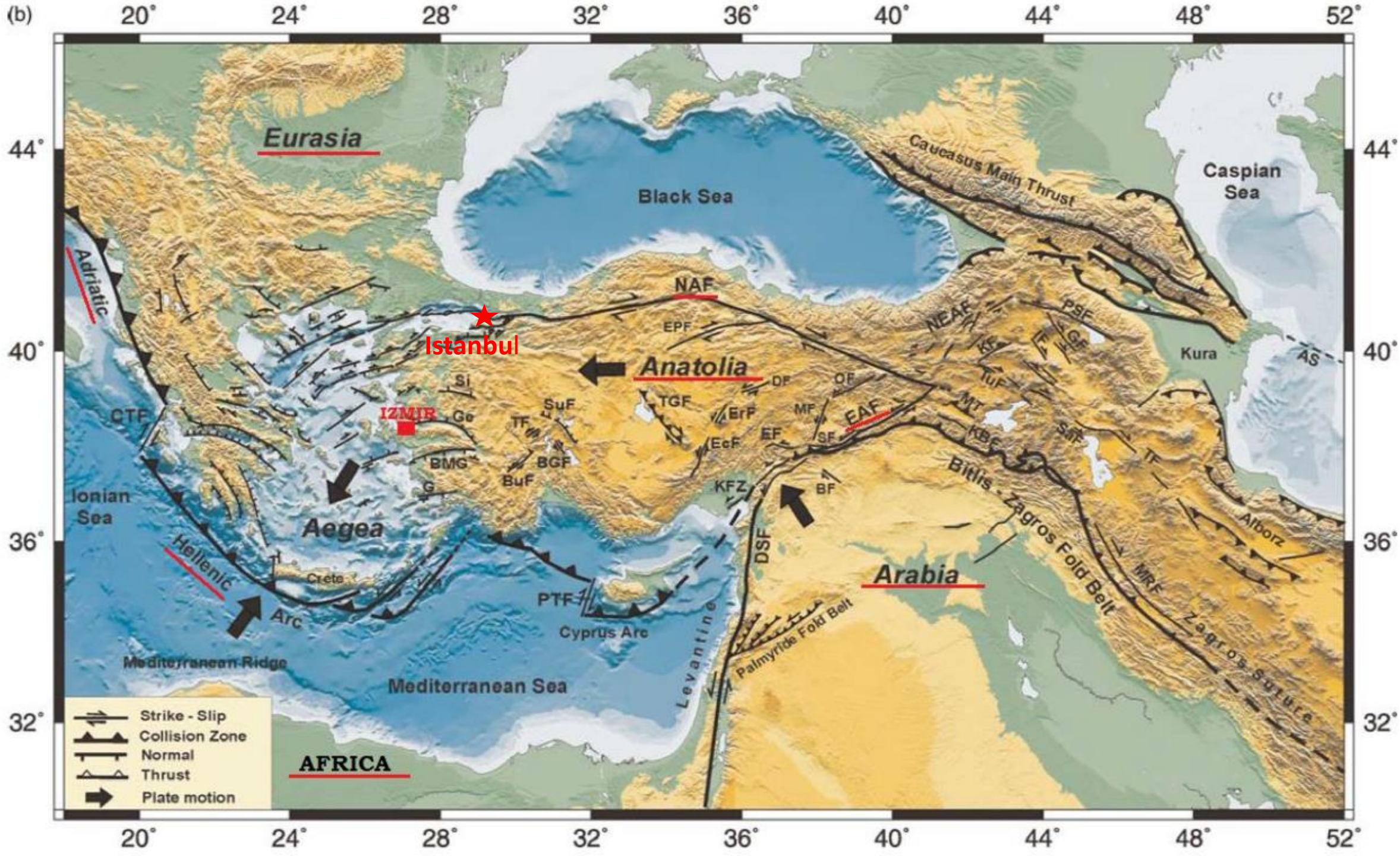


# Department of Earthquake Risk Management and Urban Improvement

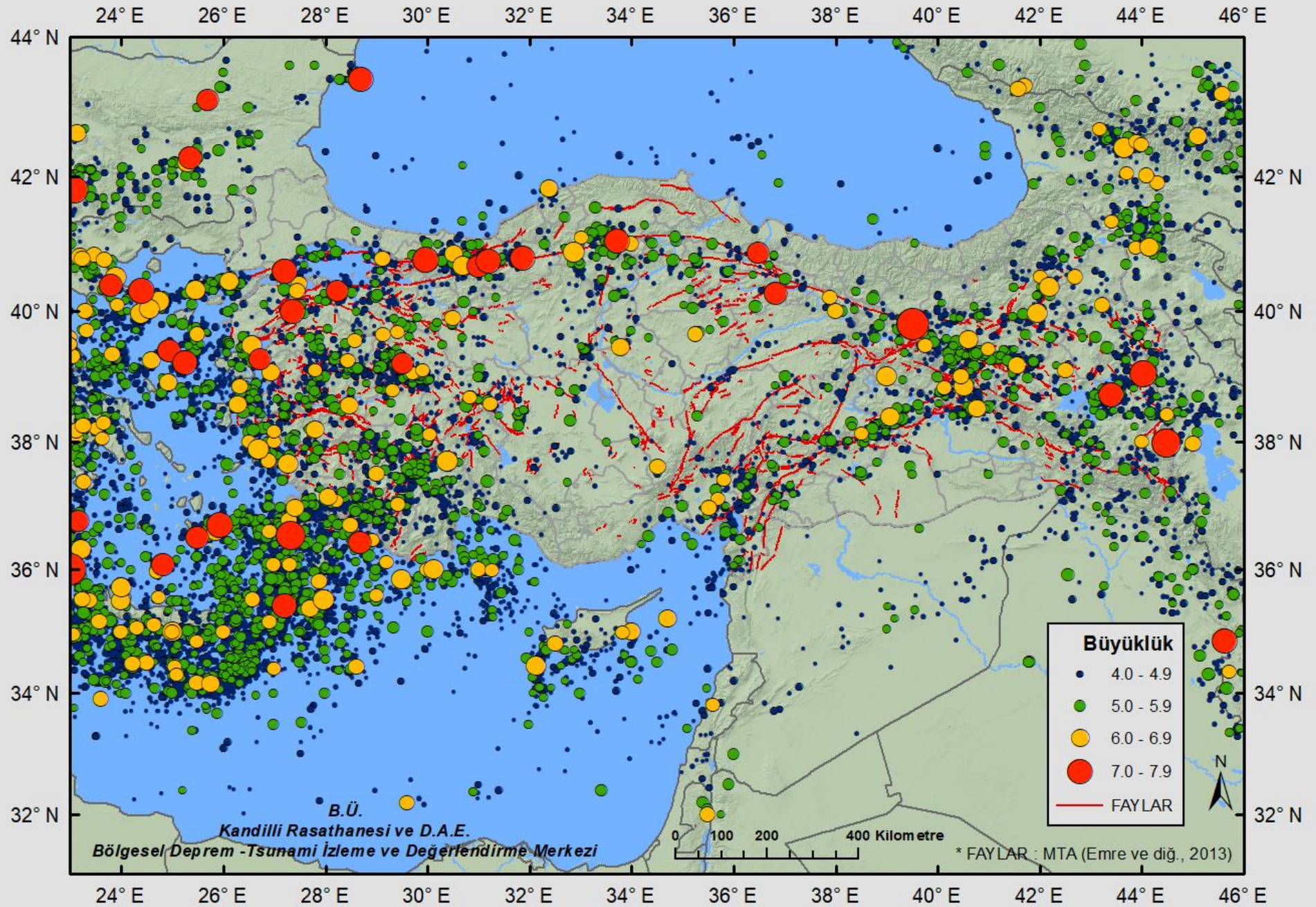
## Directorate of Earthquake and Geotechnical Investigation

