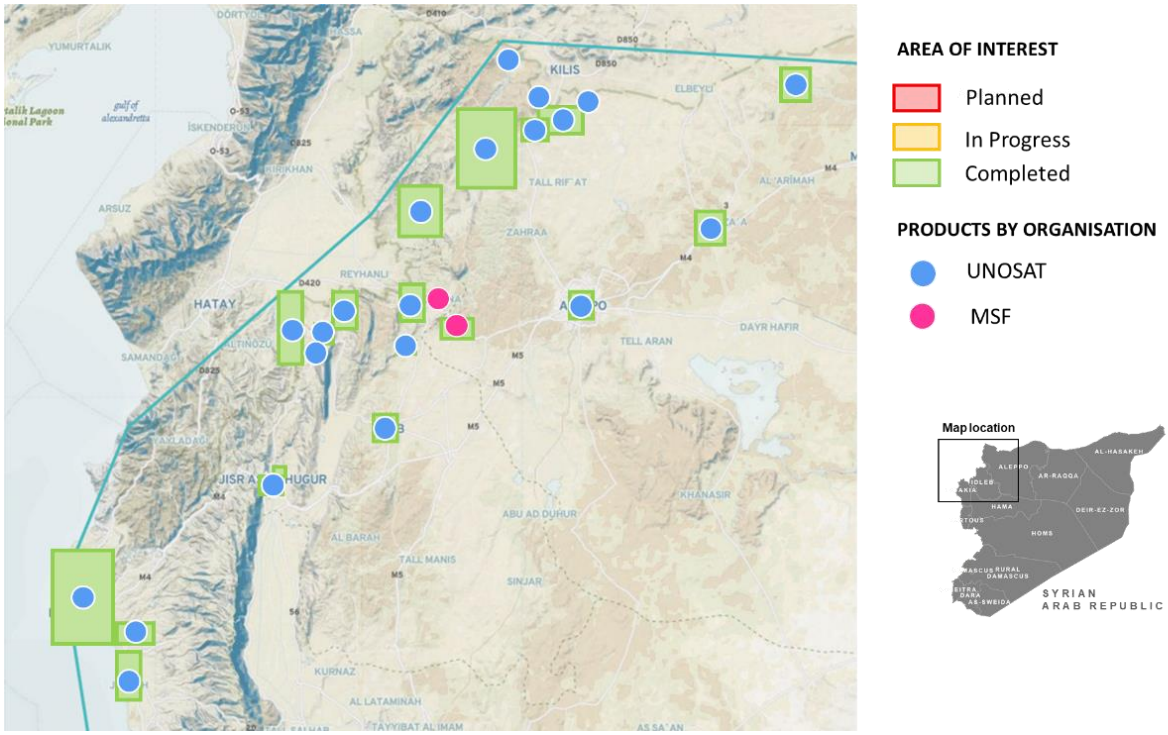


*Figure 2, the snapshot of GDACS – SMCS, depicts the analysis extent and status of UNOSAT and MSF (2)*

## II.1 Satellite-derived analysis

As part of the Charter for Syria appeal, UNOSAT analysed a vast amount of pre- and post-satellite imagery available through the Charter to provide a comprehensive overview of the distribution and extent of damage caused by the earthquake in Syria. Efforts were particularly made to estimate the number of damaged buildings, but additional satellite derived analyses were also made to assess the level of damage to cultural heritage and some critical infrastructures. In this regard, UNOSAT released products related to the dam breakage along the Orontes River. In cooperation with Wuhan University, the UNOSAT team has also released a Light loss assessment report for northern Syria and southern Türkyie using Night-time Light Imagery.

The overall damage analysis carried out by UNOSAT was conducted using a series of pre- and post-event satellite images covering different areas of interest. This report focuses on the most affected areas of Syria and summarises the satellite-derived building damage analysis for the Governorates of Latakia, Aleppo and Idleb in the Syrian Arab Republic.

It should be also outlined that due to previous building damage analyses carried out by UNOSAT during the conflict in Syria, in some areas it was possible to distinguish earthquake-induced damage from pre-existing damage related to the ongoing conflict in Syria.

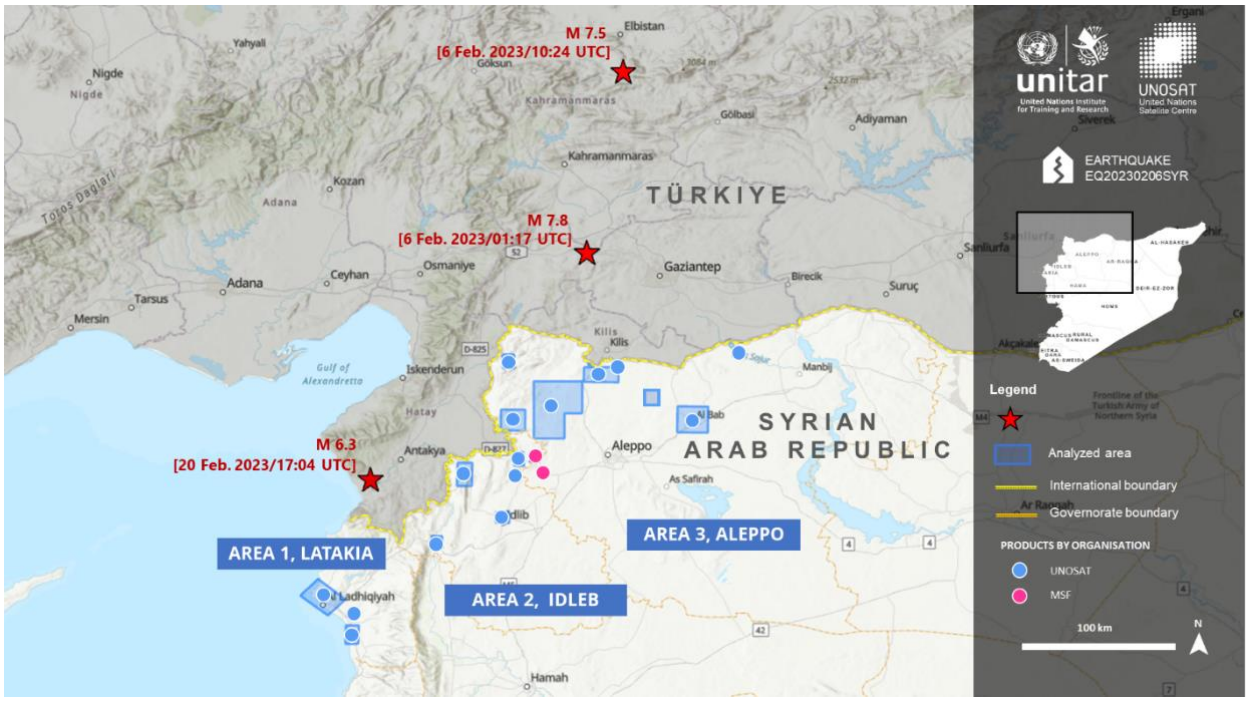


*Figure 3. This map depicts the analysis extents in Latakia, Aleppo, and Idleb Governorate of Syrian Arab Republic examined by UNOSAT and MSF to determine infrastructure damage caused by the M7.8 earthquake on the 6th of February 2023.*
*The map also identifies the earthquake epicentres in Türkiye.*

| Area of interest | Pre event satellite data | Post event satellite data |
|---|---|---|
| **Area 1, Latakia Governorate** | 1. WorldView-3, 26 Jul. 2022 | 1. Pléiades, 9 Feb. 2023 |
| | 2. WorldView-3, 6 Dec. 2022 | 2. Pléiades, 12 Feb. 2023 |
| **Area 2, Idleb Governorate** | 1. WorldView-2, 20 Feb. 2021 | 1. Pléiades, 9 Feb. 2023 |
| | 2. GeoEye-1, 22 Nov. 2021 | 2. Gaofen-2, 9 feb 2023 |
| | 3. WorldView-3, 9 Oct. 2021 | 2. Pléiades, 16 Feb. 2023 |
| | 4. WorldView-3, 26 Jul. 2022 | 3. WV-2, 17 February 2023 |
| | 5. WorldView-2, 22 Aug. 2022 | 4. Pléiades, 22 Feb 2023 |
| | 6. GeoEye-1, 22 Sep. 2022 | |
| | 7. Jilin1, 2 Jan. 2023 | |
| **Area 3, Aleppo Governorate** | 1. WorldView-2,7 Nov. 2021 | 1. WorldView-3, 7 Feb. 2023 |
| | 2. WorldView-2, 10 Oct. 2022 | 2. Pléiades, 8 Feb. 2023 |
| | 3. WorldView-2, 11 Oct. 2022 | 3. Pléiades, 9 Feb. 2023 |
| | 4. WorldView-2, 28 Oct. 2022 | 4. Pléiades, 10 Feb. 2023 |
| | 5. WorldView-2, 21 Jan. 2023 | 5. Pléiades, 11 Feb. 2023 |
| | 6. WorldView-2, 26 Jan. 2023 | 6. WorldView-3, 11 Feb. 2023 |
| | | 7. WorldView-2, 12 Feb. 2023 |
| | | 8. Pléiades, 15 Feb 2023 |
| | | 9. WorldView-2, 17 Feb. 2023 |

