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

AFAD

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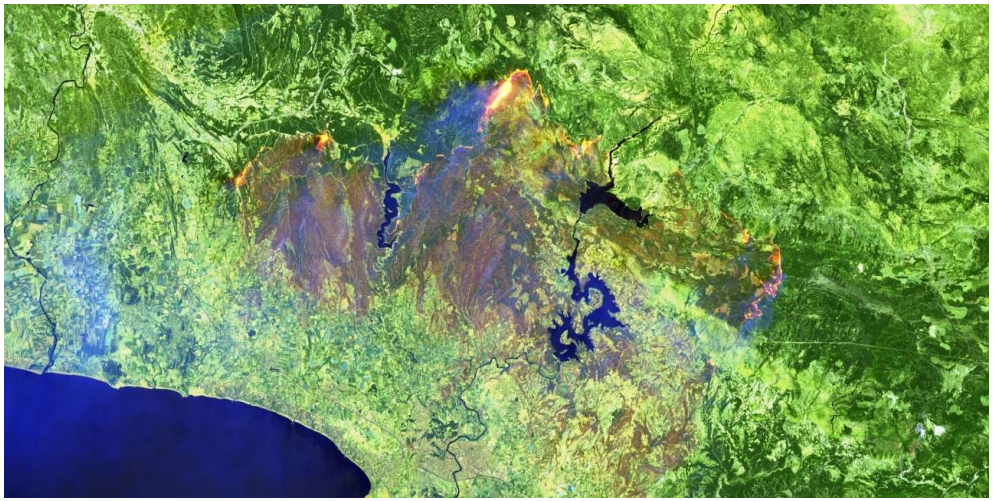
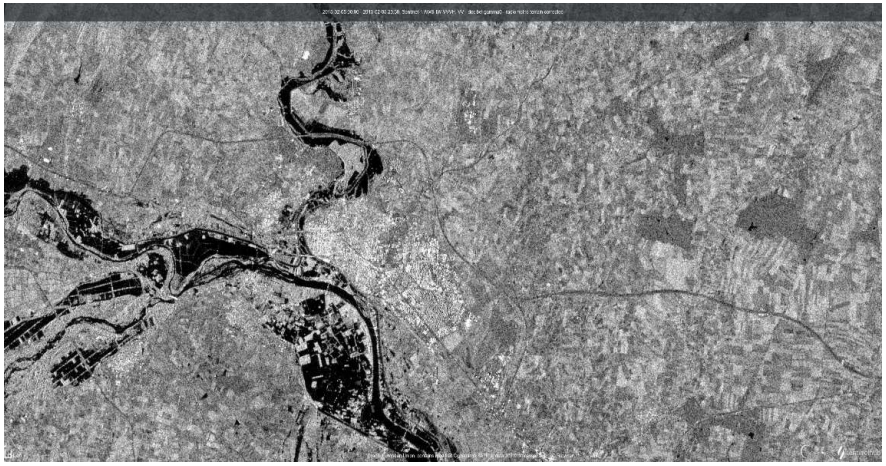
Disaster and Emergency Management Authority
Information Systems And Communication Department

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 Eartquakes RS Cases
- Conclusion

Remote Sensing





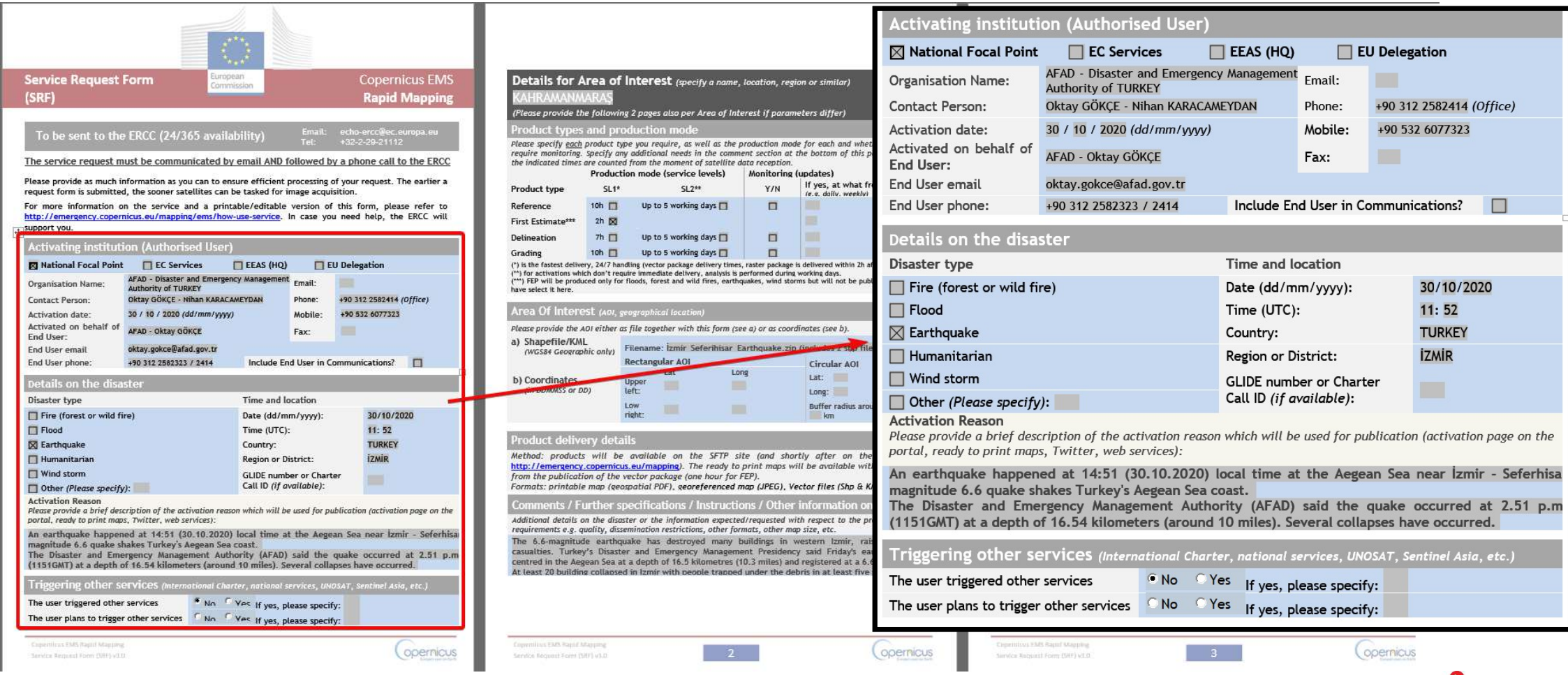
Remote Sensing Data Sources

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
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

- 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) — Copernicus EMS Rapid Mapping

To be sent to the ERCC (24/365 availability) — Email: echo-ercc@ec.europa.eu Tel: +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	Email:	
Contact Person:	Oktay GÖKÇE - Nihan KARACAMEYDAN	Phone:	+90 312 2582414 *(Office)*
Activation date:	30 / 10 / 2020 *(dd/mm/yyyy)*	Mobile:	+90 532 6077323
Activated on behalf of End User:	AFAD - Oktay GÖKÇE	Fax:	
End User email	oktay.gokce@afad.gov.tr		
End User phone:	+90 312 2582323 / 2414	Include End User in Communications?	☐

