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Intergovernmental Oceanographic Commission

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Project Kick-Off Workshop

IOC EU ECHO NEAMTWS

17 & 20 December 2021

Strengthening the Resilience of Coastal Communities in the North East Atlantic, Mediterranean Region to the Impact of Tsunamis and Other Sea Level-Related Coastal Hazards Project

Country: Turkey

Presenter: Prof. Dr. Ahmet Cevdet Yalçıner

Contributors to the presentation: Dr. Öcal Necmioğlu (until 30 November 2021)

Gozde Guney Dogan Bingol

INTRODUCTION / BACKGROUND INFORMATION

- *In-country liaison/focal point for the project:* *Prof. Dr. Ahmet Cevdet Yalciner*
- *Identification/confirmation of your nominated community for Tsunami Ready Recognition(Include a map of coastal community if possible):* *in the next slides*
- *Preliminary information concerning key national stakeholders and partners that you envisage for this project:* *Istanbul Metropolitan Municipality (IMM), Disaster Emergency Management Authority, Ministry of Interior (AFAD), TUBITAK, İzmir Metropolitan Municipality (IzMM), Governorship and Municipality of Bodrum, Tourism Sector, Port Authorities, Marina Managers and more . . .*
- *Potential national contributions:* *IMM, IzMM, TUBITAK and more …*
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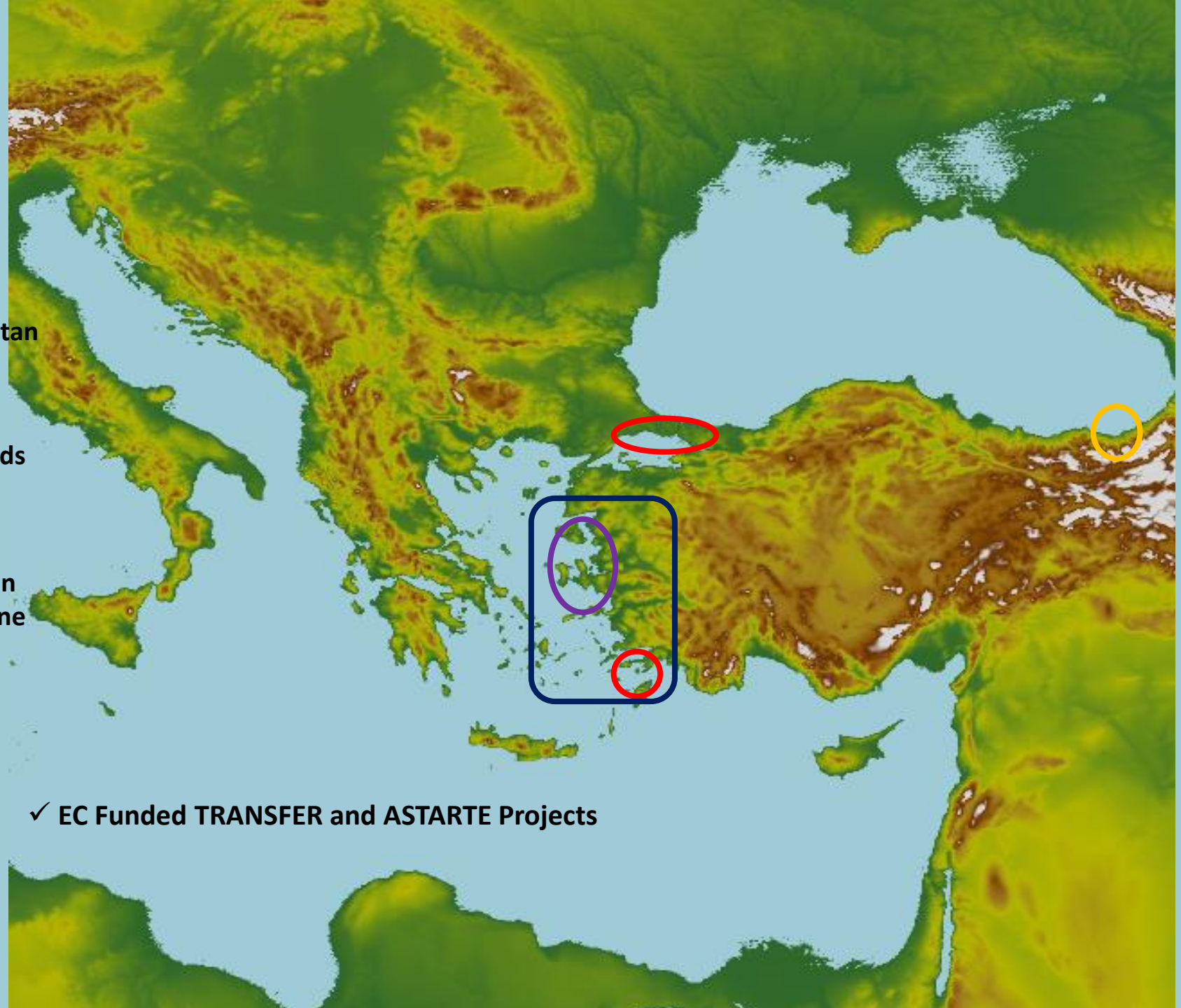

- ✓ Complete Tsunami Hazard Assessment, Vulnerability and Risk Analysis for the Marmara Coast of Istanbul Metropolitan Area (IMM-METU)
- ✓ Tsunami Action Planning Istanbul Metropolitan Municipality (IMM-METU)

✓Last Mile Bodrum (JRC-KOERI-METU)

✓Tsunami Hazard Assessment, Inundation mapping and Action Plan for Izmir Metropolitan Area (IzMM-METU)

✓Eastern Black Sea Stream Beds Reclamation and Improvement Project against multi hazards (Ministry of Environment , Urbanization and Climate Change-METU-ITU)

✓Fault Based Probabilistic Tsunami Generation and Hazard Analysis for Aegean Coasts: Online Interactive Tsunami Information System (TUBITAK-METU)

✓Tsunami Hazard and Risk Analysis for Critical Plants at Different locations around the country

✓Storm Hazard Analysis for Important Ports and Coastal Structures (Requirement of Turkish Design Code for Coastal Structures by Minsitry of Transport, Infrastructure and Communication)

✓ EC Funded TRANSFER and ASTARTE Projects

COMMUNITY COASTAL SEA LEVEL HAZARD EARLY WARNING AND MITIGATION SYSTEM CONTEXT/ STATUS (CON'T)

(i) Risk Knowledge and Communication Strategies

- *Is there any baseline knowledge, methods, tools and practices concerning sea level coastal hazard risk perceptions and risk communication strategies within the nominated community*

		PROVIDE AN IDEA OF EXISTING KNOWLEDGE ETC, ON SEA LEVEL COASTAL HAZARD RISK PERCEPTIONS AND COMMUNICATION STRATEGIES WITHIN THE LOCAL COMMUNITY [none/lacking/some]	NEEDS
I	Tsunami	some (mainly at Aegean coast after recent events)	Awareness raising, Hazard Assessment, Evacuation map, Action Plan, Signage
1	Storm Surge	some (Community has experienced frequent storm and flood events)	Update available guidelines, Storm hazard assessment, Storm-Flood impact assessmen at the river mouths, Inundation mapping, Action plan
2	Sea Level Rise	lacking	Adaptation measures

COMMUNITY COASTAL SEA LEVEL HAZARD EARLY WARNING AND MITIGATION SYSTEM CONTEXT/ STATUS (CON'T)

(ii) Early Warning and Mitigation System Status

- *What is the status of early warning and mitigation system (detection, monitoring, analysis, warning, communication, dissemination and response) for tsunami within the nominated community?*
- *What is the current status of the Joint Research Centre (JRC) Inexpensive Device for Sea Level Measurements (IDSL) stations (if any) ? (Operating? Any Issues?)*

		PROVIDE AN IDEA OF EXISTING CAPACITY/CAPABILITY WITHIN THE LOCAL COMMUNITY [Non-existence/ lacking/ available]	NEEDS
I	Detection	**available**	**detection at offshore by buoys**
1	Monitoring (e.g. IDSL)	**available**	**More IDSL's distributed to more locations**
2	Warning / Forecast	**available**	**Buoys to support forecast system**
3	Communication & Dissemination	**available**	**Increasing awareness and preparedness**
4	Preparedness and Response	**lacking**	**evacuation maps and tsunami action plans for the coastal communities**

COMMUNITY COASTAL SEA LEVEL HAZARD EARLY WARNING AND MITIGATION SYSTEM CONTEXT/ STATUS (CON'T)

(iii) Status / Elements of Tsunami Ready in the proposed/nominated community site?

- *Are there any Tsunami Ready elements/indicators achieved in accordance to UNESCO IOC Tsunami Ready Indicators (See UNESCO IOC Tsunami Ready Indicators-(Latest Indicators-not published yet). What has been achieved earlier?*
- *E.g. Tsunami Hazards are mapped and designated, Tsunami information displayed etc.*

	UNESCO IOC TSUNAMI READY INDICATORS	PROVIDE AN IDEA OF EXISTING CAPACITY AT THE NOMINATED COMMUNITY [NONE/ ONGOING/ ACHIEVED]
I	ASSESSMENT (ASSESS)	
1	ASSESS-1. Tsunami hazard zones are mapped and designated	For Istanbul Metropolitan City and Bodrum (achieved) For Izmir Metropolitan City (ongoing)
2	ASSESS-2. The number of people at risk in the tsunami hazard zone is estimated	For Istanbul and Bodrum (achieved) For Izmir (ongoing)
3	ASSESS-3. Economic, infrastructural, political, and social resources are identified	For Istanbul and Bodrum (achieved) For Izmir (ongoing)
II	PREPAREDNESS (PREP)	
4	PREP-1. Easily understood tsunami evacuation maps are approved	For Istanbul Metropolitan City and Bodrum (achieved)
5	PREP-2. Tsunami information is publicly displayed	For Istanbul Metropolitan City and Bodrum (achieved)
6	PREP-2. Outreach and public awareness and education resources are available and distributed	Ongoing
7	PREP-3. Outreach or educational activities are held at least three times a year	For Istanbul Metropolitan City (ongoing)
8	PREP-4: A community tsunami exercise is conducted at least every two years	None
III	RESPONSE (RESP)	
9	RESP-1. A community tsunami emergency response plan (ERP) is approved	None
10	RESP-2. The capacity to manage emergency response operations during a tsunami is in place	None
11	RESP-3. Redundant and reliable means to timely receive 24-hour official tsunami alerts are in place	None
12	RESP-4. Redundant and reliable means to timely disseminate 24-hour official tsunami alerts to the public are in place	None

MATCHING NEEDS

- *What are the needs to establish the full cycle of Tsunami Ready Recognized Community?*
- *Where can we focus and intensify project efforts (in reference to project activities)?*

	UNESCO IOC TSUNAMI READY INDICATORS	PROVIDE AN IDEA OF EXISTING CAPACITY AT THE NOMINATED COMMUNITY [NONE/ONGOING/ ACHIEVED]	NEEDS
I	ASSESSMENT (ASSESS)		
1	ASSESS-1. Tsunami hazard zones are mapped and designated	Buyukçekmece District of Istanbul (achieved) other coastal districts (ongoing)	
2	ASSESS-2. The number of people at risk in the tsunami hazard zone is estimated	For Istanbul (achieved)	
3	ASSESS-3. Economic, infrastructural, political, and social resources are identified	For Istanbul (achieved)	
II	PREPAREDNESS (PREP)		
4	PREP-1. Easily understood tsunami evacuation maps are approved	For Istanbul (achieved)	
5	PREP-2. Tsunami information is publicly displayed	For Istanbul (achieved)	
6	PREP-2. Outreach and public awareness and education resources are available and distributed	For Istanbul (ongoing)	
7	PREP-3. Outreach or educational activities are held at least three times a year	None	
8	PREP-4: A community tsunami exercise is conducted at least every two years	None	
III	RESPONSE (RESP)		
9	RESP-1. A community tsunami emergency response plan (ERP) is approved	None	
10	RESP-2. The capacity to manage emergency response operations during a tsunami is in place	None	
11	RESP-3. Redundant and reliable means to timely receive 24-hour official tsunami alerts are in place	None	
12	RESP-4. Redundant and reliable means to timely disseminate 24-hour official tsunami alerts to the public are in place	None	

Tsunami Ready Indicators

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			Bodrum	Istanbul	
I	**EVALUATION (EVA)**				
1	Eva-1. Have designated and mapped tsunami hazard zones.	LM	✔	✔	Available in Bodrum and Istanbul
2	Eva-2. To develop and initial estimate of the number of people that live in the tsunami hazard zone.		✔	✔	Available for Istanbul, feasible for Bodrum
II	**MITIGATION (MIT)**				
3	Mit-1. Have a public display of tsunami information.	LM	✔	✔	None at the moment-Locations identified in Bodrum and Istanbul
4	Mit-2. To develop a list of available economic, infrastructural, political and social resources to reduce tsunami risk at the community level.		✔	✔	Feasible
III	**PREPAREDNESS (PREP)**				
5	Prep-1. Produce easily understood tsunami evacuation maps as determined to be appropriate by local authorities in collaboration with communities.	LM	✔	✔	Available in Bodrum and Istanbul
6	Prep-2. Develop and distribute outreach and public education materials.		✔	✔	Already good progress – development and distribution functions could be separated
7	Prep-3. Hold at least three outreach or educational activities annually.		✔	✔	Feasible
8	Prep-4: Conduct a biannual tsunami community exercise.	LM	✔	✔	Feasible
IV	**RESPONSE (RESP)**				
9	Resp–1. Address tsunami hazards in the community's emergency operations plan (EOP).		✔	✔	Feasible, significant progress since 30 October 2020 EQ, need legislative framework
10	Resp–2. Commit to supporting the emergency operations center (EOC) during a tsunami incident if an EOC is opened and activated.		✔	✔	Feasible, significant progress since 30 October 2020 EQ, need legislative framework
11	Resp–3. Have redundant and reliable means for a 24-hour warning point (and EOC if activated) to receive official tsunami threats.		✔	✔	Feasible, significant progress since 30 October 2020 EQ, need legislative framework
12	Resp–4. Have redundant and reliable means for 24-hour warning point and/or EOC to disseminate official tsunami alerts to the public.		✔	✔	Feasible, significant progress since 30 October 2020 EQ, need legislative framework

Dr. Öcal NECMİOĞLU

Tsunami Ready & DG-ECHO/IOC Project

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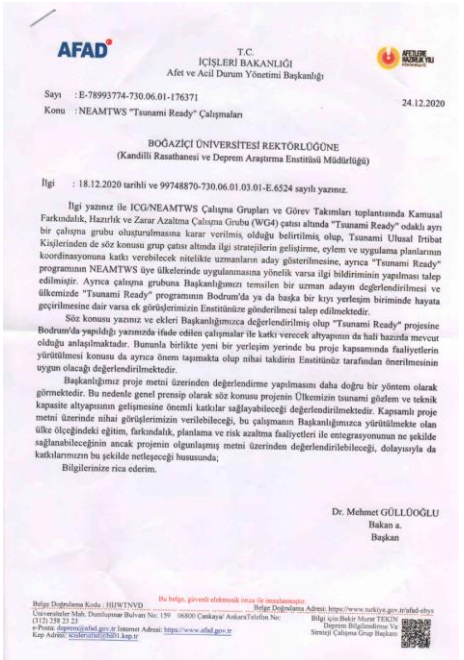
- KOERI has confirmed its support and interest to participate in the DG-ECHO/IOC Project “Strengthening the Resilience of Coastal Communities in the North-East Atlantic and Mediterranean Region to the Impact of Tsunamis and Other Sea Level-Related Coastal Hazard.