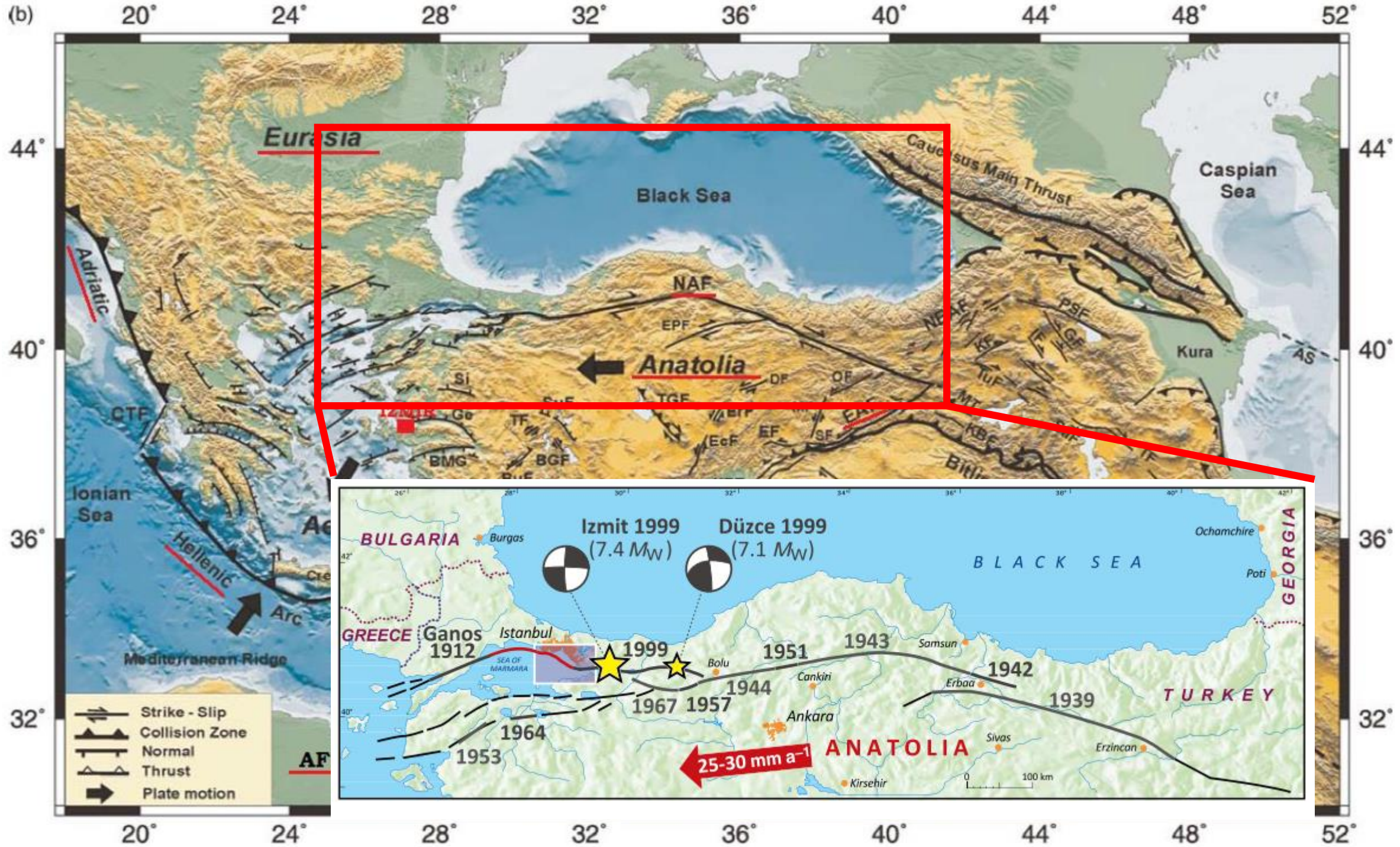
Dr. Eyrim Yavuz and Dr. Melis Cevatoglu Bayraklı

16/09/2021



1900 - 31 ARALIK 2020 ALETSEL DÖNEM DEPREMLERİ M ≥ 4.0 11032 Adet





## Directorate of Earthquake and Geotechnical Investigation in few words:

❑ Founded in 1994

❑ Main responsibilities:

- ✓ To plan and execute projects and surveys, as well as produce maps and reports within the scope of earthquake and ground investigation within its jurisdiction areas,
- ✓ To carry out or have work done on the determination of urban risks, the creation of disaster hazard and risk maps,
- ✓ To give opinions on geological, geophysical and geotechnical investigation reports prepared by municipalities, other public institutions and organizations, private or legal persons, within the scope of zoning and urban planning.

**Directorate of Earthquake and Geotechnical Investigation** in few words:

❑ Some of Major projects:

