مـــــركز محمد بن راشد للـــــفضـــــاء
MOHAMMED BIN RASHID SPACE CENTRE

SENTINEL ASIA

JAXA Explore to Realize

ESKİŞEHİR TEKNİK ÜNİVERSİTESİ
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Eskisehir Technical University, Institute of Earth and Space Sciences (ESTU-IESS), New Member of Sentinel Asia

Dr. Onur KAPLAN

Presentation Outline

ESKİŞEHİR TEKNİK ÜNİVERSİTESİ
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- How it all started?
- Eskisehir and Eskisehir Technical University (ESTU)
- Institute of Earth and Space Sciences (IESS)
- Building Damage Detection Following Earthquakes Utilizing SAR and Optical Images – A National Project
- A Selected Case Study
- Recommendations

Sentinel Asia Capacity Building WS in Ankara, Türkiye" Workshop on January 7 and 8, 2025

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Eskisehir Technical University

ESKİŞEHİR TEKNİK ÜNİVERSİTESİ
ESKİŞEHİR TECHNICAL UNIVERSITY

Established on 18 May 2018 – Law 7141

60 years of experience in higher education and research

Focused on innovation and research

Education

- 6 Faculties
- 3 Vocational Schools
- 3 Institutes
- 16000 Students
- 1600 Staff Members (700 Academics)

Campus Facilities

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Institute of Earth and Space Sciences

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Departments

- Geodesy and Geographic Information Technologies
- Remote Sensing & GIS
- Documentation of Cultural Heritage
- Environmental studies
- Satellite and Space Sciences
- Space Studies
- Earth Sciences and Earthquake Engineering
- Earth Systems Science and Engineering
- Disaster Management and Built Environment

Academic Graduate Programs Coordinated By IESS

- Remote Sensing and Geographic Information Systems (MSc and PhD)
- Earth Sciences (MSc)
- +250 Enrolled Students

Projects and Memberships

Active participation in14 EU projects – (Sustainability and Resilience)

Member of Sentinel Asia Network (DAN)

Echo Sustainable Infrastructure Hub Membership

Filling the Gap: Adaptive Smart Training + Learning Network

Ecological Planning & Design for Disaster-resilient and Sustainable Cities (AI + Geospatial + Green Skills)

! Why «EPD-Net» Exists

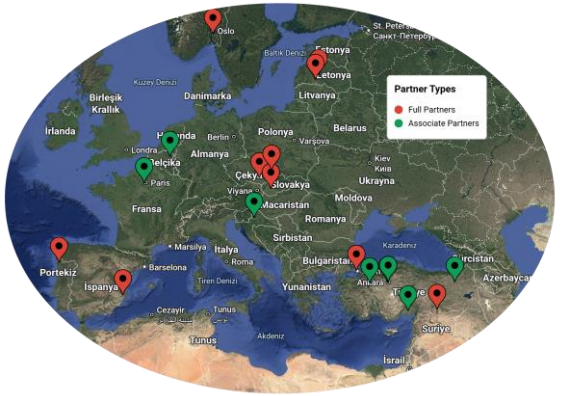
- Disaster Risk is Rising with Climate Change and Rapid Urbanization.
- A Skills Gap Persists in Ecological Planning & Design for Disaster Management.
- Goal: Practical, Evidence-based Capacity Building for Planners and Designers.

AI What EPD-Net Delivers

- AI-powered, Scenario-based Smart Training Module for Resilience Planning.
- Transnational Learning Network to Share Best Practices and Co-create Solutions.
- Integration of Green + Digital Skills (E.G., Geospatial Analysis, Ai-assisted Planning).

Σ Scale & Who Benefits?

- 30 Partners Across 11 Countries; 36-month Work Plan (M1–M36).
- Universities, Municipalities, Professionals, Ngos & Private Sector Partners.
- Outcome: Stronger Decision-making and Design for Resilient, Sustainable Cities.



Co-funded by the European Union

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Website: epd-net.org • Contact: epd-net@eskisehir.edu.tr

Filling the Gap: Adaptive Smart Training + Learning Network

Ecological Planning & Design for Disaster-resilient and Sustainable Cities (AI + Geospatial + Green Skills)

EPD-Net

LinkedIn

Co-funded by the European Union

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Earth Sciences and Earthquake Engineering

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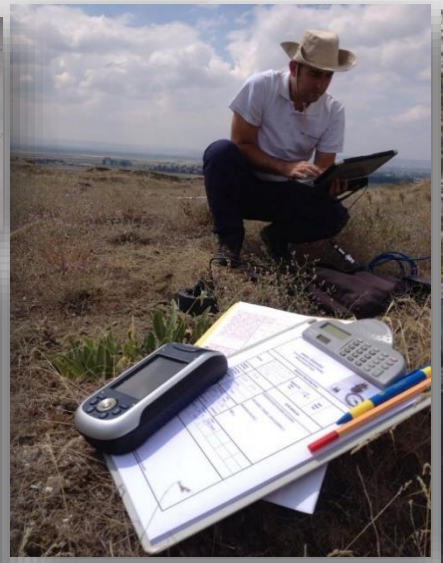

Earth Sciences and Earthquake Engineering

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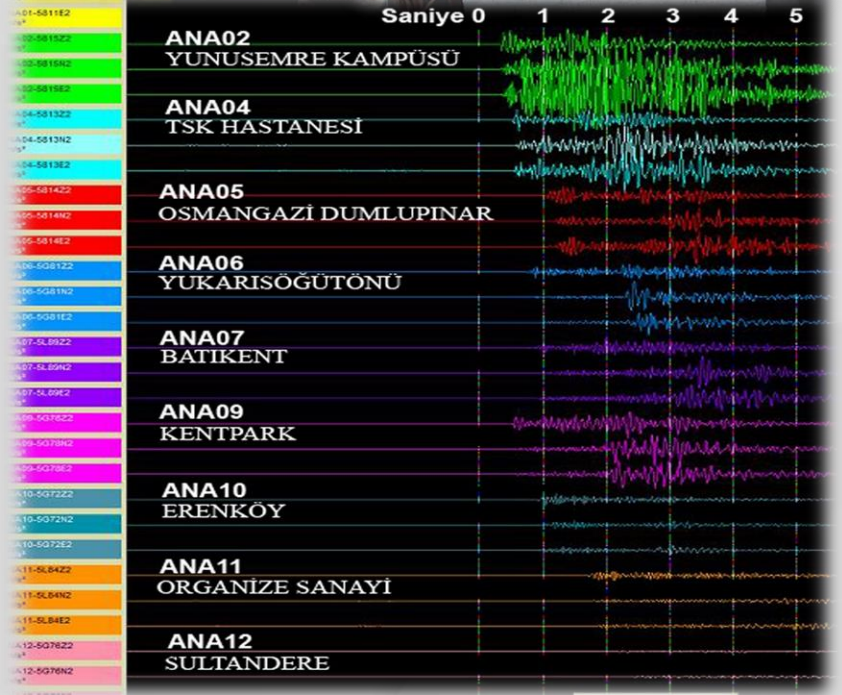
Estu-Net Seismic Network