- Prof. Dr. Ahmet Cevdet Yalçıner has been nominated as the in-country liaison/focal point for the project.

- Istanbul Metropolitan Municipality has agreed to be part of this important initiative. In addition, based on important achievements made thanks to the "Last Mile-Turkey" project in Bodrum executed in 2019, we anticipate similar support from the Bodrum Municipality.

- In addition to the Istanbul Metropolitan and possibly Bodrum Municipality, key national stakeholders and partners are expected to be AFAD (Disaster and Emergency Presidency), İstanbul and Muğla Provincial Directorates of AFAD, and Bodrum Governorate. Engagement of relevant NGO’s is considered to be a possibility.



AFAD

T.C.
İÇİŞLERİ BAKANLIĞI
Afet ve Acil Durum Yönetimi Başkanlığı

Sayı : E-78993774-730.06.01-176371
Konu : NEAMTWS "Tsunami Ready" Çalışmaları

24.12.2020

BOĞAZİÇİ ÜNİVERSİTESİ REKTÖRLÜĞÜNE
(Kandilli Rasathanesi ve Deprem Araştırma Enstitüsü Müdürlüğü)

İlgi : 18.12.2020 tarihli ve 99748870-730.06.01.03.01-E.6524 sayılı yazınız.

İlgi yazınız ile ICG/NEAMTWS Çalışma Grupları ve Görev Takımları toplantısında Kamusal Farkındalık, Hazırlık ve Zarar Azaltma Çalışma Grubu (WG4) çatısı altında "Tsunami Ready" odaklı ayrı bir çalışma grubu oluşturulmasına karar verilmiş olduğu belirtilmiş olup, Tsunami Ulusal İrtibat Kişilerinden de söz konusu grup çatısı altında ilgi stratejilerin geliştirme, eylem ve uygulama planlarının koordinasyonuna katkı verebilecek nitelikte uzmanların aday gösterilmesine, ayrıca "Tsunami Ready" programının NEAMTWS üye ülkelerinde uygulanmasına yönelik varsa ilgi bildiriminin yapılması talep edilmiştir. Ayrıca çalışma grubuna Başkanlığımızı temsilen bir uzman adayın değerlendirilmesi ve ülkemizde "Tsunami Ready" programının Bodrum'da ya da başka bir kıyı yerleşim biriminde hayata geçirilmesine dair varsa ek görüşlerimizin Enstitünüze gönderilmesi talep edilmektedir.

Söz konusu yazınız ve ekleri Başkanlığımızca değerlendirilmiş olup "Tsunami Ready" projesine Bodrum'da yapıldığı yazınızda ifade edilen çalışmalar ile katkı verecek altyapının da hali hazırda mevcut olduğu anlaşılmaktadır. Bununla birlikte yeni bir yerleşim yerinde bu proje kapsamında faaliyetlerin yürütülmesi konusu da ayrıca önem taşımakta olup nihai takdirin Enstitünüz tarafından önerilmesinin uygun olacağı değerlendirilmektedir.

Başkanlığımız proje metni üzerinden değerlendirme yapılmasını daha doğru bir yöntem olarak görmektedir. Bu nedenle genel prensip olarak söz konusu projenin Ülkemizin tsunami gözlem ve teknik kapasite altyapısının gelişmesine önemli katkılar sağlayabileceği değerlendirilmektedir. Kapsamlı proje metni üzerinde nihai görüşlerimizin verilebileceği, bu çalışmanın Başkanlığımızca yürütülmekte olan ülke ölçeğindeki eğitim, farkındalık, planlama ve risk azaltma faaliyetleri ile entegrasyonunun ne şekilde sağlanabileceğinin ancak projenin olgunlaşmış metni üzerinden değerlendirilebileceği, dolayısıyla da katkılarımızın bu şekilde netleşeceği hususunda;

Bilgilerinize rica ederim.

Dr. Mehmet GÜLLÜOĞLU
Bakan a.
Başkan

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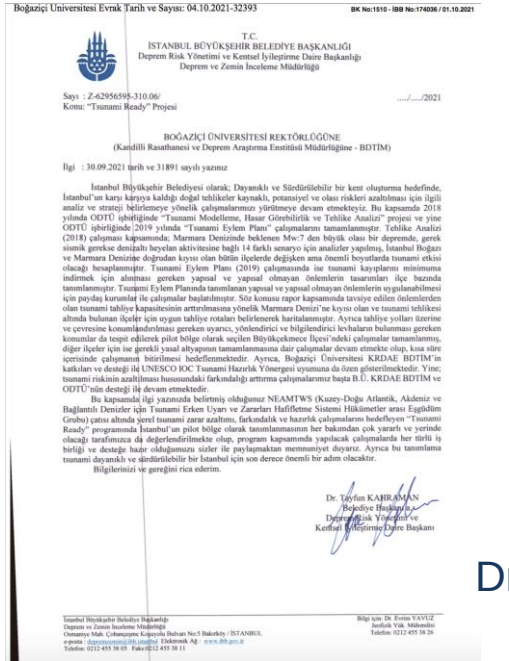
e-Posta: deprem@afad.gov.tr İnternet Adresi: https://www.afad.gov.tr
Kep Adresi: kisilerafad@hs01.kep.tr

Bilgi için Bekir Murat TEKİN
Deprem Bilgilendirme Ve Strateji Çalışma Grup Başkanı

ICG/NEAMTWS-XVII



Boğaziçi Üniversitesi Evrak Tarih ve Sayısı: 04.10.2021-32393

BK No:1510 - İBB No:174036 / 01.10.2021

T.C.
İSTANBUL BÜYÜKŞEHİR BELEDİYE BAŞKANLIĞI
Deprem Risk Yönetimi ve Kentsel İyileştirme Daire Başkanlığı
Deprem ve Zemin İnceleme Müdürlüğü

Sayı : Z-62956595-310.06/
Konu: "Tsunami Ready" Projesi

...../...../2021

BOĞAZİÇİ ÜNİVERSİTESİ REKTÖRLÜĞÜNE
(Kandilli Rasathanesi ve Deprem Araştırma Enstitüsü Müdürlüğüne - BDTİM)

İlgi : 30.09.2021 tarih ve 31891 sayılı yazınız

İstanbul Büyükşehir Belediyesi olarak; Dayanıklı ve Sürdürülebilir bir kent oluşturma hedefinde, İstanbul'un karşı karşıya kaldığı doğal tehlikeler kaynaklı, potansiyel ve olası riskleri azaltılması için ilgili analiz ve strateji belirlemeye yönelik çalışmalarımızı yürütmeye devam etmekteyiz. Bu kapsamda 2018 yılında ODTÜ işbirliğinde "Tsunami Modelleme, Hasar Görebilirlik ve Tehlike Analizi" projesi ve yine ODTÜ işbirliğinde 2019 yılında "Tsunami Eylem Planı" çalışmalarını tamamlanmıştır. Tehlike Analizi (2018) çalışması kapsamında; Marmara Denizinde beklenen Mw:7 den büyük olası bir depremde, gerek sismik gerekse denizaltı heyelan aktivitesine bağlı 14 farklı senaryo için analizler yapılmış, İstanbul Boğazı ve Marmara Denizine doğrudan kıyısı olan bütün ilçelerde değişken ama önemli boyutlarda tsunami etkisi olacağı hesaplanmıştır. Tsunami Eylem Planı (2019) çalışmasında ise tsunami kayıplarını minimuma indirmek için alınması gereken yapısal ve yapısal olmayan önlemlerin tasarımları ilçe bazında tanımlanmıştır. Tsunami Eylem Planında tanımlanan yapısal ve yapısal olmayan önlemlerin uygulanabilmesi için paydaş kurumlar ile çalışmalar başlatılmıştır. Söz konusu rapor kapsamında tavsiye edilen önlemlerden olan tsunami tahliye kapasitesinin arttırılmasına yönelik Marmara Deniz'ne kıyısı olan ve tsunami tehlikesi altında bulunan ilçeler için uygun tahliye rotaları belirlenerek haritalanmıştır. Ayrıca tahliye yolları üzerine ve çevresine konumlandırılması gereken uyarıcı, yönlendirici ve bilgilendirici levhaların bulunması gereken konumlar da tespit edilerek pilot bölge olarak seçilen Büyükçekmece İlçesi'ndeki çalışmalar tamamlanmış, diğer ilçeler için ise gerekli yasal altyapının tamamlanmasına dair çalışmalar devam etmekte olup, kısa süre içerisinde çalışmanın bitirilmesi hedeflenmektedir. Ayrıca, Boğaziçi Üniversitesi KRDAE BDTİM'in katkıları ve desteği ile UNESCO IOC Tsunami Hazırlık Yönergesi uyumuna da özen gösterilmektedir. Yine; tsunami riskinin azaltılması hususundaki farkındalığı arttırma çalışmalarımız başta B.Ü. KRDAE BDTİM ve ODTÜ'nün desteği ile devam etmektedir.

Bu kapsamda ilgi yazınızda belirtmiş olduğunuz NEAMTWS (Kuzey-Doğu Atlantik, Akdeniz ve Bağlantılı Denizler için Tsunami Erken Uyarı ve Zararları Hafifletme Sistemi Hükümetler arası Eşgüdüm Grubu) çatısı altında yerel tsunami zarar azaltımı, farkındalık ve hazırlık çalışmalarını hedefleyen "Tsunami Ready" programında İstanbul'un pilot bölge olarak tanımlanmasının her bakımdan çok yararlı ve yerinde olacağı tarafımızca da değerlendirilmekte olup, program kapsamında yapılacak çalışmalarda her türlü iş birliği ve desteğe hazır olduğumuzu sizler ile paylaşmaktan memnuniyet duyarız. Ayrıca bu tsunamiready tsunami dayanıklı ve sürdürülebilir bir İstanbul için son derece önemli bir adım olacaktır.

Bilgilerinizi ve gereğini rica ederim.

Dr. Tayfun KAHRAMAN
Belediye Başkanı a.
Deprem Risk Yönetimi ve
Kentsel İyileştirme Daire Başkanı

İstanbul Büyükşehir Belediye Başkanlığı
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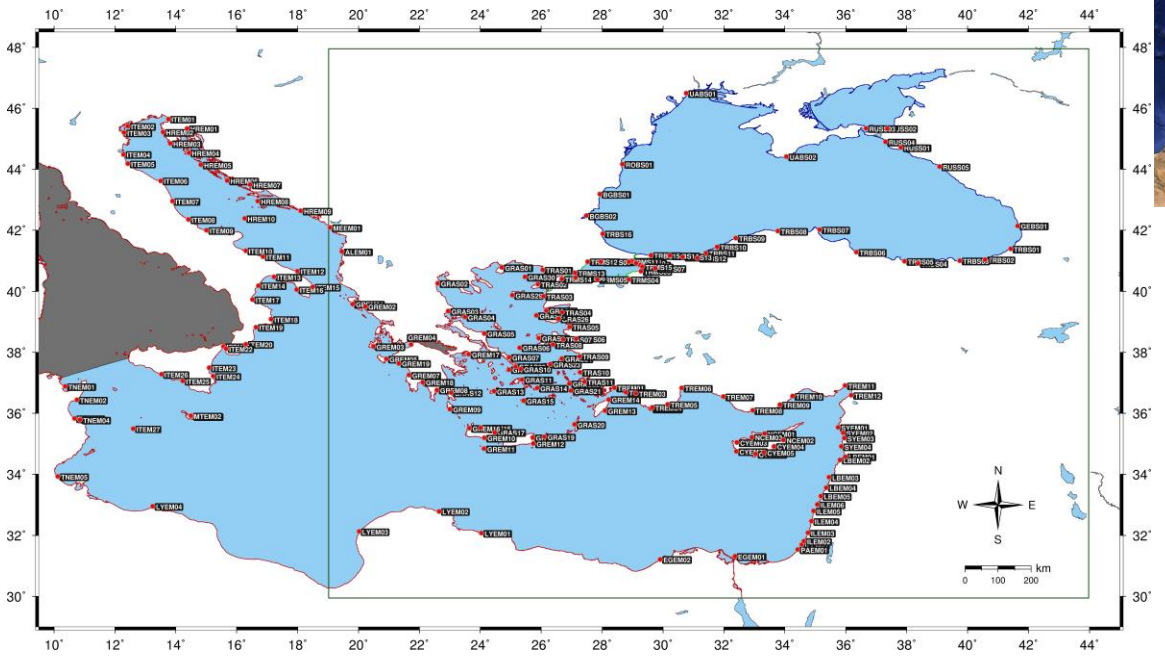
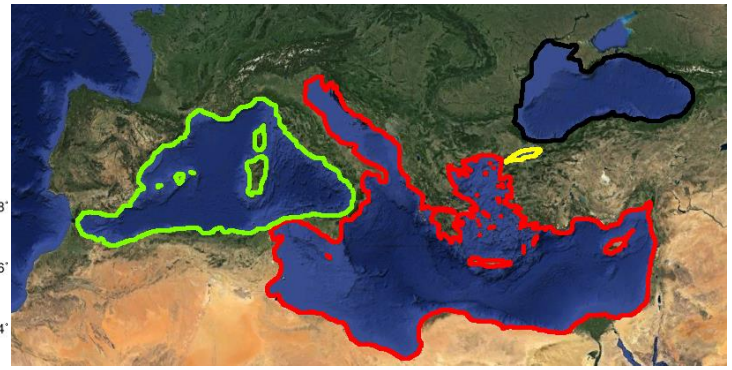
Dr. Öcal NECMİOĞLU

Present Status

TSP-TR is operational since 1 July 2012 together with CENALT. 2022 marks the 10th anniversary of operational NEAMTWS.





SUBSCRIBERS:

CDH (CYPRUS), NIOF (EGYPT), CENALT (FRANCE), BSH (GERMANY), DWD (GERMANY), NOA (GREECE), PMO (ISRAEL), INGV (ITALY), NCGR (LEBANON), IPMA (PORTUGAL), NIEP (ROMANIA), TYPHOON (RUSSIAN FEDERATION), DGPCE (SPAIN), IGN (SPAIN)
CCS (UNITED KINGDOM), ERCC (EU),
IOC Secretariat
15 Institutions from 13 Member States
2 International Organizations
AFAD (CPA) and MUĞLA Metropolitan Municipality at the national level

The maps and related information presented here do not necessarily reflect the views and position of the United Nations, UNESCO, IOC or any affiliated Member State.

