

# Operational Use of Remote Sensing and Crowd Sourcing Data on 6 February Earthquakes as a Case Study

**AFAD** 



**Seher TURAN**

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**Disaster Management Technologies Group Leader**

**Republic of Turkey  
Ministry of Interior**

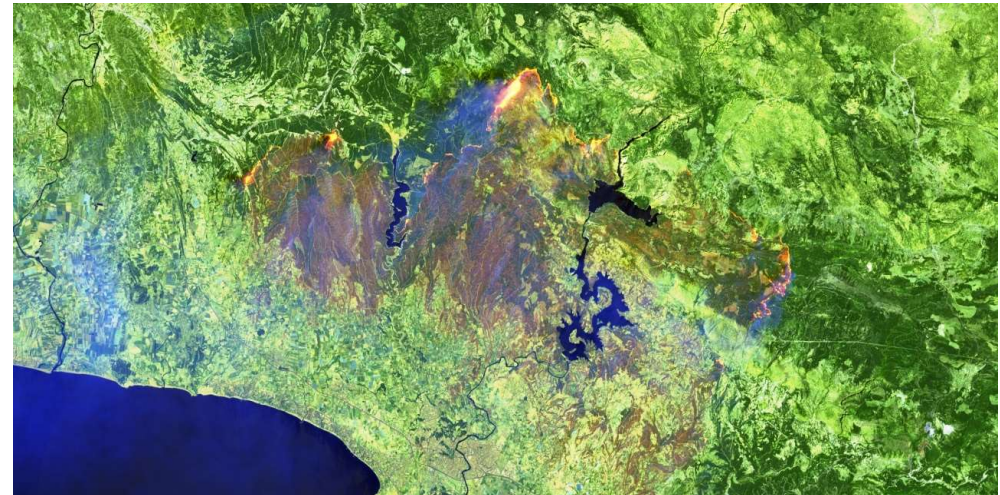
**Disaster and Emergency Management Authority  
Information Systems And Communication Department**

# Presentation content



- Remote Sensing Data Sources
- Data Processing, Evaluation, Mapping
- Disaster Management and Decision Support System (AYDES)
- AYDES RS (Remote Sensing) Cases
- Crowd Sourcing Cases on AYDES
- Kahramanmaraş Earthquakes RS Cases
- Conclusion

# Remote Sensing



## Remote Sensing Data Sources

Institution / Organization	Platform Type Used	Data Type
General Directorate of Mapping(HGM)	Aerial platform (plain)	Aerial photo
Air Force Command (HKK)	Satellite platform	Satellite image(Göktürk 1 – 2)
TÜBİTAK SPACE / Turkish Space Agency	Satellite platform	Satellite image(Rasat)
General Directorate of Security(EGM)	Aerial platform (helicopter / UAV)	Video
Gendarmerie General Directorate(JGM)	Aerial platform (UAV)	Video
United Nations Disaster Charter (The International Charter Space and Major Disasters)	Satellite platform	Satellite image and/or analysis result
Copernicus Emergency Mapping Service via the European Union ERCC (Emergency Response Coordination Centre)	Satellite platform	Just analysis result
APSCO (Asia-Pacific Space Cooperation Organization) - passive	Satellite platform	Satellite image
Open source data(ESA Sentinel, USGS LANDSAT, ASF SAR)	Satellite platform	Satellite image
Dis Sentinel Asia (A space-based DM support system in the Asia-Pacific region)	Satellite platform	Satellite image and/or analysis result

## Post Disaster Earth Observation Process Flow Chart

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- Disaster impact area recognition and update
- Activation for the provision of satellite and aerial photographs from various platforms (Disaster Charter, Copernicus EMS, Sentinel Asia, General Directorate of Mapping HGM, etc.),
- Sharing satellite images with various institutions for damage assessment,
- Monitoring the platforms and downloading satellite images and adding them to the system,
- Following the damage assessment studies and trying to add them to the system (Different universities and agencies remote sensing department),
- Evaluation of new satellite image acqueries or map requests from the field or crisis center ,
- Mapping different aspects of disaster (such as surface faulting, temporary camps etc.)

# RS – ERCC Copernicus EMS Activation

## Service Request Form (SRF)

To be sent to the ERCC (24/365 availability)

Email: [echo-ercc@ec.europa.eu](mailto:echo-ercc@ec.europa.eu)  
Tet: +32-2-29-21112

The service request must be communicated by email AND followed by a phone call to the ERCC

Please provide as much information as you can to ensure efficient processing of your request. The earlier a request form is submitted, the sooner satellites can be tasked for image acquisition.

For more information on the service and a printable/editable version of this form, please refer to <http://emergency.copernicus.eu/mapping/ems/how-use-service>. In case you need help, the ERCC will support you.

### Activating institution (Authorised User)

National Focal Point  EC Services  EEAS (HQ)  EU Delegation

Organisation Name: AFAD - Disaster and Emergency Management Authority of TURKEY  
Contact Person: Oktay GÖKÇE - Nihan KARACAMEYDAN  
Activation date: 30 / 10 / 2020 (dd/mm/yyyy)  
Activated on behalf of End User: AFAD - Oktay GÖKÇE  
End User email: [oktay.gokce@afad.gov.tr](mailto:oktay.gokce@afad.gov.tr)  
End User phone: +90 312 2582323 / 2414

### Details on the disaster

Disaster type  
 Fire (forest or wild fire)  
 Flood  
 Earthquake  
 Humanitarian  
 Wind storm  
 Other (Please specify):

Time and location  
Date (dd/mm/yyyy): 30/10/2020  
Time (UTC): 11: 52  
Country: TURKEY  
Region or District: İZMİR  
GLIDE number or Charter  
Call ID (if available):

### Activation Reason

Please provide a brief description of the activation reason which will be used for publication (activation page on the portal, ready to print maps, Twitter, web services):

An earthquake happened at 14:51 (30.10.2020) local time at the Aegean Sea near İzmir - Seferhisar magnitude 6.6 quake shakes Turkey's Aegean Sea coast. The Disaster and Emergency Management Authority (AFAD) said the quake occurred at 2.51 p.m. (1151GMT) at a depth of 16.54 kilometers (around 10 miles). Several collapses have occurred.

### Triggering other services (International Charter, national services, UNOSAT, Sentinel Asia, etc.)

The user triggered other services  No  Yes If yes, please specify:  
The user plans to trigger other services  No  Yes If yes, please specify:

### Details for Area of Interest (specify a name, location, region or similar)

**KAHRAMANMARAS**

(Please provide the following 2 pages also per Area of Interest if parameters differ)

### Product types and production mode

Please specify each product type you require, as well as the production mode for each and when require monitoring. Specify any additional needs in the comment section at the bottom of this page the indicated times are counted from the moment of satellite data reception.