*Table 1. Overview of satellite imageries had been used for the damage assessment covering all analysed area and its acquisition date.*

## II.2 Analysis summary

This comprehensive satellite-derived building damage analysis identifies a total of 2,090 buildings/structures with visible damages constraints within Latakia, Aleppo, and Idleb Governorates.


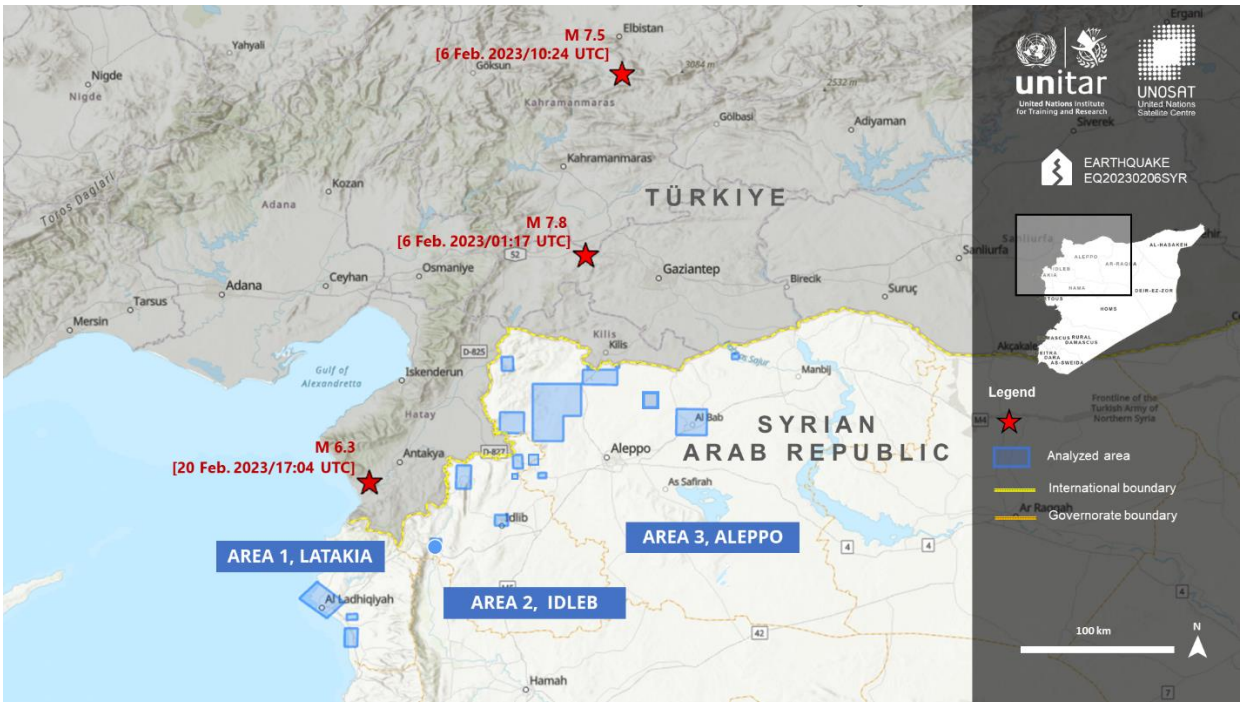


*Figure 4. This map depicts the analysis extents in Latakia, Aleppo, and Idleb Governorate of Syrian Arab Republic examined by UNOSAT and MSF to determine infrastructure damage caused by the M7.8 earthquake on the 6th of February 2023.*

| Governorate | Area ($km^2$) | Analysis Extent | | Building damage assessment | | |
|---|---|---|---|---|---|---|
| | | Analyzed aerea ($km^2$) | Percentage of Area in Analyzed Extent ($km^2$) | Damaged Buildings | Potentially Damaged Buildings | Total of Damaged and Potentially Damaged Buildings |
| **Latakia** | 2,448 | 179 | **7%** | 82 | 213 | 295 |
| **Idleb** | 5,418 | 86 | **2%** | 103 | 266 | 369 |
| **Aleppo** | 19,883 | 957 | **5%** | 431 | 995 | 1,426 |
| **Hama** | 11,094 | 67 | **1%** | - | - | - |
| **Total** | **27,749** | **1,222** | **4%** | **616** | **1,474** | **2,090** |

*Table 2. Overview of building/structure damage assessment conducted by UNOSAT, and MSF The table gives an overview of the total area and analysed area of each affected department and the potentially damaged and damaged buildings and roads identified during the analysis.*

## II.3 Area 1: Latakia Governorate

Latakia Governorate has an estimated population of approximately 790,000 (as of 2020) and a total area of 2,448 km$^2$. As illustrated in Figure 5, the overall analysis extent for Latakia governorate comprises of three separate areas of interest covering approximately 179 km$^2$ across four districts, including Latakia, Al-Haffa, Al-Qardaha and Jebleh.

As reported in Table 3, UNOSAT analysis shows 295 buildings/structures with visible damage and/or potentially damaged.

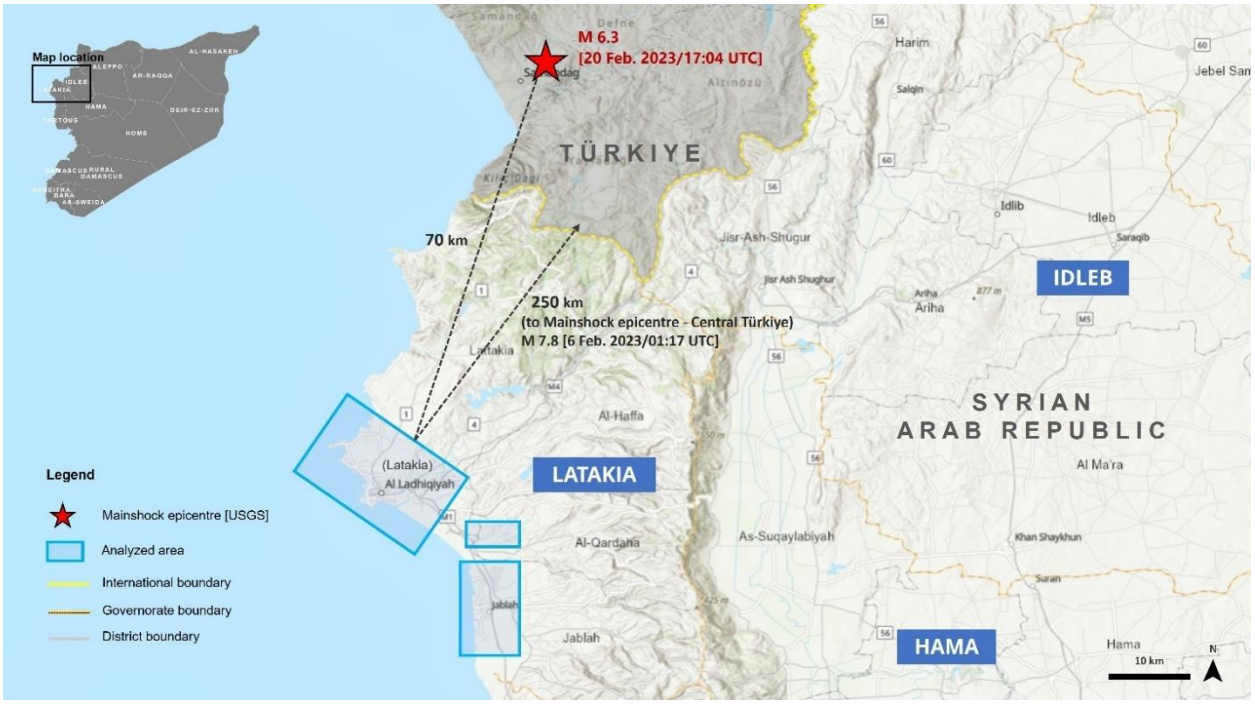


*Figure 5. This map depicts the analysis extents in Latakia Governorate of Syria examined by UNOSAT to determine infrastructure damage caused by the M7.8 earthquake on the 6th of February 2023. The map also identifies the three Mainshock epicentre, which is also situated within the governorate.*