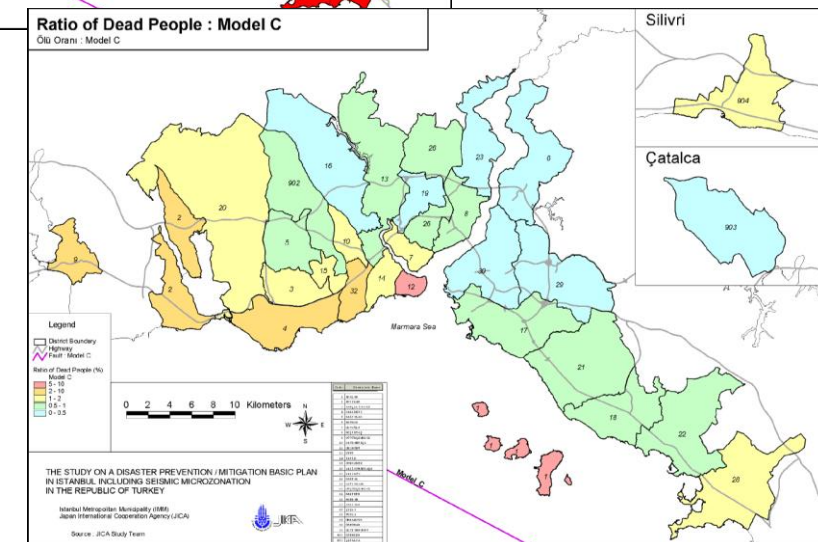
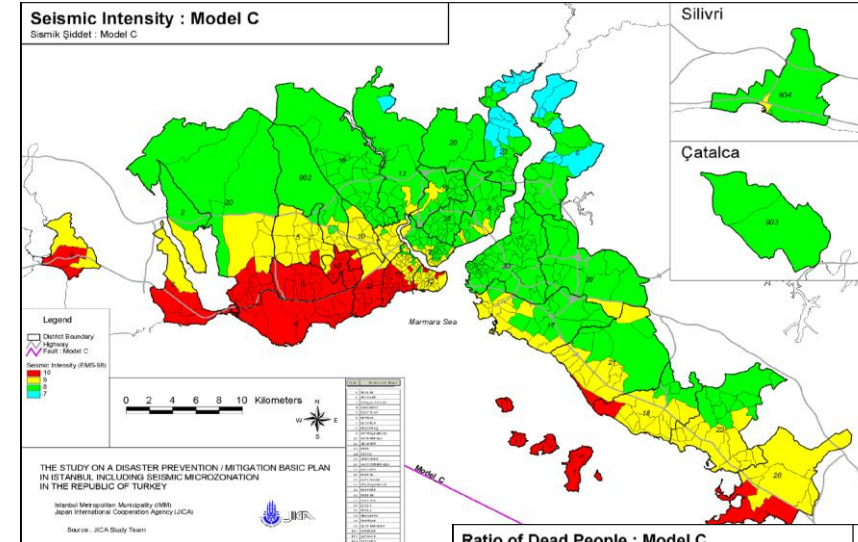
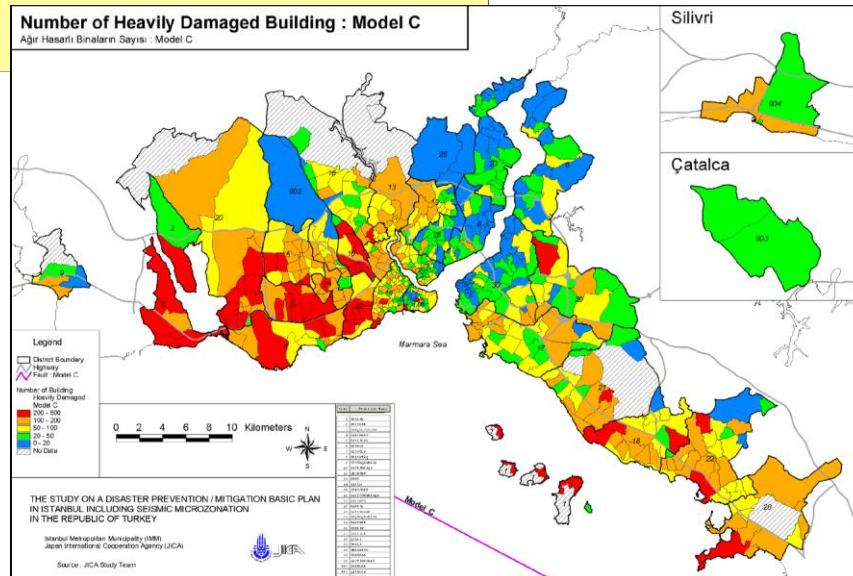
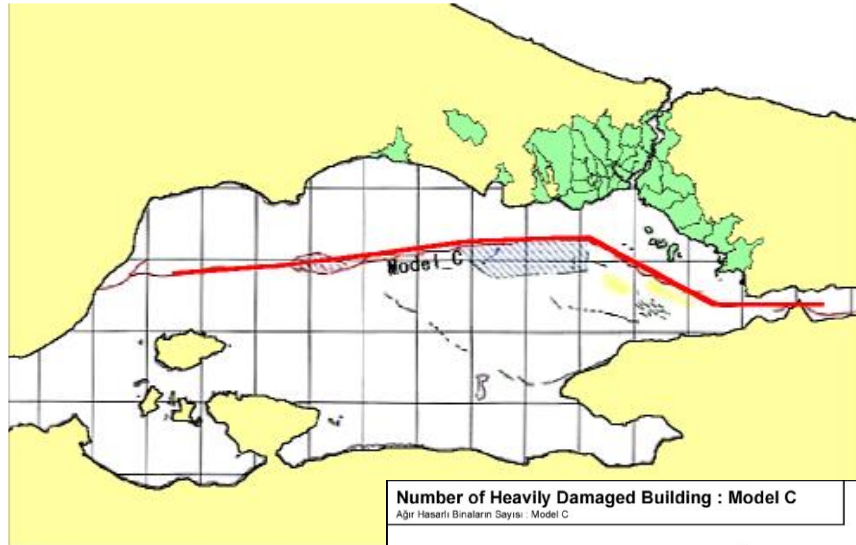
- ✓ Landslide Awareness Project (2020)
- ✓ Tsunami Action Plan (2019)
- ✓ Probable Earthquake Loss Estimates for Istanbul Province (2019)
- ✓ Tsunami Risk Investigation in the Marmara coasts of Istanbul (2018)
- ✓ Social Vulnerability Research in the Face of Disasters in Istanbul Province (2018)
- ✓ Mega City Indicator System (MegaIST) (2012)
- ✓ Istanbul City Geology (2011)
- ✓ European and Anotolian Side Microzonation Projects (2007 and 2009)
- ✓ Istanbul Province Disaster Prevention/Mitigation Basic Plan Study Including Seismic Microzonation (2002)

And many more...