Product type	Production mode (service levels)		Monitoring (updates)	
	SL1*	SL2**	Y/N	If yes, at what fr (e.g. daily, weekly)
Reference	10h <input type="checkbox"/>	Up to 5 working days <input type="checkbox"/>	<input type="checkbox"/>	
First Estimate***	2h <input checked="" type="checkbox"/>			
Delineation	7h <input type="checkbox"/>	Up to 5 working days <input type="checkbox"/>	<input type="checkbox"/>	
Grading	10h <input type="checkbox"/>	Up to 5 working days <input type="checkbox"/>	<input type="checkbox"/>	

(\*): is the fastest delivery, 24/7 handling (vector package delivery times, raster package is delivered within 2h at (\*) for activations which don't require immediate delivery, analysis is performed during working days.  
(\*\*) FEP will be produced only for floods, forest and wild fires, earthquakes, wind storms but will not be published select it here.

### Area Of Interest (AOI, geographical location)

Please provide the AOI either as file together with this form (see a) or as coordinates (see b).

a) Shapefile/KML (WGS84 Geographic only)		b) Coordinates (WGS84 or DD)	
Filename: İzmir Seferhisar Earthquake.zin	Rectangular AOI	Upper left: <input type="text"/>	Lower right: <input type="text"/>
	Circular AOI	Lat: <input type="text"/>	Long: <input type="text"/>
		Buffer radius around: <input type="text"/>	km

### Product delivery details

Method: products will be available on the SFTP site (and shortly after on the <http://emergency.copernicus.eu/mapping>). The ready to print maps will be available with from the publication of the vector package (one hour for FEP).

Formats: printable map (geospatial PDF), georeferenced map (JPEG), Vector files (Shp & KML)

Comments / Further specifications / Instructions / Other information on Additional details on the disaster or the information expected/requested with respect to the product requirements e.g. quality, dissemination restrictions, other formats, other map size, etc.

The 6.6-magnitude earthquake has destroyed many buildings in western İzmir, raised casualties. Turkey's Disaster and Emergency Management Presidency said Friday's earthquake centred in the Aegean Sea at a depth of 16.5 kilometres (10.3 miles) and registered at a 6.6. At least 20 buildings collapsed in İzmir with people trapped under the debris in at least five

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National Focal Point  EC Services  EEAS (HQ)  EU Delegation

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End User phone: +90 312 2582323 / 2414

Email:   
Phone: +90 312 2582414 (Office)  
Mobile: +90 532 6077323  
Fax:   
Include End User in Communications?

### Details on the disaster

Disaster type  
 Fire (forest or wild fire)  
 Flood  
 Earthquake  
 Humanitarian  
 Wind storm  
 Other (Please specify):

Time and location  
Date (dd/mm/yyyy): 30/10/2020  
Time (UTC): 11: 52  
Country: TURKEY  
Region or District: İZMİR  
GLIDE number or Charter  
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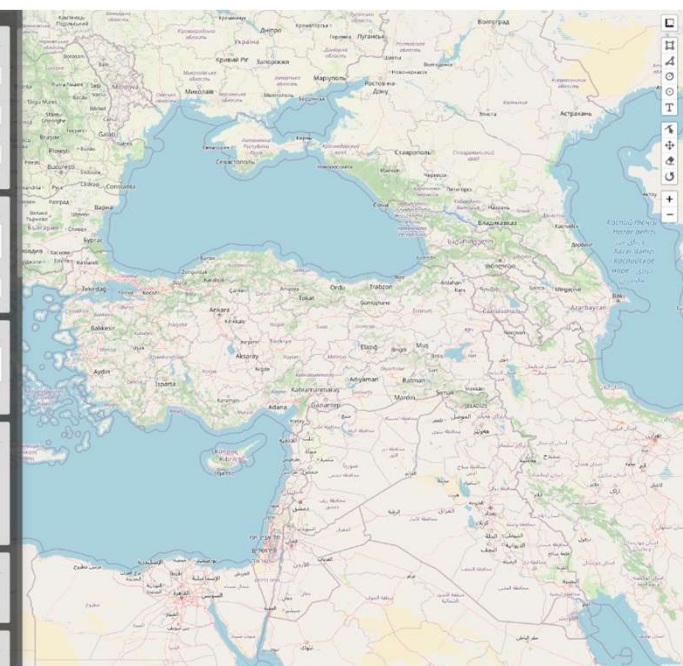
# RS - Data Sources– Sentinel Asia and UN Disaster Charter Activation

The screenshot shows the 'AU Dashboard' interface. The main heading is 'Call Details Dashboard: Tmp Call (new)'. Below this, there are several input fields and sections:

- Date and time of the call:** A date field containing '22-Feb-2021' and a time field containing '09:29'. A red asterisk indicates a required field.
- Local time:** A field containing '09:29'.
- 2a Name and contact information of the caller (organisation submitting this request):** This section contains fields for 'Organisation' (filled with 'ESA'), 'Contact - Name' (filled with 'AU\_public'), 'Contact - Surname' (filled with 'AU\_public'), 'FAX' (filled with '+90 22 22222222'), 'Phone' (filled with '+00000000'), 'E-mail' (filled with 'a13charter+au\_public@gmail.com'), and 'Mobile Phone' (filled with '+91 81 11111111').
- Submitted on behalf:** A section with 'YES' and 'NO' buttons.
- 3 Type of disaster:** A section with multiple checkboxes for disaster types: Earthquake, Flood (large area), Flash Flood, Landslide, Oil spill, Sea ice, Snow hazard, Storm & Hurricane (litoral area), Tsunami, Volcanic eruptions, Wildfire, and Infrastructure.

The screenshot shows the 'Requester' form in the Sentinel Asia system. It includes the following sections:

- Requester:** Fields for Name (filled with 'Seher Turan'), Organization (filled with 'TR Ministry of Interior - Disaster and Emergency Management Authority (JFA)'), Membership (filled with 'JPT member'), Phone (filled with '+90350783545'), Cellular Phone (filled with '+90350783545'), Fax, and Email (filled with 'seher.turan@afad.gov.tr').
- Disaster Management Organization:** A section with a text area for ADRC information and fields for Organization (filled with 'AFAD - Disaster and Emergency Management Authority of Turkey') and Email (filled with 'seher.turan@afad.gov.tr').
- Planned end-user of the observed information:** A section with a text area for user information and radio buttons for 'The Information/Image shall be used only for our organization' and 'The Information will be provided to other relevant organizations'.
- Purpose of the Request (How does your organization intend to use the satellite data?):** A section with checkboxes for 'Emergency Response', 'Situation Confirmation', 'Rescue Activity', 'Evacuation Activity', and 'Other'. Below this are checkboxes for 'Damage and Loss Assessment (CALAI/Port Disaster Needs Assessment (DPNA))', 'Recovery Planning', and 'Detection of an advance warning of hazardous situation'.
- Type of Disaster:** A section with checkboxes for 'Flood', 'Landslide', 'Storm', 'Forest Fire', and 'Volcano'. Below this are checkboxes for 'Earthquake', 'Ice Hazard', 'Tsunami', and 'Other'.
- Analysis requirement for damages:** A section with checkboxes for 'Building Damages', 'Infra. Damages', 'Lahar', and 'Other'.