Details on the disaster

Disaster type		Time and location	
☐ Fire (forest or wild fire)		Date (dd/mm/yyyy):	30/10/2020
☐ Flood		Time (UTC):	11: 52
☒ Earthquake		Country:	TURKEY
☐ Humanitarian		Region or District:	İZMİR
☐ Wind storm		GLIDE number or Charter Call ID *(if available)*:	
☐ Other *(Please specify)*:			

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 whether 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) SL1*	SL2**	Monitoring (updates) Y/N	If yes, at what frequency (e.g. daily, weekly)
Reference	10h ☐	Up to 5 working days ☐	☐	
First Estimate***	2h ☒			
Delineation	7h ☐	Up to 5 working days ☐	☐	
Grading	10h ☐	Up to 5 working days ☐	☐	

(*) is the fastest delivery, 24/7 handling (vector package delivery times, raster package is delivered within 2h af
(**) 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 publ
have 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)* — Filename: İzmir Seferihisar Earthquake.zip (includes 2 sup file

b) Coordinates *(in DDMMSS or DD)* — Rectangular AOI: Upper left: Lat / Long; Low right: Lat / Long. Circular AOI: Lat: / Long: / Buffer radius arou 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 wit from the publication of the vector package (one hour for FEP).
Formats: printable map (geospatial PDF), georeferenced map (JPEG), Vector files (Shp & K

Comments / Further specifications / Instructions / Other information on

Additional details on the disaster or the information expected/requested with respect to the pr requirements e.g. quality, dissemination restrictions, other formats, other map size, etc.

The 6.6-magnitude earthquake has destroyed many buildings in western İzmir, rais casualties. Turkey's Disaster and Emergency Management Presidency said Friday's ea centred in the Aegean Sea at a depth of 16.5 kilometres (10.3 miles) and registered at a 6.
At least 20 building collapsed in İzmir with people trapped under the debris in at least five

Copernicus EMS Rapid Mapping — Service Request Form (SRF) v3.0 — 2

Copernicus EMS Rapid Mapping — Service Request Form (SRF) v3.0 — 3

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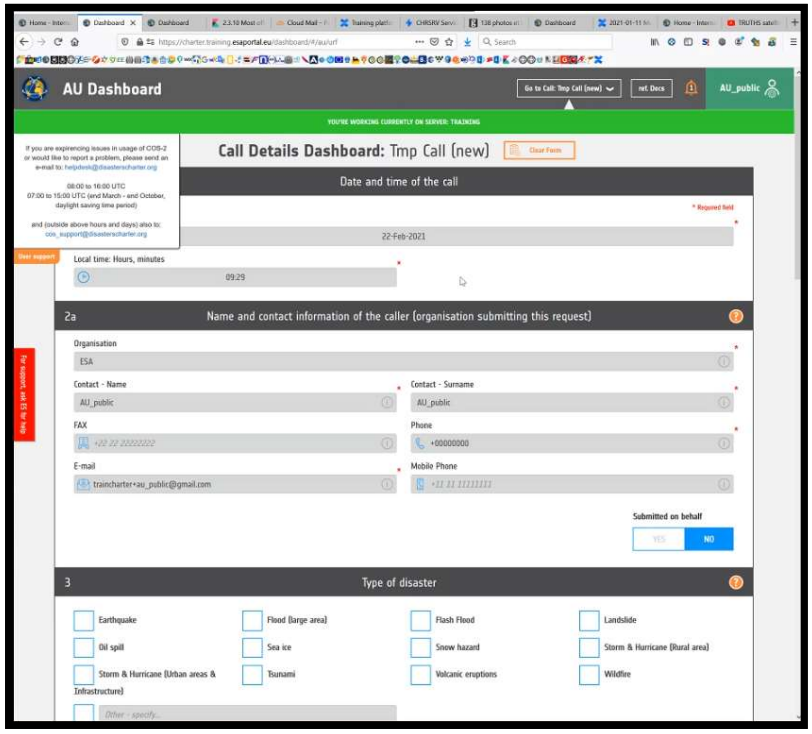
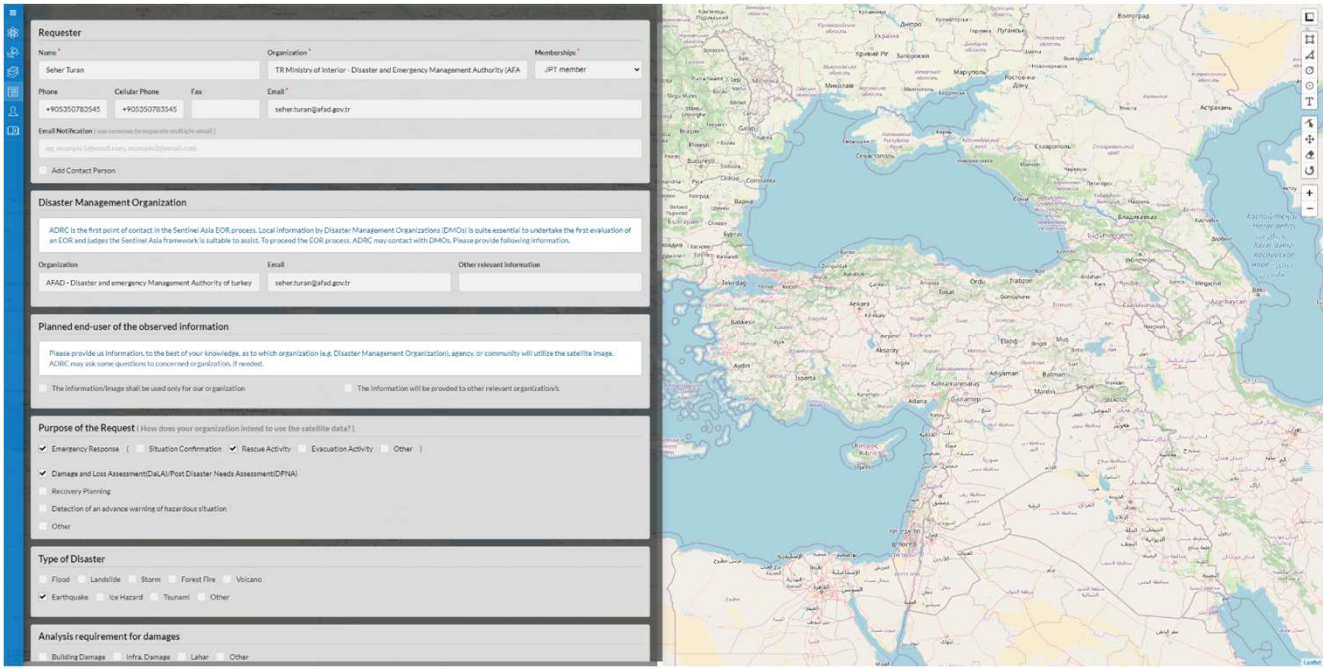
RS - Data Sources– Sentinel Asia and UN Disaster Charter Activation





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:

