

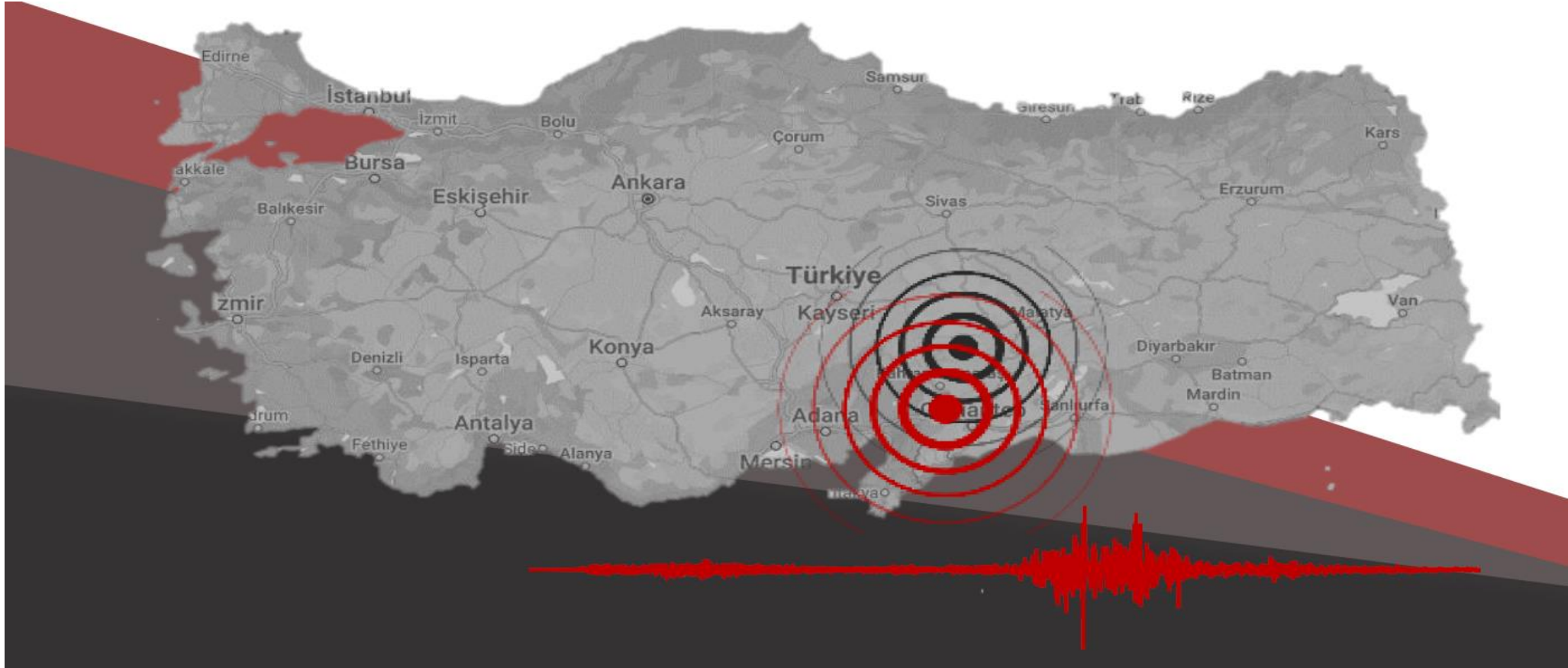


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Technical and Humanitarian Studies of Surveyors after the 6 February Earthquakes in Türkiye



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Outline



- February EQs, General Information
- Emergency Humanitarian Aids
- Photogrammetric Mapping for Initial Damage Assessment
- Deformation Surveying During Research & Rescue
- Remote Sensing Analyses
- Damage Assessment and Urgency activities
- Cultural Heritage Saving
- Geodetic Surveying of Ground Deformations and Monitoring
- Information About Aids for Surveyors and Solidarity
- Reconstruction Progress