No	STATION CODE	Lat.Deg N	Lon.Deg E	Elev. (m)	Location	INSTRUMENT TYPE	Installation Date	Connection Type
					Weak-Motion Stations			
1	BORA	39.8801	30.4534	930	Alınca	Guralp 3T 120sn	09.03.2005	Satellite
2	AUMIH	39.8733	31.4621	1458	Mihalıccık	Guralp 6TD	29.09.2010	Satellite
3	AUSIV	39.4398	31.5395	1150	Sivrihisar	Guralp 6TD	28.01.2010	Satellite
4	AUKIR	39.2878	30.5306	1130	Kırka	Guralp 6TD	27.01.2010	Satellite
5	AUKUT	39.3955	30.0213	1126	City Forest	Guralp 6TD	27.01.2010	Satellite
6	AUBOZ	39.9103	30.0323	893	Bozüyük	Guralp 6TD	26.01.2010	Satellite
7	ANA-SRCK	40.0416	30.6259	331	Sarıcakaya	Guralp 3TDE 120sn	06.03.2013	3G/EDGE
8	ANA-CIFT	39.3612	31.0625	892	Cifteler	Guralp 3TDE 120sn	07.03.2013	3G/EDGE

41 Stations

No	STATION CODE	Lat.Deg N	Lon.Deg E	Elev. (m)	Location	INSTRUMENT TYPE	Installation Date	Connection Type
					Strong-Motion Stations			
1	2601 ANA01	39.8135	30.5284	787	Iki Eylul Campus	Guralp 5TCDE	07.12.2005	Local Network
2	2602 ANA02	39.7893	30.4972	815	Yesiltepe	Guralp 5TD	14.03.2005	Local Network
3	2603 ANA03	39.8801	30.4534	930	Alınca	Guralp 5TD	09.03.2005	Satellite
4	2604 ANA04	39.7732	30.5101	770	Kırmızıtoprak	Guralp 5TCDE	09.12.2005	3G/EDGE
5	2606 ANA05	39.7488	30.4956	833	Büyükdere	Guralp 5TD	10.12.2005	ADSL
6	2610 ANA06	39.8245	30.4243	837	Yukarisögütönü.	Guralp 5TD	14.06.2010	ADSL
7	2611 ANA07	39.7900	30.4453	813	Batıkent	Guralp 5TCDE	30.09.2014	3G/EDGE
8	2612 ANA08	39.7669	30.4049	833	Karabayır	Guralp 5TD	15.09.2012	ADSL
9	2613 ANA09	39.7736	30.5533	788	Seker	Guralp 5TD	07.09.2012	ADSL
10	2614 ANA10	39.7529	30.5521	860	Erenköy	Guralp 5TD	08.09.2012	ADSL
11	2615 ANA11	39.7443	30.6503	814	Organized Industry	Guralp 5TD	14.06.2010	3G/EDGE
12	2616 ANA12	39.6974	30.6346	916	Sultandere	Guralp 5TD	15.06.2010	ADSL
13	2605 2617	39.7211	30.5326	936	Asri Cemetery	Guralp 5TCDE	11.09.2012	3G/EDGE
14	1622	40.1953	29.0534	156	Merinos	Guralp 5TCDE	22.07.2013	3G/EDGE
15	OSG2	40.2656	29.0336	78	Armutköy	Guralp 5TCDE	23.07.2013	3G/EDGE
16	OSG3	40.1770	29.0567	366	Mollafenari	Guralp 5TCDE	24.07.2013	3G/EDGE
17	OSG4	40.2630	29.0992	106	Demirtas	Guralp 5TCDE	25.07.2013	3G/EDGE
18	OSG5	40.2652	28.9860	162	Hamitler	Guralp 5TCDE	26.07.2013	3G/EDGE

Earth Sciences and Earthquake Engineering

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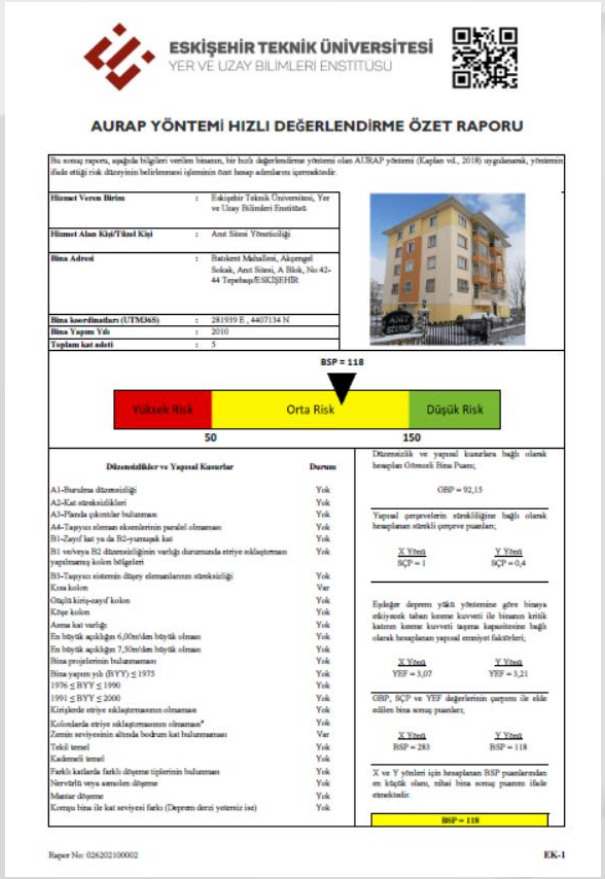
Seismic Safety Assessment and Structural Health Monitoring Applications



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YER VE UZAY BİLİMLERİ ENSTİTÜSÜ

AURAP YÖNTEMİ HIZLI DEĞERLENDİRME ÖZET RAPORU

Bu sonuç raporu, aşağıda bilgileri verilen binanın, bir hızlı değerlendirme yöntemi olan AURAP yöntemi (Kaplan vd., 2018) uygulanarak, yönteminin ifade ettiği risk düzeyinin belirlenmesi işleminin özet hesap adımlarını içermektedir.