United Nations 'Disaster Charter' and 'Sentinel Asia' are other international organizations that can be activated for post-disaster, remote sensing-based damage assessment mapping.

## Some of Our Remote Sensing Projects and Tasks

### Image Supply Projects / Works:

- Real-time image transfer project from EGM Air platforms in case of disaster – 2021
- Satellite image supply protocols and activations (International Charter, Sentinel Asia, Copernicus EMS etc.) – 2022

### Image Processing and Interpretation Projects:

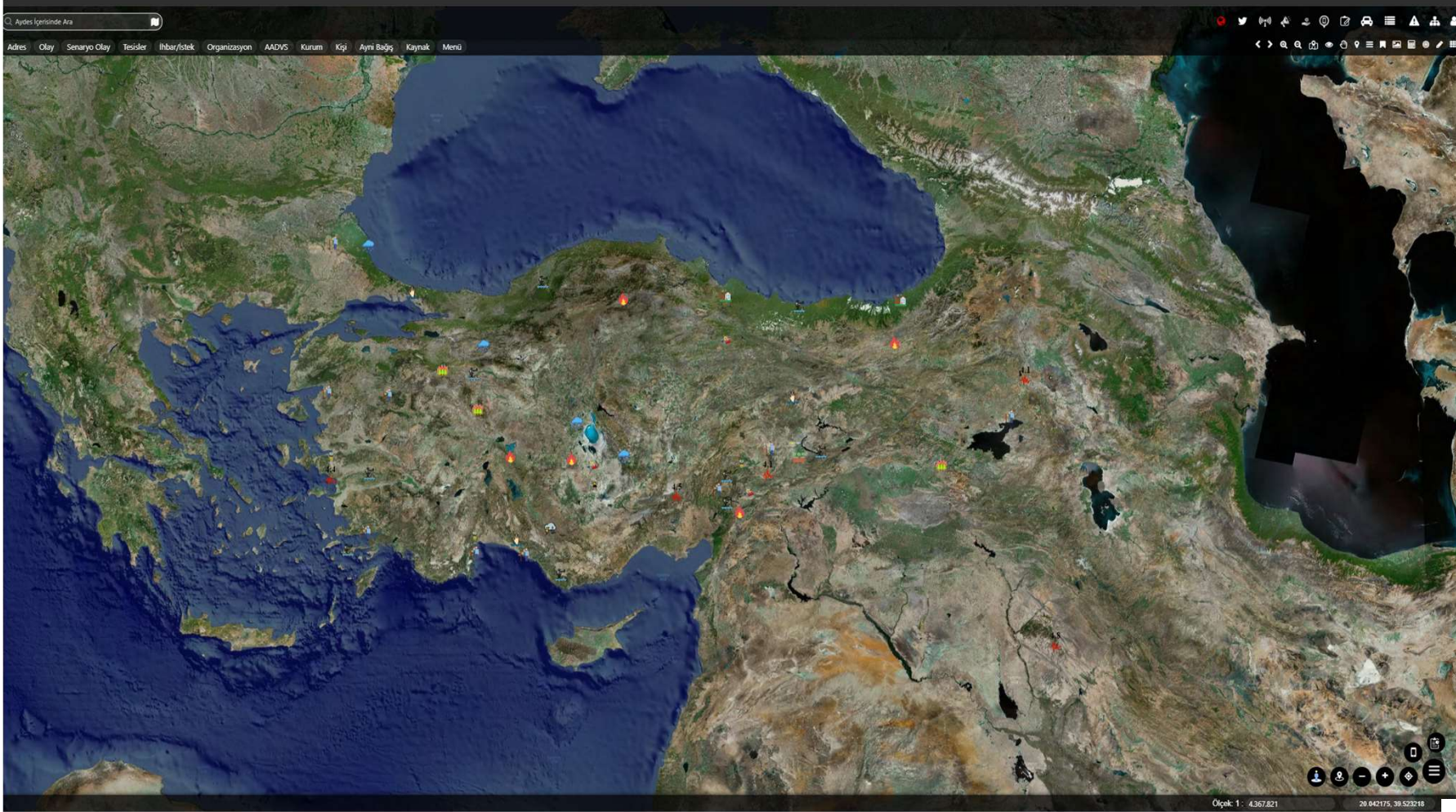
- AYDES UZAL (Desktop image processing and analysis software -2018)
- AYDES Crowdsourcing (WEB based image evaluation software - 2018)
- Coordinated image creation project from videos – 2017
- Creation of Disaster Analysis Web Portal – 2022

Creation of the web portal 'afetanaliz.aydes.gov.tr'

- Adding Satellite Image to AYDES:  
Adding event-based satellite imagery - 2022



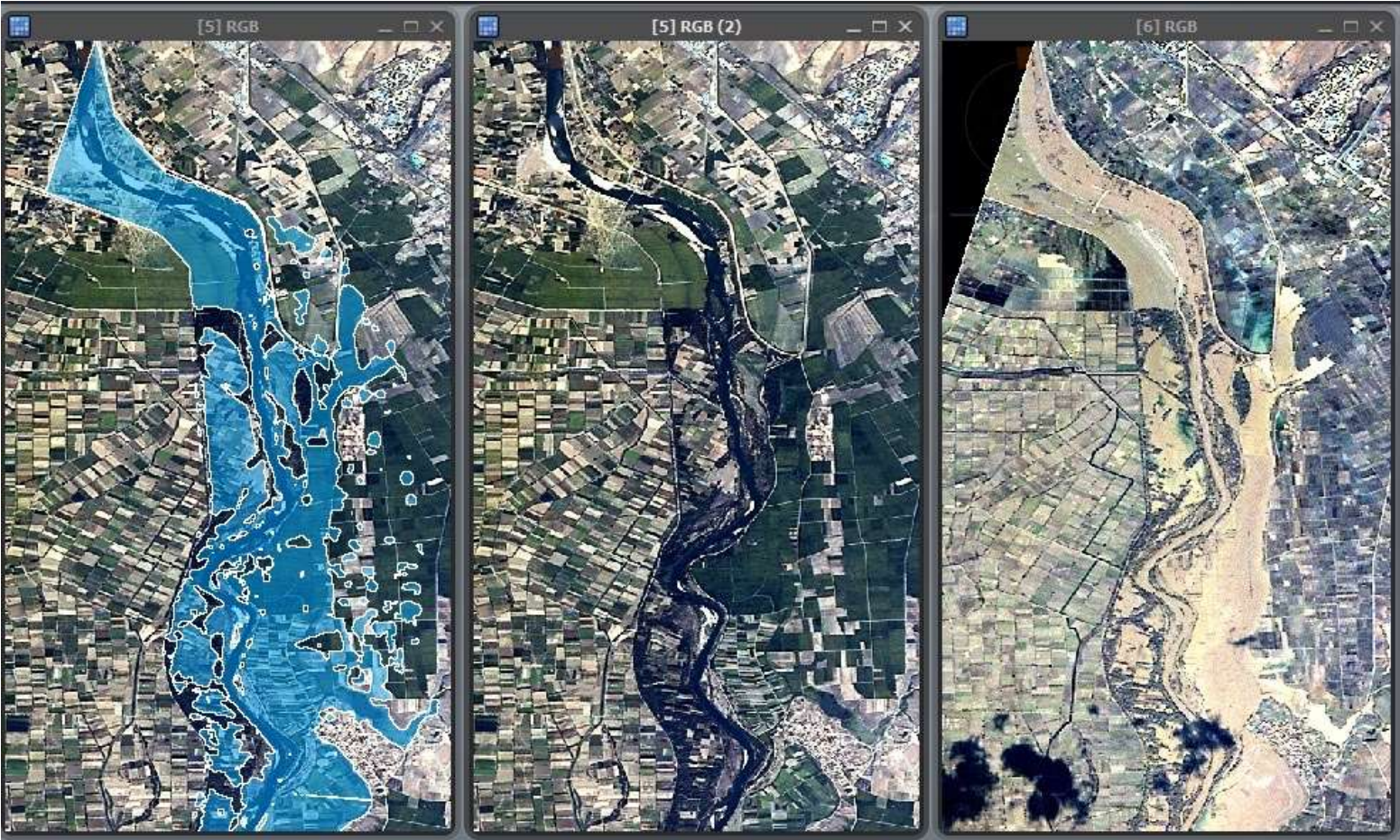
# AYDES: Disaster Management and Decision Support System