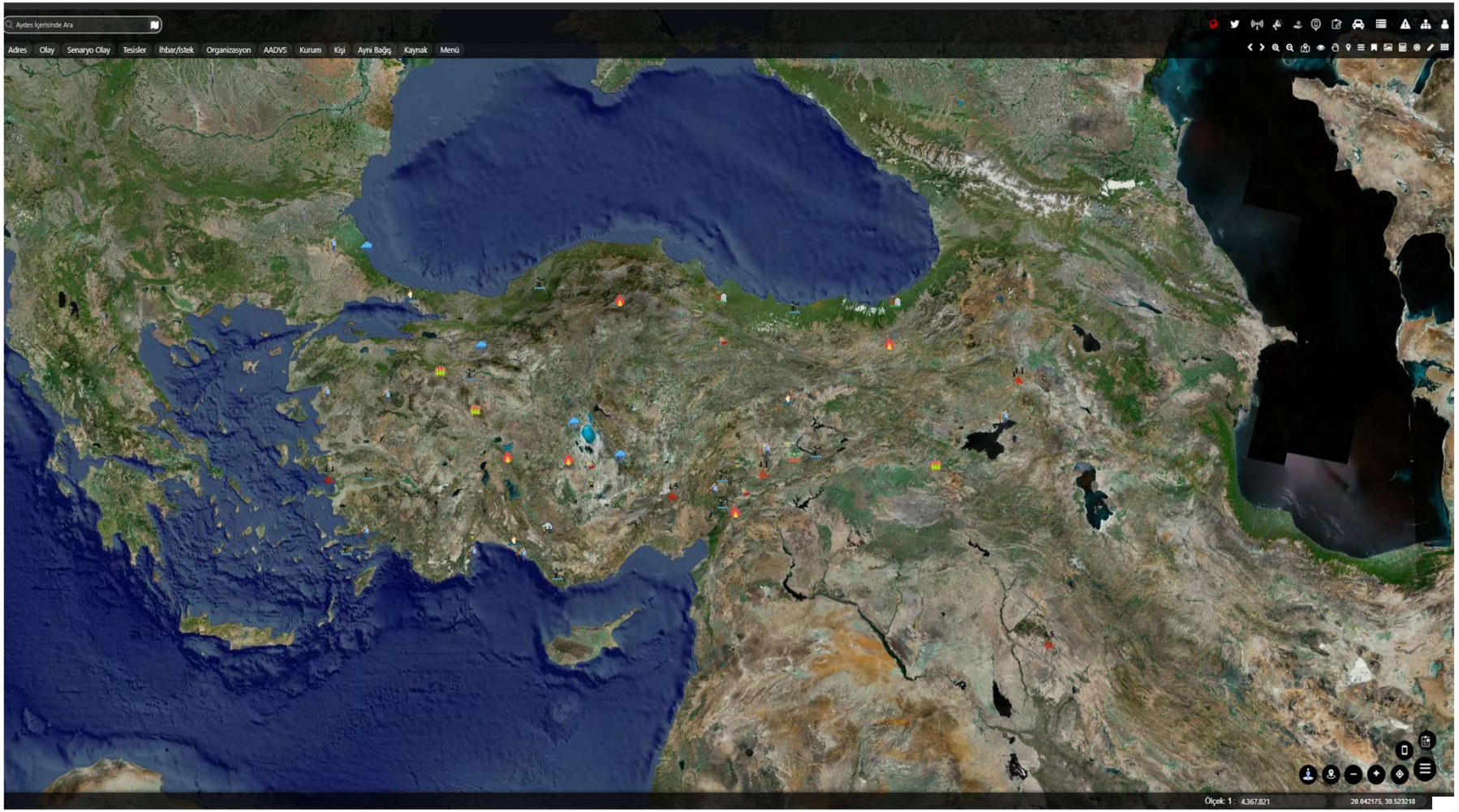
- AYDES UZAL (Desktop image processing and analysis software -2018)
- AYDES Crowdsourcing (WEB based image evaluation software - 2018)
- Coordinated image creation project from videos – 2017
- Creation of Disaster Analysis Web Portal – 2022

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

- Adding Satellite Image to AYDES:

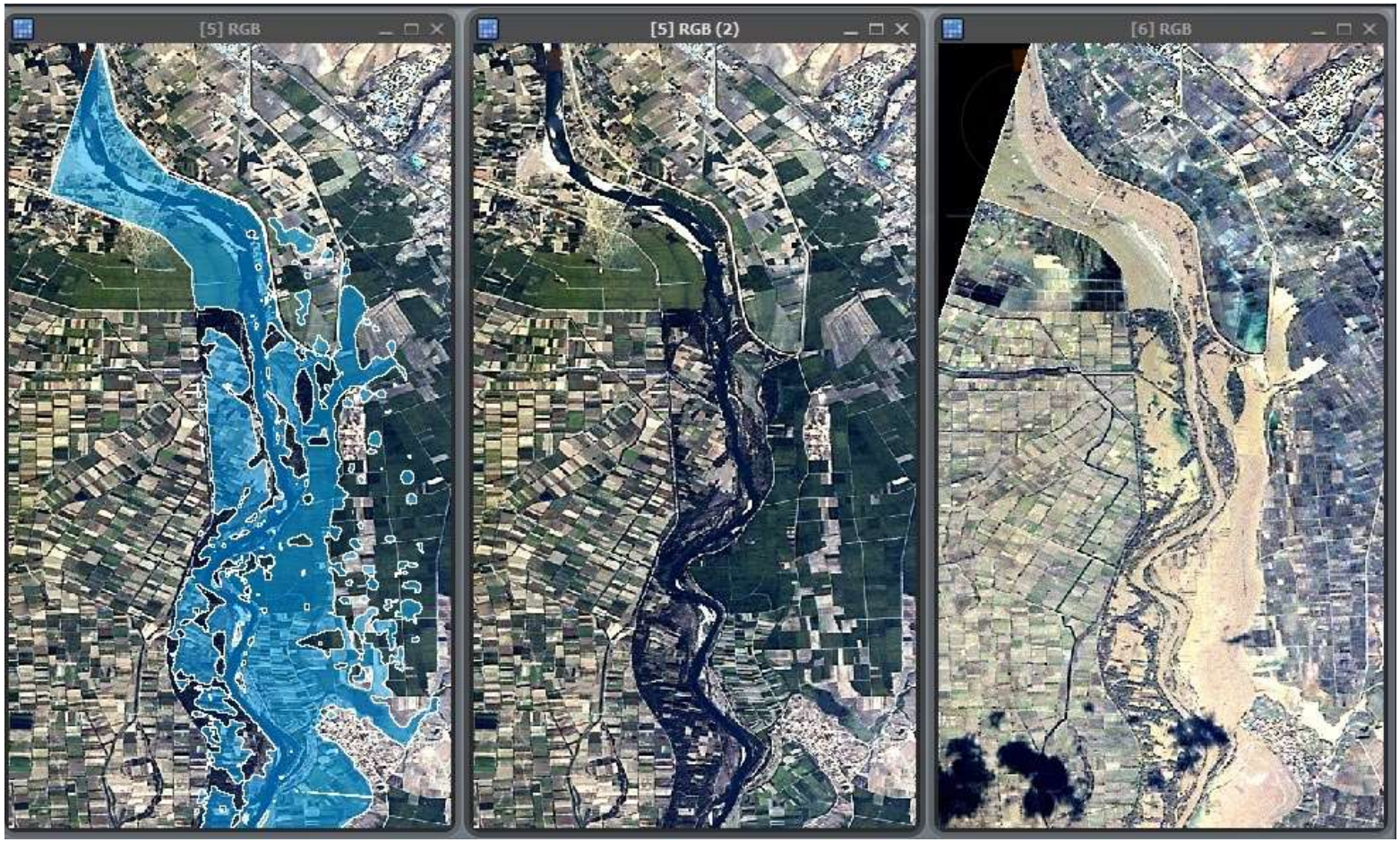
Adding event-based satellite imagery - 2022