Hizmet Veren Birim	:	Eskişehir Teknik Üniversitesi, Yer ve Uzay Bilimleri Enstitüsü
Hizmet Alan Kişi/Tüzel Kişi	:	Anıt Sitesi Yöneticiliği
Bina Adresi	:	Batıkent Mahallesi, Akçengel Sokak, Anıt Sitesi, A Blok, No:42-44 Tepebaşı/ESKİŞEHİR
Bina koordinatları (UTM36S)	:	281939 E , 4407134 N
Bina Yapım Yılı	:	2010
Toplam kat adeti	:	5

Düzensizlikler ve Yapısal Kusurlar	Durum
A1-Burulma düzensizliği	Yok
A2-Kat süreksizlikleri	Yok
A3-Planda çıkıntılar bulunması	Yok
A4-Taşıyıcı eleman eksenlerinin paralel olmaması	Yok
B1-Zayıf kat ya da B2-yumuşak kat	Yok
B1 ve/veya B2 düzensizliğinin varlığı durumunda etriye sıklaştırması yapılmamış kolon bilgileri	Yok
B3-Taşıyıcı sistemin düşey elemanlarının süreksizliği	Yok
Kısa kolon	Var
Ortalı kirişsayıf kolon	Yok
Köşe kolon	Yok
Asma kat varlığı	Yok
En büyük açıklığın 6,00m'den büyük olması	Yok
En büyük açıklığın 7,50m'den büyük olması	Yok
Bina projelerinin bulunmaması	Yok
Bina yaşını yılı (BYY) ≤ 1975	Yok
1976 ≤ BYY ≤ 1990	Yok
1991 ≤ BYY ≤ 2000	Yok
Kirişlerde etriye sıklaştırmasının olmaması	Yok
Kolonlarda etriye sıklaştırmasının olmaması*	Yok
Zemin seviyesinin altında bodrum kat bulunmaması	Var
Tekil temel	Yok
Kazıklı temel	Yok
Farklı katlarda farklı düşeme tiplerinin bulunması	Yok
Nervürlü veya asmolen döşeme	Yok
Mantar döşeme	Yok
Komşu bina ile kat seviyesi farkı (Deprem derzi yetersiz ise)	Yok

Düzensizlik ve yapısal kusurlara bağlı olarak hesaplan Ölçeksiz Bina Puanı;

GBP = 92,15

Yapısal çerçevelerin sünekliğine bağlı olarak hesaplanan sünekli çerçeve puanları;

X Yönü	Y Yönü
SÇP = 1	SÇP = 0,4

Eşdeğer deprem yükü yöntemine göre binaya etkiyecek taban kesme kuvveti ile binanın kritik katının kesme kuvveti taşıma kapasitesine bağlı olarak hesaplanan yapısal emniyet faktörleri;

X Yönü	Y Yönü
YEF = 3,07	YEF = 1,21

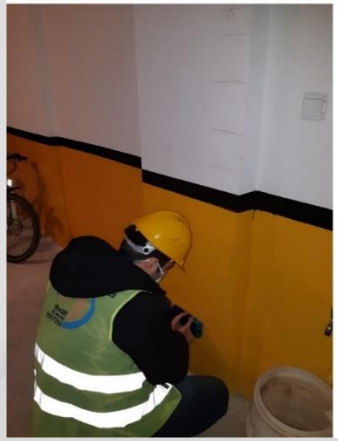
GBP, SÇP ve YEF değerlerinin çarpımı ile elde edilen bina sonuç puanları;

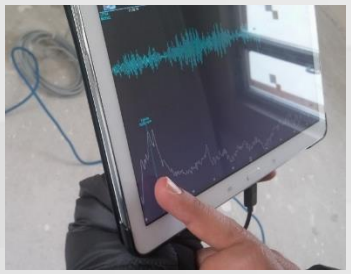
X Yönü	Y Yönü
BSP = 283	BSP = 118

X ve Y yönleri için hesaplanan BSP puanlarından en küçük olanı, nihai bina sonuç puanını ifade etmektedir.

BSP = 118

Rapor No: 02620210002 EK-1





Geodesy and Geographic Information Technologies

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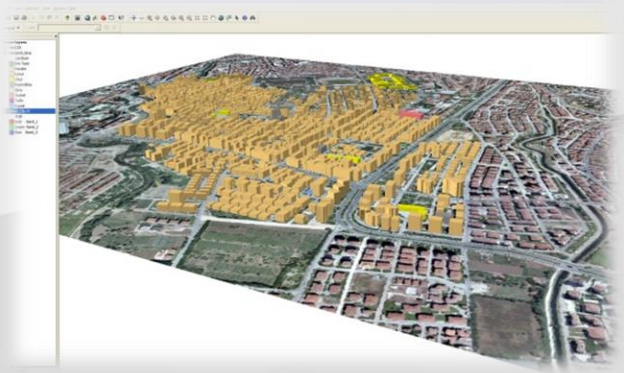