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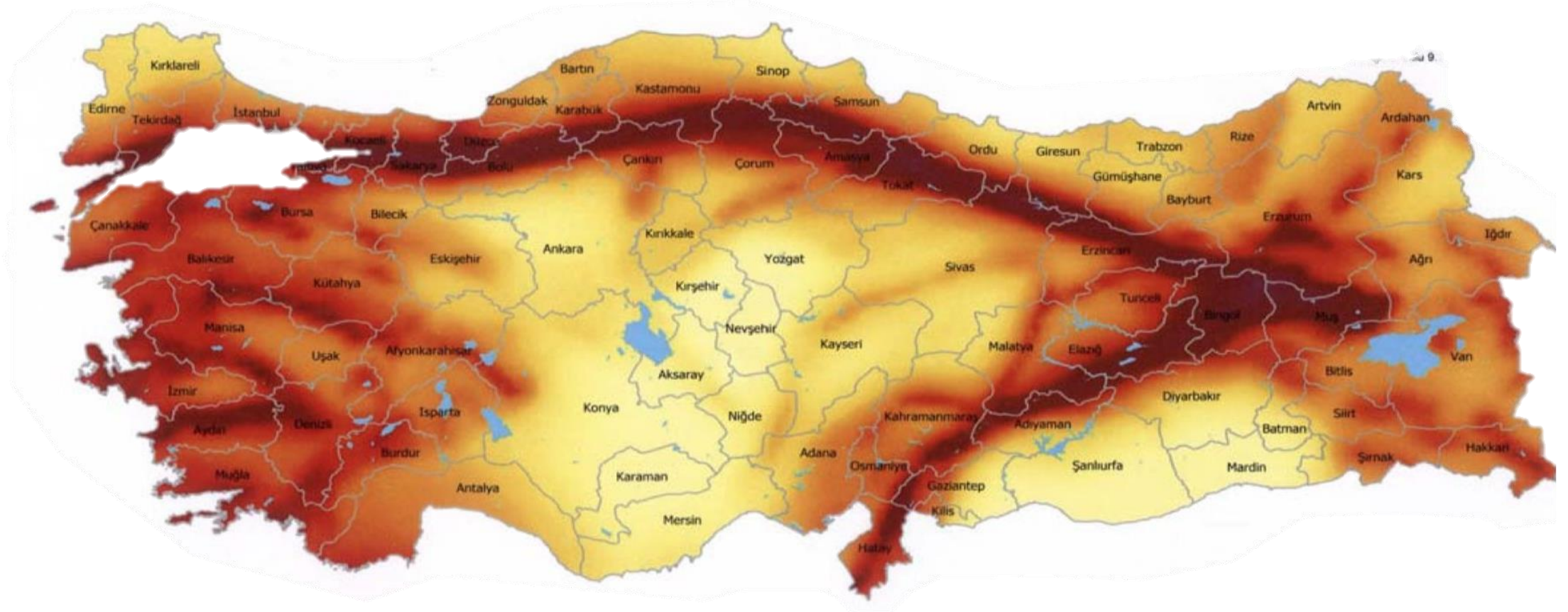




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Earthquake Risk Map of Türkiye



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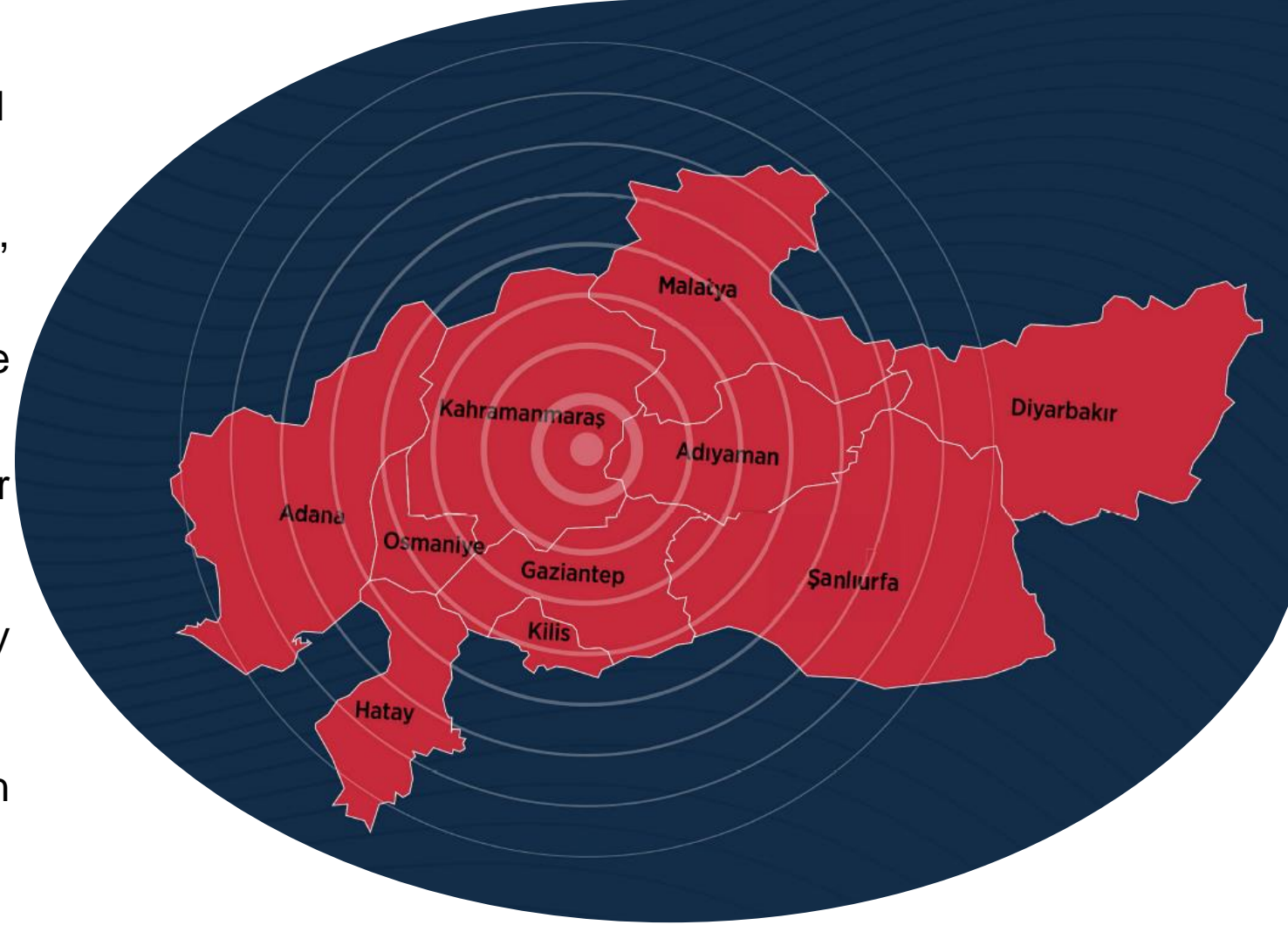
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About Türkiye Earthquake