# Istanbul Province Disaster Prevention/Mitigation Basic Plan Study Including Seismic Microzonation (2002)

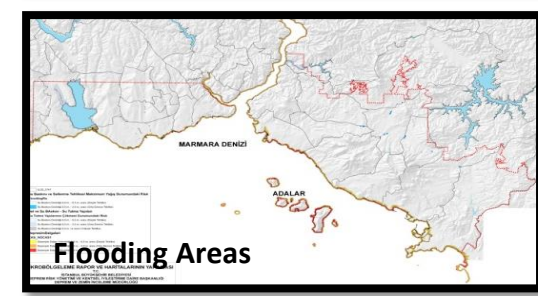
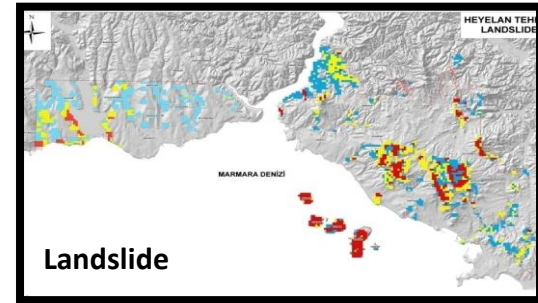
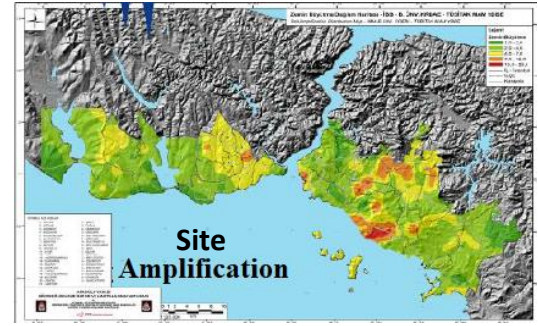
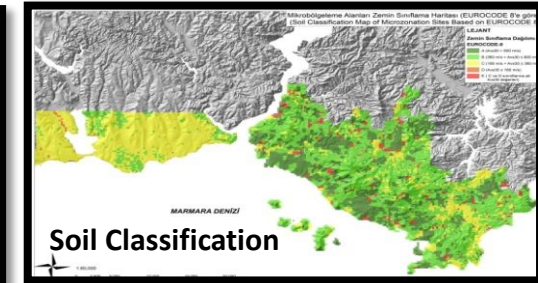
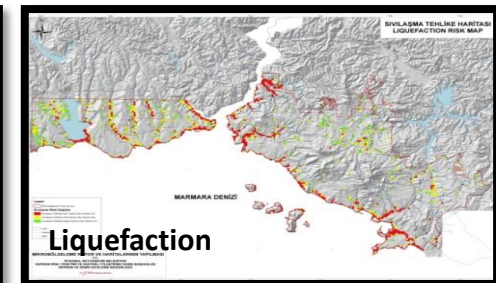
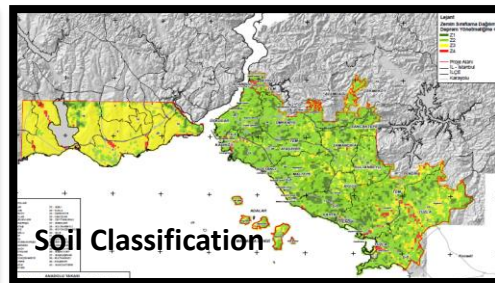
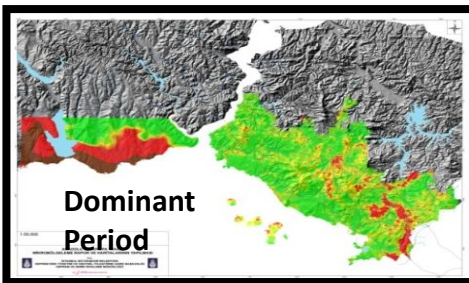
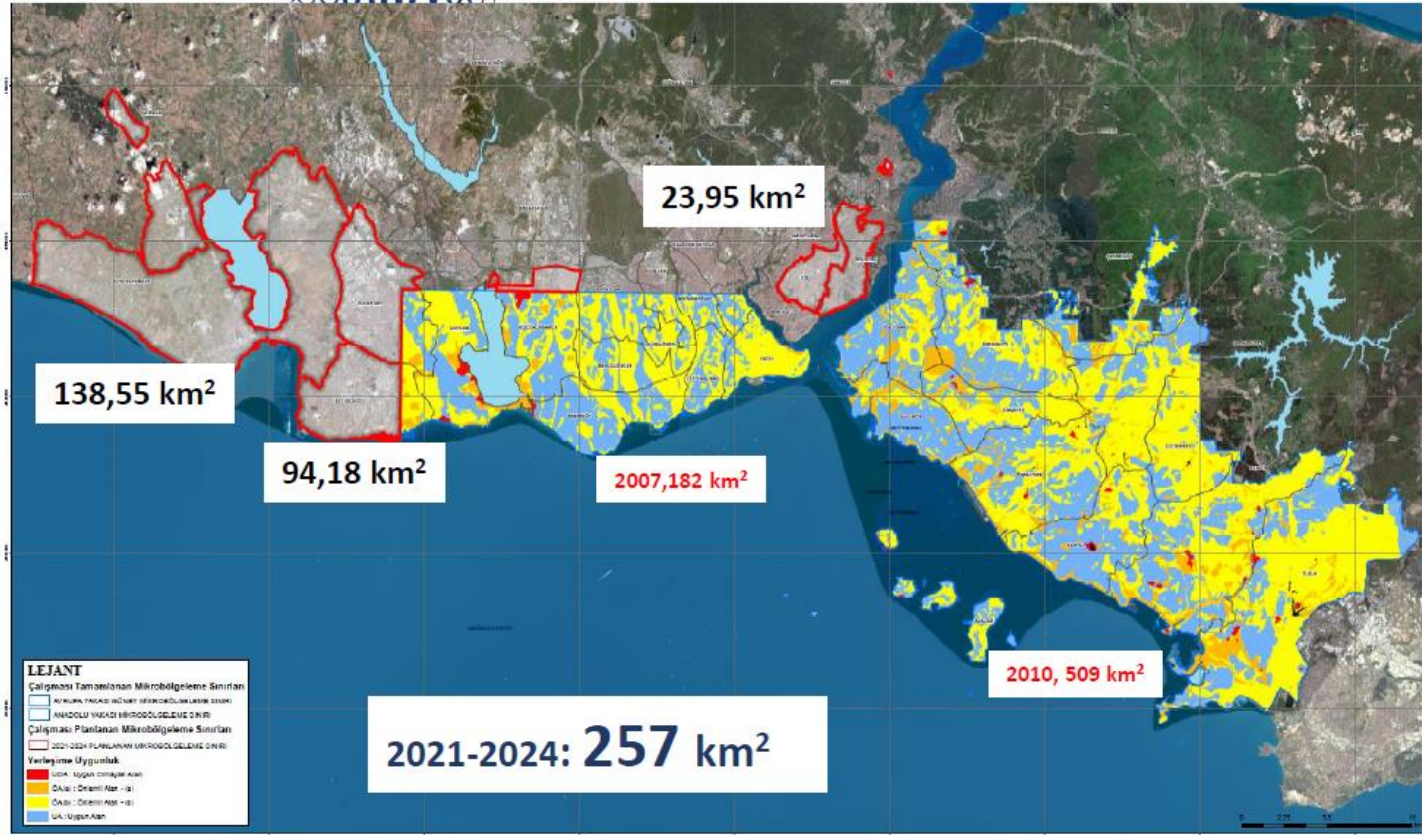
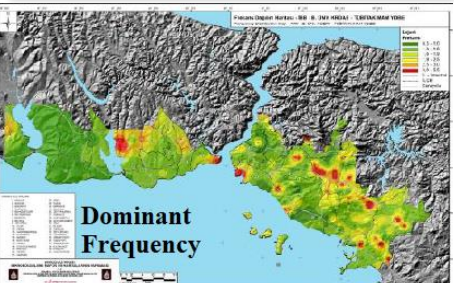
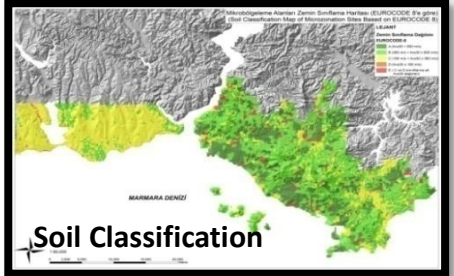
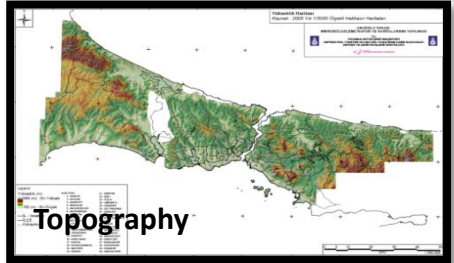
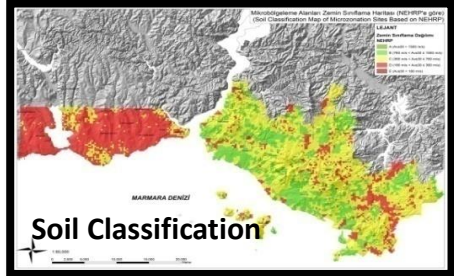
## Objectives:

- to compile seismic microzonation maps
  - to advise on new building construction for earthquake resistant urbanization
  - for the seismic disaster prevention/damage reduction plan for the city of Istanbul and its surroundings.
- \* This study not only concentrated on the life loss or injured people, but also all engineering structures such as buildings, tunnels, bridges, gas or water pipes, drainage systems, etc.