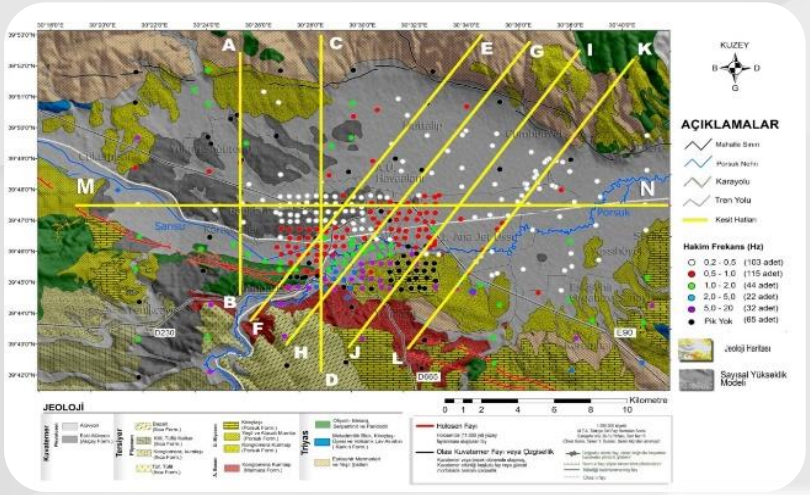

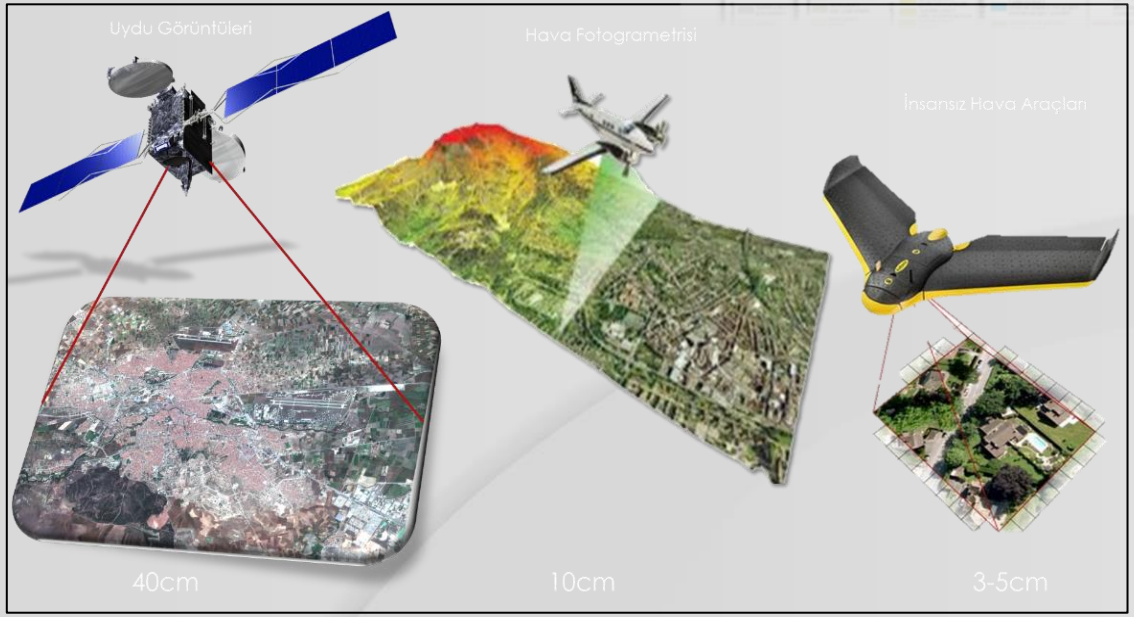

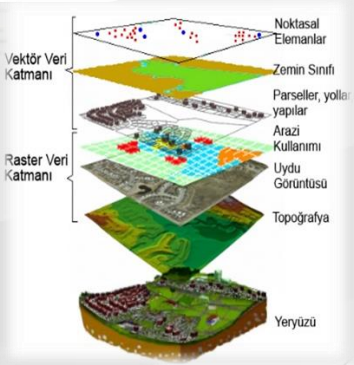

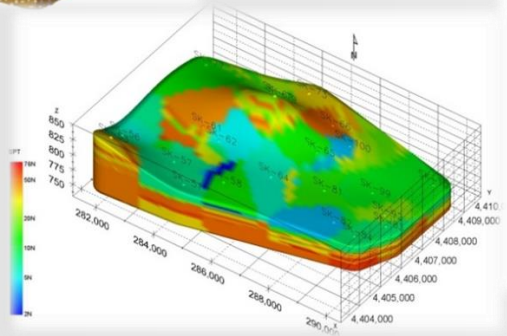

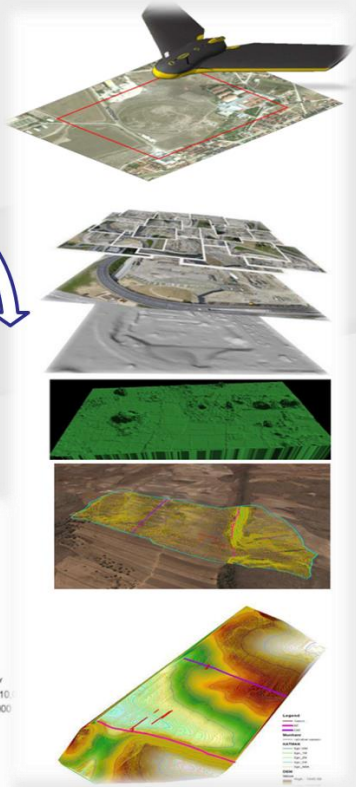

High-resolution satellite remote sensing for post-earthquake damage assessment