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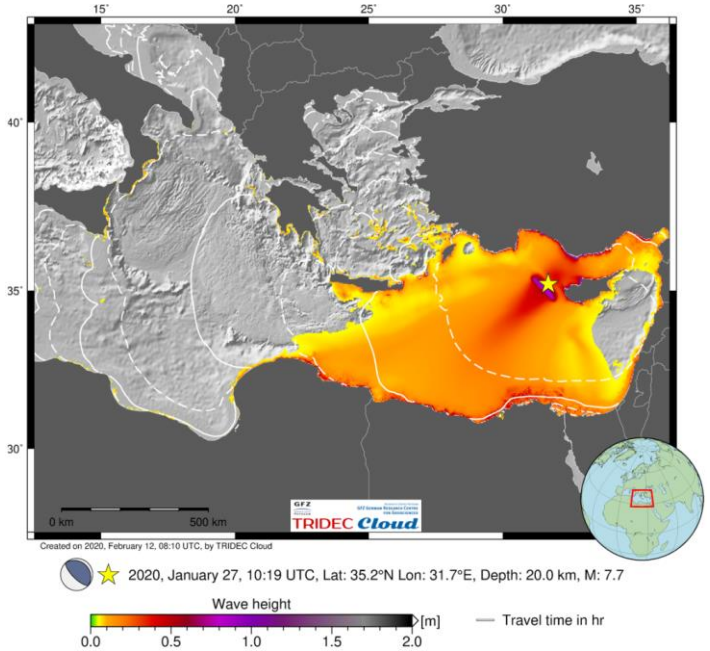
AFAD MINISTRY OF INTERIOR DISASTER AND EMERGENCY MANAGEMENT PRESIDENCY

Muğla Metropolitan Municipality
Directorate of Fire Department

NEAMWave21



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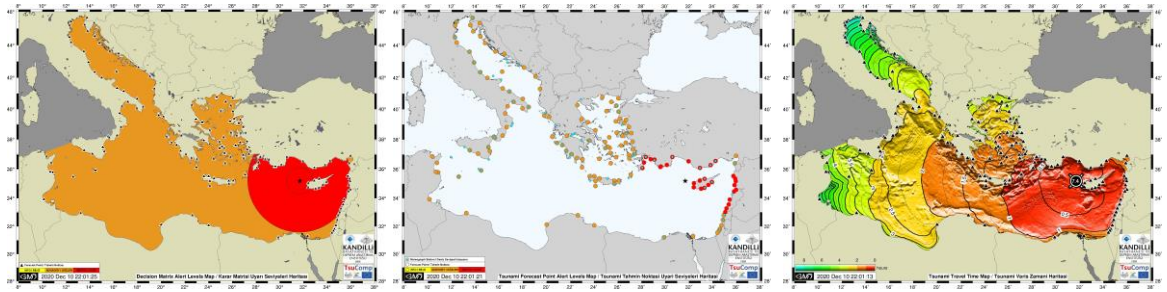
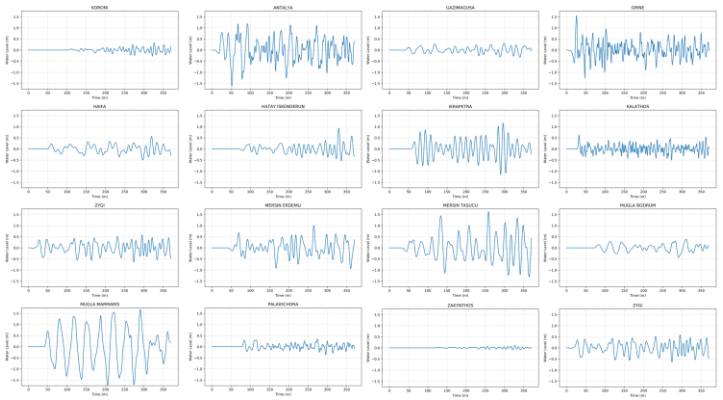


KOERI and National Observatory of Athens (NOA) have combined their efforts through a joint scenario in the Eastern Mediterranean based on a M7.7 earthquake along the western segment of the Cyprian Arc. The modelling of the KOERI-NOA scenario had been done by KOERI through the Easy Wave tsunami modelling tool embedded in GFZ's TridecCloud©, which is a cloud- and web-based prototype Tsunami Early Warning Decision Support platform based on the experiences and the knowledge gained in various research projects. During the conduct of the exercise, TridecCloud© was also utilized for the real-time simulation of the sea-level readings KOERI's enanced products were appreciated once again by the participants.



From Last Mile to Tsunami Ready in Turkey

Dr. Öcal NECMİOĞLU

UNESCO/IOC/ICG/NEAMTWS Tsunami National Contact
Kandilli Observatory and Earthquake Research Institute
Boğaziçi University
İstanbul – TURKEY
(Until 30 November 2021)

Last Mile - Bodrum

To address local/near-field tsunami warning, awareness and preparations, the European Commission (EC) funded a new project through the EC-Joint Research Center (JRC) involving KOERI and Middle East Technical University (METU), in close connection with a wide range of local stake-holders. In this context a collaborative action "Last Mile - Bodrum" for

- *the simulation of the SGM for the 20 July 2017 (Mw 6.6) Bodrum–Kos Earthquake (KOERI)*
- *the installation of a local earthquake monitoring-tsunami warning system (KOERI-JRC)*
- *preparation of high-resolution tsunami inundation and evacuation maps (METU)*
- *awareness and preparations activities, such as seminars, workshops (KOERI-METU)*
- *a tsunami exercise in Bodrum (ALL incl. Local Stakeholders)*

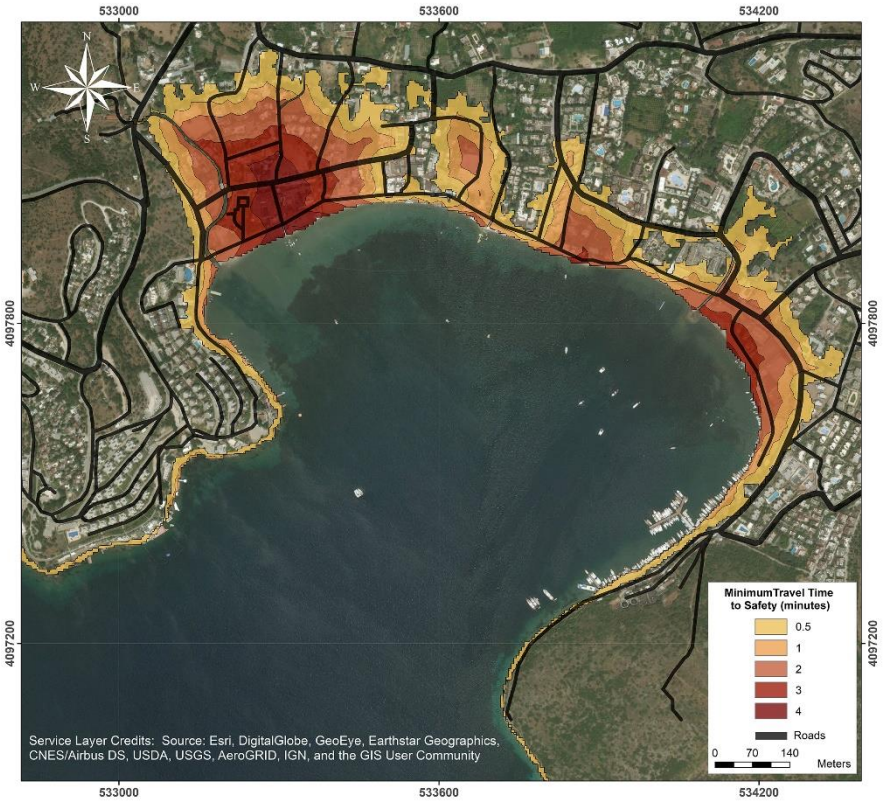
has been initiated.

Tsunami Inundation and Evacuation Maps (METU)

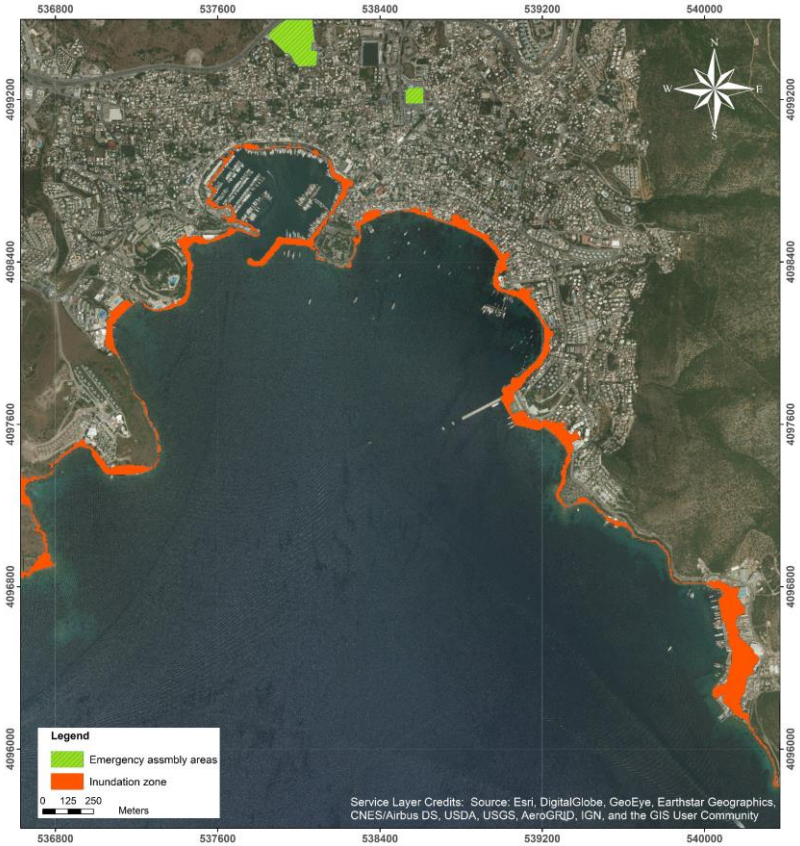
Distribution of Maximum Flow Depth in Bitez Bay due to
Left: 1956-Amorgos Scenario
Right: Combined Gokova Seismic and Gokova-North-Datca Landslide Scenario

Dr. Öcal NECMİOĞLU

Tsunami Inundation and Evacuation Maps (METU)

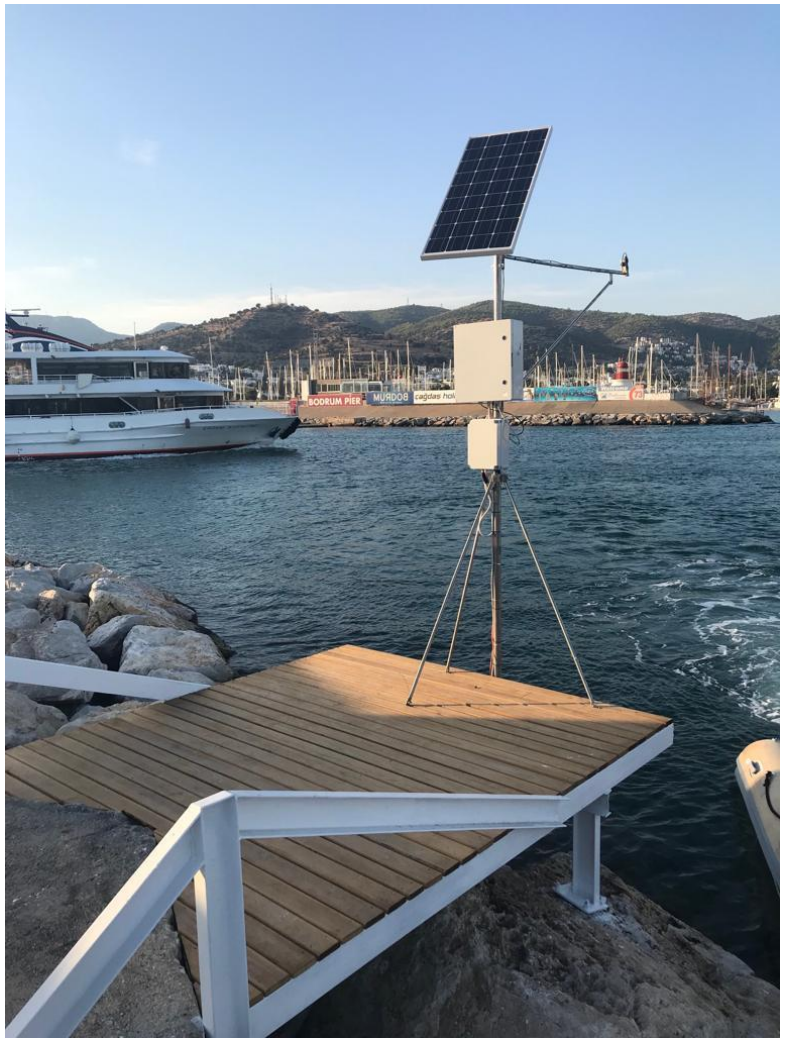


Tsunami Evacuation Walk Time Map for the coastal areas around the Bitez Bay according to the merged inundation area of Combined Gokova Seismic and Gokova-North-Datca Landslide Scenario and 1956-Amorgos Scenario

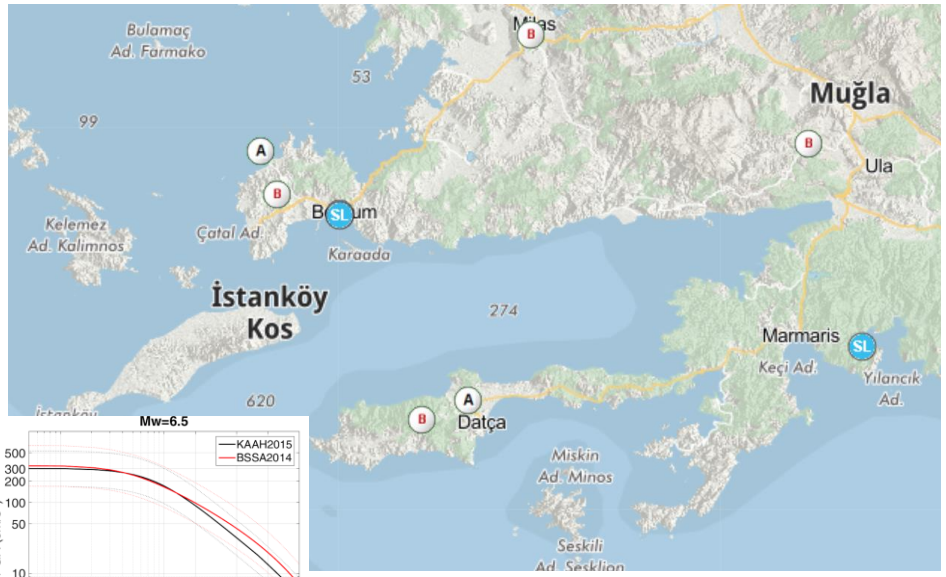


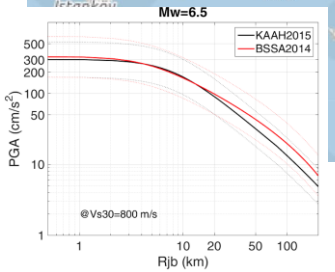
Inundation Zones and Emergency Assembly Areas in Central Bodrum

Prototype Local Tsunami Warning System (KOERI-JRC)



Local EW PGA threshold @ 0.04g (Mw 6.0)-0.06g (Mw 6.5)





The maps and related information presented here do not necessarily reflect the views and position of the United Nations, UNESCO, IOC or any affiliated Member State.