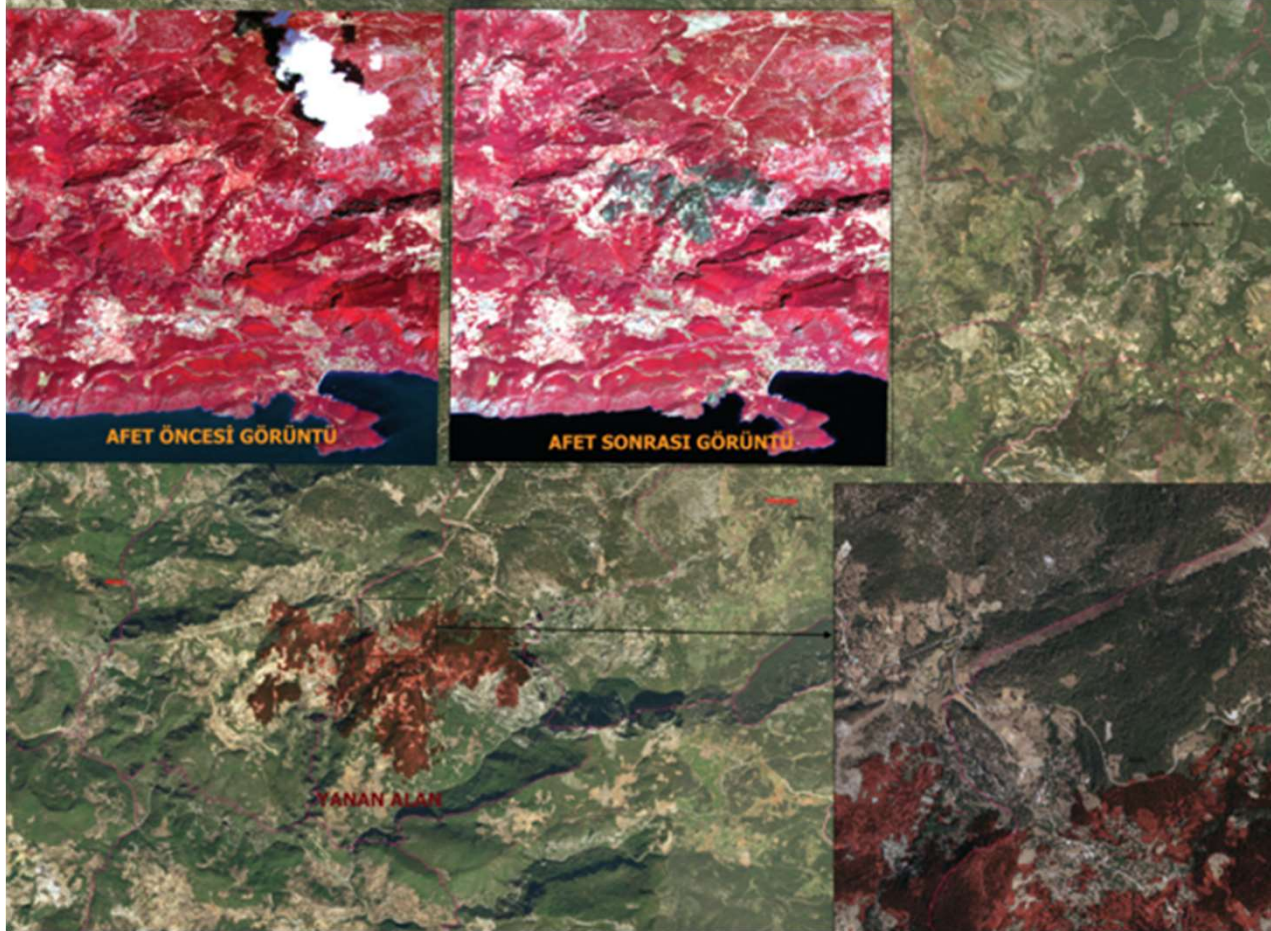
# AYDES: Disaster Management and Decision Support System