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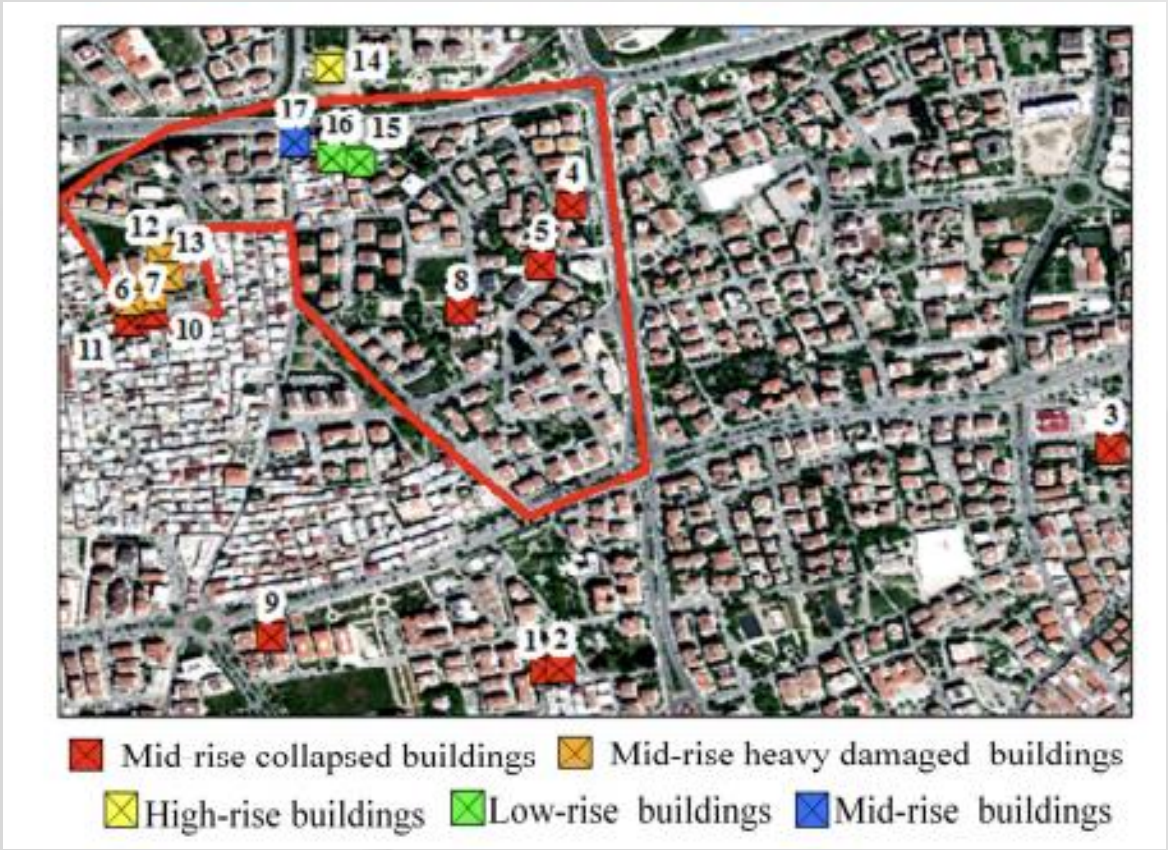

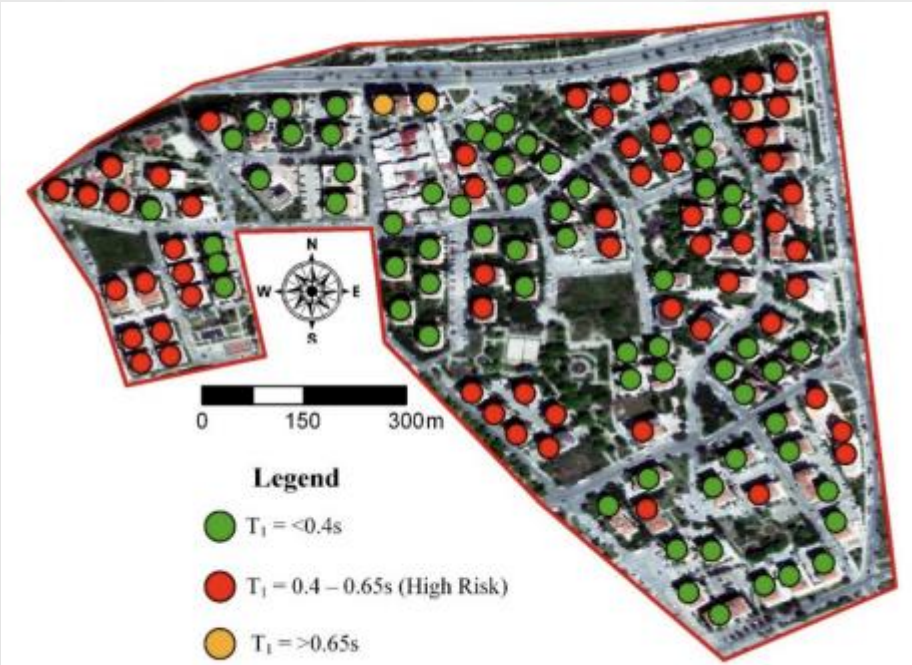

Figure 10. Structural damage estimation in the study area.

Turkey Black Sea Region Landslides

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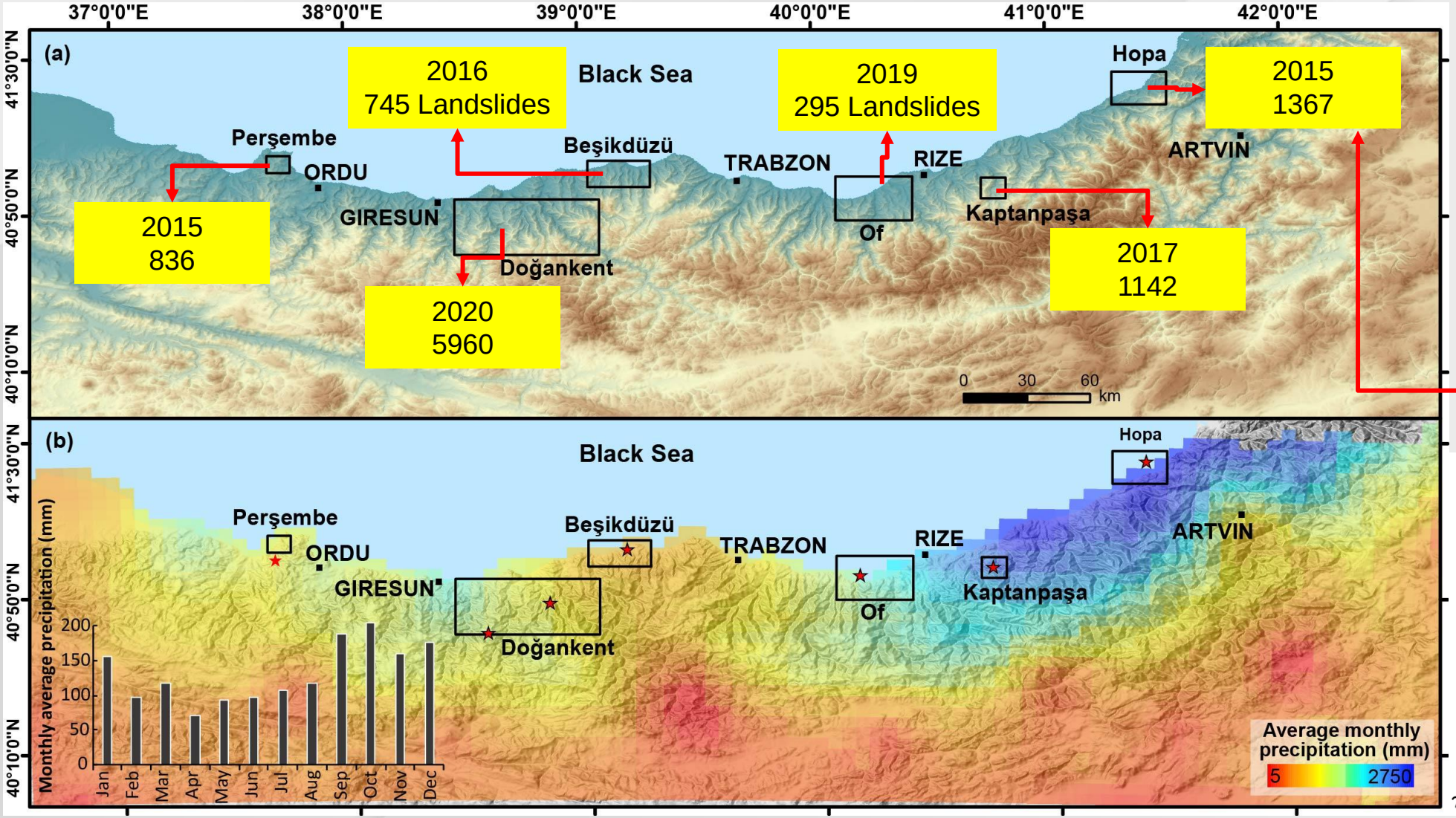