# European and Anotolian Side Microzonation Projects (2007 and 2009)

- \* Geological, geotechnical and geophysical investigations within the project area are carried out.
- \* Vulnerable areas are determined depending on the earthquake effect and local soil conditions.
- \* New engineering solutions are developed in terms of earthquake-soil-structure interaction.
- \* Landuse Maps are prepared.
- \* The results are also used as a base for earthquake hazard and tsunami analyses.

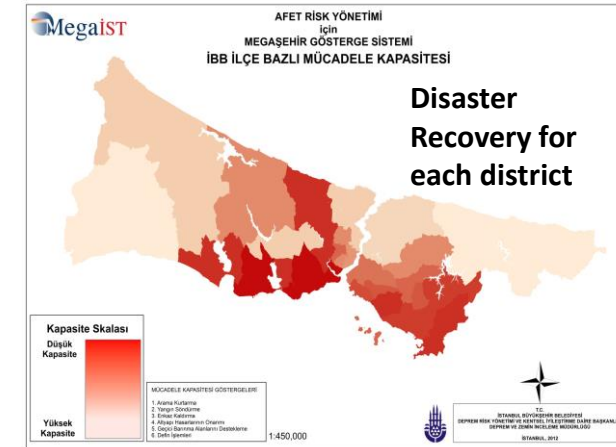
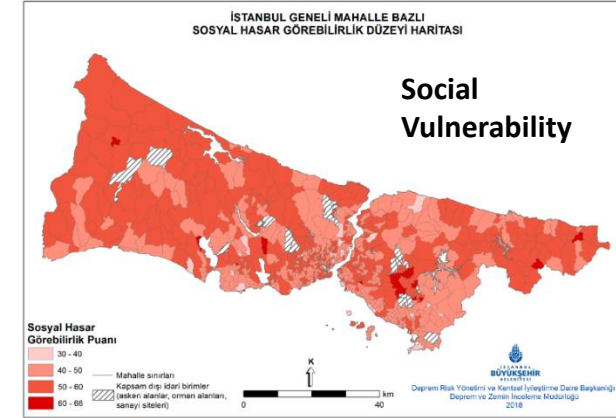
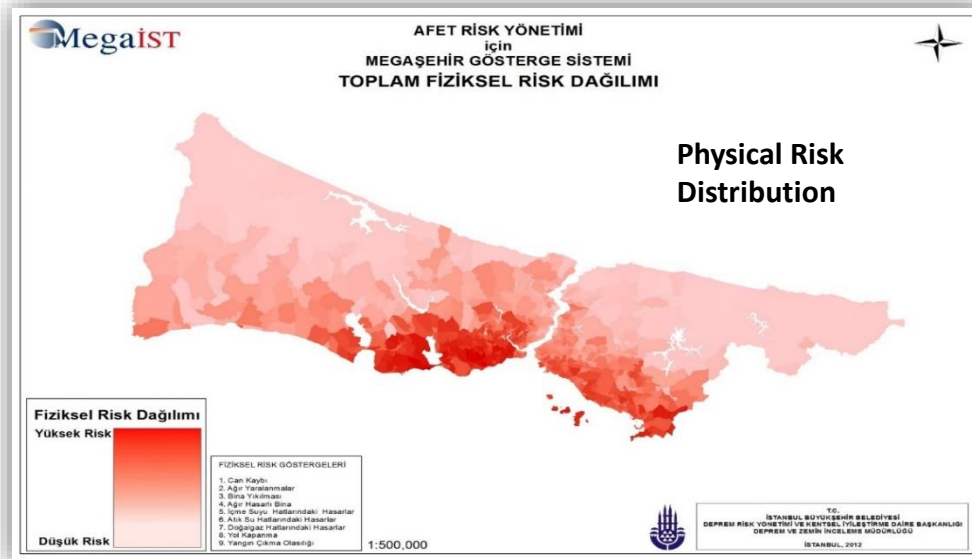




# Mega City Indicator System (MegaIST) (2012)

MegaIST is a disaster risk analysis that focused on the social vulnerability and the physical damages (life loss, all damaged structures, fire, etc.). The capacity for disaster recovery has also been revealed.