- EQ is larger than many countries in Europe.
- Extensive damage occurred in a total of 11 provinces
- Damaged to over half a million buildings, communication and energy infrastructure,
- This population corresponds to 17% of the total population.
- In these devastating earthquakes, 10 of our colleagues lost their lives.
- Homes and offices of approximately our 100 members were destroyed.
- Provincial branch offices of our chamber in three cities were destroyed completely.



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Emergency Humanitarian Aids



- We have collected donations and materials such as blanket, food, water, clothes from our members. Also materials purchased by the our chamber.
- We established Disaster Coordination Centers as Union of Chambers of Turkish Engineers and Architects.



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Since the first days of the earthquake, our Board of Directors has participated to the humanitarian and technical works in the earthquake area.

We established directly Contact with all members and supported the works on the delivery and coordination of the aids.



- **Emergency Aerial Mapping with UAV**

On February 7, 20 volunteers were identified as the Chamber for the rapid mapping of the disaster area with unmanned aerial vehicles and damage assessment. The data obtained has been shared at cloud of General Directorate of GIS in a way that everyone can use.





Emergency Mapping With UAV



UAV image from Hatay/Antakya

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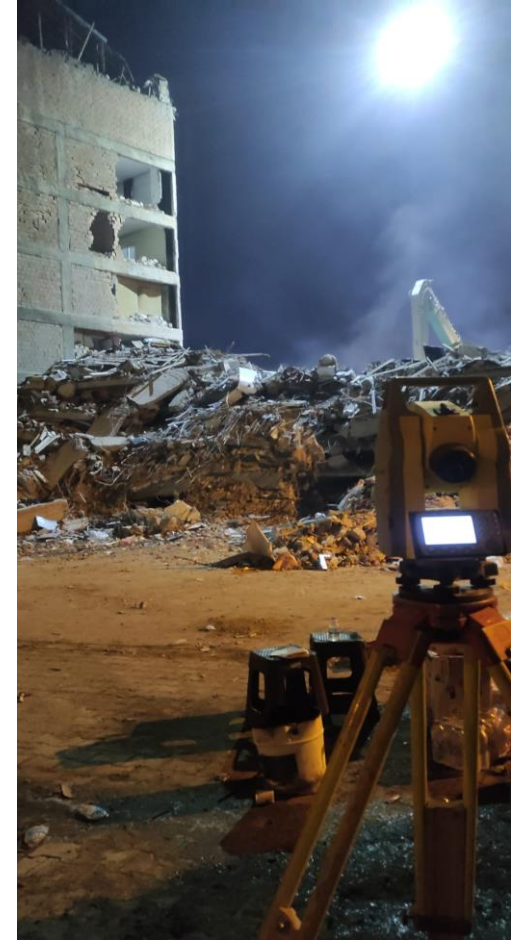
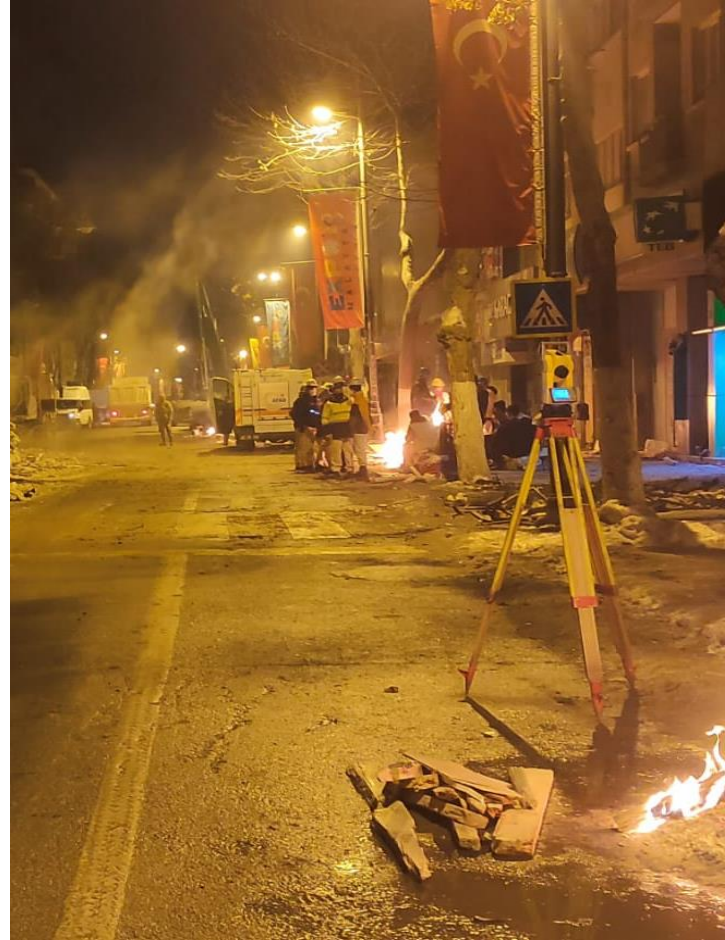
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- **Deformation Surveying of Heavy Damaged Buildings During Search and Rescue Studies**