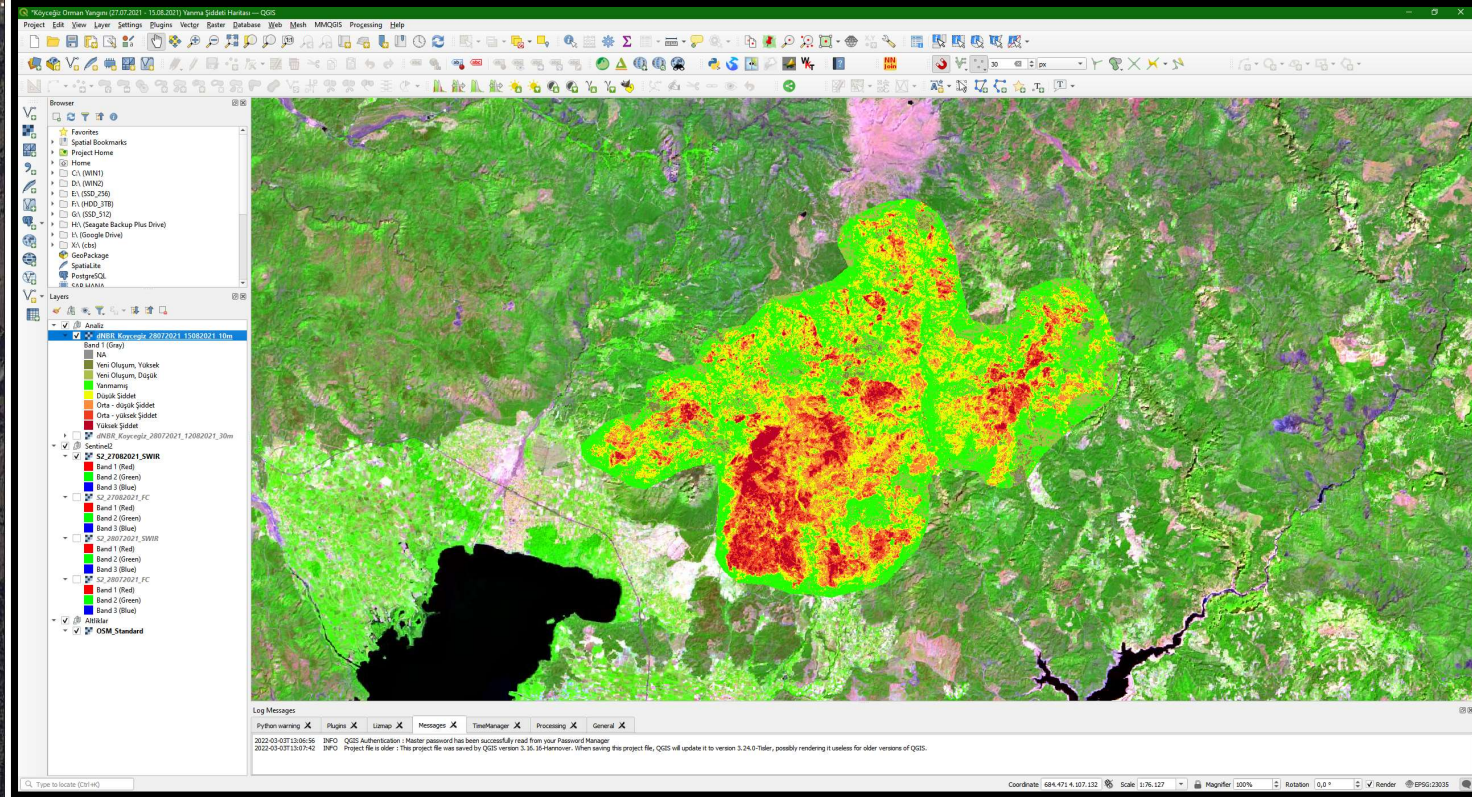
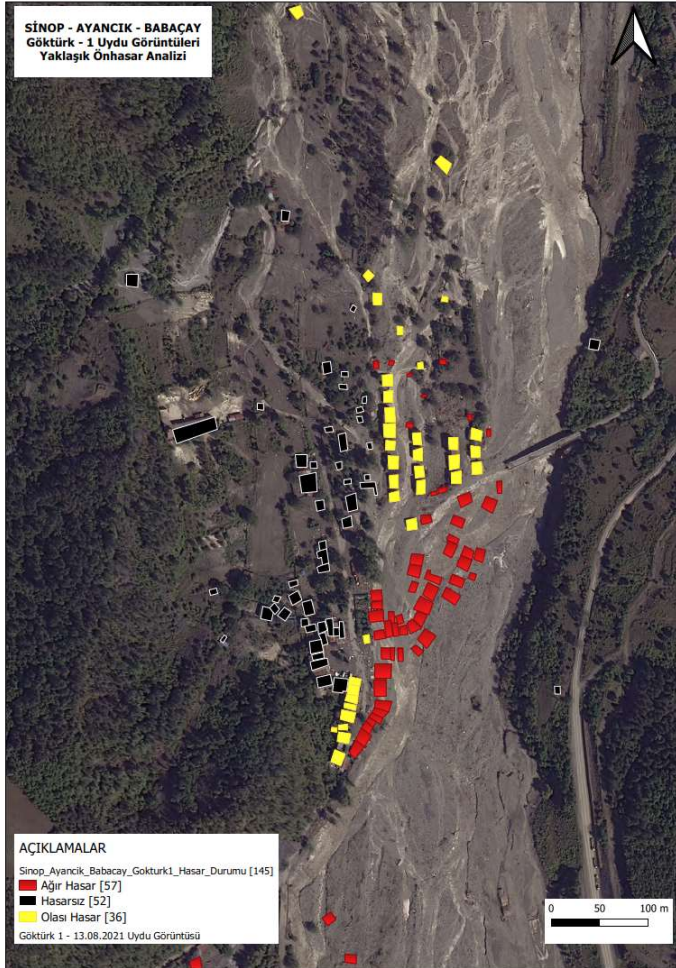
# Case Studies about flood RS on AYDES



## Case Studies about forest fire RS on AYDES



# Case Studies about flood and forest fire RS on AYDES



# Crowd Sourcing Cases on AYDES

The screenshot displays the AYDES application interface. The top navigation bar includes a search bar with the text "Aydes İçerisinde Ara" and a menu with options: Adres, Olay, Senaryo Olay, Tesisler, İhbar/İstek, Organizasyon, AADVS, Kurum, Kişi, Aynı Bağış, Kaynak, and Menü. The main area is split into a left sidebar and a right map. The sidebar, titled "İhbar İstek Listesi", contains a list of reports with details such as date, time, and status. The map shows a red-shaded area around Gaziantep, with various locations and roads labeled. The bottom right corner of the map features a navigation and zoom control panel.

**İhbar İstek Listesi**

- Psikososyal Destek/Etkinlik Diğer 04.09.2023 15:51:28  
MARDİN Aile ve Sosyal Hizmetler İl Müdürlüğü AYDES...
- Diğer 112 28.08.2023 17:02:43
- Hasar Tespit Talebi 112 24.08.2023 15:55:26  
hasar tespit
- Mahsur Kalma Diğer 20.08.2023 16:06:56  
MEHMET YÜKSEL İSİMLİ ÇOBAN SÜTÇÜLER ÇOBANISA KÖYÜ ...
- Barrınma Talebi Şahsi 13.08.2023 12:06:30  
Kahramanmaraş İli Pazarcık İlçesi depreminden dola...
- Boğulma SMS 07.08.2023 18:49:00  
Ö.M (31) boğulma tehlikesi geçirmiş olup Cebediden...
- Suda Boğulma SMS 07.08.2023 17:50:00  
Boğulma tehlikesi geçiren A.O.M ve R.M yaralı olar...

# Crowd Sourcing Cases on AYDES

The screenshot displays the AYDES application interface with four main panels:

- Olay İşlemleri (Incident Operations):** Shows a photograph of a damaged area and a table with incident details.
- Afetzede Defteri (Inventory Book):** Lists victims with their names, IDs, and status.
- Müdahale İşlemleri (Response Operations):** Lists response activities with their locations and statuses.
- Görevlendirme Listesi (Personnel Assignment List):** Lists assigned personnel with their names and assignment details.