AYDES: Disaster Management and Decision Support System

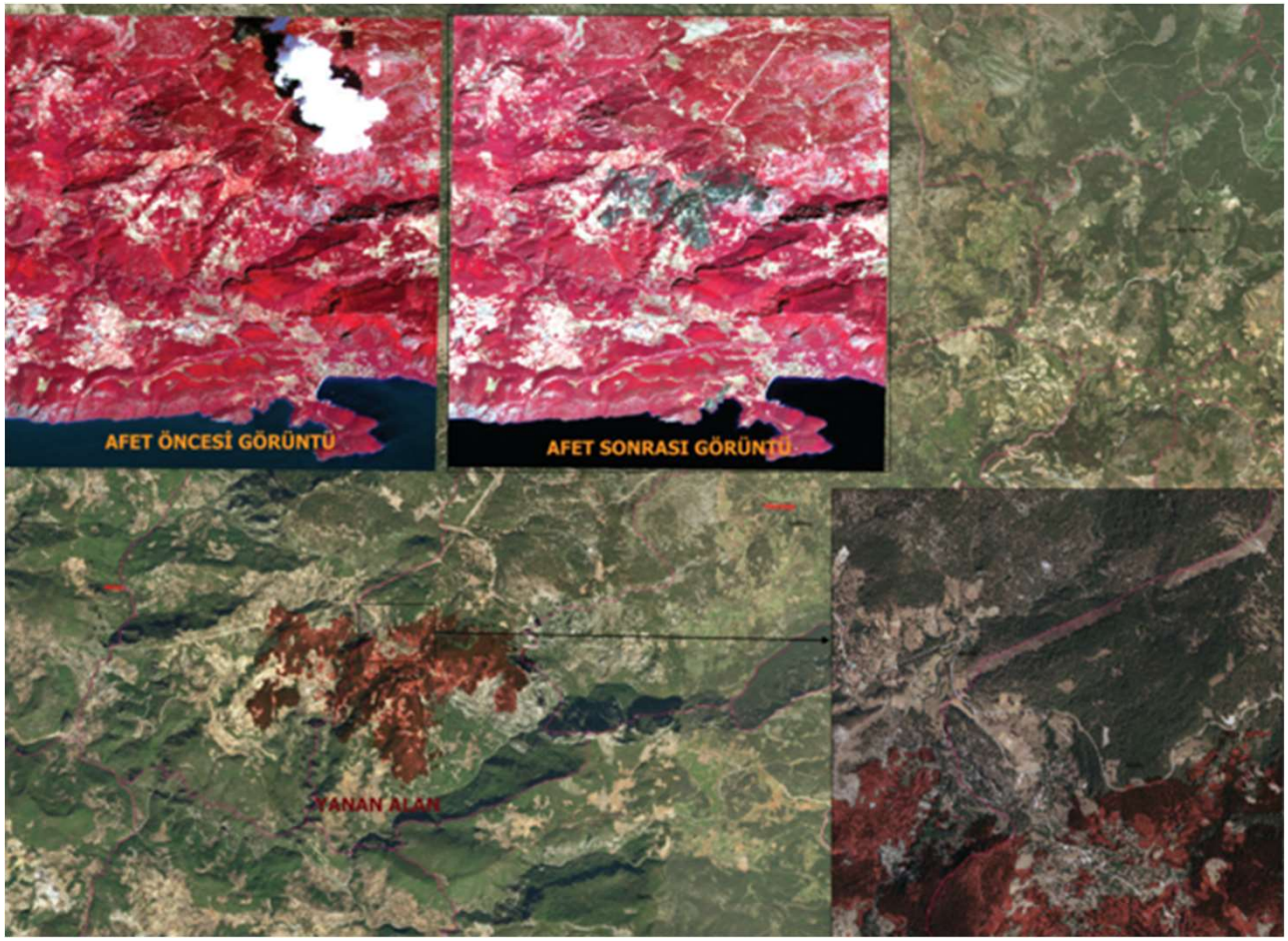


AYDES: Disaster Management and Decision Support System

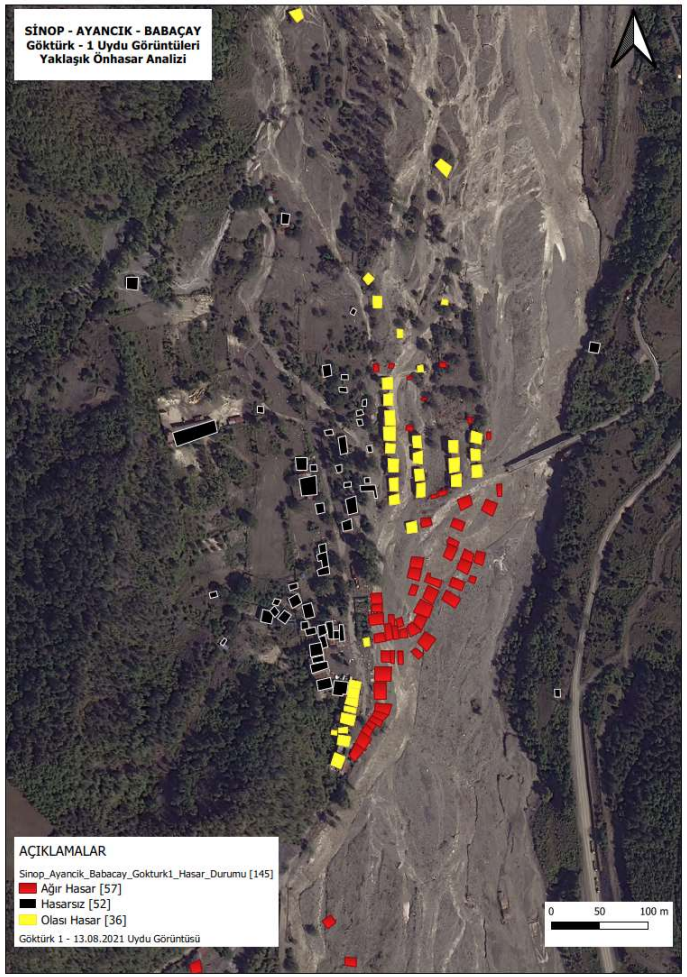
Case Studies about flood RS on AYDES