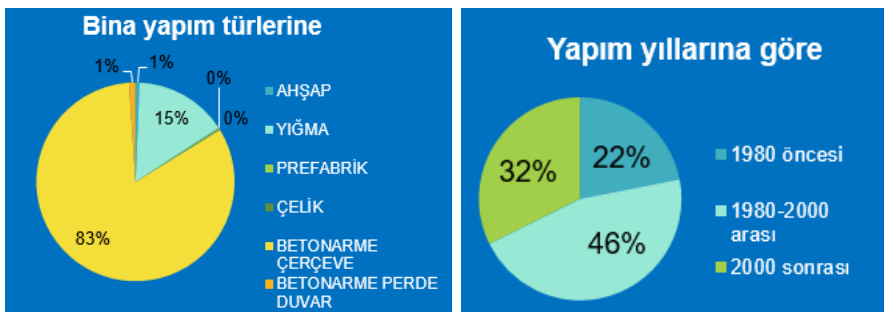
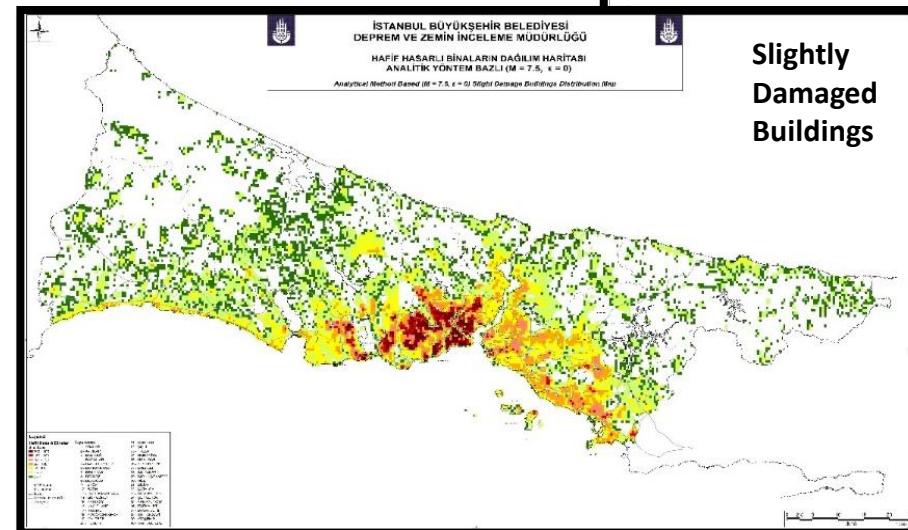
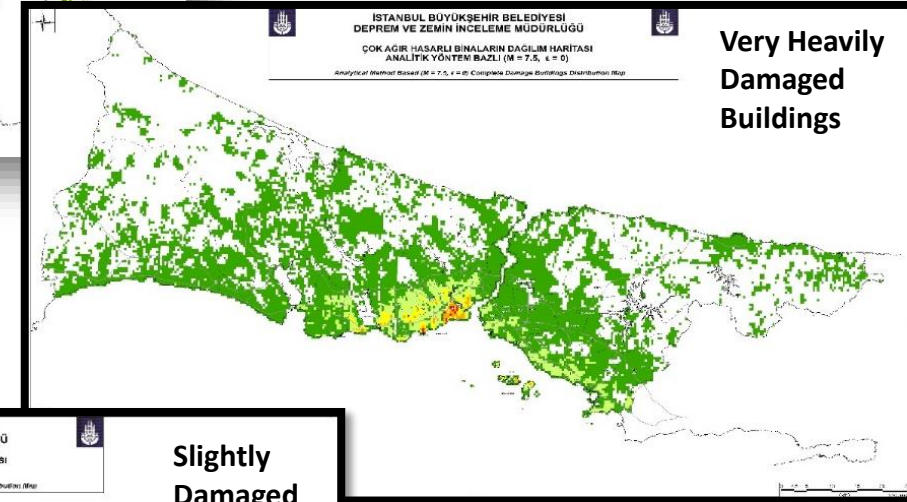
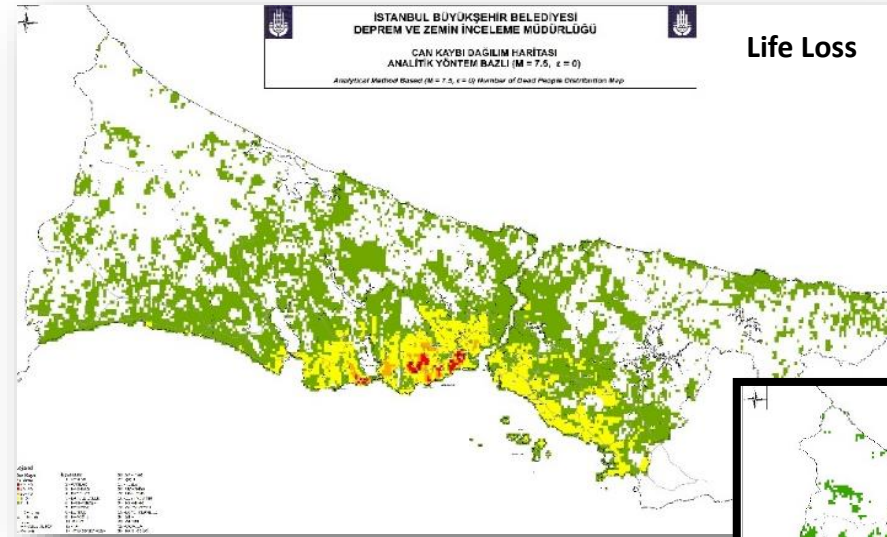
Alternative	Utility
FATİH	0.913
BAHCELİEVLER	0.756
AVCILAR	0.536
KUCUKCEKMECE	0.513
BAKIRKOY	0.455
BAGCILAR	0.450
ZEYTİNBURNU	0.383
ESENYURT	0.362
GUNGOREN	0.349
BEYLİKDUZU	0.310
BEYOĞLU	0.251
PENDİK	0.251
ESENLER	0.228
KARTAL	0.214
TUZLA	0.209
BUYUKCEKMECE	0.197
EYUP	0.191
KADIKOY	0.186
BAYRAMPASA	0.165
MALTEPE	0.154
SISLI	0.151
KAGITHANE	0.137
GAZIOSMANPASA	0.135
ADALAR	0.134
USKUDAR	0.119
SULTANBEYLİ	0.117
UMRANIYE	0.105
ATASEHIR	0.098
SILIVRI	0.090
SANCAKTEPE	0.081
BASAKSEHIR	0.074
SULTANGAZI	0.066
SARIYER	0.047
BEYKOZ	0.046
BESIKTAS	0.046
ARNAVUTKOY	0.041
CEKMEKOY	0.032
CATALCA	0.021
SILE	0.005



- Can Kaybı
- Ağır Yaralı Sayısı
- Tamamen Yıkılan Bina Sayısı
- Ağır Hasarlı Bina Sayısı
- 2-6 m Genişliğindeki Yolların Kapanması
- Yanıcı Patlayıcı Tesislerde Yangın Hasarı
- Doğal Gaz Hatlarındaki Acil Müdahale Gerektiren Hasar Sayısı
- İçme Suyu Hatlarındaki Acil Müdahale Gerektiren Hasar Sayısı
- Ahsap Binalarda Yangın Çıkma Olasılığı
- Atık Su Hatlarındaki Acil Müdahale Gerektiren Hasar Sayısı

# Probable Earthquake Loss Estimates for Istanbul Province (2019)

- 3.500 - 5.000 very heavily damaged buildings (0.4% of all building storage)
- 20.000 - 30.000 heavily damaged
- 90.000 - 110.000 moderately damaged
- 15.000 - 35.000 life loss
- 50.000 - 75.000 injured
- Loss (structural damage) 26B TL
- Total loss 80-100B TL,