Adı	Adres
Kastamonu - Bozkurt Su Baskını	Kastamonu - Bozkurt Su Baskını

Adı	Numarası	Tarih	Seviyesi	Kapatılma Zamanı	Açıklama	Afad Müdahale Etti Mi?
Kastamonu - Bozkurt Su Baskını	20213700053	11-08-2021 06:40:34	2	04-01-2022 15:30:20	Kastamonu ili genelinde aşırı yağışlar sebebiyle sel felaketi meydana gelmiştir. Çevre illerden destek ekipleri olay bölgesine sevk edilmiştir.	<input checked="" type="checkbox"/>

Adı	Numarası	Tarih	Seviyesi	Kapatılma Zamanı	Açıklama	Afad Müdahale Etti Mi?
1-ABDULKADİR - ERTUĞRUL - 2021370005361 - 2021370061 - Yaralı						
2-Abdullah - KAYIŞ - 20213700053250 - 202137009 - Sağlam						
3-AHMET - BALCI - 20213700053293 - 39619655868 - Sağlam						
4-AHMET - KALYANCIOĞLU - 2021370005329 - 2021370029 - Yaralı						
5-AHMET - MERDA - 2021370005314 - 2021370014 - Yaralı						
6-AHMET - RENÇBER - 20213700053210 - 43768517304 - Sağlam						
7-AHMET - ŞIŞMAN - 20213700053356 - 53800182940 - Sağlam						

Ad Soyad:	Olay:
ABDURRAHMAN SELİM ERTAN	20213700053 - Kastamonu - Bozkurt Su Baskını
ABDÜLBAKİ ARCANLI	20213700053 - Kastamonu - Bozkurt Su Baskını
ABİDİN EROĞLU	20213700053 - Kastamonu - Bozkurt Su Baskını
ABİDİN KORKMAZ	20213700053 - Kastamonu - Bozkurt Su Baskını
ASLI ERDOĞAN	20213700053 - Kastamonu - Bozkurt Su Baskını
ATİLA İNCE	20213700053 - Kastamonu - Bozkurt Su Baskını
ATİLA TEMÜRLÜ	20213700053 - Kastamonu - Bozkurt Su Baskını