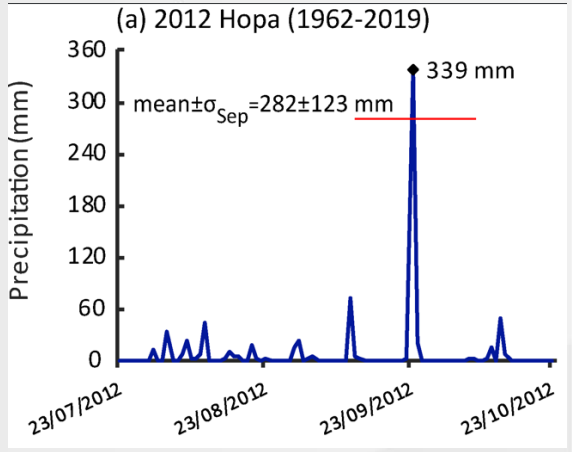

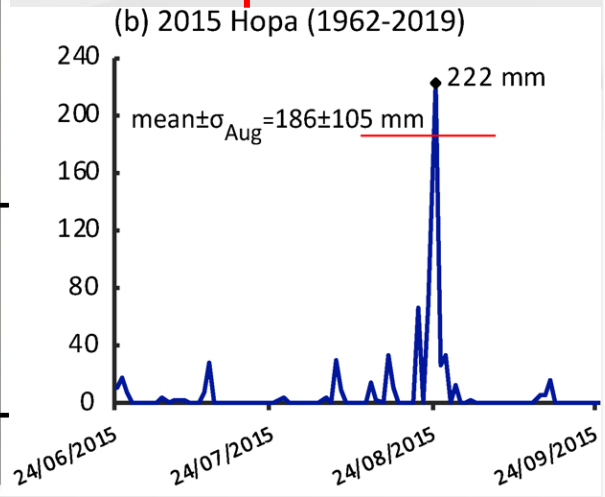

In 2015-2020, more than 10 000 Landslide occurred, and 32 people died.

Building Damage Detection Following Earthquakes Utilizing SAR and Optical Images – National project

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Selected Case Study: 20251128-Indonesia-Flood-Landslide-00628