| Governorate/ Area of interest | Analysis extent | Building damage assessment | | |
|---|---|---|---|---|
| | Analyzed aerea (km$^2$) | Damaged Buildings | Potentially Damaged Buildings | Total of Damaged and Potentially Damaged Buildings |
| **Latakia** | **179** | **82** | **213** | **295** |
| Latakia City | 137 | 18 | 55 | 73 |
| Istamo Village and surounding | 13 | 22 | 42 | 64 |
| Jebleh City | 11 | 31 | 90 | 121 |
| Nortern part of Jebleh | 18 | 11 | 26 | 37 |

*Table 3. Overview of building/structure damage assessment in Latakia City[1], Istamo Village and surrounding[2], Jebleh City [3]and Northern part of Jebleh[4], Latakia Governorate. The table gives an overview of the total area and analysed area of each affected populated place of the department and the potentially damaged and damaged buildings identified during the analysis.*

[1] https://unosat.org/products/3481
[2] https://unosat.org/products/3488
[3] https://unosat.org/products/3486
[4] https://unosat.org/products/3488

## II.3.1 Building/Structure damage assessment in Latakia Governorate

The preliminary assessment of damage to buildings and structures in Latakia Governorate was conducted by the UNOSAT team using a photo-interpretation approach, using very high-resolution satellite images before and after the seismic event made available through the Space Charter. Post-event satellite images were acquired on 9th and 12th of February 2023, together with the images available before the disaster. In the analysed areas, 82 buildings with significant visible damage were observed. The city of Jebleh recorded the highest number of earthquake affected buildings, with 121 damaged and potentially damaged buildings.

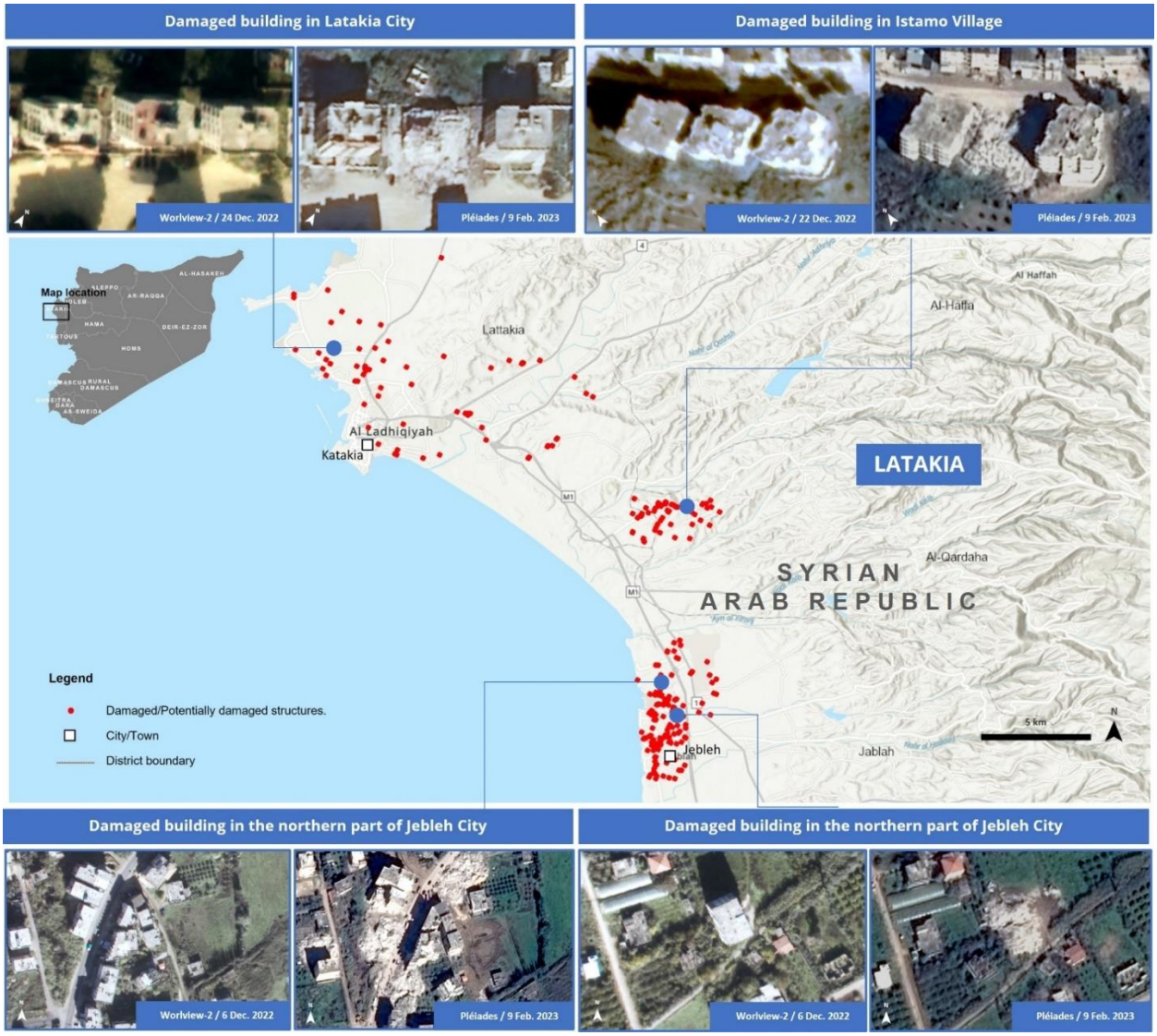


*Figure 6. This map depicts the extent of damaged buildings in the Latakia Governorate of Syrian Arab Republic, specifically in the Jebleh City, Latakia City, and surounding. Additional inset images from Pleiades satellite acquired on the 9th of February 2023 highlight and visualise the extent of damage to buildings within Jebleh City, Latakia City, and Istamo village.*

## II.4 Area 2: Idleb Governorate

Idleb Governorate has an estimated population of approximately 1.2 million people (as of 2021) and a total area of 5,418 km$^2$. As illustrated in Figure 7, the overall analysis extent for Idleb Governorate comprises of seven separate areas of interest covering approximately 86 km$^2$ across three districts, including Idleb, Jisr-Ash-Shugur, and Harim.

As reported in Table 4, UNOSAT analysis shows 369 buildings/structures with visible damage and/or potentially damaged.