We established volunteer surveying teams to monitor the movements of heavy damaged buildings in order to ensure the life safety of the research- resource teams in this activities.

Because, when any movement was detected, area have to be evacuated.





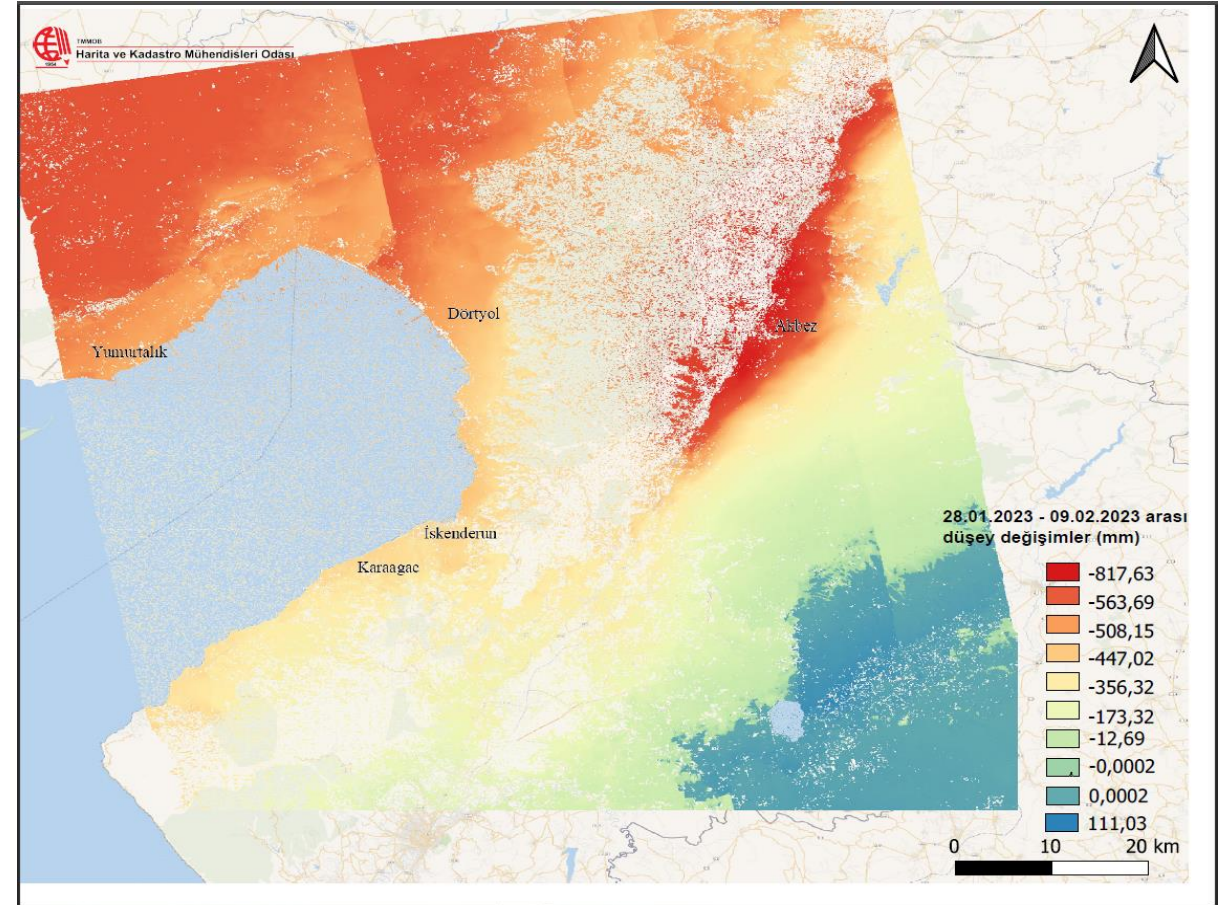
- **Evidence Collection from collapse of the buildings for judgement**

An emergency meeting was held with the Ministry of Justice and it was ensured that survey engineers take part in the evidence collection teams. Survey Engineers took place during the evidence collection from damaged and collapsed buildings by mapping.