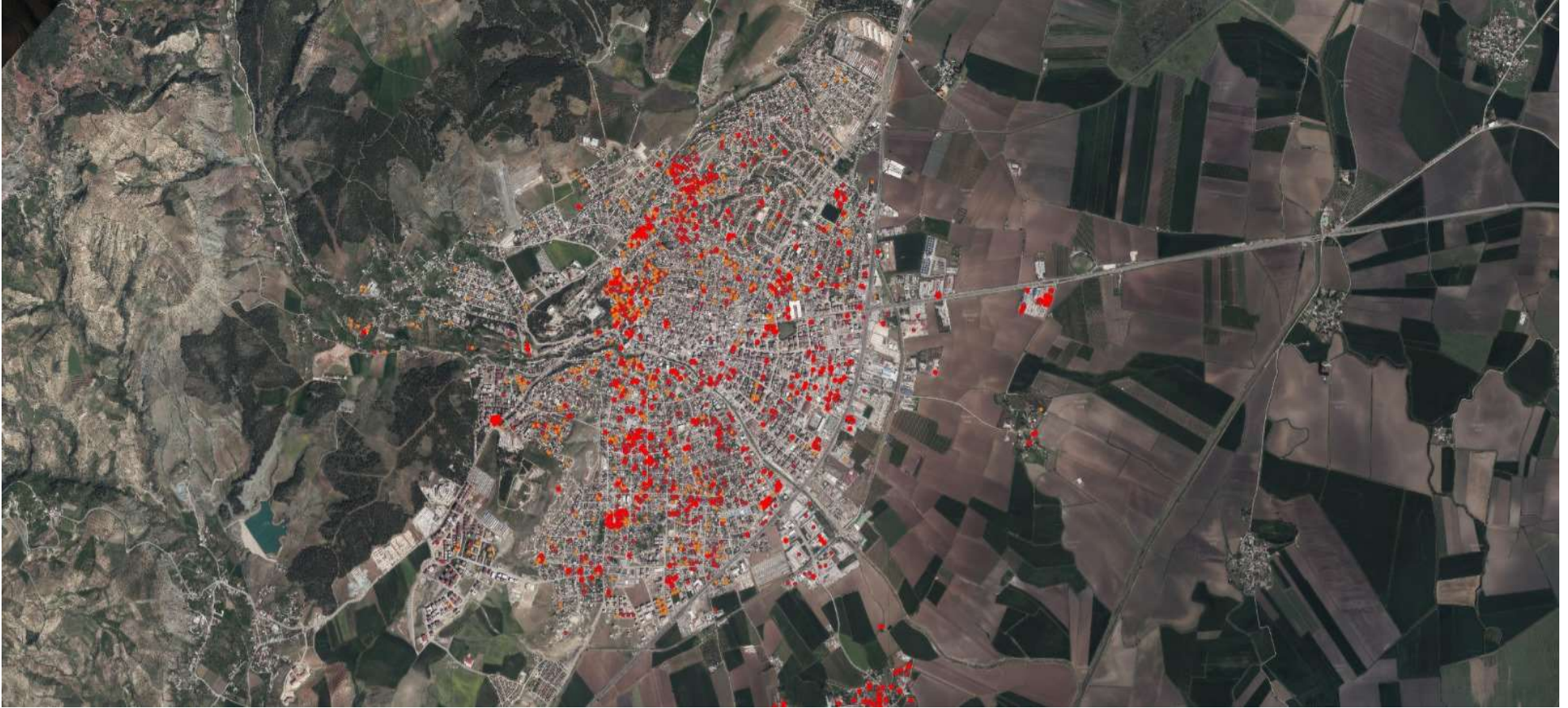
Descriptive Information about incident

Inventory Book listing incident victims

Location and status of response activities

Personnel Assignment Lists

## 6 February Kahramanmaraş Earthquakes on AYDES



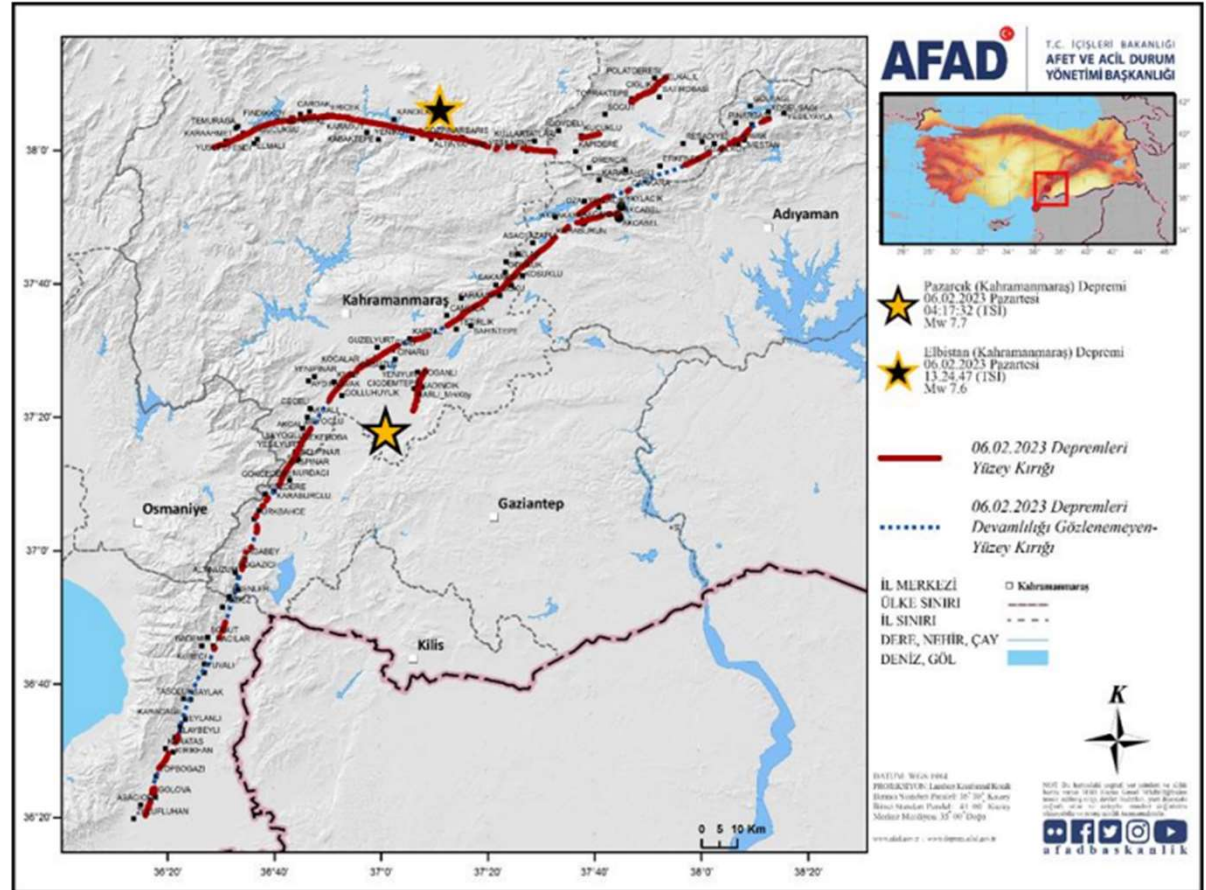


## 6 February Kahramanmaraş Earthquakes

06.02.2023  
7.7 Mw & 7.6 Mw  
Kahramanmaraş

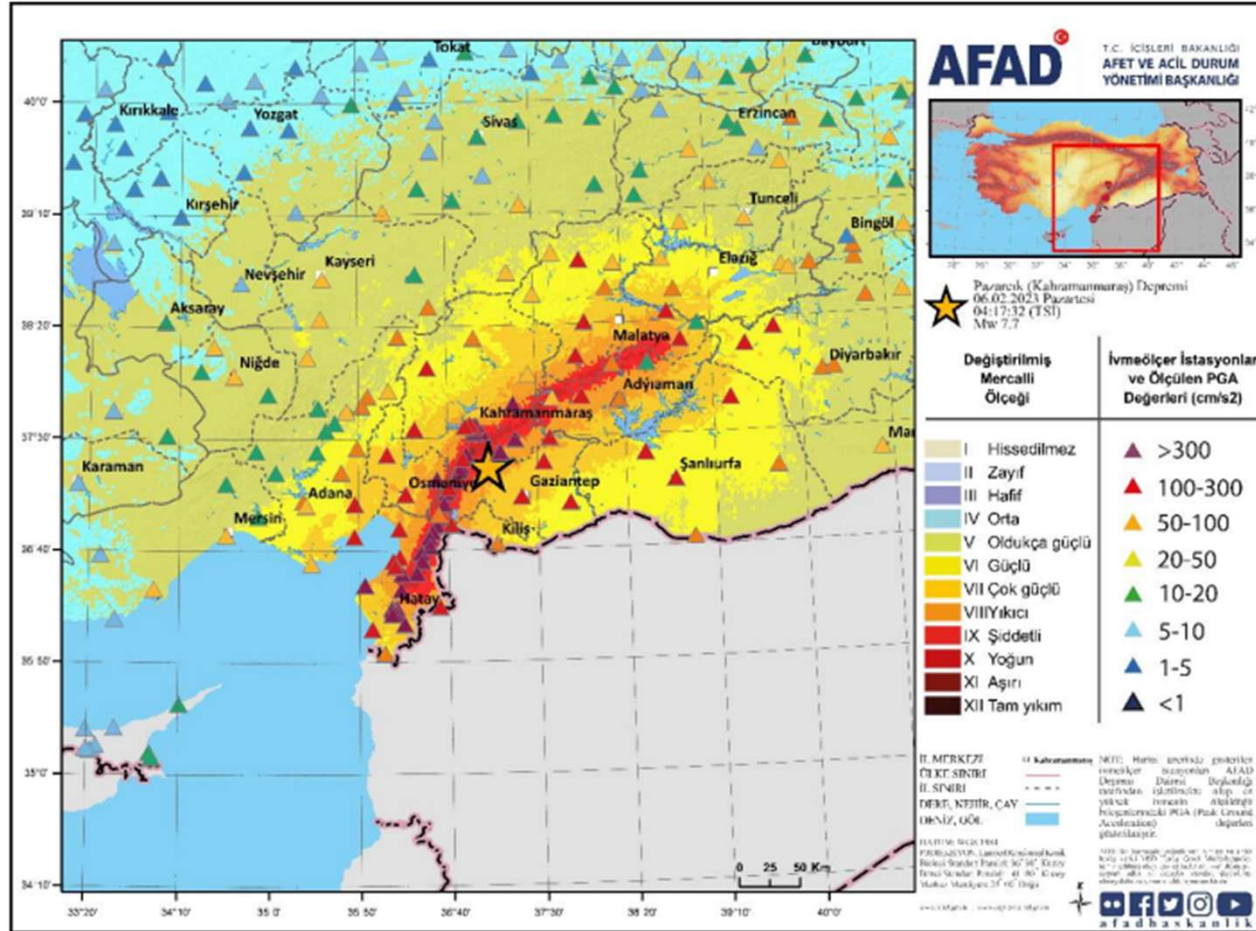


Total number of collapsed buildings: 37.984  
Heavy damaged buildings: 205.534



Surface rupture map observed after the Kahramanmaraş Earthquakes

# 6 February Kahramanmaraş Earthquakes on AYDES&AFAD-RED












# 6 February Kahramanmaraş Earthquakes Remote Sensing Data

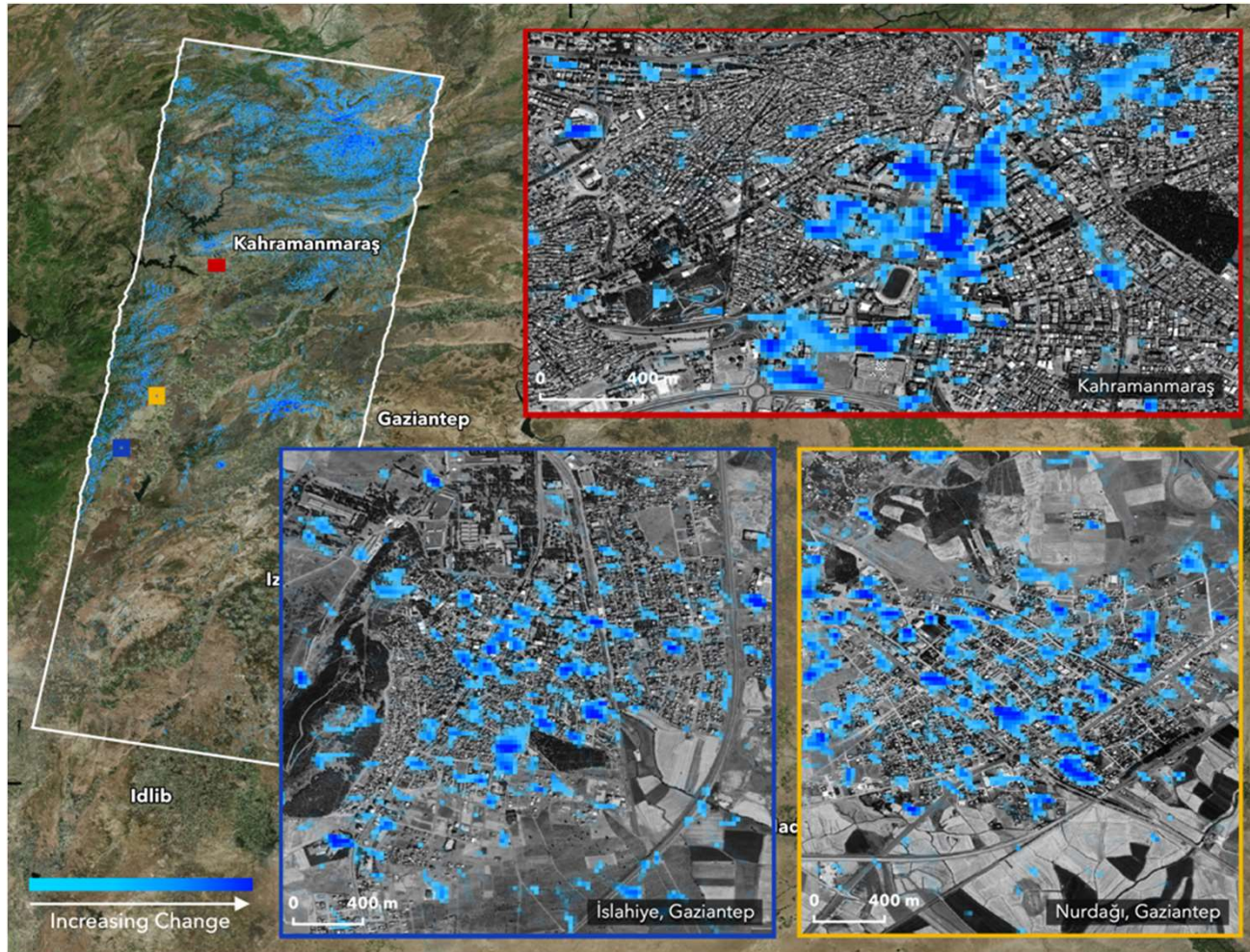
AFAD Projects - AfetAnalizPRO

Search Öm hukuki ve cezai işlemleri başlatma ve taleplerde bulunma hakkı saklıdır.

afetanaliz beta

 <p>Antalya - Managat Orman Yangını (27.07.2021 - 06.08.2021)</p> <p>Load the map View metadata</p>	 <p>AYANCIK SEL-TAŞKIN - MOLOZ_AKMASI (11.08.2021)</p> <p>Load the map View metadata</p>	 <p>BOZKURT SEL-TAŞKIN - MOLOZ_AKMASI (11.08.2021)</p> <p>Load the map View metadata</p>	 <p>KAHRAMANMARAŞ DEPREMLERİ (06.02.2023)</p> <p>Load the map View metadata</p>
 <p>Köyceğiz Orman Yangını (27.07.2021 - 15.08.2021)</p> <p>Load the map View metadata</p>	 <p>Mersin - Gülnar - Silifke Orman Yangını (07.09.2022)</p> <p>Load the map View metadata</p>	 <p>MUGLA -DATÇA ORMAN YANGINI (13 -14 Temmuz 2022)</p> <p>Load the map View metadata</p>	 <p>MUGLA - MARMARİS - HİSARÖNU - BÖRDÜBET ORMAN YANGINI (21 - 24 Haziran 2022)</p> <p>Load the map View metadata</p>
 <p></p>	 <p></p>	 <p></p>	