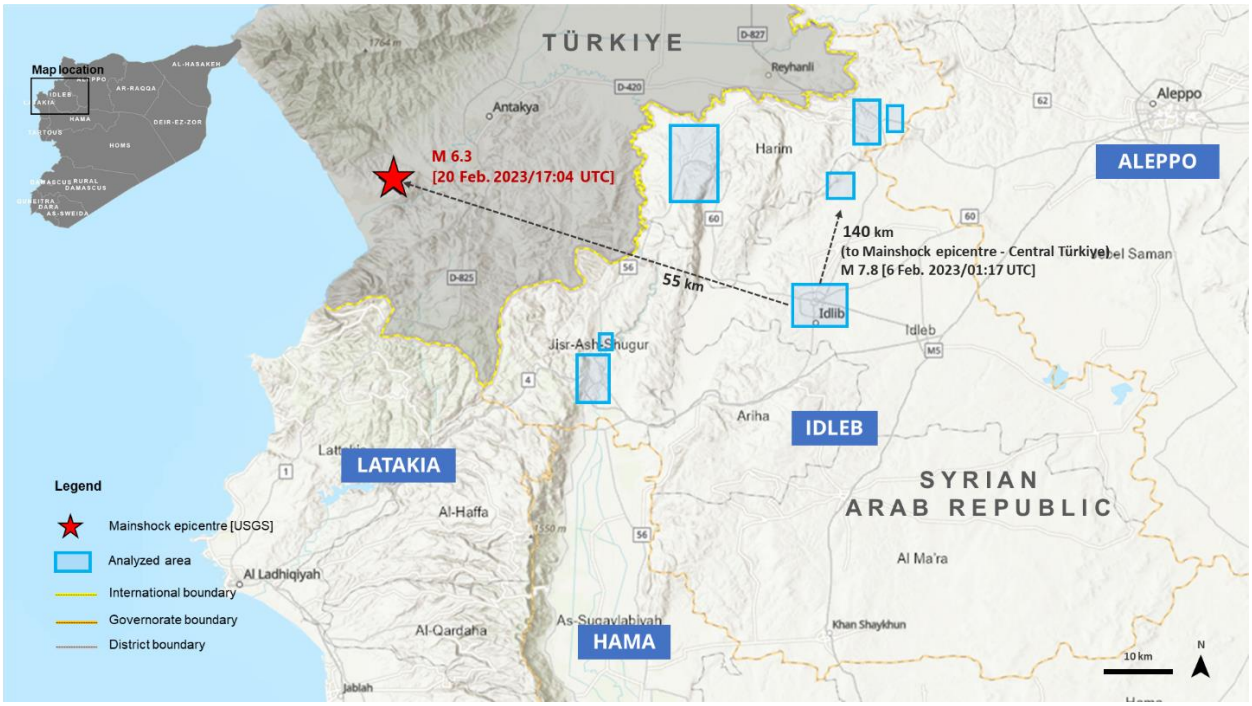


*Figure 7. This map depicts the analysis extents in Aleppo Governorate of Syria examined by UNOSAT and MSF to determine infrastructure damage caused by the M7.8 earthquake on the 6th of February 2023. The map also identifies the three Mainshock epicentre, which is also situated within the department.*

| Governorate/ Area of interest | Analysis extent | Building damage assessment | | |
|---|---|---|---|---|
| | Analyzed aerea (km$^2$) | Damaged Buildings | Potentially Damaged Buildings | Total of Damaged and Potentially Damaged Buildings |
| **Idleb** | **86** | **103** | **266** | **369** |
| Idleb City | 19 | 12 | 80 | 92 |
| Jisr ash-Shughur City | 15 | 7 | 68 | 75 |
| Salqin Town | 52 | 35 | 61 | 96 |
| Sarmada Town | 28 | 47 | 7 | 54 |
| Ad Dana Town | 5 | 2 | 15 | 17 |
| Killi Village | 7 | - | 11 | 11 |
| Ein Elsoda Village | 4 | - | 24 | 24 |

*Table 4. Overview of building/structure damage assessment in Idleb City[5], Jisr ash-Shughur City[6], Salqin Town[7], Salquin Town, Ad Dana Town, Kili Village [8]and Ein Elsoda Village, Idleb Governorate. The table gives an overview of the total area and analysed area of each affected populated place of the department and the potentially damaged and damaged buildings identified during the analysis.*

[5] https://unosat.org/products/3487
[6] https://unosat.org/products/3501
[7] https://unosat.org/products/3494
[8] https://unosat.org/products/3516

## II.4.1 Building/Structure damage assessment in Idleb Governorate

The preliminary assessment of damage to buildings and structures in Latakia Governorate was conducted by the UNOSAT team and other partners using a photo-interpretation approach, using very high-resolution satellite images before and after the earthquake event made available through the Space Charter. Post-event satellite images were acquired on 9th, 16th,17th, 22th of February 2023, together with the images available before the disaster. In the analysed areas, 103 buildings with significant visible damage were observed. In Salqin Town the analysts observed the highest number of earthquake affected buildings, with 96 damaged and potentially damaged detected.

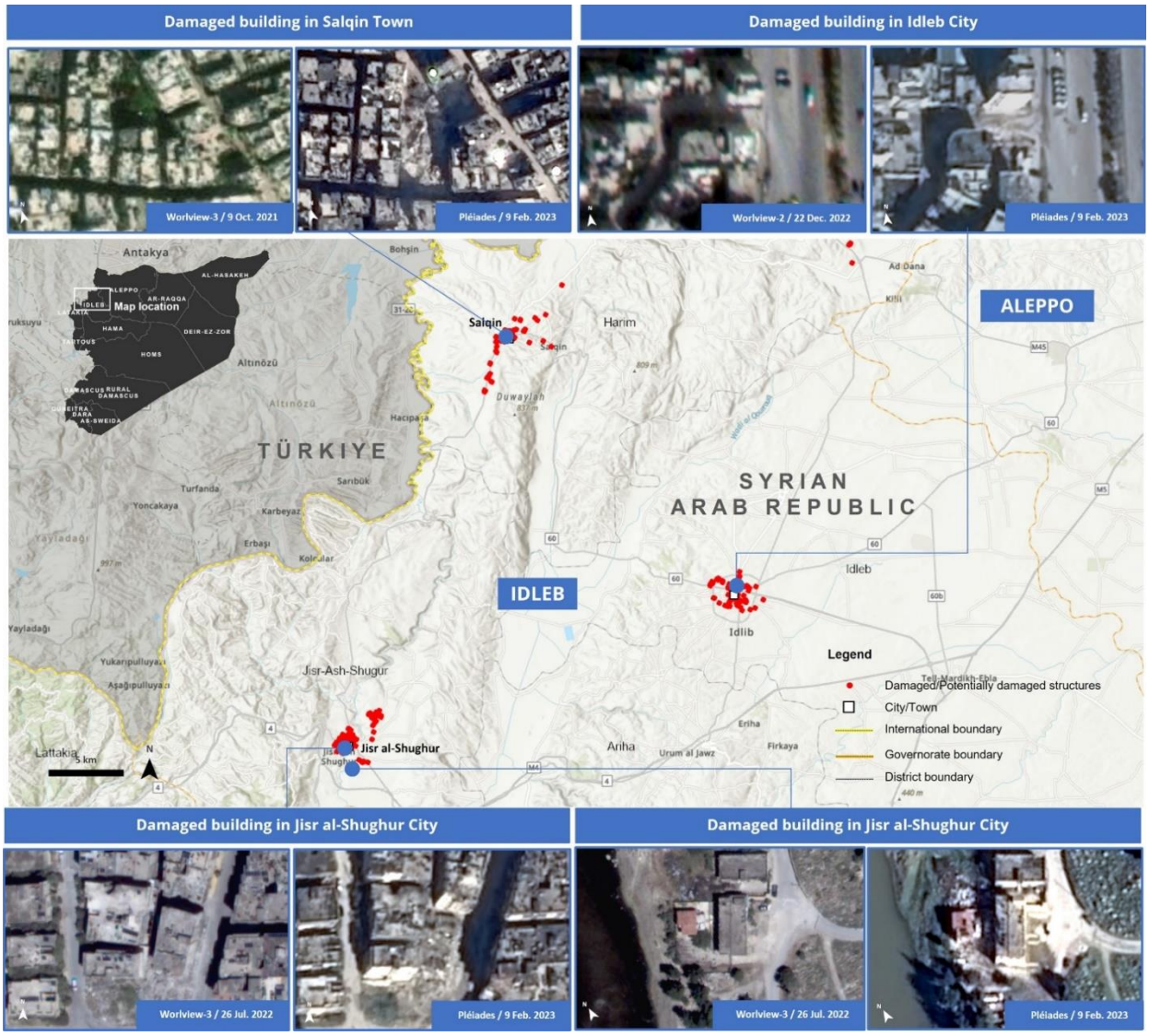


Figure 8. This map depicts the extent of damaged buildings in Idleb Governorate of Syrian Arab Republic, specifically in the Idleb, Jisr-Ash-Shughur,and Harim districts, Additional inset images from the Pleiades satellite acquired on the 9th of February 2023 highlight and visualise the extent of damage to buildings within Idleb City, Jisr-Ash-Shughur City, and Salqin Town.

## II.5 Area 3: Aleppo Governorate

Aleppo Governorate had an estimated population of almost 4 million people (as of 2020) and a total area of 19,883 km$^2$. As illustrated in Figure 9, the overall analysis extent for Aleppo Governorate comprises of ten separate areas of interest covering approximately 957 km$^2$ across five districts, including Afrin, A'zaz, Al Bab, Jarablus, Harim, and Jebel Saman.