İSTANBUL BUILDING TYPE INFO - 2018

# Tsunami Risk Investigation in the Marmara coasts of Istanbul (2018) and Tsunami Action Plan (2019)

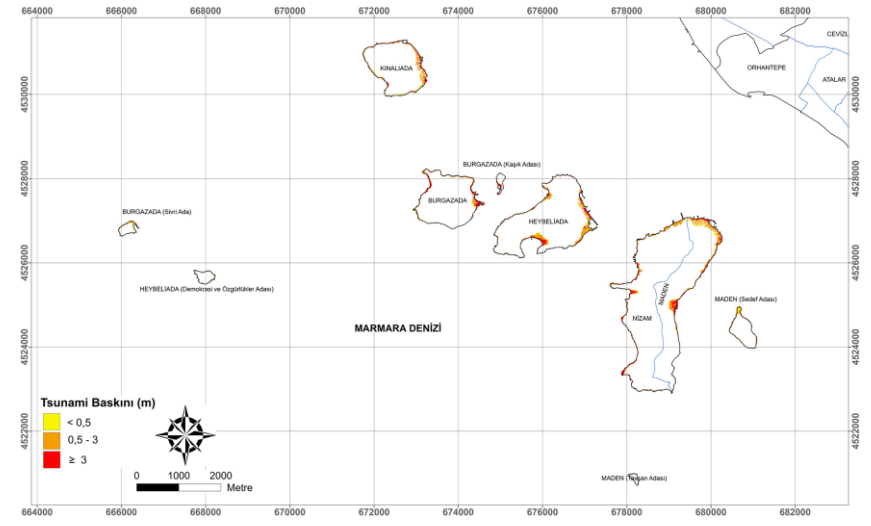
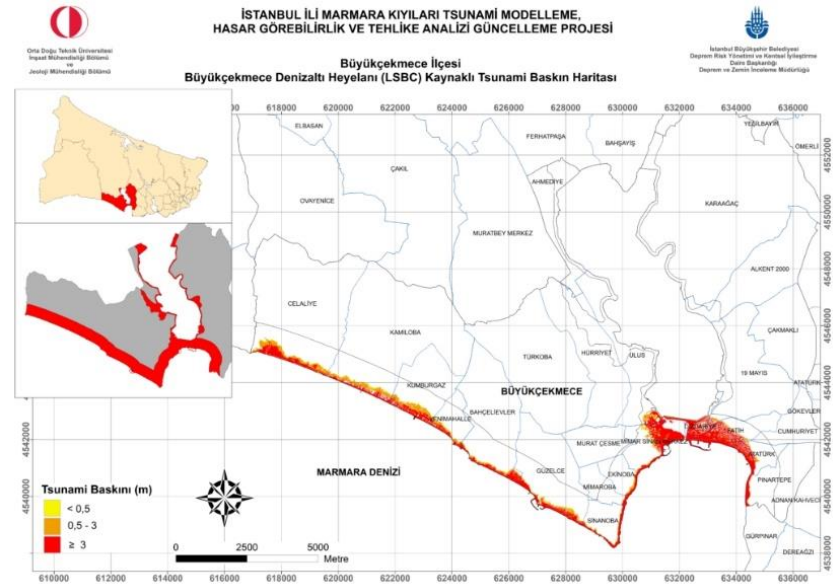
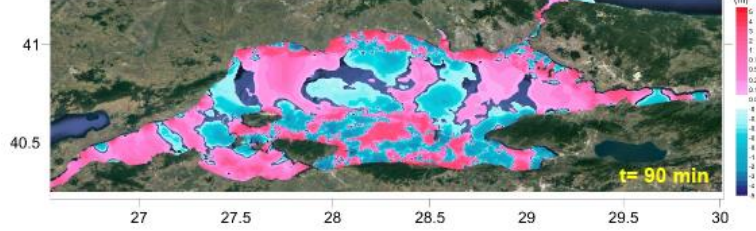
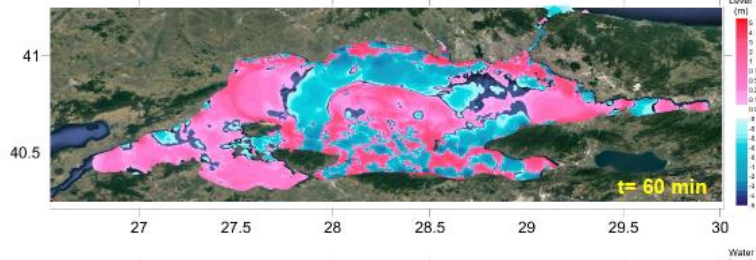
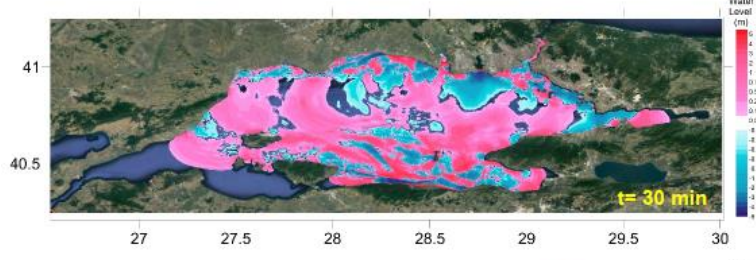
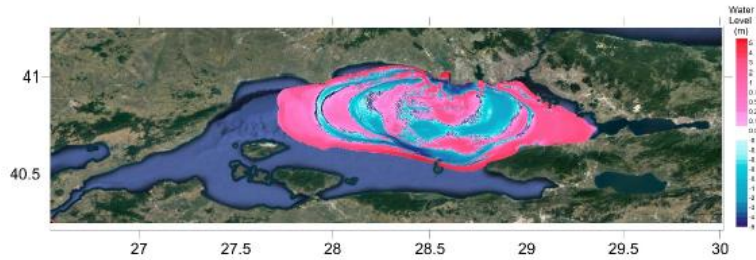
The possible tsunami that will occur after the possible Istanbul earthquake ( $M_w=7.5$ ), both seismic and triggered landslides, were determined and a tsunami hazard analysis was made for all Marmara coasts of Istanbul.

Different seismic and landslide scenerios were used for the calculation. According to the worst case scenerio;

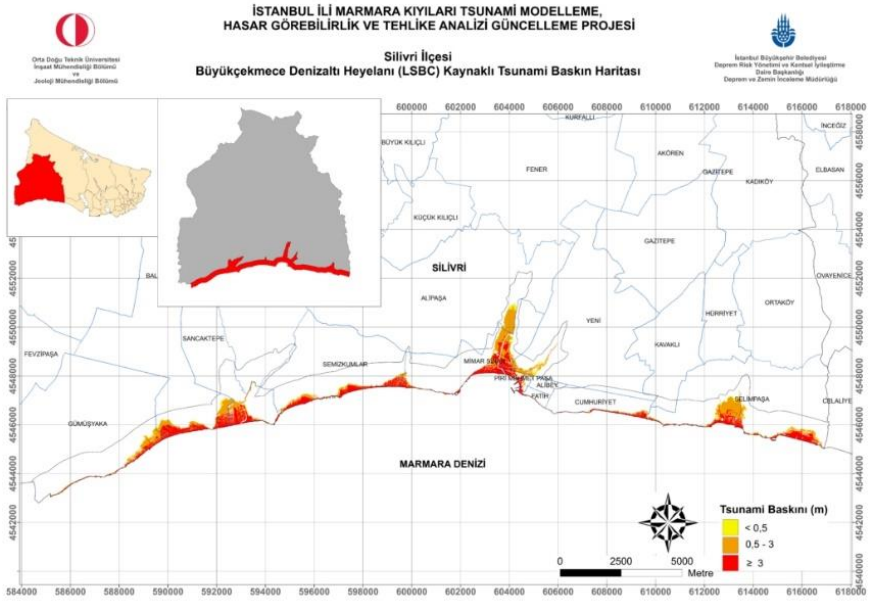
\* Appx. wave height: 10m (eastern coasts of İstanbul)