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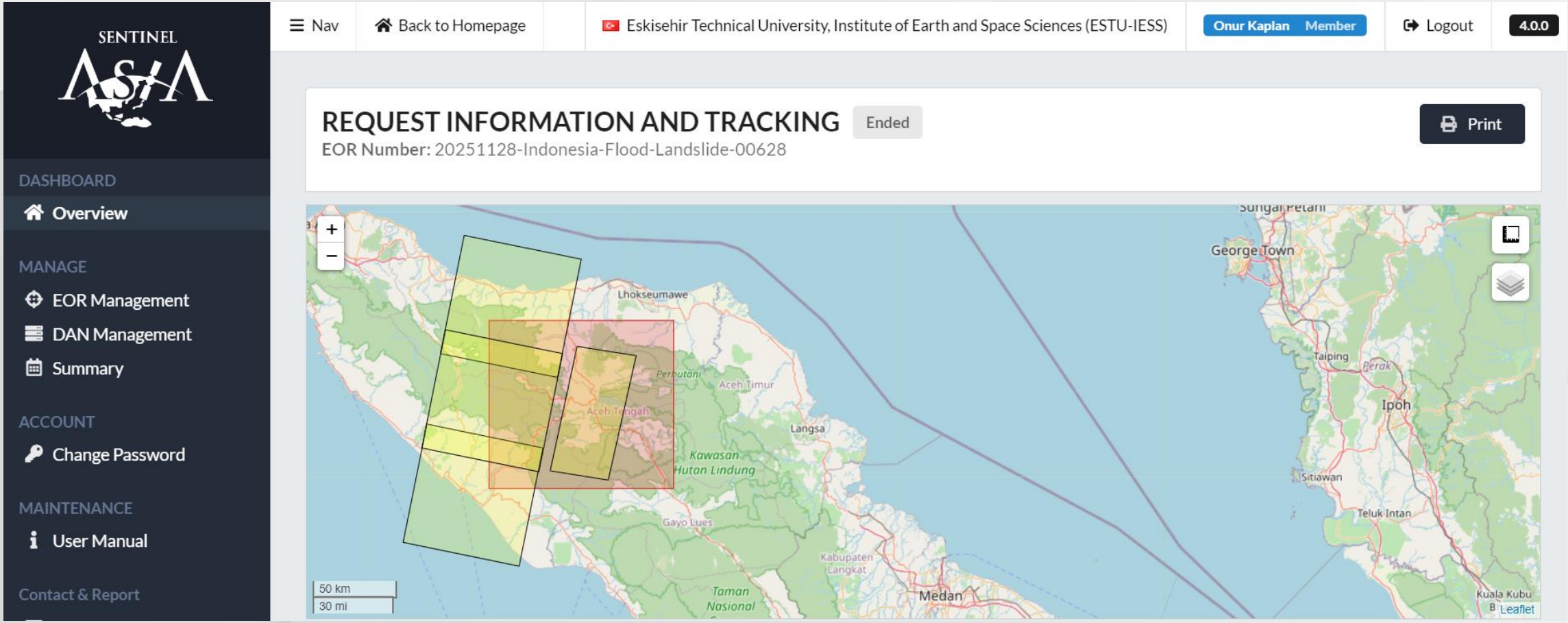
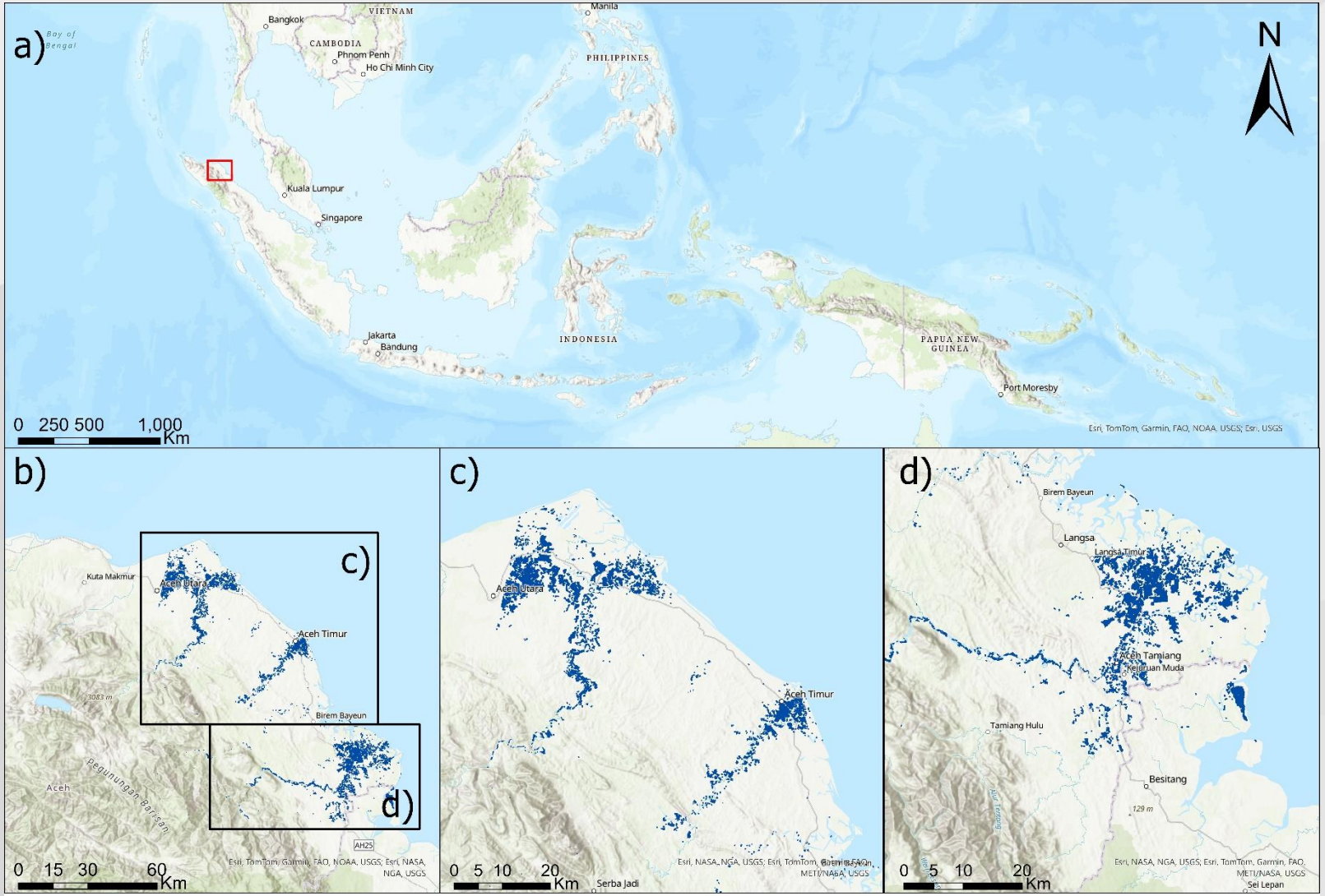


Floods



(a) Location and boundaries of the study area.
(b) Flood-affected areas resulting from extreme rainfall events.
(c) Zoomed-in view of the flood extent within the study area.
(d) Additional zoomed-in view of the flood extent within the study area.