- **InSAR Analysis of Disaster Area and Informing the Public.**

Our Chamber's Photogrammetry and Remote Sensing Commission performed insar analyses by using sentinel SAR data and prepared a report regarding surface deformations, horizontal and vertical displacement.



Remote Sensing gave an answer to the public!
It is a subsidence, not the sea level rise or tsunami!



Subsidence of Iskenderun City



- **Geodetic Evaluation of the Earthquake**

A report prepared by our Geodesy and Navigation Commission on the Geodetic Evaluation of the Earthquake and its effects and the urgent work to be done.





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Role of the Surveyors on disaster



- **Report on the Disaster and Chamber's Studies**

A Report has been prepared on Earthquake and evaluation of disaster management of Türkiye after many site visits on the region.



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- **Mobile GIS Application Development for management of humanitarian aids**

A mobile application and desktop interface was developed by our Chamber in order to coordinate the aids provided by the Engineers' Chambers to prevent duplication, and collect and monitor the needs properly. Necessary licenses for the software infrastructure were obtained from ESRI free of charge and made available for usage of all members .





Cultural Heritage of Türkiye



Source : Maarif Agency
@MaarifAgency / Twitter



Habibi Neccar Mosque (The oldest mosque in Turkey)



Antakya Orthodox Church





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Cultural Heritage Saving



<https://bringhistoryback.3dprobox.com/>

TARİHİ GERİ GETİR

elim...hep beraber tarihi geri getir

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elim...hep beraber tarihi geri getir

3D ProBox



Kültürel Eserleri Yeniden Canlandırıyoruz

6 Şubat 2023'teki Kahramanmaraş ve Hatay depremleri sonucunda zarar gören eser ve yapıların dijital kopyalarını oluşturmak amacıyla çalışmalara başlandı. Siz de Habib-i Neccar Camii'ne ait fotoğraflarınızı "web sitesi üzerinden" sunularımıza yükleyerek bu projeye ortak olabilirsiniz.