Table-Top Tsunami Exercise @ WTAD2019

An awareness seminar in a primary school and a preparedness seminar in a coastal hotel, both in Bodrum-Turkey, were organized on 4 November 2019.

A table-top tsunami exercise was organised in Bodrum-Turkey on 5 November 2019, coordinated by the Mugla City Disaster and Emergency Management Presidency (Mugla AFAD), supported by the District Governorship of Bodrum, Municipality of Bodrum, KOERI, METU, Bodrum Port Authority and various NGOs, as part of the pilot project "Last Mile Turkey" activities, funded and supported by the EC-JRC.

The exercise was based on the 20 July 2017 Mw 6.6 Bodrum-Kos earthquake and provided an opportunity to assess the added values of various activities undertaken since the 2017 earthquake, such as dedicated meetings with the local stakeholders on tsunami hazard-risk-awareness-readiness, preparation of tsunami inundation and evacuation maps and installation of pilot local tsunami early warning system (triggered by the strong ground motion generated from an earthquake recorded by two seismic devices and complemented with a sea-level observation device) in the Bodrum Marina, all being tested currently as part of the pilot project "Last Mile Turkey".

After the exercise, a press conference was organised in Bodrum-Turkey targeting further tsunami awareness in the region. A national press-release concerning these activities was issued by the Boğazici University.

Tsunami Ready Indicators

I	**EVALUATION (EVA)**	
1	Eva-1. Have designated and mapped tsunami hazard zones.	LM
2	Eva-2. To develop and initial estimate of the number of people that live in the tsunami hazard zone.	
II	**MITIGATION (MIT)**	
3	Mit-1. Have a public display of tsunami information.	LM
4	Mit-2. To develop a list of available economic, infrastructural, political and social resources to reduce tsunami risk at the community level.	
III	**PREPAREDNESS (PREP)**	
5	Prep-1. Produce easily understood tsunami evacuation maps as determined to be appropriate by local authorities in collaboration with communities.	LM
6	Prep-2. Develop and distribute outreach and public education materials.	
7	Prep-3. Hold at least three outreach or educational activities annually.	
8	Prep-4: Conduct a biannual tsunami community exercise.	LM
IV	**RESPONSE (RESP)**	
9	Resp–1. Address tsunami hazards in the community's emergency operations plan (EOP).	
10	Resp–2. Commit to supporting the emergency operations center (EOC) during a tsunami incident if an EOC is opened and activated.	
11	Resp–3. Have redundant and reliable means for a 24-hour warning point (and EOC if activated) to receive official tsunami threats.	
12	Resp–4. Have redundant and reliable means for 24-hour warning point and/or EOC to disseminate official tsunami alerts to the public.	

Could the Last Mile Project in Turkey further develop and expand, for example into potential Tsunami Ready communities in the future?

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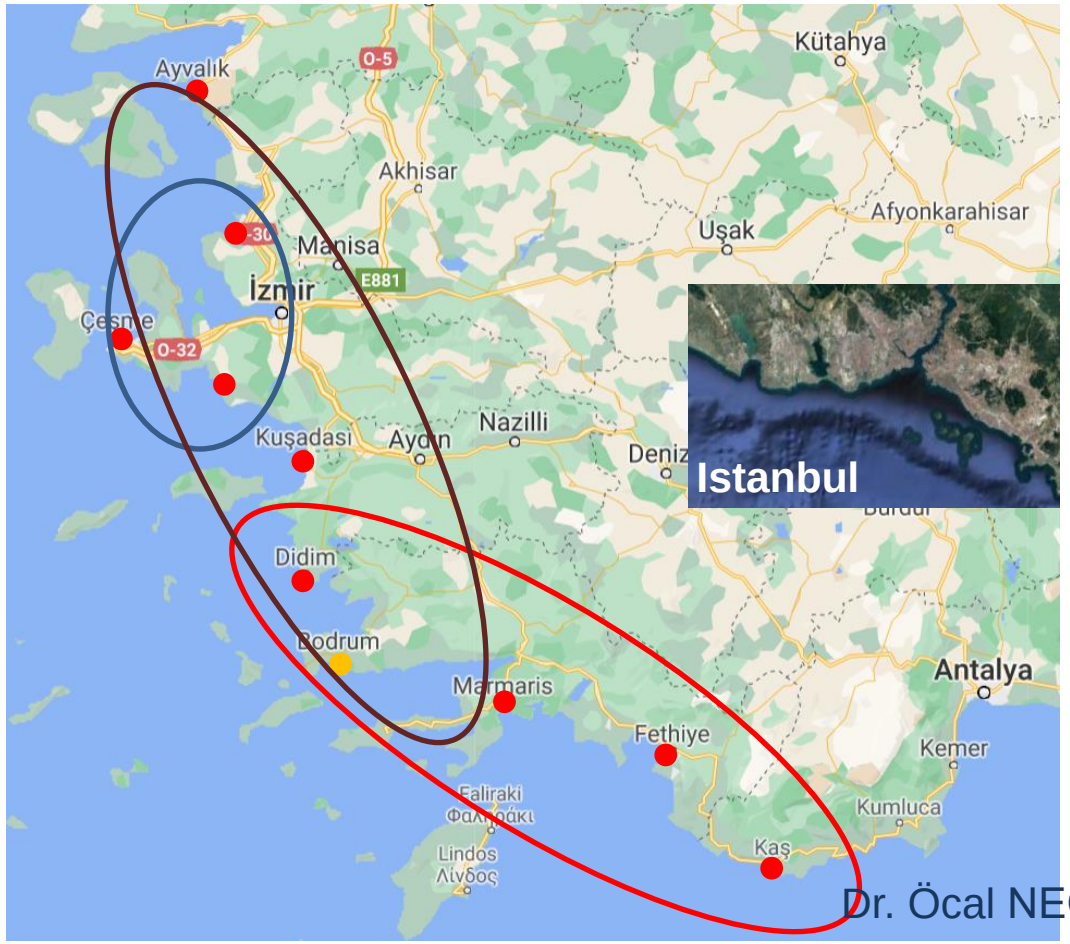

Complete Tsunami Hazard Assessment, Vulnerability and Risk Analysis for the Marmara Coast of Istanbul Metropolitan Area

Ahmet Cevdet Yalciner[1], Mehmet Lutfi Suzen[1], Duygu Tufekci Enginar[1], Gozde Guney Dogan[1], Cagil Kolat[2], Busra Celikbas[1], Bora Yalciner[2], Ozge Cabuk[1], Mahmut Bas[3], Osman Kilic[3], Emin Yahya Mentese[3], Ahmet Tarih[3], Andrey Zaytsev[4], Efim Pelinovski[5,6]

[1]Middle East Technical University, Ankara, Turkey

[2]Verisis Inc. R&D Branch, Middle East Technical University Technopolis, Ankara, Turkey

[3]Istanbul Metropolitan Municipality, Directorate of Earthquake and Ground Research, Istanbul, Turkey,

[4]Special Research Bureau for Automation of Marine Researches, Far Eastern Branch of Russian Academy of Sciences, Russia,

[5]Nizhny Novgorod State Technical University, Nizhny Novgorod, Russia,

[6]Institute of Applied Physics, Russian Academy of Science, Nizhny Novgorod, Russia

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PHASES

“Updating of Istanbul’s Tsunami Hazard and Vulnerability Analyses”

PHASE 1:

STAGE 1) Development of high resolution Digital Elevation Model (DEM) data enhanced by including buildings

STAGE 2) Computation of hazard levels for each 17 coastal districts w.r.t NAF sourced 14 different co-seismic and 3 submarine landslide areas with the use of NAMI DANCE GPU software

STAGE 3) Vulnerability analysis by using the MeTHuVA (METU Metropolitan Tsunami Human Vulnerability Assessment) Method (Tufekci et al., 2018) that covers human vulnerability assessment with GIS-based multi criteria decision analysis (MCDA)

PHASE 2:

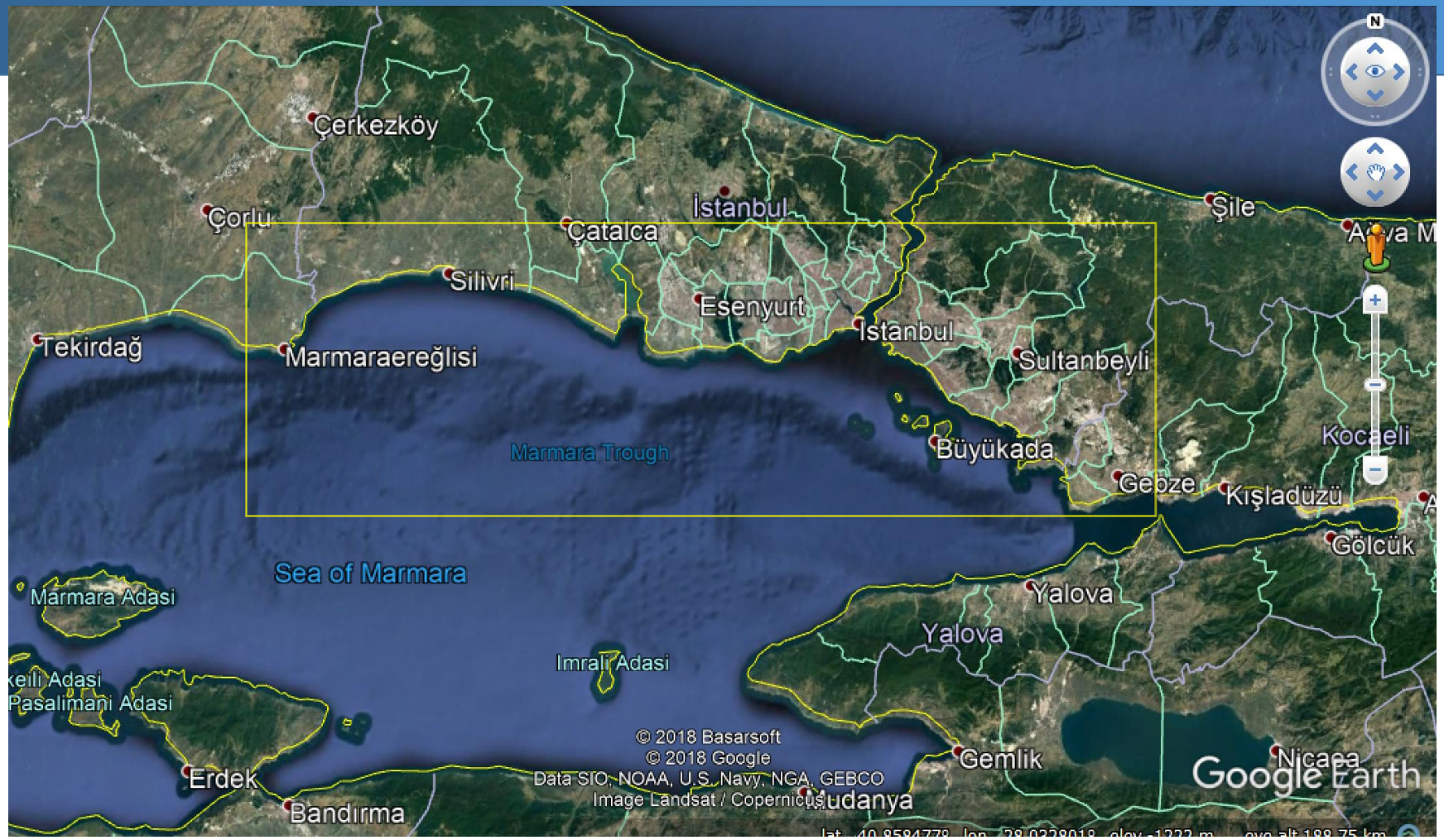
Tsunami Action Plan

Structural measures

Nonstructural Measures

39 districts of Istanbul Metropolitan Municipality

17 of 39 are along Marmara or Bosphorus Coast



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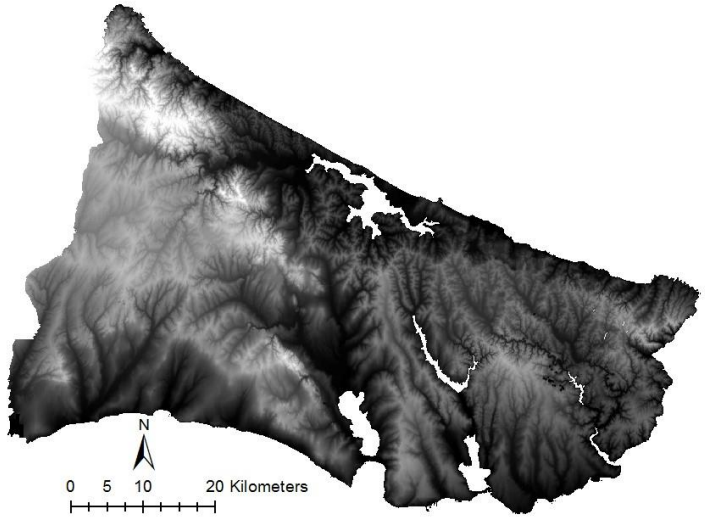
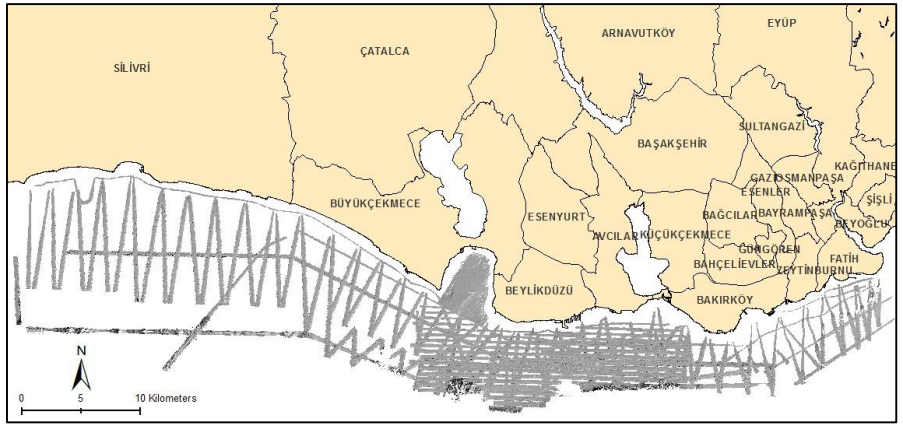
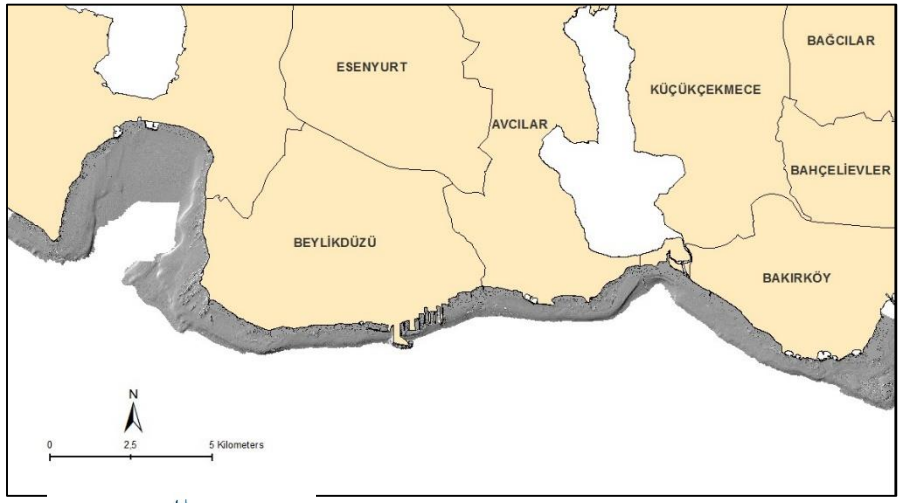
STAGE 1: Development of high resolution Digital Elevation Model (DEM) data