As reported in Table 5, UNOSAT and MSF preliminary analysis shows 1426 buildings/structures with visible damage and/or potentially damaged.

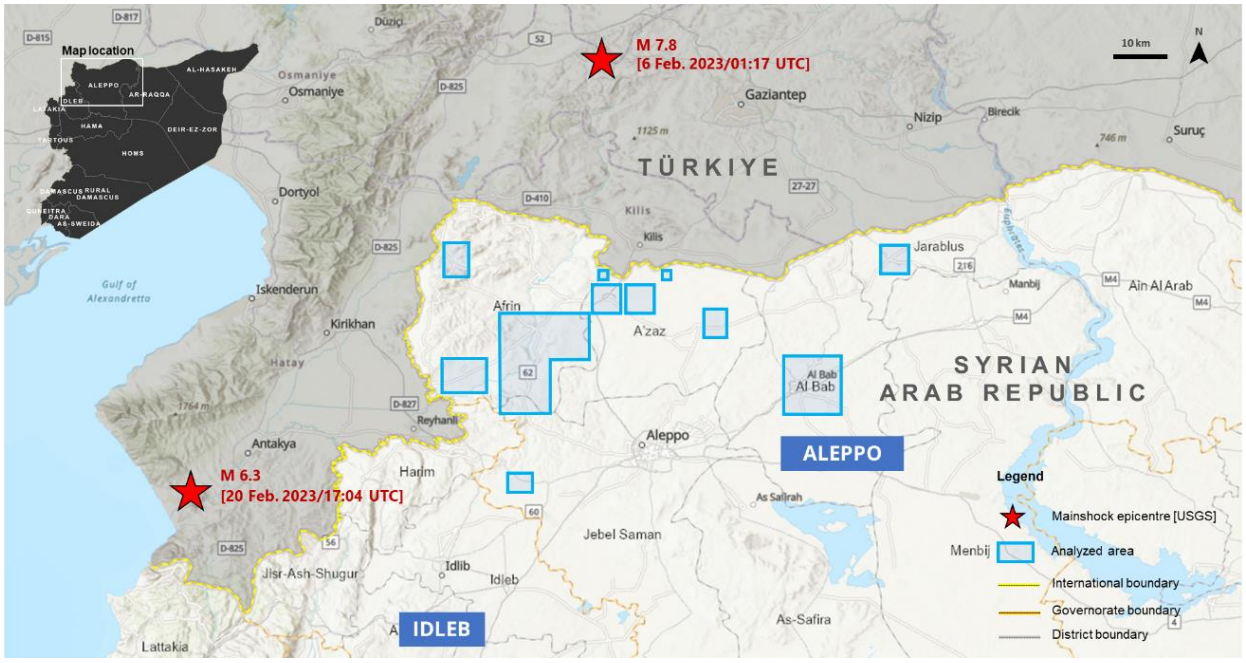


*Figure 9. This map depicts the analysis extents in Aleppo Governorate of Syria examined by UNOSAT to determine infrastructure damage caused by the M7.8 earthquake on the 6th of February 2023. The map also identifies the three Mainshock epicentre, which is also situated within the department.*

| Governorate/ Area of interest | Analysis extent | Building damage assessment | | |
|---|---|---|---|---|
| | Analyzed aerea (km$^2$) | Damaged Buildings | Potentially Damaged Buildings | Total of Damaged and Potentially Damaged Buildings |
| **Aleppo** | **957** | **431** | **995** | **1426** |
| Afrin City and sirrounfing | 508 | 2 | 108 | 110 |
| Al-Krum (Yazibagh) Village | 2 | - | 2 | 2 |
| Zayzafun Village | 2 | 25 | 33 | 58 |
| Lilawa Village | 8 | 30 | 68 | 98 |
| Rajo Town | 35 | - | 11 | 11 |
| Jindires town | 110 | 310 | 470 | 780 |
| A'zaz City | 28 | - | 91 | 91 |
| Nayarah Village and surrounding | 56 | - | 12 | 12 |
| Al Bab City | 174 | 37 | 168 | 205 |
| Al Ataarib Town | 9 | 27 | 32 | 59 |
| Akhtarin | 25 | - | - | - |

*Table 5. Overview of building/structure damage assessment in Afrin City[9], Al-Krum Village, Zayzafun Village[10], Lilawa Village[11], Rajo Town, Jindires Town[12], Azaz City[13], Nayarah Village, Al Bab City [14]and Al Ataarib Town, Aleppo Governorate. The table gives an overview of the total area and analysed area of each affected populated place of the department and the potentially damaged and damaged buildings identified during the analysis.*

[9] https://unosat.org/products/3491
[10] https://unosat.org/products/3482
[11] https://unosat.org/products/3484
[12] https://unosat.org/products/3490
[13] https://unosat.org/products/3504
[14] https://unosat.org/products/3502

## II.5.1 Building/Structure damage assessment in Aleppo Governorate

The preliminary assessment of damage to buildings and structures in Aleppo Governorate was conducted by the UNOSAT team and other partners using a photo-interpretation approach, using very high-resolution satellite images before and after the earthquake event made available through the Space Charter. Post-event satellite images were acquired on 7th to12th,15th, and 17th of February 2023, together with the images available before the disaster. In the analysed areas, 431 buildings with significant visible damage were observed. In Salqin Town the analysts observed the highest number of earthquake affected buildings, with 780 damaged and potentially damaged detected.