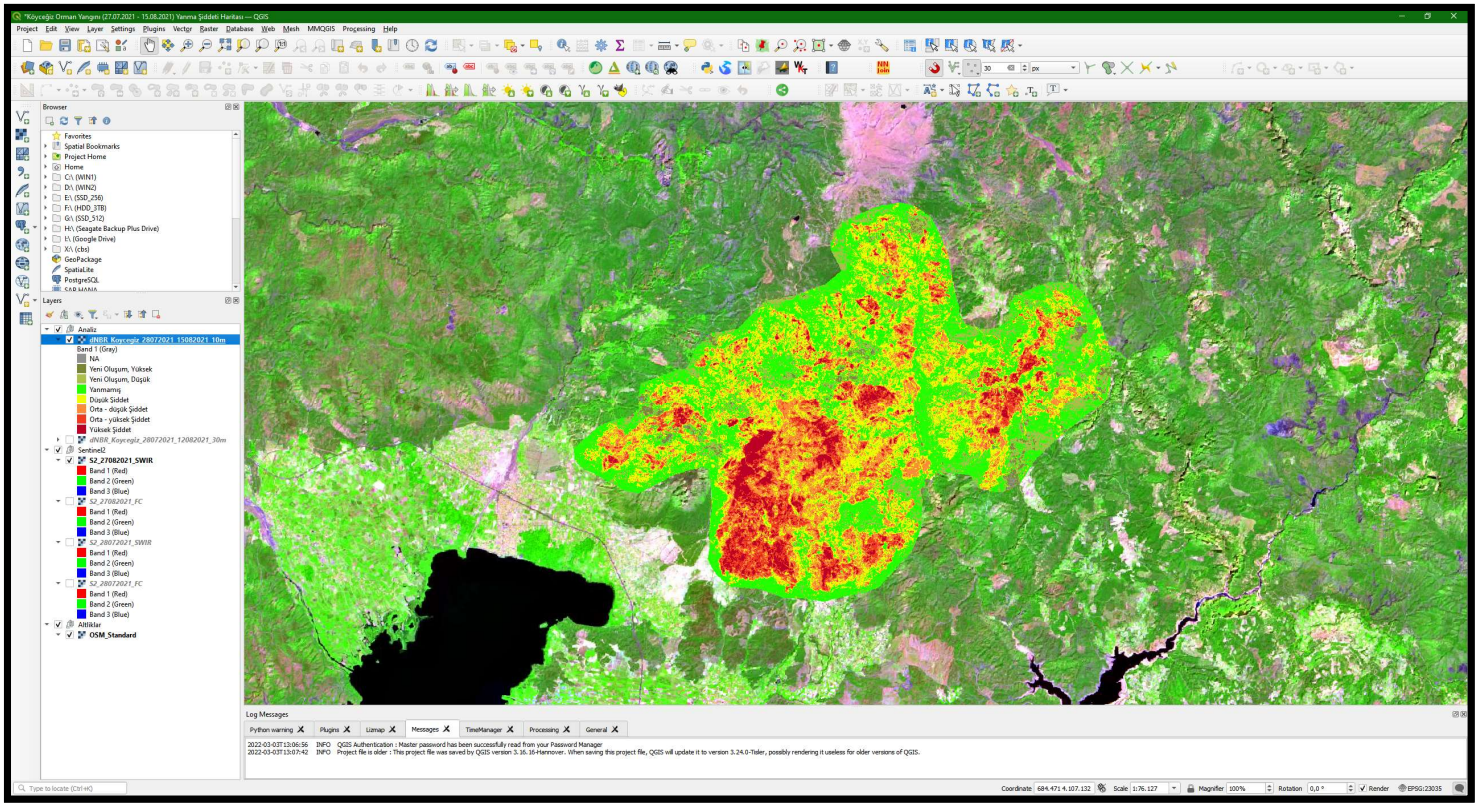


Case Studies about forest fire RS on AYDES

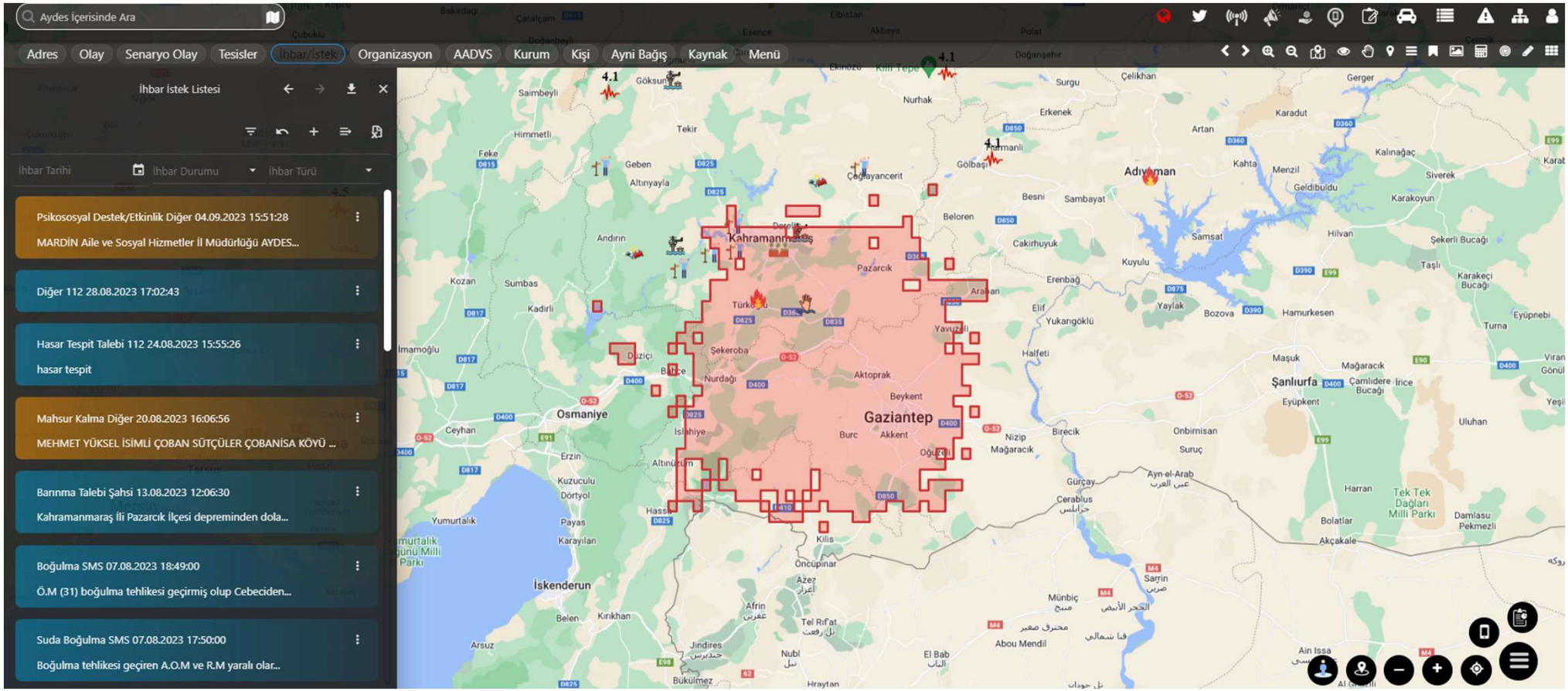


Case Studies about flood and forest fire RS on AYDES