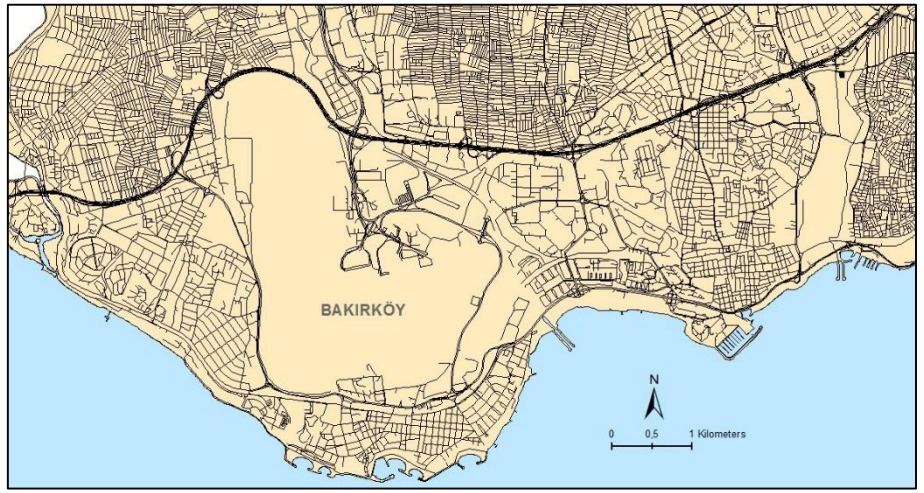


1m resolution LIDAR based DEM data

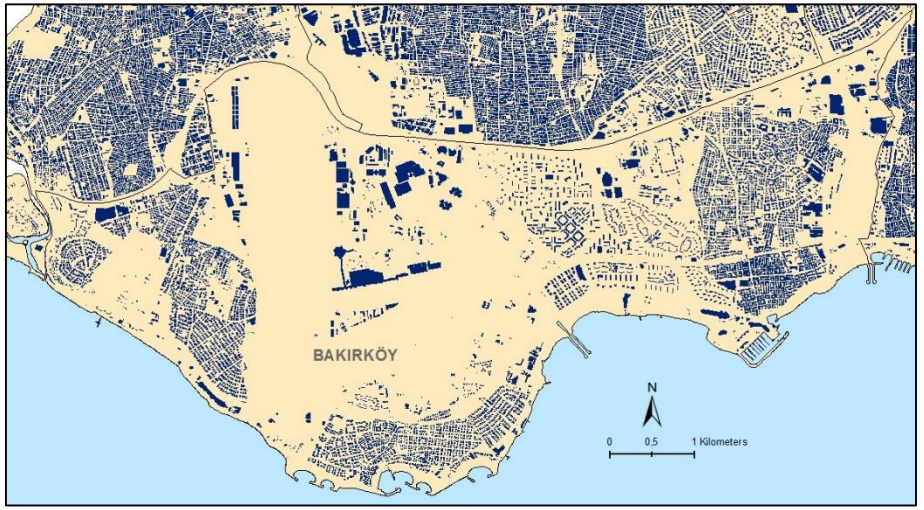




High re netrical data for 7-8 km offshore



Roads database



Buildings database

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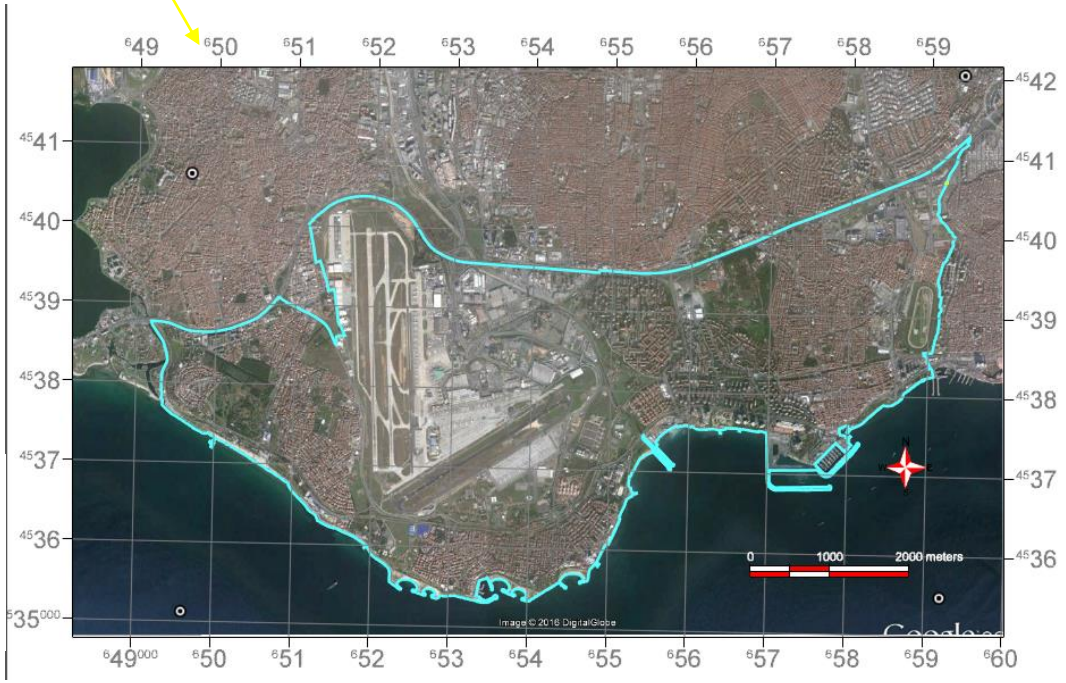
Example Application Area: Bakırköy district, İstanbul



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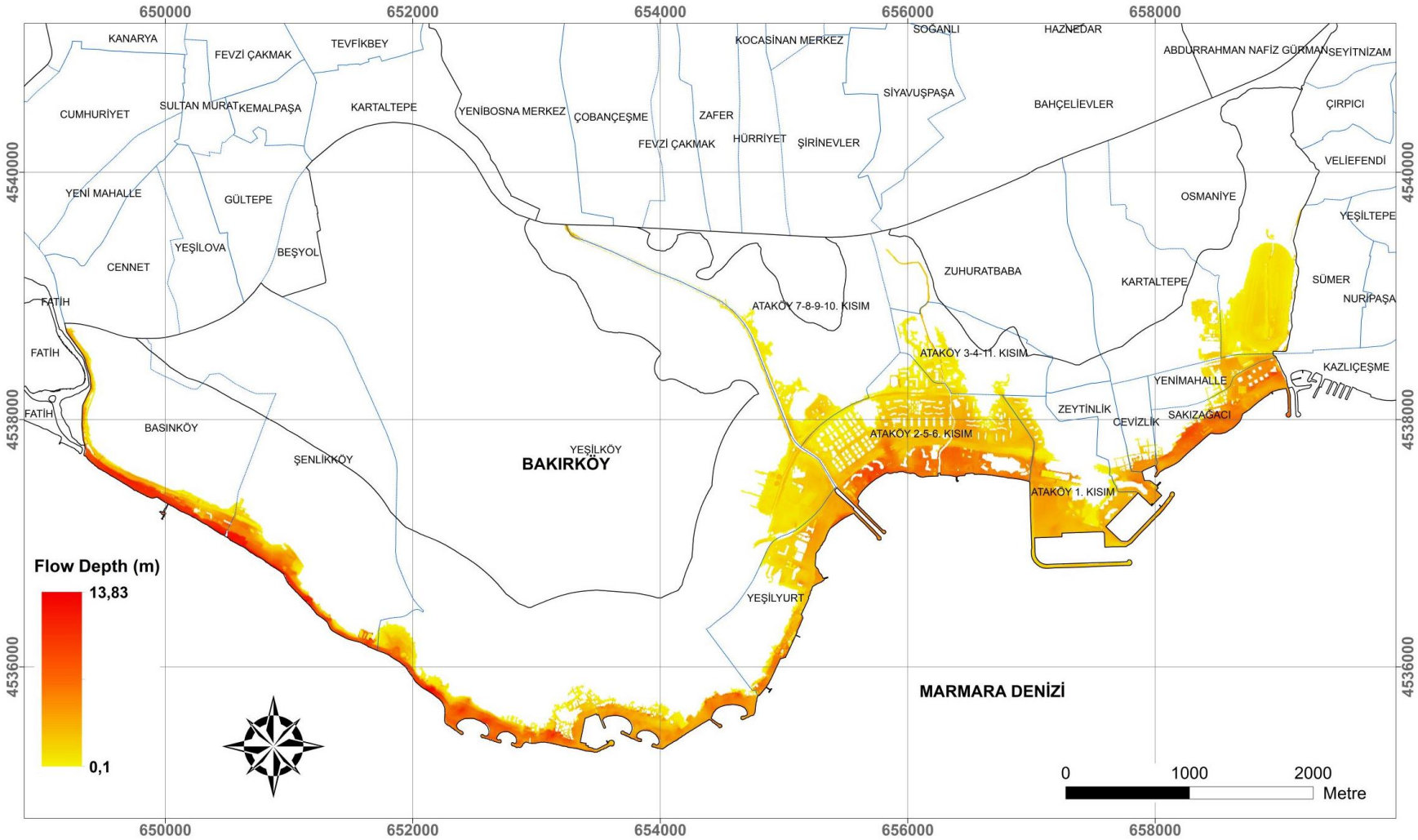
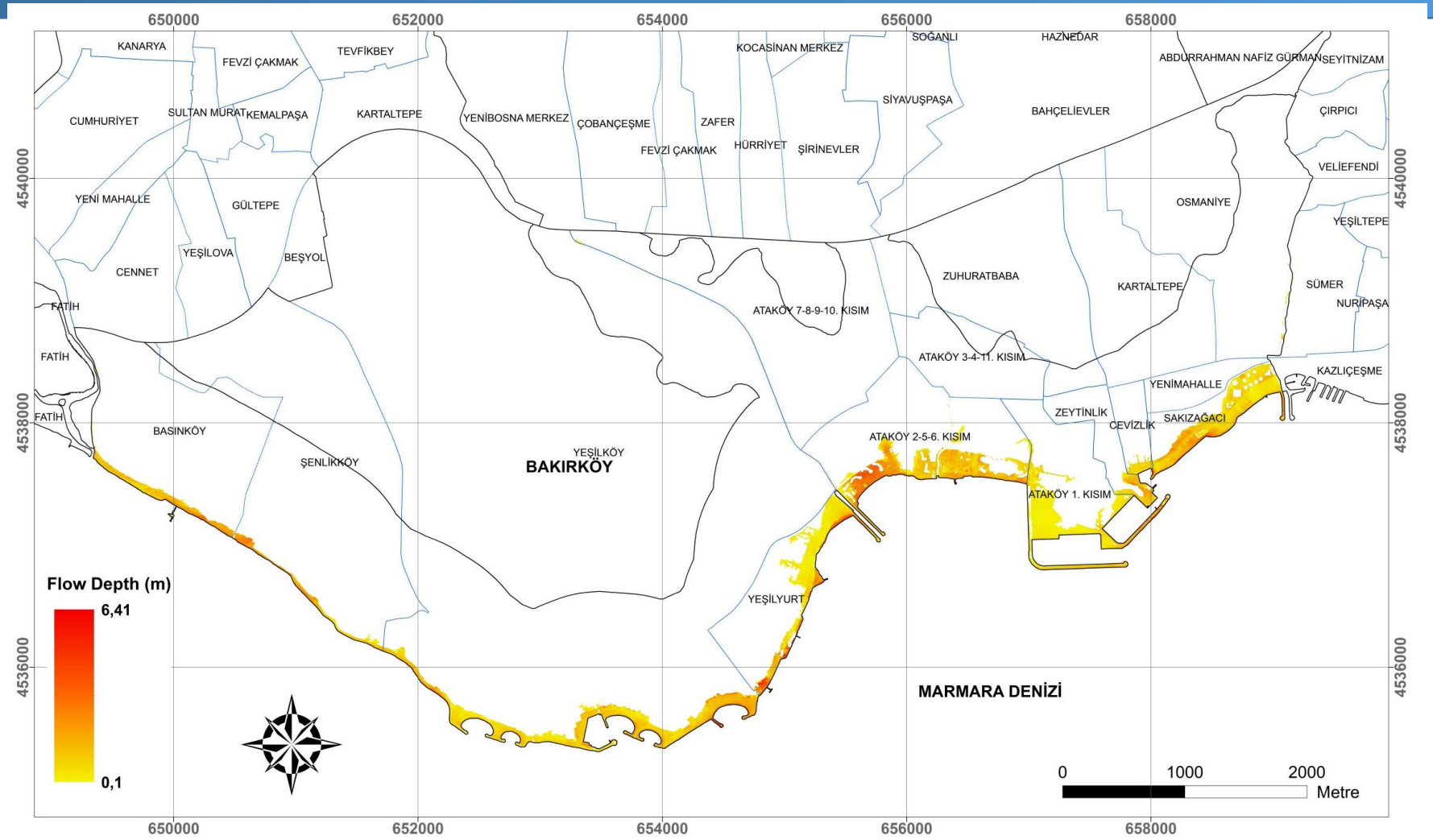
TSUNAMI HAZARD ANALYSIS – HAZARD MAP - LANDSLIDE SOURCE BAKIRKOY DISTRICT EXAMPLE