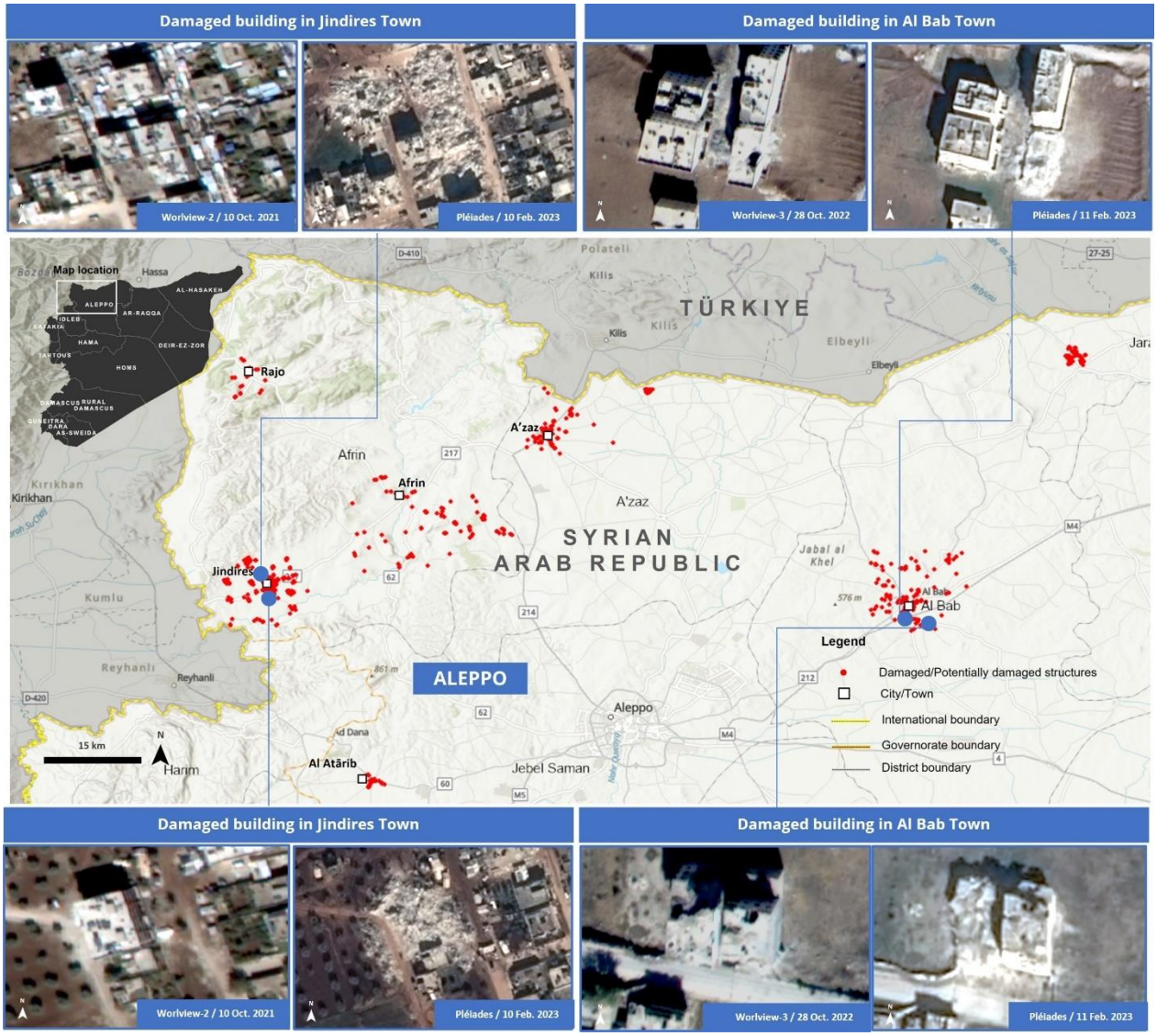


*Figure 10. This map depicts the extent of damaged buildings in the Aleppo Governorate, specifically in the Afrin, A'zaz, Harim, Al Bab, and Jarablus Districts. Additional inset images from the Pleiades satellite acquired on the 10th and 11th of February 2023 highlight and visualise the extent of damage to buildings within Jindires and Al Bab Towns.*

## II.6 Challenges of damage assessment in already existing damage zones

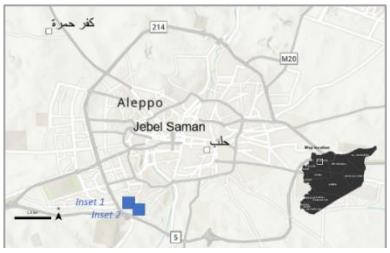


*Figure 11. This map illustrate below inset location*

The civil war in Syria, which started in 2011, has caused extensive damage and destruction in several areas affected by the conflict. Cities such as Aleppo and Damascus have been partially destroyed by repeated bombings. Over the past few years, the United Nations Satellite Centre (UNOSAT) has been working on conflict-related damage assessment in Syria in some of the most hard-hit areas. In assessing the damage after the earthquake, it was therefore crucial to distinguish existing damage due to the conflict from that caused by the earthquake. Unfortunately, this was only possible in some areas where UNOSAT had already carried out damage analysis following the conflict. Below are some examples of damage caused by the conflict in the city of Aleppo.


*Figure 12. This image shows inset 1 with destroyed, damaged and potentially damaged buildings in southwestern part of the city Aleppo before and after the earthquake of 6th of February 2023. The pre imagery from the Worldview-2 satellite acquired on the 26th of January 2023, and the Pleiades satellite acquired on the 22nd of February 2023 visualise that damage was already existent prior to the earthquake.*


*Figure 13. This image shows inset 2 with destroyed, damaged and potentially damaged buildings in southwestern part of the city Aleppo before and after the earthquake of 6th of February 2023. The pre imagery from the Worldview-2 satellite acquired on the 26th of January 2023, and the Pleiades satellite acquired on the 22nd of February 2023 visualise that damage was already existent prior to the earthquake*

# III. Additional Analysis

## III.1 Damage Assessment of Cultural Heritage Sites

Over the past few years, UNOSAT has conducted damage analysis on behalf of UNESCO of several cultural heritage sites in Syria affected during the conflict. After the earthquake of 6 February 2023, UNOSAT has carried out a new analysis of the different sites to see if they had suffered further damage due to the earthquake. Some of the most important historical sites that were analysed are the Crusader Citadel, the Ancient City of Aleppo and the site of Cyrrhus in Syria.[15].

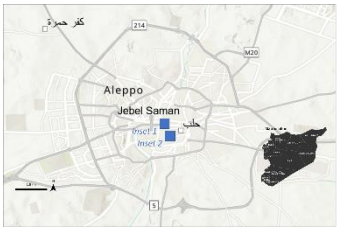


*Figure 14.This map illustrate insets location*

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*Figure 15. This field photo illustrates damaged building over the cultural site Bayt Ghazale by the Syrian Directorate-General of Antiquities & Museums (DGAM)*

*Figure 16. This field photo illustrates damaged building in area between Suq al-Attarin and Suq al-Ebi, Ancient City of Aleppo by the Syrian Directorate-General of Antiquities & Museums (DGAM)*


*Figure 17. These images illustrate severe damage in cultural site Bayt Ghazale Ancient City of Aleppo*


*Figure 18. These images illustrate severe Bayt Ghazale, Ancient City of Aleppo*

*Pleiades image copyright: © CNES (2023), distribution by Airbus DS*
*Source: Airbus DS and the International Charter Space and Major Disasters*

*WorldView-2 image copyright: © DigitalGlobe, Inc. (2023)*
*Source: USGS / HDDS and the International Charter Space and Major Disasters'*

[15] https://unosat.org/products/3505

## III.2 Post-earthquake night-time light monitoring using satellite images

In the aftermath of the earthquake, UNOSAT, in collaboration with Wuhan University, conducted an analysis over southern Türkyie and northern Syria to estimate the loss of electricity in some of the most affected cities, using night light images collected by optical sensors. On 14 February, UNOSAT published a light loss assessment report outlining some indicators related to the decrease in night-time light intensity that could be linked to the intensity/distribution of building damage and power outages in the areas most affected by the earthquake. From the analysis conducted by Wuhan University and UNOSAT, it can be concluded that, based on the night light images acquired on 8 February, the provinces of Hatay, Kahramanmaras and Adiyam are those with major loss of light observed.

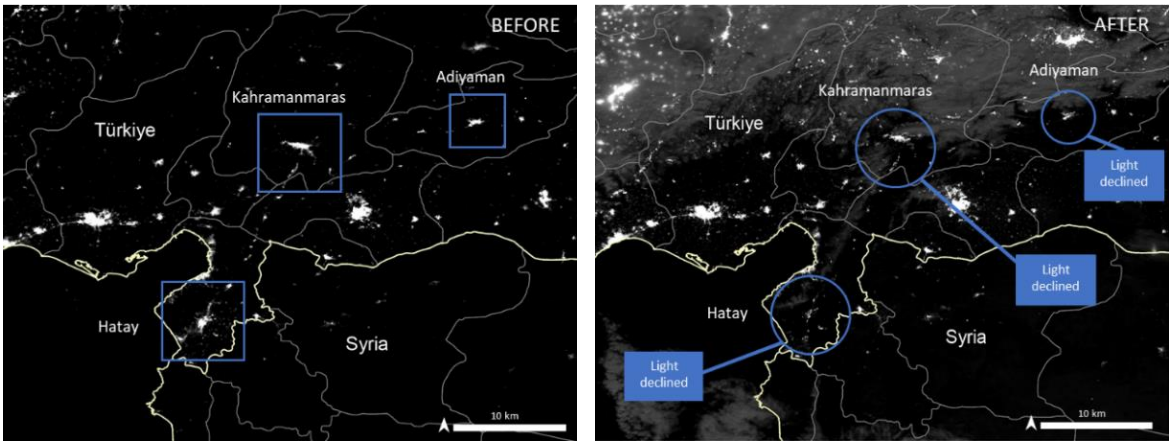


*Figure 19. These images illustrate data retrieved from optical satellite images over several urban areas located in different provinces, including Hatay, Kahramanmaras and Adiyaman. The pre- and post- image was acquired with VIIRS VNP46A1 on the 24 Jan. 2023 and VIIRS VNP46A1 on the 08 Feb. 2023.*