# 6 February Kahramanmaraş Earthquakes Remote Sensing Examples



EOS-RS Damage Proxy Map  
Turkey and Syria Earthquakes  
from synthetic aperture  
radar(SAR) images acquired  
by the ALOS-2 satellite  
operated by the Japan  
Aerospace Exploration Agency  
(JAXA) before and after the  
disaster.

## 6 February Kahramanmaraş Earthquakes Remote Sensing Examples

Aerial photo of Göktürk satellite taken from Adıyaman after the February 6 earthquakes



## 6 February Kahramanmaraş Earthquakes Remote Sensing Examples

Aerial photo of Göktürk satellite taken from Hatay, Antakya after the February 6 earthquakes



## 6 February Kahramanmaraş Earthquakes Remote Sensing Examples

General Directorate of Mapping took action within a day or two of the earthquake to take aerial photographs.



## Conclusion

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After the disaster, we started working to obtain images of the impact area we determined from some institutions and universities within a day or two after the disaster. We transferred the obtained remote sensing images to our systems and made them available to our relevant departments for use in emergency response and improvement activities.

This is the first time that large earthquakes affecting such a wide geography and occurring consecutively in a short time have occurred in our country. Even though preparations and drills were made beforehand, such a degree of destruction could not be foreseen. The impact of the disaster was so great that it was possible to see the damaged buildings even with the naked eye.



**For your detailed questions  
Please send e-mail to:  
[cbs\\_bshd@afad.gov.tr](mailto:cbs_bshd@afad.gov.tr)**

**Thank you for your attention..**