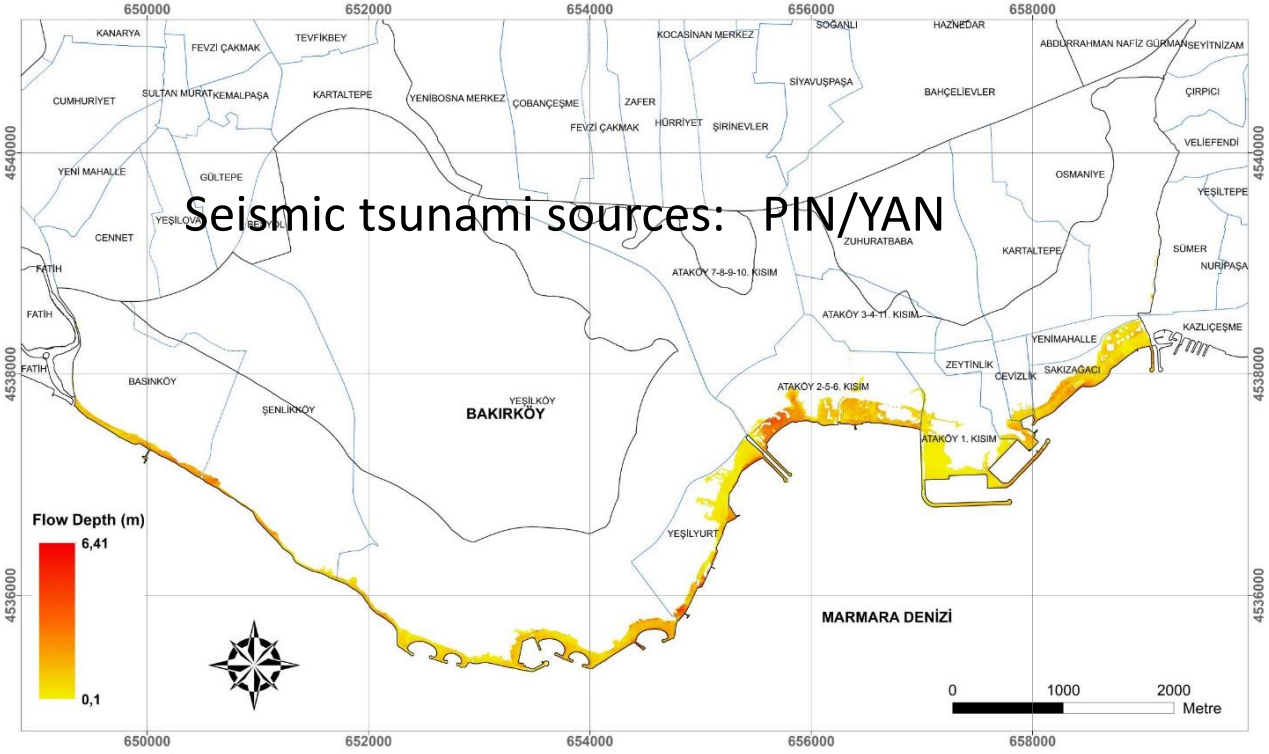
- Tsunami Source LSBC
- Maximum flow 13,80 meters
- Maximum inundation distance reached 1200 meters.

TSUNAMI HAZARD ANALYSIS – HAZARD MAP - SEISMIC SOURCES BAKIRKOY DISTRICT EXAMPLE

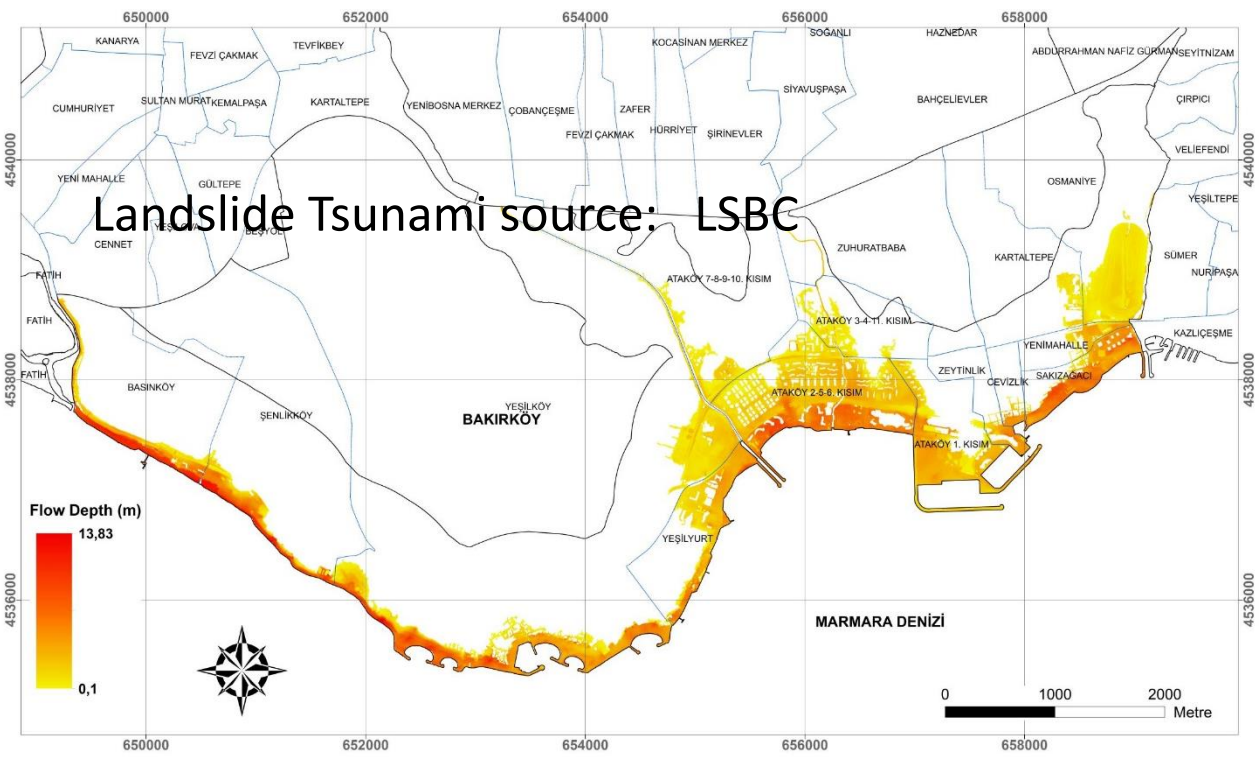


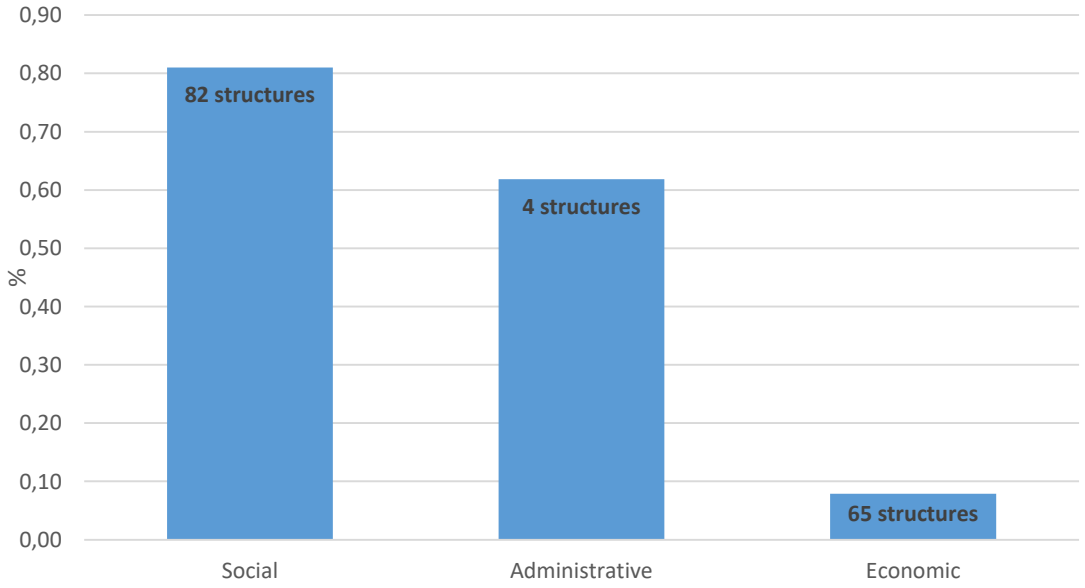
- Tsunami Source PIN/YAN
- Maximum flow depth 6.40 meters
- Maximum inundation distance reached 360 meters.