Giriş Yap



Giriş Yap

Üye değilseniz lütfen
önce kayıt olun



Fotoğraf Yükle

Çekmiş olduğunuz
fotoğrafları yükleyin



Modelleyelim

Teknolojik altyapımız ile
bunu modelleyelim

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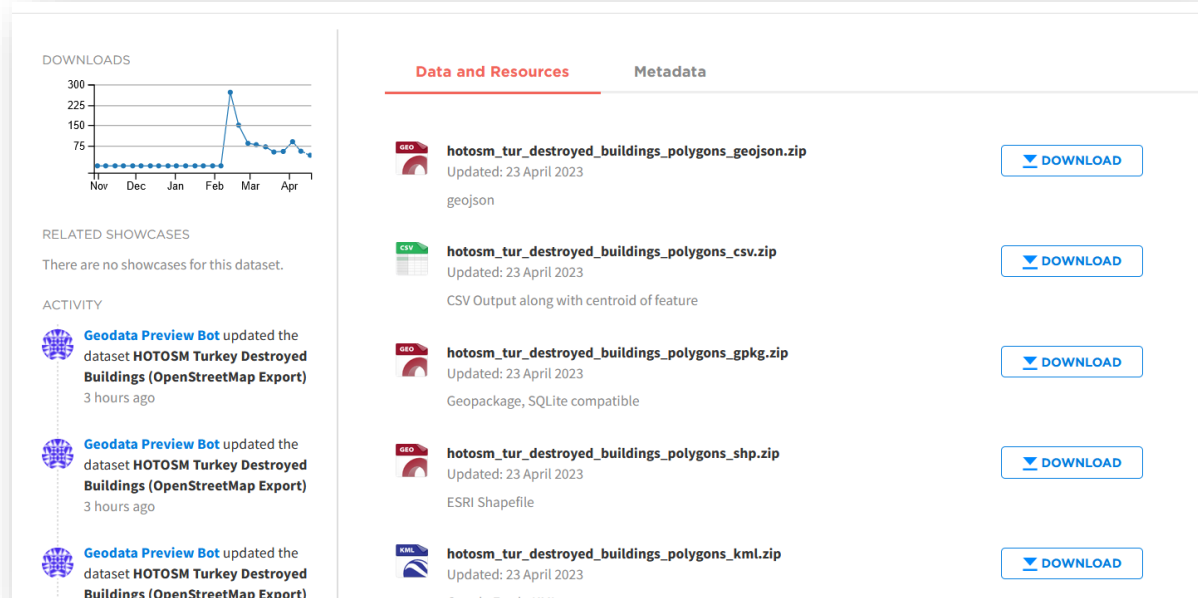
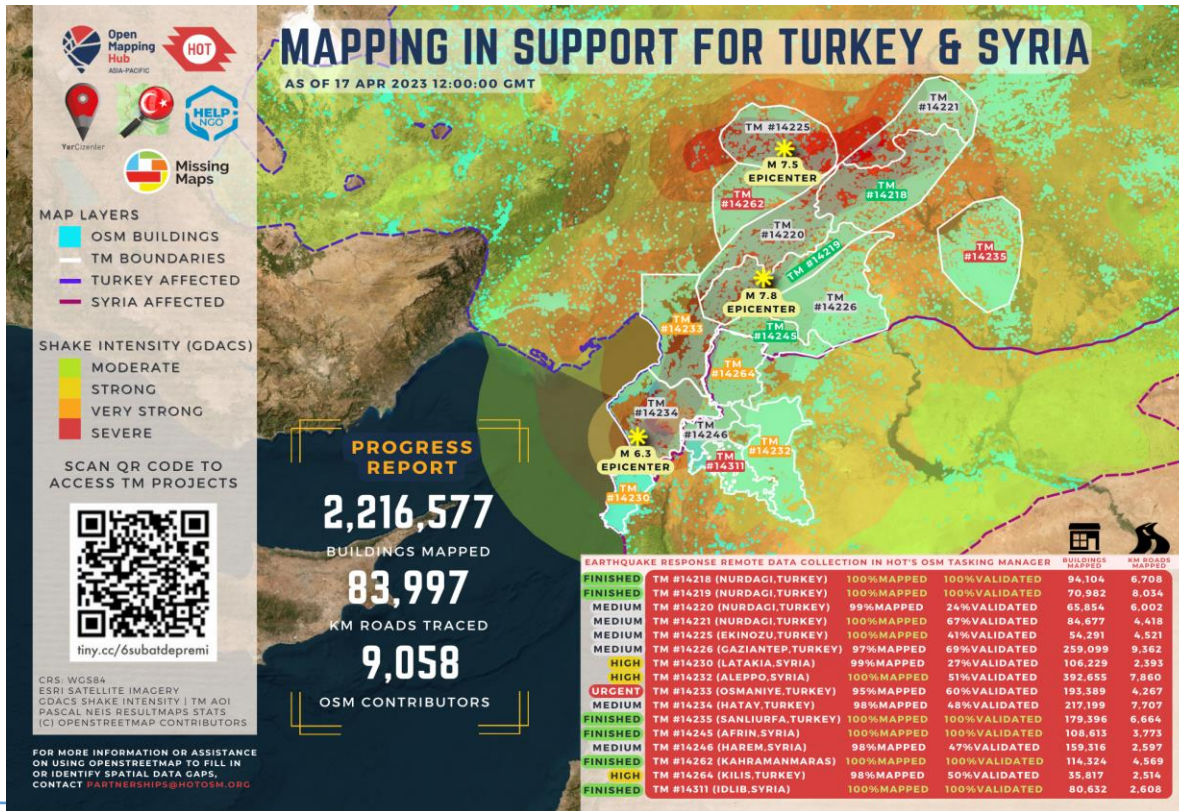
www.hkmo.org.tr

- **Voluntary remotely Mapping**

- Manual Digitizing with HOT action
- Geocoding of the official confirmed tabular data
- High resolution image collection mainly from UAVs
- Cultural Heritage Database generation
- Collaboration with AFAD, HGM, and communities in the field.
- Assesment with available satellite data.

Civil Initiative during the EQ Response Actions

“Open data collaboration cluster consisting of national and international actors, coordinated in Türkiye by Yer Çizenler.”