\* Arrival time: in about 8 mins

\* Inundation distance: up to 150 m



# Tsunami Action Plan (2019) and Field Studies



**Yesil İSTANBUL**

PARK BAĞIÇ VE YEŞİL ALANLAR DAİRE BAŞKANLIĞI

DEPREM RİSK YÖNETİMİ VE KENTSEL İYİLEŞTİRME DAİRE BAŞKANLIĞI

## TSUNAMİ BİLGİLENDİRMESİ VE TAHLİYE YOLLARI

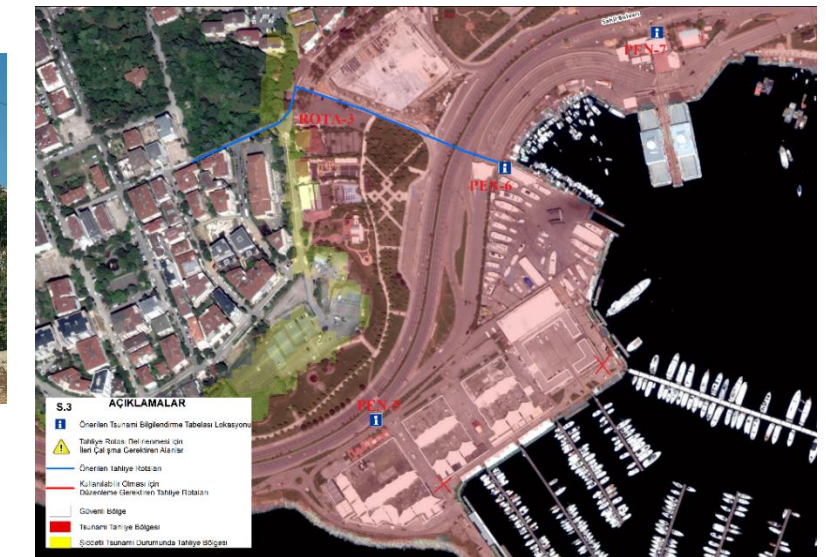
**Tsunami Öncesinde ve Sonrasında Dikkat Edilmesi Gerekenler**

- Tsunami öncesinde evde bulunulması halinde:
  - Evden dışarı çıkmadan önce, elektrik, gaz ve su tesisatlarının kontrol edilmesi.
  - Evden çıkarken, evdeki tehlikeli nesnelere (örneğin: kırık camlar, duvarlar, tavanlar) dikkat edilmesi.
  - Evden çıkarken, evdeki tehlikeli nesnelere (örneğin: kırık camlar, duvarlar, tavanlar) dikkat edilmesi.
- Tsunami sırasında dışarıda bulunulması halinde:
  - Daha önce belirlenmiş tahliye rotalarını kullanmak.
  - Tahliye rotaları kullanılırken, tahliye rotalarının güvenli olduğunu kontrol etmek.
  - Tahliye rotalarını kullanırken, tahliye rotalarının güvenli olduğunu kontrol etmek.
- Tsunami sonrasında:
  - Tsunami sonrasında tahliye alanına ulaşmak.
  - Tsunami sonrasında tahliye alanına ulaşmak.
  - Tsunami sonrasında tahliye alanına ulaşmak.

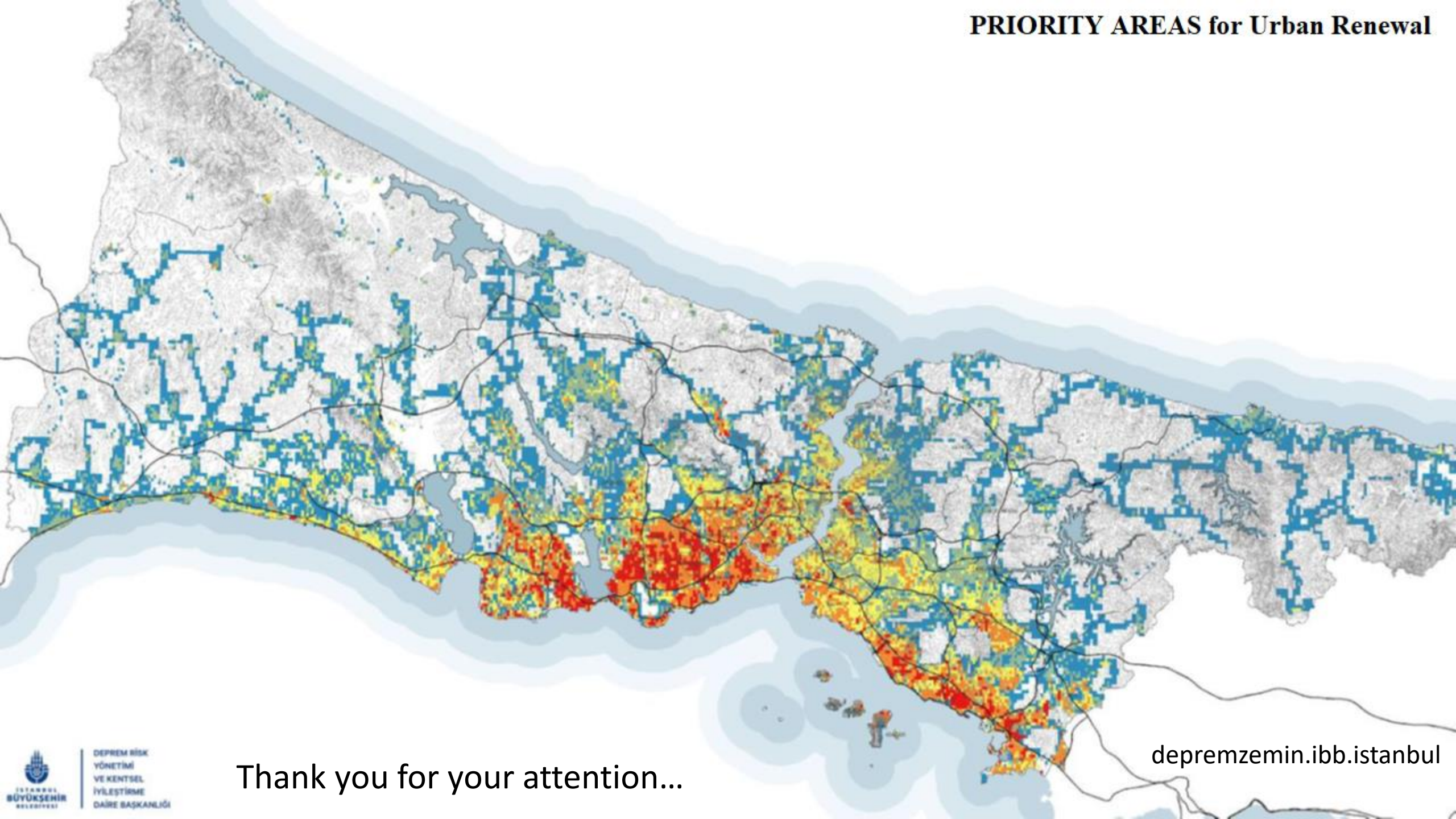
- Tsunami sonrasında tahliye alanına ulaşmak.
- Tsunami sonrasında tahliye alanına ulaşmak.
- Tsunami sonrasında tahliye alanına ulaşmak.

**ACIKLAMALAR**  
 - Evden Tahliye Yolu  
 - Tahliye Rotaları  
 - Tahliye Alanları

**İSTANBUL BÜYÜKŞEHİR BELEDİYESİ**



# PRIORITY AREAS for Urban Renewal



Thank you for your attention...

[deprenzemin.ibb.istanbul](http://deprenzemin.ibb.istanbul)