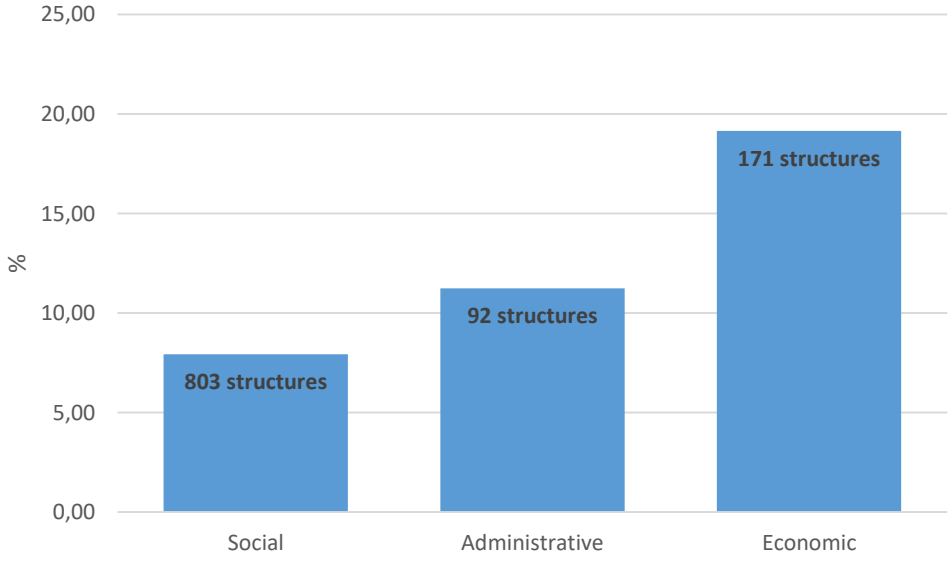
Seismic tsunami sources: PIN/YAN



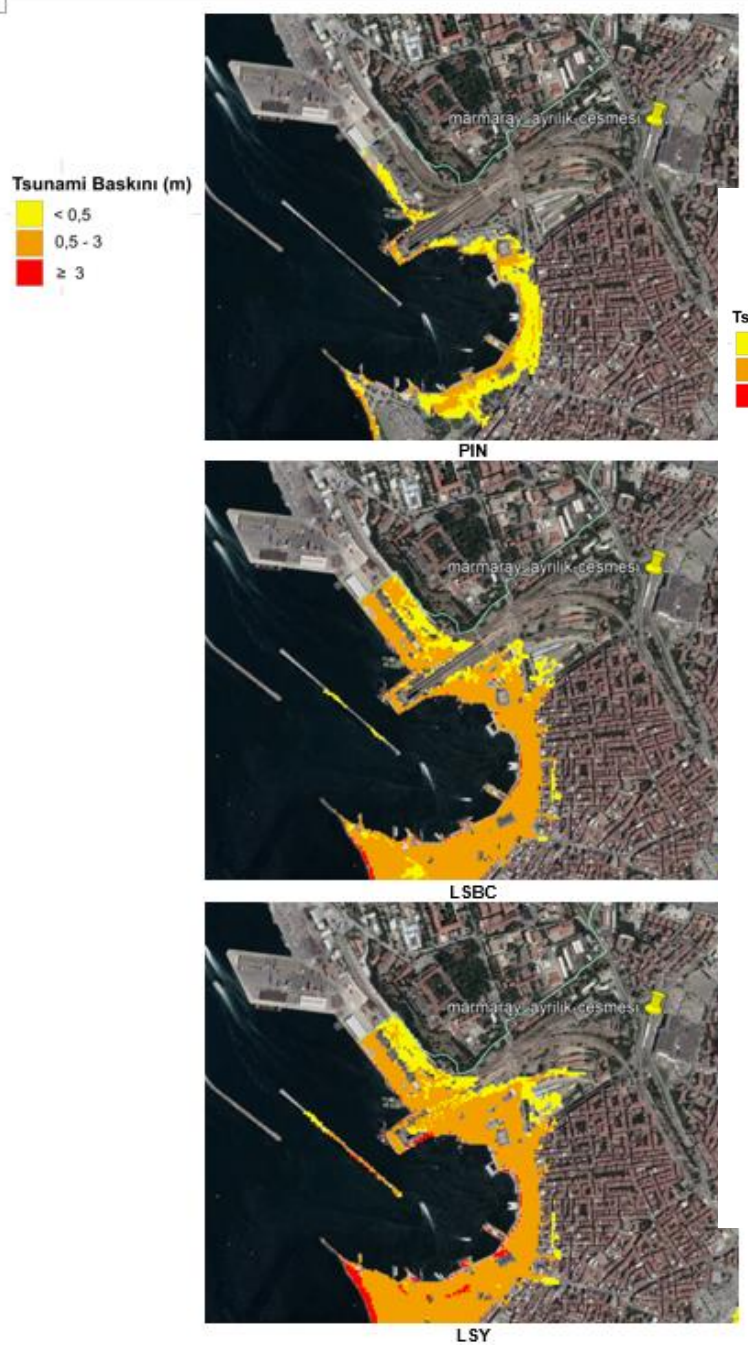
Landslide Tsunami source: LSBC



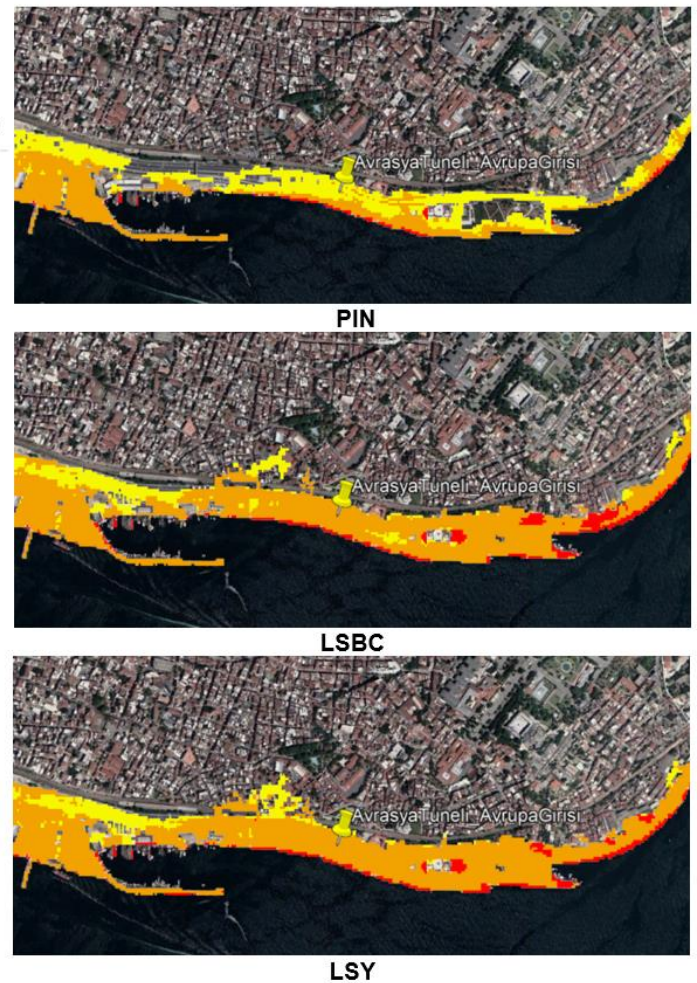




Şekil 10.6 Marmaray Üsküdar İstasyonu su baskını



Şekil 10.7 Marmaray Ayrılık Çeşmesi İstasyonu su baskını



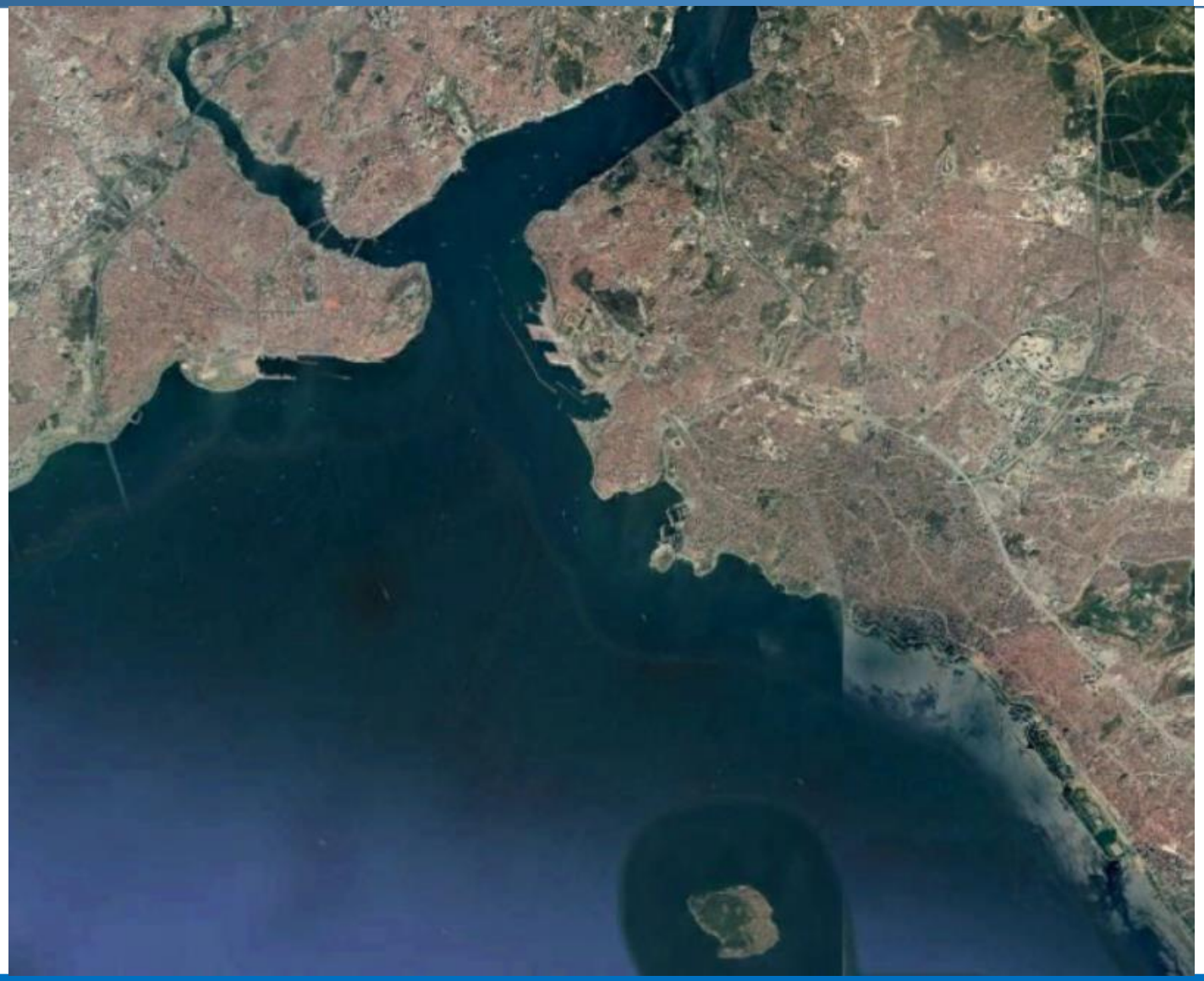
Şekil 10.8 Avrasya Tüneli Avrupa Girişi su baskını

Istanbul Metropolitan Municipality Tsunami Action Planning Project

İSTANBUL BÜYÜKŞEHİR BELEDİYESİ

METU

Structural Measures



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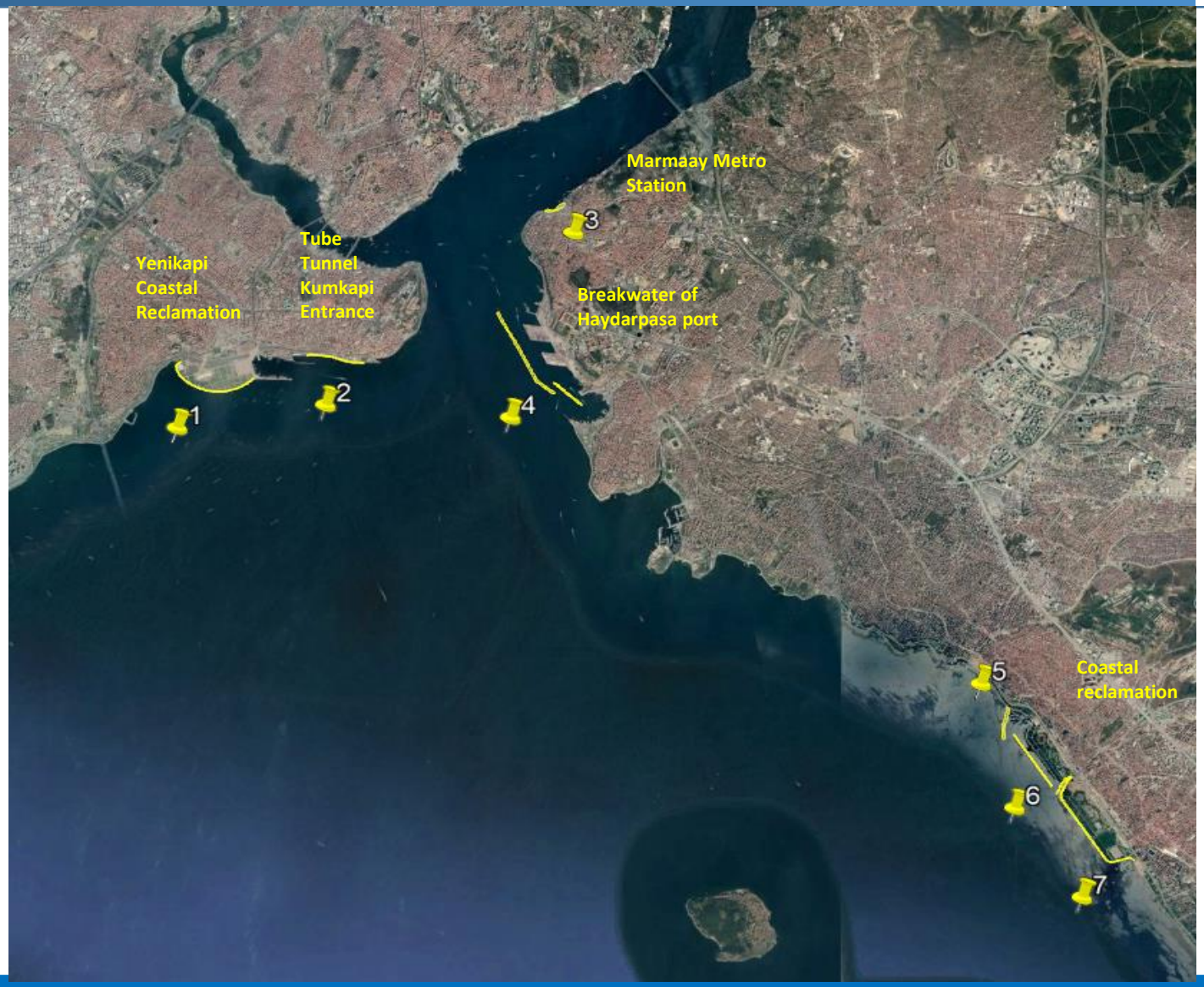
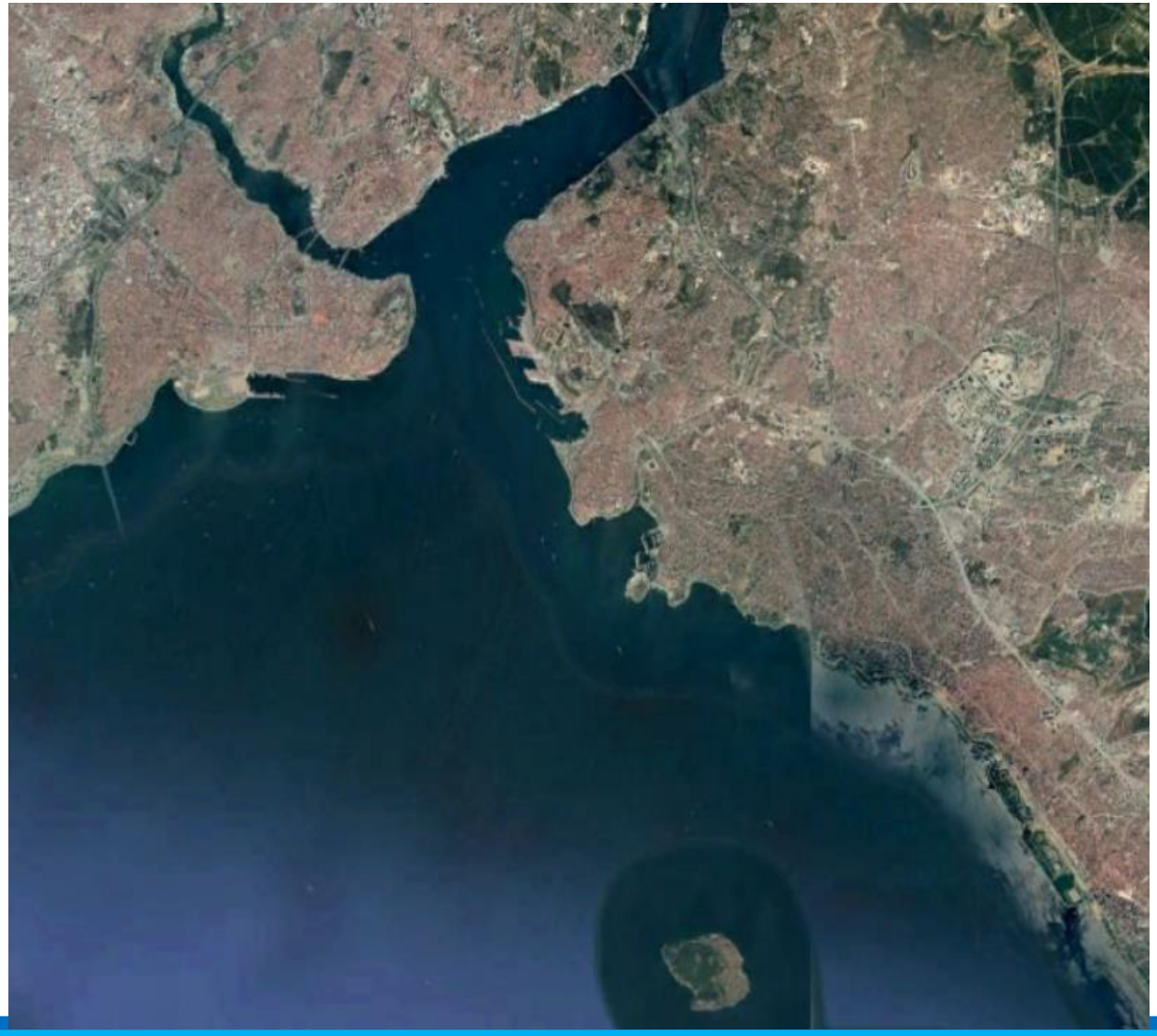
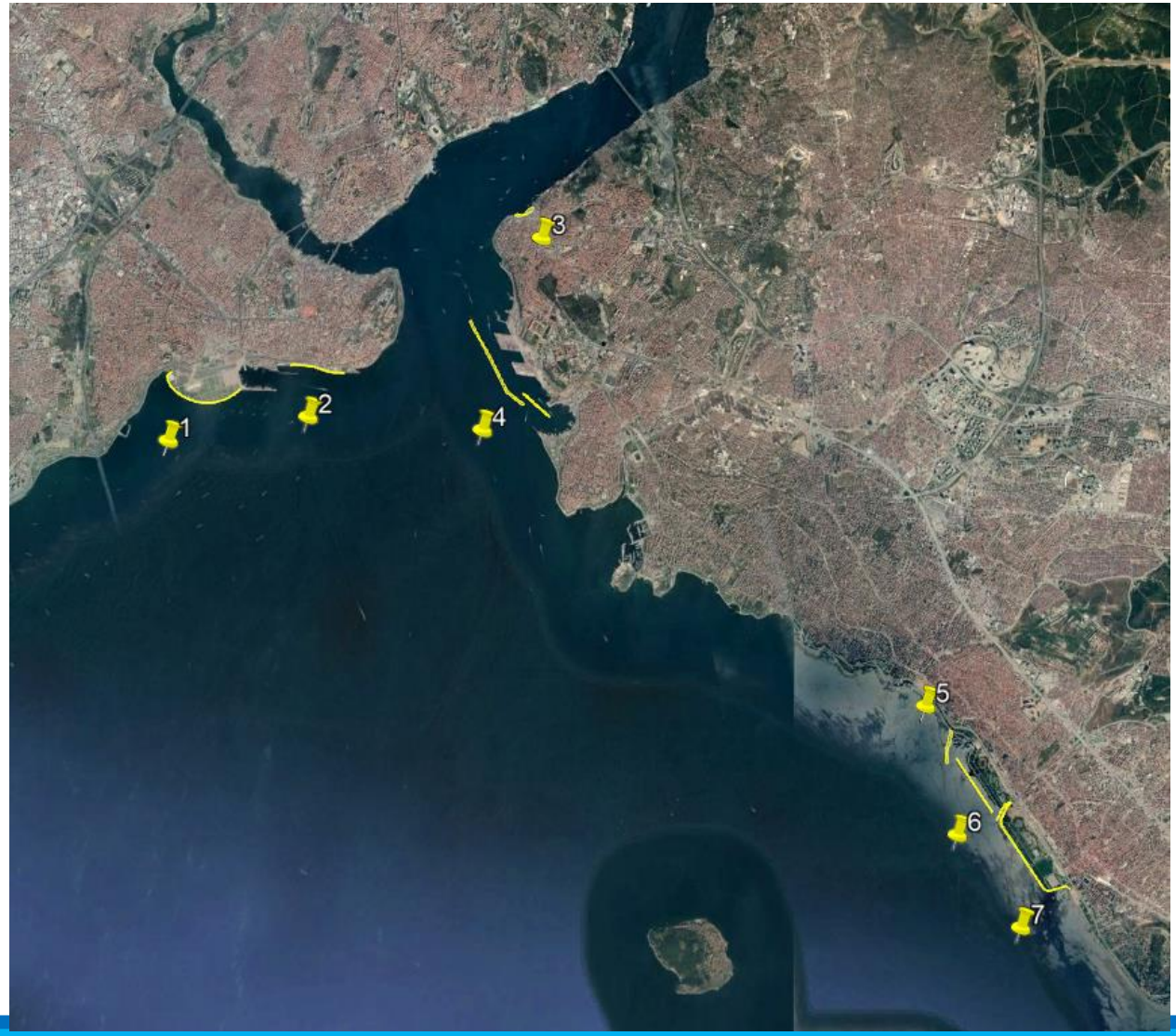