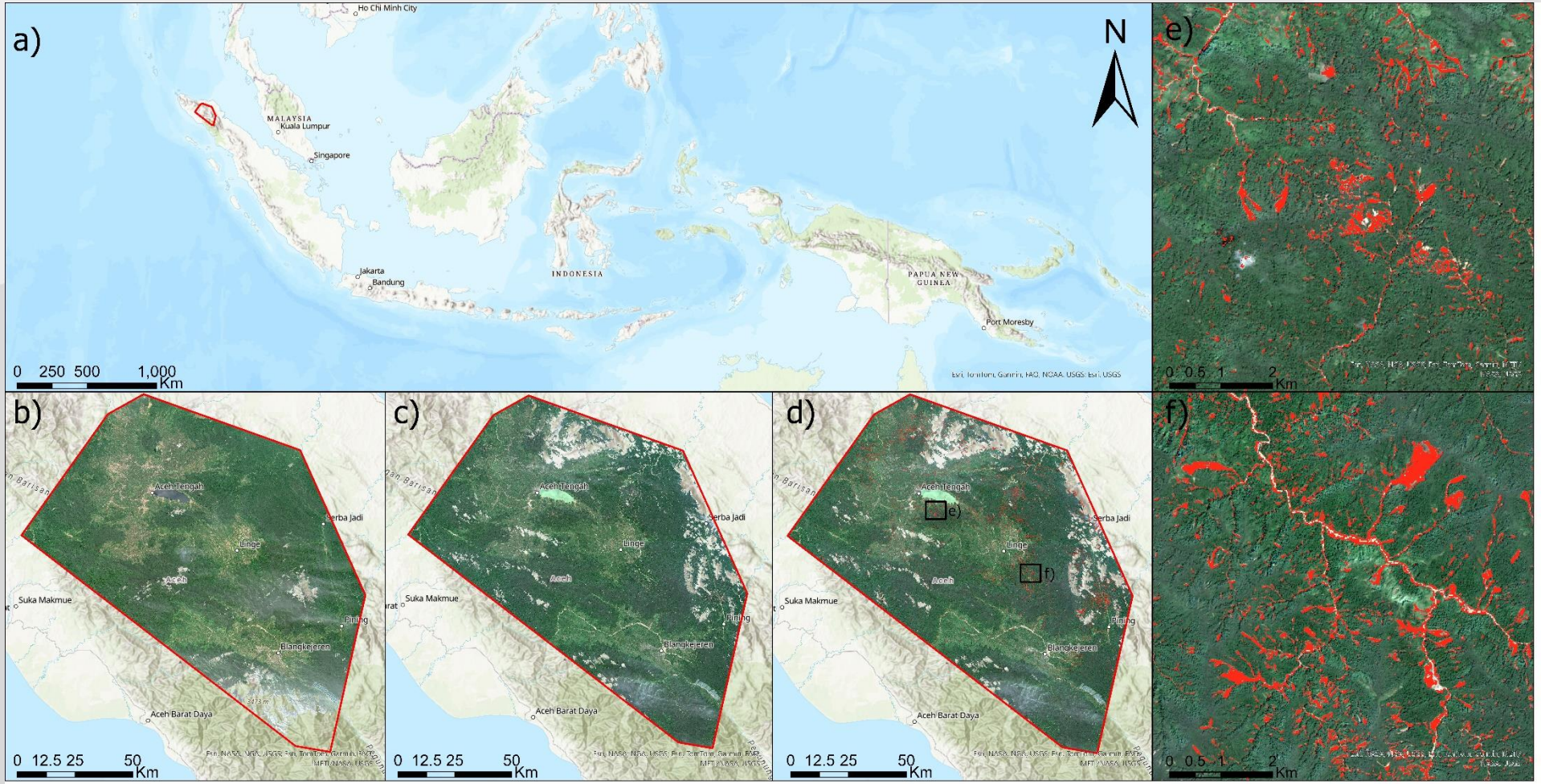
SAR Image acquired by the Sentinel-1 satellite operated by the ESA

Pre-Event Image Date: 25/11/2025

Post-Event Image Date: 03/12/2025

Analyses conducted on GEE

Landslides



(a) Location and boundaries of the study area.
(b) Pre-flood satellite image of the study area, illustrating baseline land cover and geomorphological conditions.
(c) Post-flood satellite image of the study area, highlighting surface changes and flood-related impacts.
(d) Zone within the study area where post-flood landslides are concentrated, emphasizing the spatial clustering and distribution pattern of landslide occurrences.
(e) Detailed view of landslides triggered after the event, showing representative scarps, debris paths, and affected slopes.
(f) Detailed view of landslides triggered after the event from an additional sub-area, providing a complementary close-up of landslide features and local damage patterns.

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Optic Image acquired by the Sentinel-2 satellite operated by the ESA

Pre-Event Image Date: 07/07/2025

Post-Event Image Date: 29/11/2025

Analyses conducted on GEE

Satellite remote sensing for disaster monitoring

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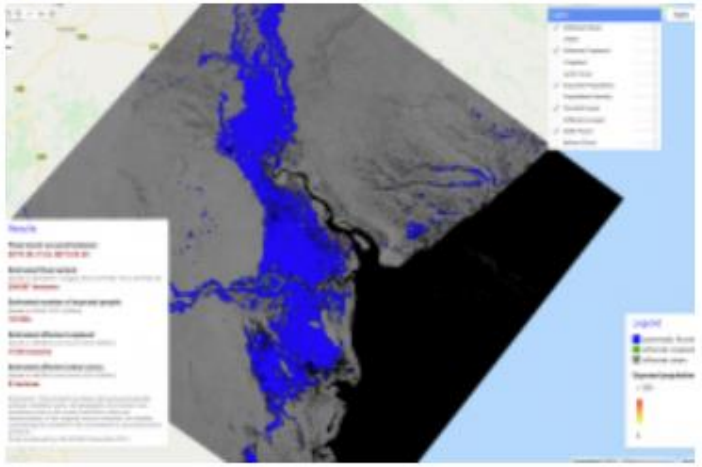
Open-source data and methods:

United Nations UN-spider Google Earth Engine tools

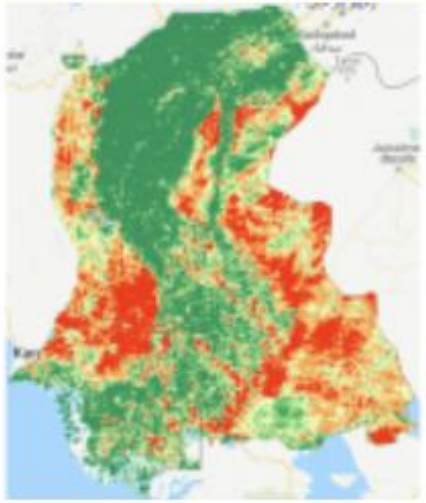
Google Earth Engine

- Drought monitoring
- Burn severity mapping
- Fire monitoring
- Landslides mapping

Recommended Practice: Flood Mapping and Damage Assessment Using Sentinel-1 SAR Data in Google Earth Engine



Recommended Practice: Agriculture Drought Monitoring and Hazard Assessment using Google Earth Engine



https://www.un-spider.org/links-and-resources/gis-rs-software/google-earth-engine-google

Thank you for your attention…

Assist. Prof. Dr. Onur KAPLAN

Eskisehir Technical University
Institute of Earth and Space Sciences

onur_kaplan@eskisehir.edu.tr