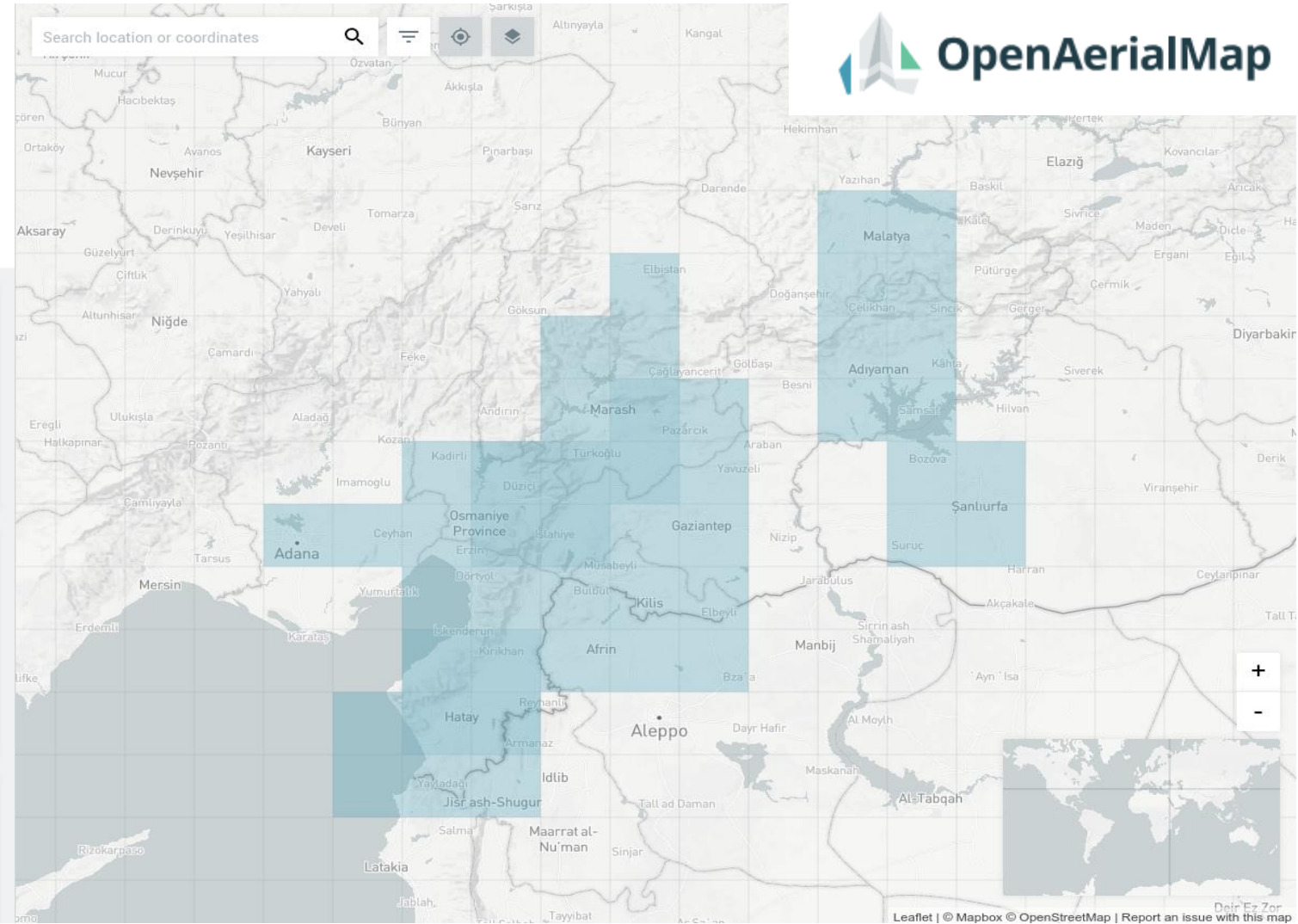
<https://data.humdata.org/dataset/>



OpenAerialMap (OAM) is a set of tools for searching, sharing, and using openly licensed satellite and unmanned aerial vehicle (UAV) imagery.

Latest uploads

<p>Rangitopuni_230324_Ortho_0050m 2023-03-23 / 5 cm Maksym Khovalko</p> 	<p>23FRESS 2023-03-16 / 5 cm Fred Yvonne</p> 
<p>Shelter 2023 2023-03-17 / 2 cm Sascha Seidel</p> 	<p>6th Avenue Northeast - 3/13/2023 2023-03-13 / 5 cm Dalton Broaddus</p> 
<p>L Street Northeast - 3/11/2023 2023-03-11 / 2 cm Dalton Broaddus</p> 	<p>Margaret St, Sydney 2023-03-10 / 1 cm jakecopp</p> 