Structural Measures

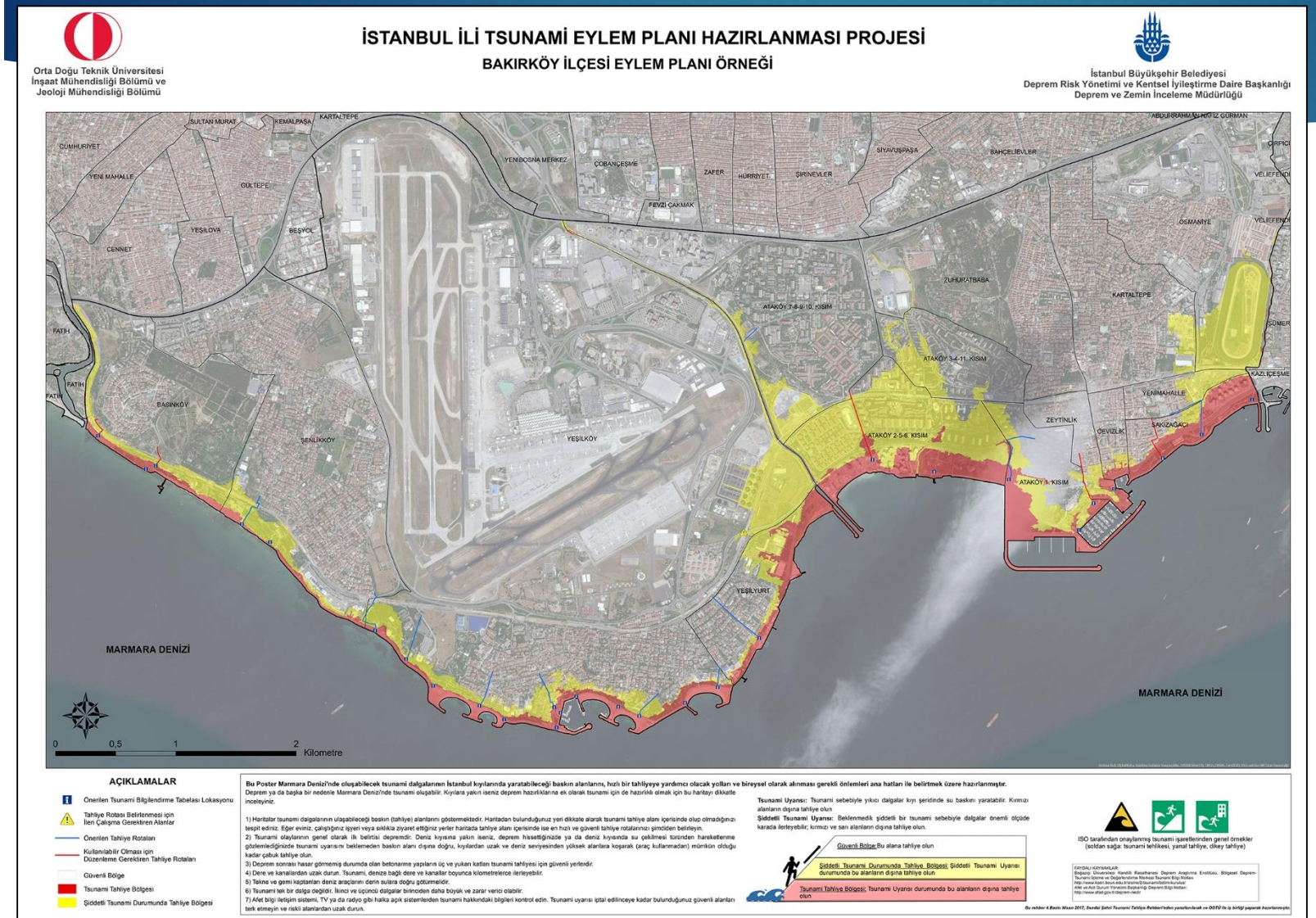




Non Structural Measures

- Conducting educational activities to increase tsunami awareness and preparedness
- By increasing tsunami awareness at personal level, increase of «n» parameter in MeTHuVA
- Evaluation of risk by change of parameter «n» MeTHuVA
- Planning and organization of regular Tsunami Drills with participation of stakeholders
- Preparation of «Tsunami Evacuation Guide»

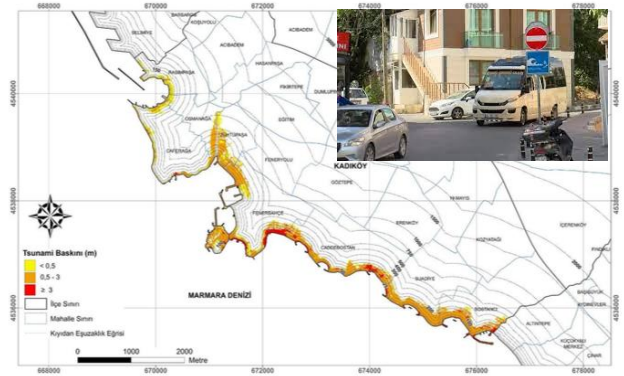
ISTANBUL METROPOLITAN MUNICIPALITY TSUNAMI ACTION PLAN – BAKIRKOY DISTRICT EXAMPLE

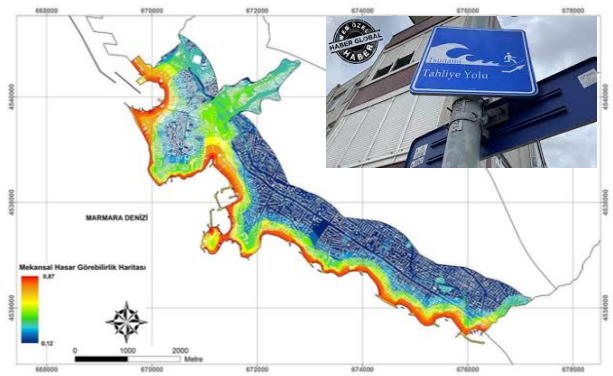


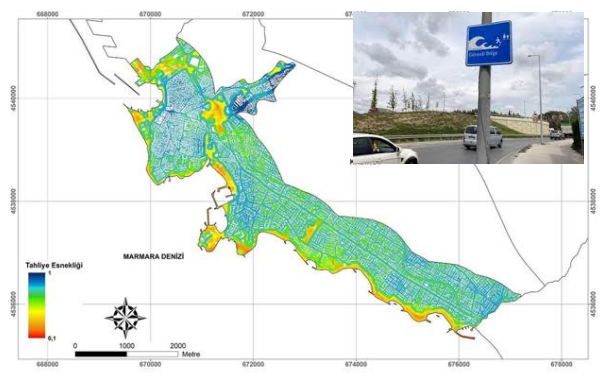
Hazard Zone Maps, Warning Signs and Evacuation Routes for 17 Districts of Istanbul

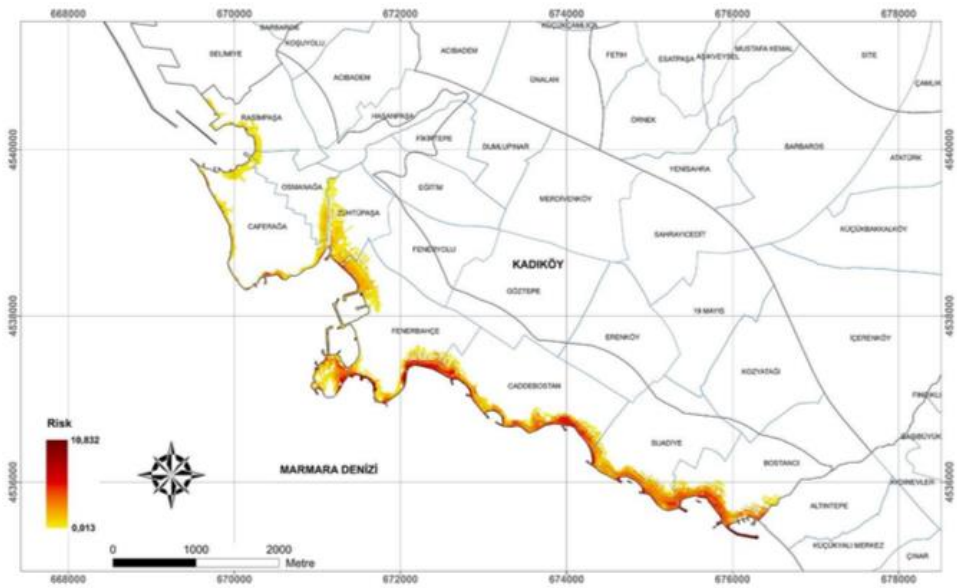
ISTANBUL METROPOLITAN MUNICIPALITY
TSUNAMI ACTION PLAN – BUYUKCEKMECE DISTRICT EXAMPLE
EVACUATION SIGNS

Progress in Istanbul



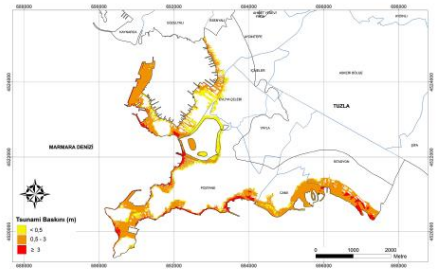






İSTANBUL İLİ MARMARA KIYILARI
TSUNAMİ MODELLEME, HASAR
GÖREBİLİRLİK VE TEHLİKE ANALİZİ
GÜNCELLEME PROJESİ
SONUÇ RAPORU

2018



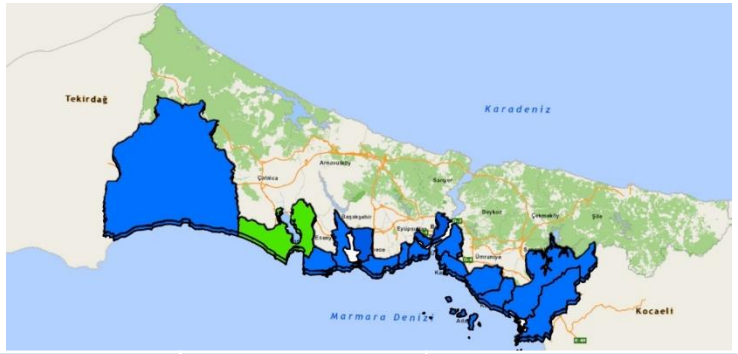
İSTANBUL BÜYÜKŞEHİR BELEDİYESİ

ORTA DOĞU TEKNİK ÜNİVERSİTESİ

ODTÜ METU

https://depremzemin.ibb.istanbul/guncelcalismalarimiz/#stanbul-tsunam-eylem-plani
https://depremzemin.ibb.istanbul/guncelcalismalarimiz/#le-tsunam-blg-ktapiklari

Progress in Istanbul



DISTRICT	NUMBER OF EVACUATION ROUTES	NUMBER OF INFORMATION PANELS	NUMBER OF SECURE AREA SIGNS	NUMBER OF EVACUATION ROUTE SIGNS
ADALAR	24	26	24	37
AVCILAR	8	14	8	6
BAKIRKÖY	14	17	14	32
BEŞİKTAŞ	8	18	8	17
BEYLİKDÜZÜ	10	11	10	15
BEYOĞLU	12	16	12	24
FATİH	15	37	15	36
KADIKÖY	22	27	22	35
KARTAL	8	5	8	19
KÜÇÜKÇEKMECE	2	15	2	5
MALTEPE	6	9	6	9
PENDİK	6	12	6	13
SİLİVRİ	33	50	35	55
TUZLA	12	11	12	27
ÜSKÜDAR	9	14	9	18
ZEYTİNBURNU	3	6	3	9

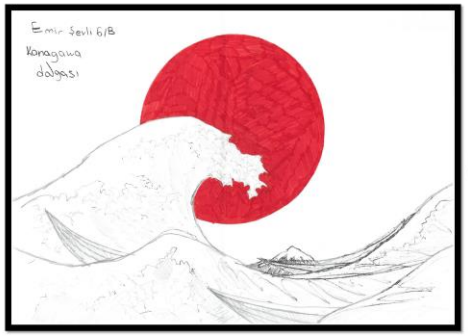
Progress in Istanbul

World Tsunami Awareness Day (5 November 2021)

KANDILLI OBSERVATORY AND EARTHQUAKE RESEARCH INSTITUTE 1868

Ömer DEMİRCİ

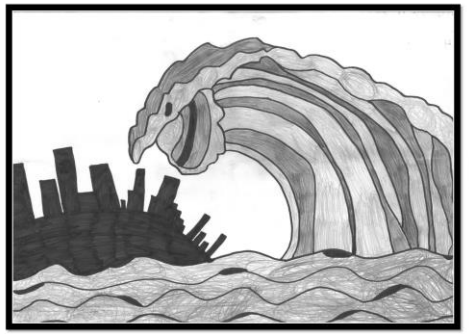
Mehmet Eren SONGÜN



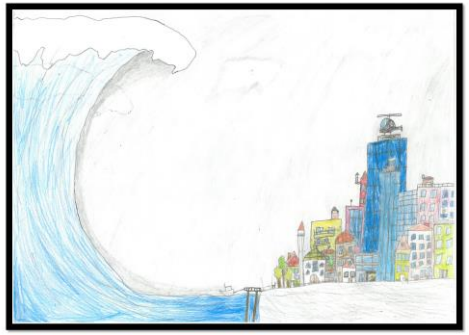
Emir ŞEVLİ

Furkan TOPÇU

Furkan TOPÇU



Beril Azra ATÇI



Halit Kerem TUNÇAZ

Ali Hakan HURŞİTOĞLU

Ayşe Naz TANGÜLER

THANKS FOR YOUR KIND ATTENTION!