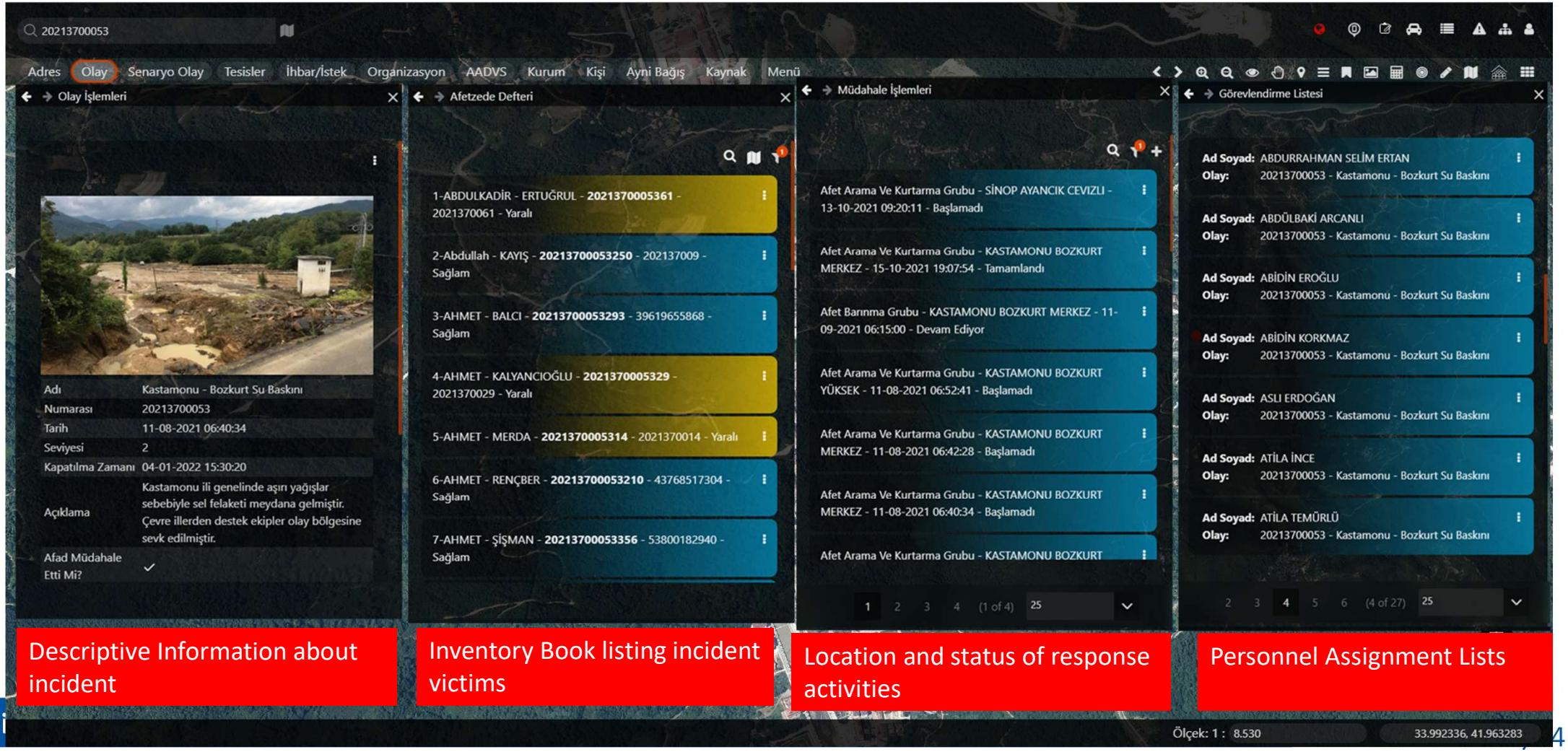




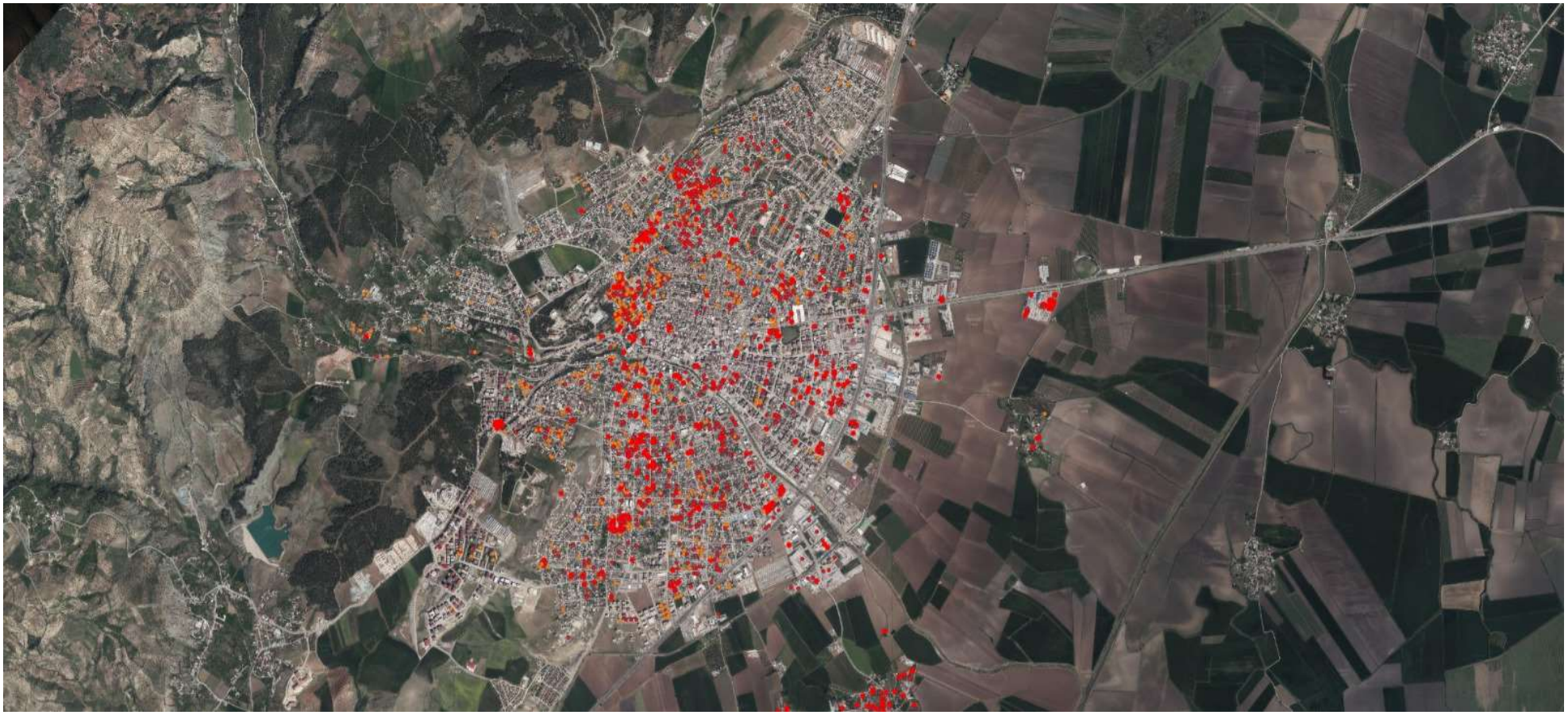
Crowd Sourcing Cases on AYDES



Crowd Sourcing Cases on AYDES



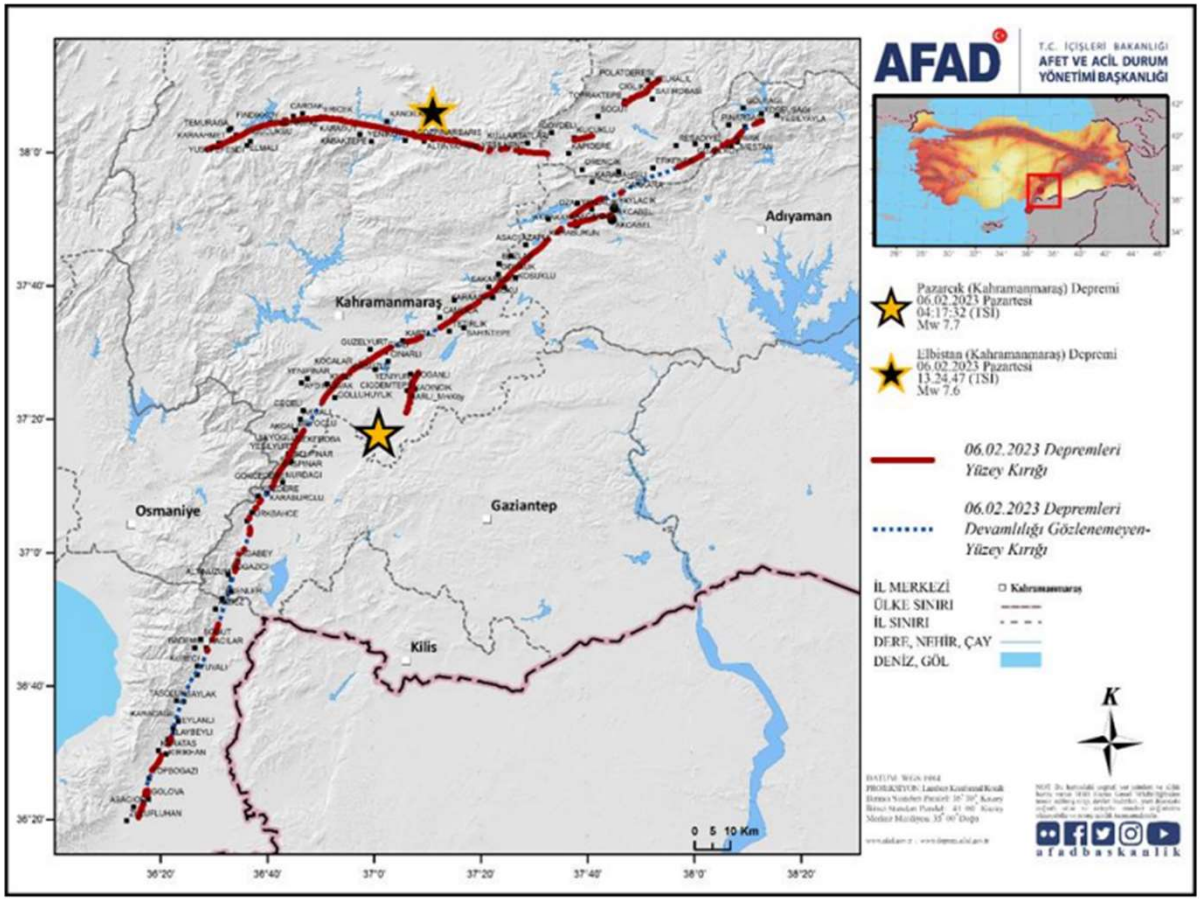
6 February Kahramanmaraş Earthquakes on AYDES