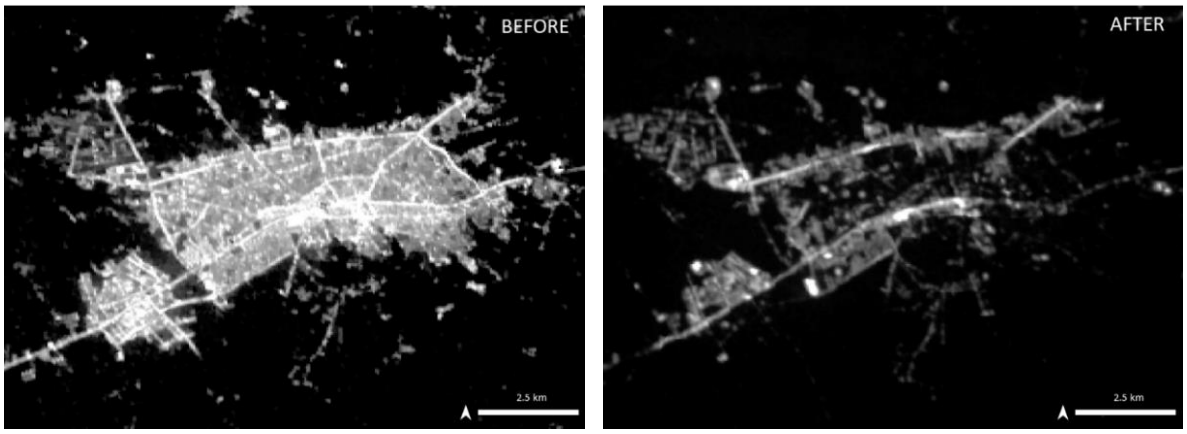


*Figure 20. These images illustrate data retrieved from Very High-Resolution satellite images over Adiyaman. The pre- and post-image was acquired with SDGSAT-1 on the 23 Aug. and Yangwang-1 / 09 Feb. 2023*

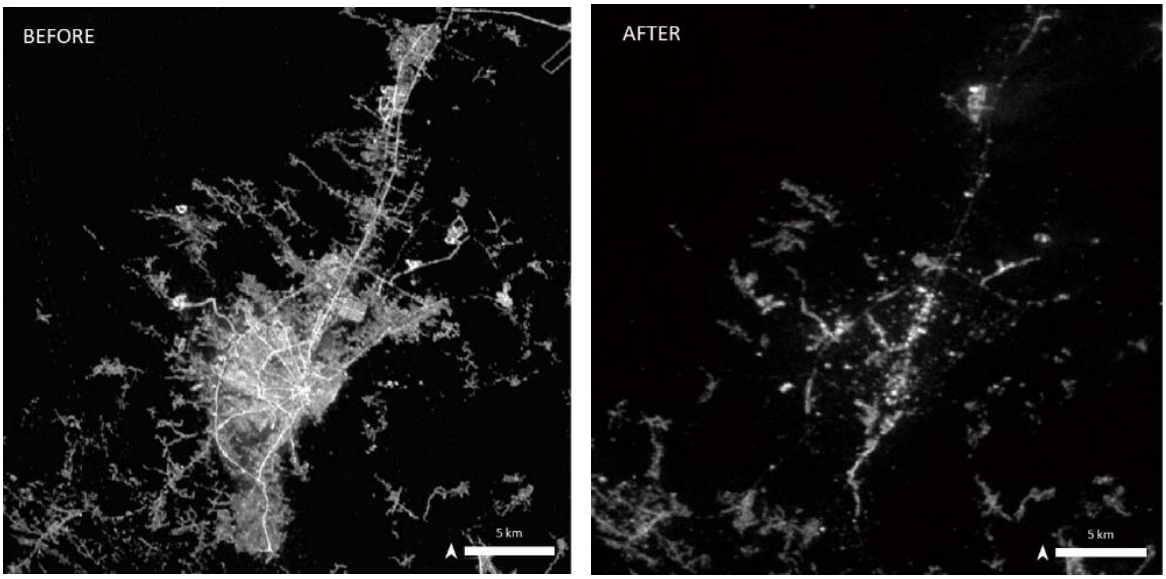


*Figure 21. These images illustrate data retrieved from Very High-Resolution satellite images over Antakya, Hatay. The pre- and post-image was acquired with SDGSAT-1 on the 23 Aug. and Yangwang-1 / 09 Feb. 2023*

*SDGSAT-1 image copyright: International Research Center of Big Data for Sustainable Development Goals (CBAS)*
*Source : International Research Center of Big Data for Sustainable Development Goals (CBAS)*

*Yangwang-1 Space Telescope night-time data Copyright: Origin Space Co., Ltd., China*
*Source: Origin Space Co., Ltd., China*

*VIIRS VNP46A image Copyright: NASA*
*Source: NASA*

## III.3 Flood impact analysis along the Orontes River (Al Assi), Syrian-Türkyie borders

In the aftermath of the earthquake, there was considerable concern by the IFRC and other humanitarian actors about potential damage to major infrastructure, such as water reservoirs and dams located in north-west Syria. Using satellite imagery collected on 9 and 14 February 2023, the UNOSAT team observed significant floods along the Orontes River. Given the low rainfall pattern before and during the period of the earthquake, the observed floods were probably caused by damage to the water infrastructure (pipelines/canals/dams) caused by the earthquake. The very high-resolution images (provided by the Space Chart) clearly showed potential visible damage to the water infrastructure that caused flooding around the village of Al Tloul, near the Orontes River.

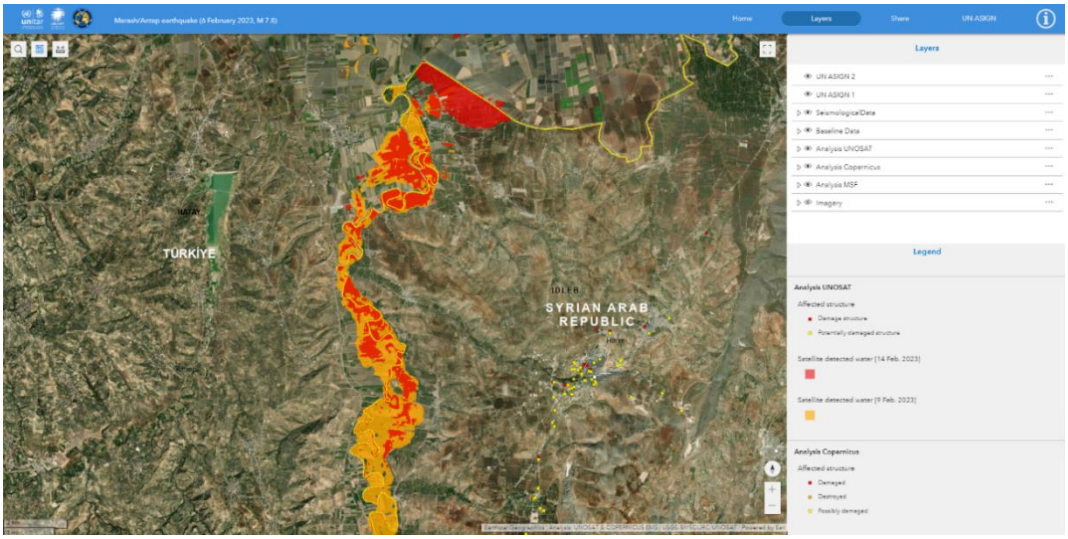


*Figure 22. A snapshot of the UNOSAT web map interface displaying satellite detected water evolution (red and orange) along the Orontes River (Al Assi), Syrian-Türkyie boarder as of 9th to 14th Feb. 2023.*


*Figure 23. The Orontes River before and after floods. The pre-image is acquired by Worldview-3 on the 9th of October 2021, while the post image is acquired by Worldview-2 on the 11th of February 2023. The post image shows extensive floods and the affected village Al Tloul.*


*Figure 24. The Orontes River before and after floods. The pre image is acquired by Worldview-3 on the 9th of October 2021, while the post image is acquired by Worldview-2 on the 11th of February 2023. The post image shows damage on water infrastructure.*

# IV. UNOSAT LIVE Web map

A dedicated "*UNOSAT Damage Assessment Live Map*" was published by the United Nations Satellite Centre (UNOSAT) to provide the humanitarian actors with a comprehensive overview of the satellite derived damage assessments conducted by the UN Satellite Centre and other mapping organisations (Copernicus EMS, MSF, etc.). With access to this web map, users have the possibility to view and download damage analyses (such as building damage points in GIS format) covering all areas of interest defined for satellite damage analyses in Syria and Türkyie.

Furthermore, through this live web map it is possible to access field pictures taken with the UN-ASIGN application, which provides important details on the ground situation and in particular about the intensity of damage to buildings and infrastructures.

The added value of this web map tool was to provide all humanitarian actors with up-to-date and publicly available building damage datasets from different mapping organisations supporting response operations in Syria and Türkyie through satellite imagery analysis.