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Damage Assessment Studies



PROVINCE	DEMOLISHED		IMMEDIATELY TO BE DEMOLISHED		HEAVY DAMAGED		HALF DAMAGED		MINOR DAMAGED		NO DAMAGE		NO INSPECTION		NO ENTRANCE		TOTAL INSPECTION		TOTAL DAMAGED+ DEMOLISHED	
	BUILDING	INDEPENDENT SECTION (HOME)	BUILDING	INDEPENDENT SECTION (HOME)	BUILDING	INDEPENDENT SECTION (HOME)	BUILDING	INDEPENDENT SECTION (HOME)	BUILDING	INDEPENDENT SECTION (HOME)	BUILDING	INDEPENDENT SECTION (HOME)	BUILDING	INDEPENDENT SECTION (HOME)	BUILDING	INDEPENDENT SECTION (HOME)	BUILDING	INDEPENDENT SECTION (HOME)	BUILDING	INDEPENDENT SECTION (HOME)
	ADANA	94	517	37	228	669	3067	1646	15472	10938	96876	75601	358332	1161	3043	4485	9236	94.631	486.771	2.446
ADIYAMAN	5826	13831	2316	6279	21526	49269	6793	23618	33925	91821	38848	70778	2248	4544	6573	13459	118.056	273.600	36.461	92.997
DIYARBAKIR	21	449	60	352	3692	10409	3054	14073	37701	150924	112165	391847	3190	8500	7801	12812	167.684	589.366	6.827	25.283
ELAZIĞ	49	67	53	186	6915	15635	491	2069	7603	41693	10947	86784	403	1238	649	1568	27.110	149.240	7.508	17.957
GAZIANTEP	3805	7623	1858	5706	13688	29589	7309	25803	61149	300875	177159	558575	13615	28017	19534	42612	298.142	998.825	26.660	68.721
KAHRAMANMAR AŞ	7295	20275	4494	13472	37499	91352	6644	22924	67284	205750	98233	177165	5575	9540	15861	25943	242.885	566.421	55.932	148.023
MALATYA	4197	11152	705	3648	28044	77006	164	511	4503	7662	13188	25437	1043	1189	5462	7142	57.306	133.747	33.110	92.317
HATAY	12920	39746	7361	30490	61006	206617	10567	37482	87966	238072	150520	294193	3659	9599	10714	21230	344.721	877.441	91.854	314.335
KİLİS	448	605	161	205	1803	2604	642	1648	10441	35324	19991	46759	530	1028	1529	2400	35.545	90.573	3.054	5.062
OSMANIYE	649	1480	476	2277	8384	16392	1313	5202	29488	87720	79700	147042	765	2269	1	1	120.776	262.383	10.822	25.351
ŞANLIURFA	660	813	575	856	4076	7674	2430	8357	73511	271133	107815	272563	5467	13222	13337	22135	207.872	596.755	7.741	17.700
TOTAL	35.964	96.558	18.096	63.699	187.302	509.614	41.053	157.159	424.509	1.527.850	884.167	2.429.475	37.656	82.189	85.946	158.538	1.714.728	5.025.122	282.415	827.030

TYPE	BUILDING COUNT	INDEPENDENT SECTION (HOME)
NO DAMAGE	884.167	2.429.475
MINOR DAMAGE	424.509	1.527.850
HALF DAMAGE	41.053	157.159
HEAVY DAMAGE	187.302	509.614
DEMOLISHED	35.964	96.558
IMMEDIATELY TO BE DEMOLISHED	18.096	63.699
NO INSPECTION	123.602	240.727
TOTAL	1.714.693	5.025.082

TOTAL	
TOTAL BUILDING	1.714.693
TOTAL INDEPENDENT SECTION (HOME)	5.025.082
TOTAL DEMOLISHED+DAMAGED BUILDING	282.415
TOTAL DEMOLISHED+DAMAGED RESIDENT	660.756
TOTAL DEMOLISHED+DAMAGED WORK PLACE	117.817
TOTAL DEMOLISHED+DAMAGED FARM HOUSE	16.660
TOTAL DEMOLISHED+DAMAGED OTHERS	31.797

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Donations for Surveyors and Solidarity



After the EQ, CLGE's generous assistance held immense significance for our colleagues whose homes and workplaces lay in ruins. CLGE's role in providing container offices, surveying equipment, and essential humanitarian aid played a critical part in helping them regain their footing and rebuild their lives.



- 12 container offices
Malatya, Adiyaman, Hatay-Center, Hatay Kırıkhan, Hatay-İskenderun, Kahramanmaraş-Center, Kahramanmaraş-Elbistan

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Donations for Surveyors and Solidarity



- 24 Total Stations (16 from Topcon, 6 from Our Chamber)
- 28 GNSS Receivers (16 from Topcon, 12 from Our Chamber)
- 16 Automatic Levellings (donation from Topcon)
- 5 GNSS Reference Stations (From Topcon)
- 8 Workstation computers,
- CAD software licenses,
- Free Cors membership accounts,
- Mobile data lines,
- Printers,
- Furnitures and working desks



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Surveying Office at Hatay-Kirikhan



Surveying Office at Kahramanmaras



Surveying Office at Hatay-Antakya



Surveying Office at Kahramanmaras-Elbistan



- Cadastre Renewal Progress
- Geodetic Infrastructure
- Etude and location selection for residential area
- Land Developing Plan and implementation
- Mapping the region again
- Construction surveying
- Monitoring the ground deformation continuously



We took initiative and key role to expedite the progress, communicate surveyors and public institutes.

We arranged a series of technical meetings in affected cities in order to pave the way for concrete administrative and technical solutions regarding property problems, ground shifts, planning, implementation and geodetic problems in the region, the General Directorate of Land Registry and Cadastre, provincial cadastre directors, municipalities, our Chamber Board and members.





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Conclusions

- Surveyors had key roles during the post-EQ days.
- Collaboration among the surveyors both in national and international was outstanding.
- Importance of civil contribution and the open data is vital.
- Spatial data and surveyors are every where.
- Solidarity Keeps Alive!

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CLGE Solidarity Transfer: 37.500 Euro

Donation from our members: 30.000 Euro

Used from our chamber budgeted: 120.000 Euro

I would like to thank you and express my gratitude for your support and solidarity to our country and our Chamber after the devastating earthquake in Türkiye.

**THANK YOU CLGE FOR
SOLIDARITY AND BEING WITH US
IN HARD DAY**



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