6 February Kahramanmaraş Earthquakes

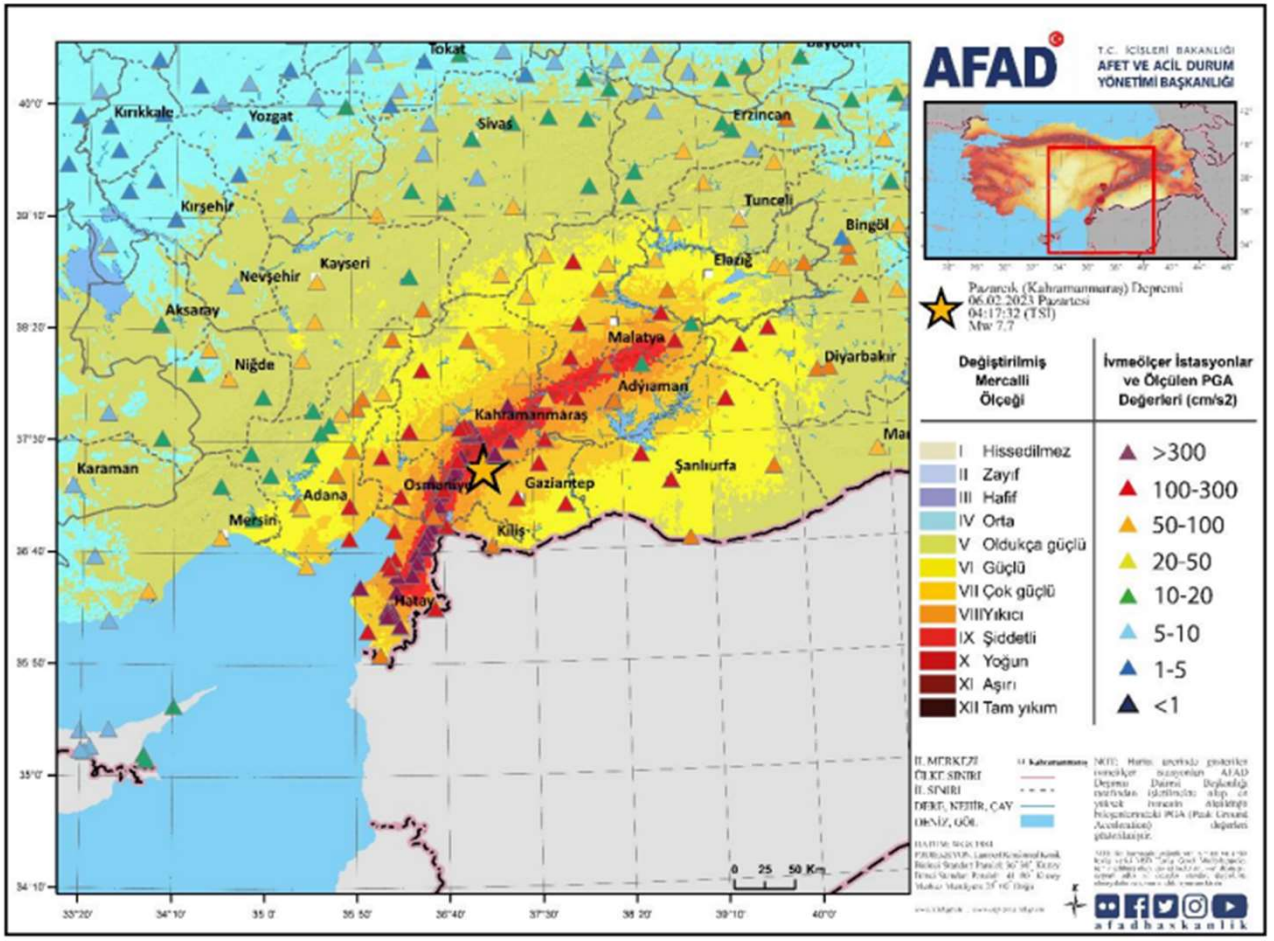
06.02.2023
7.7 Mw &7.6 Mw
Kahramanmaraş

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

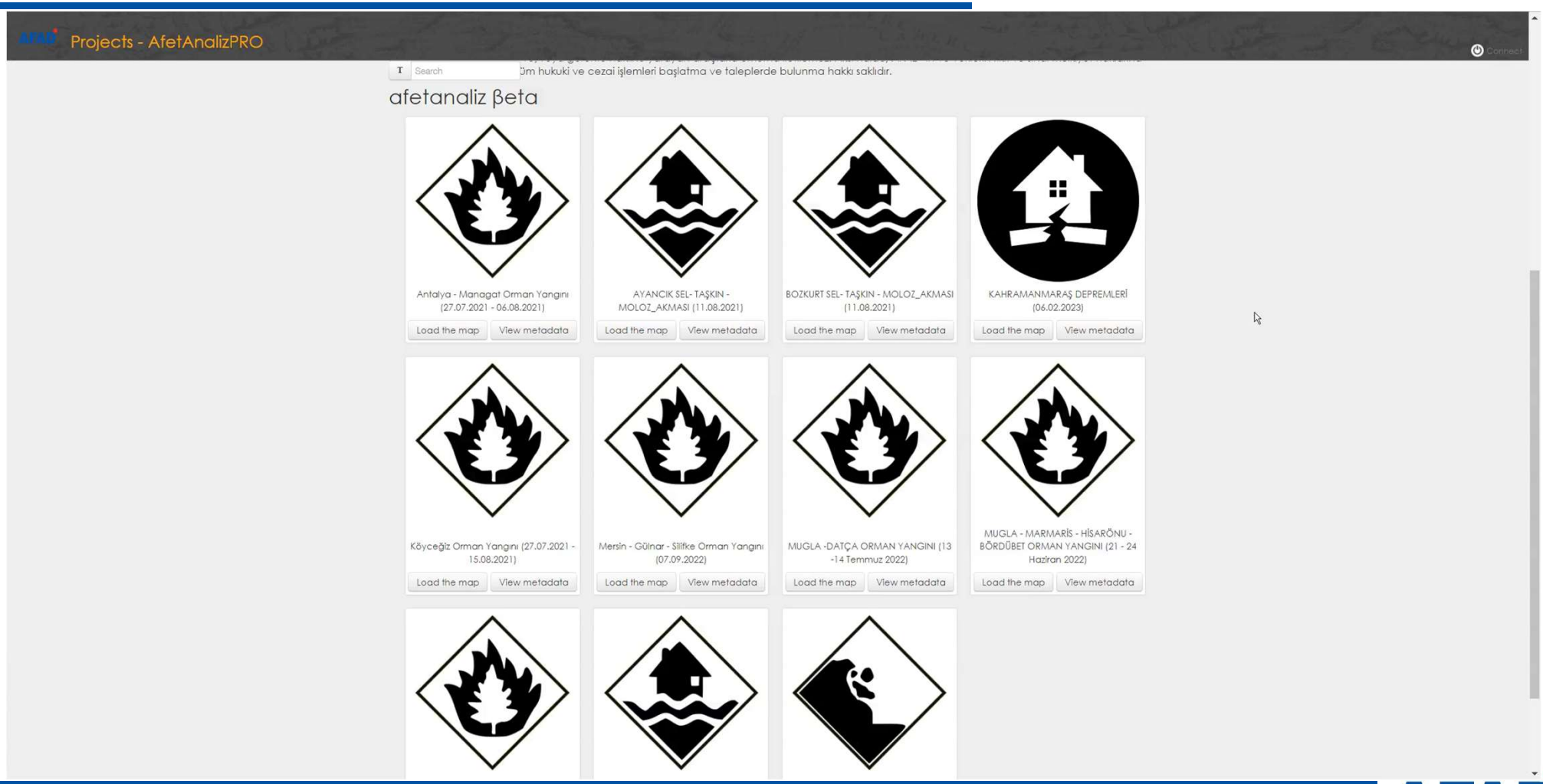


Surface rupture map observed after the Kahramanmaraş Earthquakes

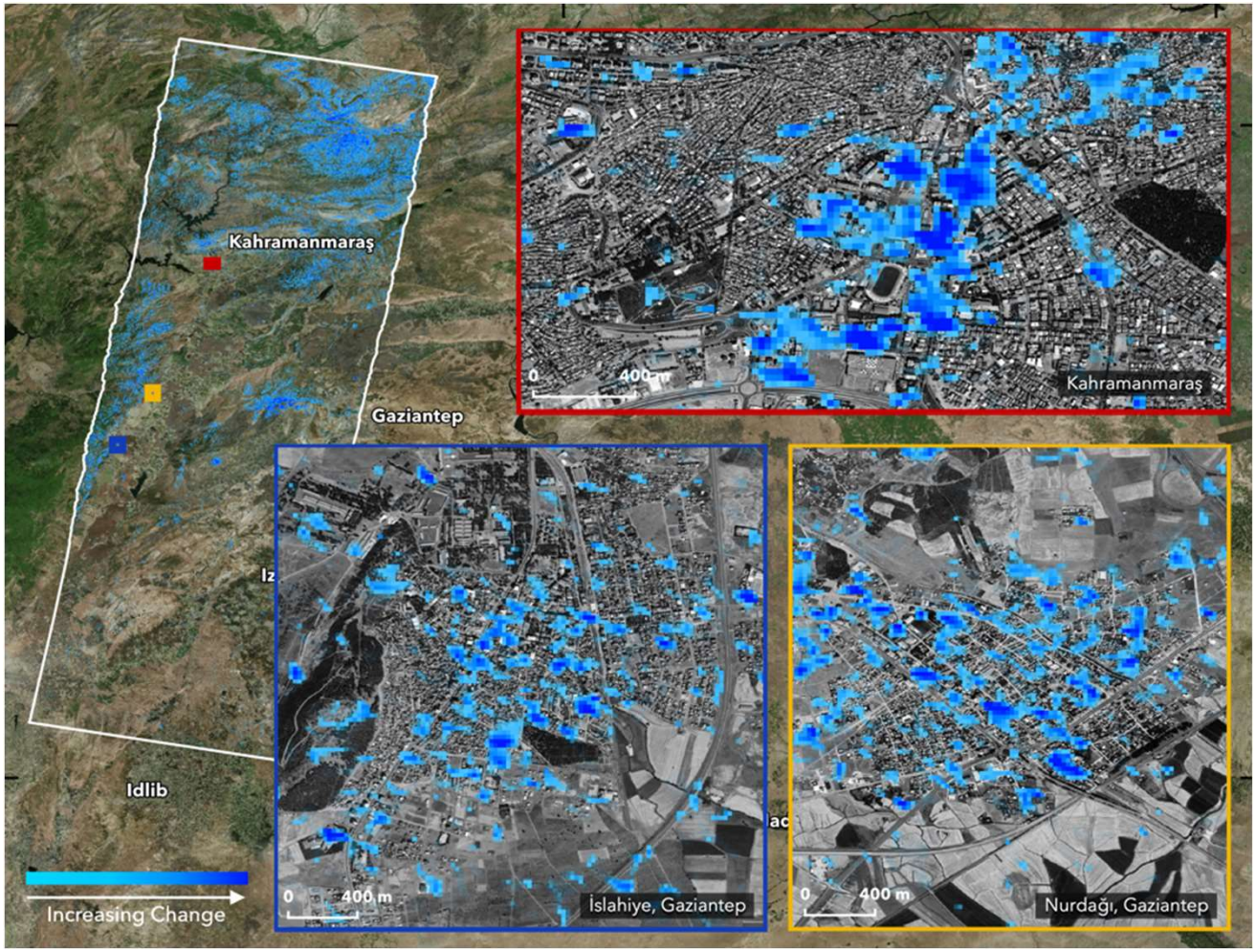
6 February Kahramanmaraş Earthquakes on AYDES&AFAD-RED



6 February Kahramanmaraş Earthquakes Remote Sensing Data



6 February Kahramanmaraş Earthquakes Remote Sensing Examples



EOS-RS Damage Proxy Map Turkey and Syria Earthquakes from synthetic aperture radar(SAR) images acquited 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

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

Thank you for your attention..