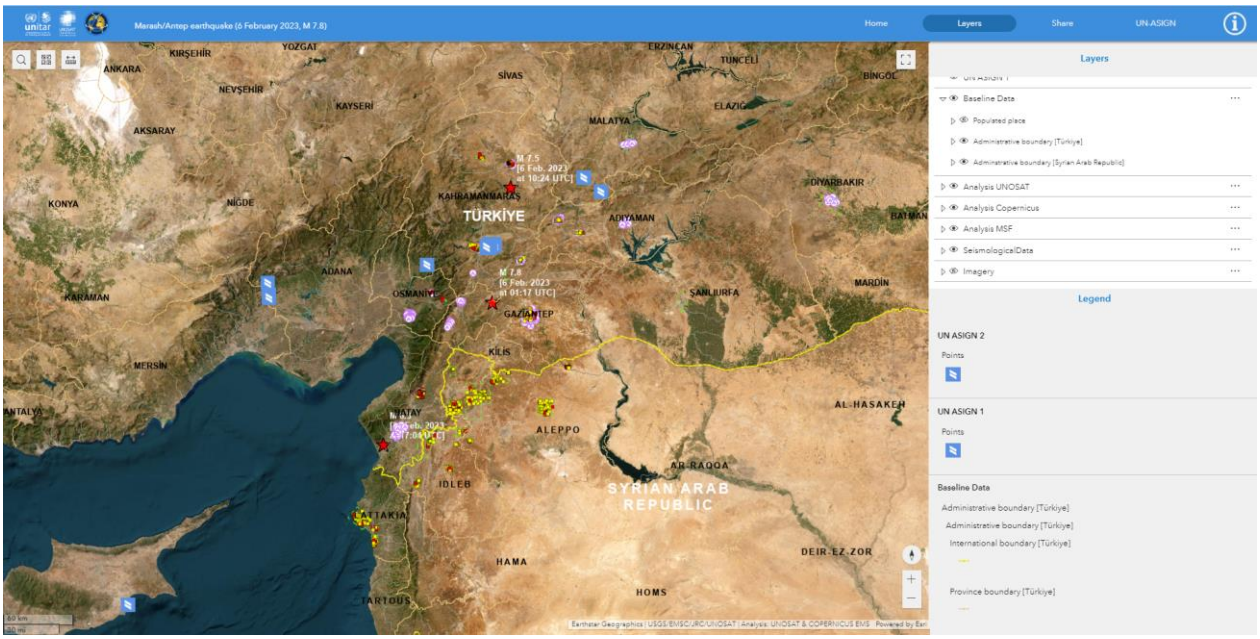


*Figure 25. A snapshot of the UNOSAT web map [16]interface displaying areas identified as damaged (red and orange) and potentially damaged (yellow) following the M 7.8 Marash/Antep (Kehramanmarash) Earthquake in all analysed areas. The image additionally shows the georeferenced images from UN-ASIGN, which have been synchronised with the web map.*

[16] https://unosat.org/products/3479

# V. UNASIGN

UN-ASIGN is a free crowd-sourcing app made available by the United Nations Satellite Centre (UNOSAT) to support its operations. It allows anyone to upload geotagged photos with annotations that are then integrated into UNOSAT mapping products in near real time. It is specifically designed to work over low bandwidth, and the contributions are automatically uploaded into the UNOSAT live map tools, to help in overall situational awareness. Having access to images and feedback of the ground is critical for UNOSAT's activities to validate the satellite image-based assessments. The relevant feedback is shared with the humanitarian entities in the field for a comprehensive assessment of the situation. Users with a mobile device and an internet connection can also view the contributions on the map in real time, or load an area to be viewed later on in off-line mode.

The UN-ASIGN app can be downloaded on Android or Apple.


*Figure 26. UN-ASIGN application interface for download on both Apple and Android devices, respectively.*

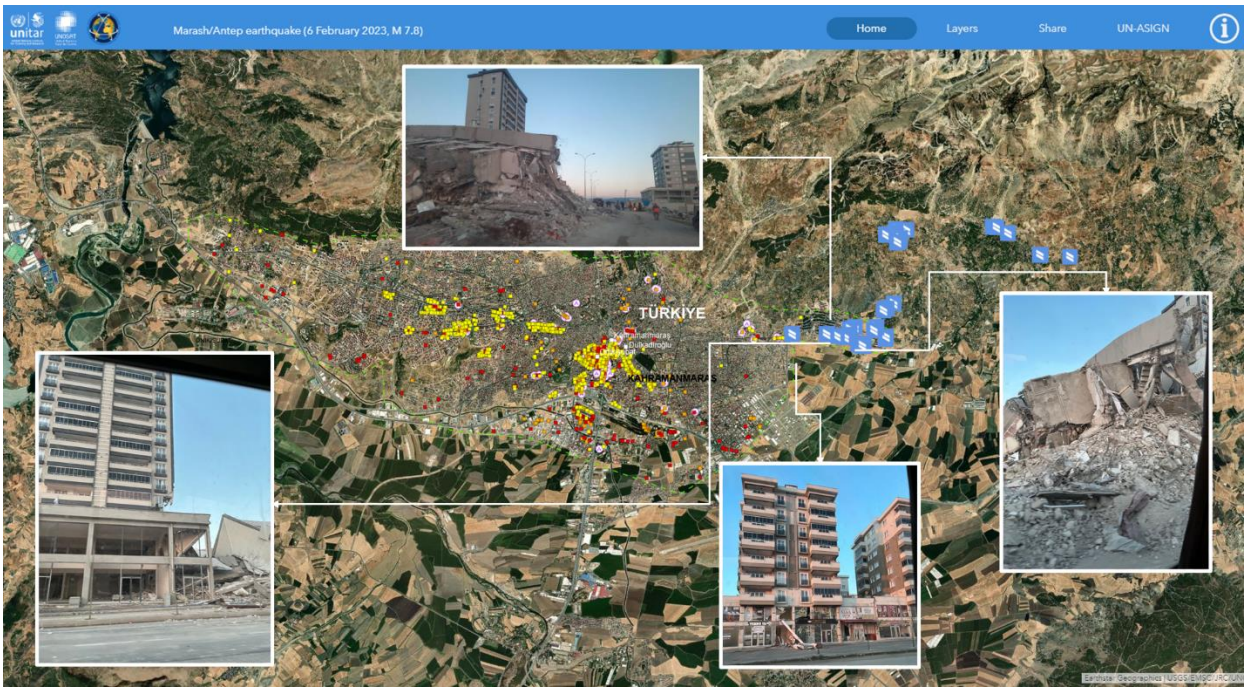


*Figure 27. UN-ASIGN images displayed on the UNOSAT live web map showing damaged structures in the Kahramanmaras Province, Türkiye, following M 7.8 Marash/Antep (Kehramanmarash) Earthquake as of 6 February 2023*

All the maps and products from UNOSAT are available at: https://unosat.org/products/ Combined satellite damaged assessment done by UNITAR-UNOSAT and Copernicus, and MSF are also available through the UNOSAT LIVE WEB MAP.

More info regarding satellite analysis plans by different groups is available on

# V.I Ground photos

The United Nations Satellite Centre (UNOSAT) used ground photos from the media and residents to visualize the damage on the ground, and understand the hazardous extent of caused by the M 7.8 Marash/Antep (Kehramanmarash) Earthquake on the 6th of February 2023.

*Figure 28. Collapsed building in Idleb region triggered by the M 7.8 Marash/Antep (Kehramanmarash) Earthquake as of 6 February 2023.*

*Credit photo: BBC*

*Figure 29. Collapsed building and rescue team searching for victims in the village of Besnia near the town of Harim, Idleb Governorate, Syria*

*Credit photo: Daily Sabah (AFP Photo)*

*Figure 30. Completely collapsed buildings in the town of Jindires, Syria*

*Credit photo: Ghaith Alsayed/AP*

*Figure 31. Collapsed building in in the Cenderes district of Aleppo, Syria.*

*Credit photo: Anadolu Agency/Getty Images*

*Figure 32. Collapsed structures, and rescue team searching for survivors in Diyarbakir city in Türkiye.*

*Credit photo: Sertaç Kayar/Reuters*


*Figure 33. Collapsed structures in Elbistan, Türkiye.*

*Credit photo: REUTERS/Maxim Shemeto*

*The analysis has not been verified in the field yet; please send your comments and feedback to unosat@unitar.org.*

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