Boğaziçi University
Kandilli Observatory and Earthquake Research Institute

RETMC

KOERI

Regional Earthquake-Tsunami Monitoring Center

Overview of TSP / NTWC Operations

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KOERI-RETMC Tsunami Working Group Co-Coordinator

with the contributions of Dr. Öcal Necmioğlu
Tsunami National Contact of Turkey

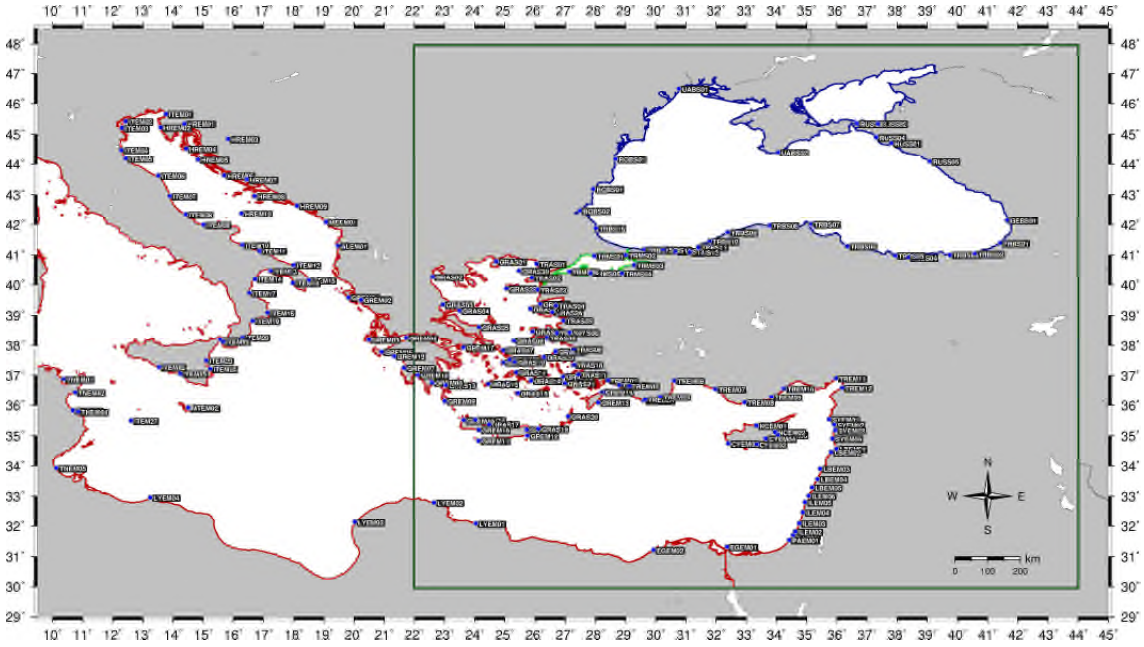
Mission of RETMC

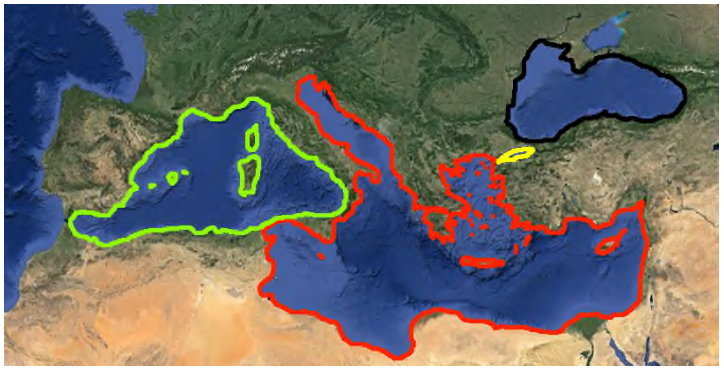
RETMC

- Establishment and operation of earthquake stations across Turkey,
- Determination of earthquake parameters immediately after the event and distribution of this information towards related institutions in 7/24,
- Development of seismic network regarding to the latest technological progress,
- Evaluating the earthquakes happened in observation area according to their tsunami potentials and disseminating tsunami alert messages to the subscribers, if necessary.
- Preparation of tsunami scenario database along the coasts of Turkey.

Present Status

TSP-TR is operational since 1 July 2012 and has been accredited by ICG/NEAMTWS in 2016.





SUBSCRIBERS:

NIOF (EGYPT)
CENALT (FRANCE)
NOA (GREECE)
PMO (ISRAEL)
INGV (ITALY)
NCGR (LEBANON)
IPMA (PORTUGAL)
NIEP (ROMANIA)
TYPHOON (RUSSIAN FEDERATION)
DGPCE (SPAIN)
CCS (UNITED KINGDOM)
ERCC (EU)
IOC Secretariat

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.

KOERI Daily Operational Set-Up

CTSP-TR Duty Shifts	Working Days	Weekends and Holidays
08:30 - 17:30	Duty Officer Stand-by Officer Back-up Officer	Duty Officer Back-up Officer
17:30 - 01:00	Duty Officer Back-up Officer	Duty Officer Back-up Officer
01:00 - 08:30	Duty Officer Back-up Officer	Duty Officer Back-up Officer

- Day Shift (8:30-17:30) and Two Night Shift (17:30-01:00 and 01:00-08:30)
- One duty officer per day (8h) and night shifts (16 hours)
- One stand-by Duty Officer per day shift
- One back-up duty officer per day and night shift
- Total number of Duty Officers: 16 – 7 of them is assigned to the Back-up Team in addition.

➢ In total, 3 Duty Officers per day shift and 2 Duty Officers per night shift available

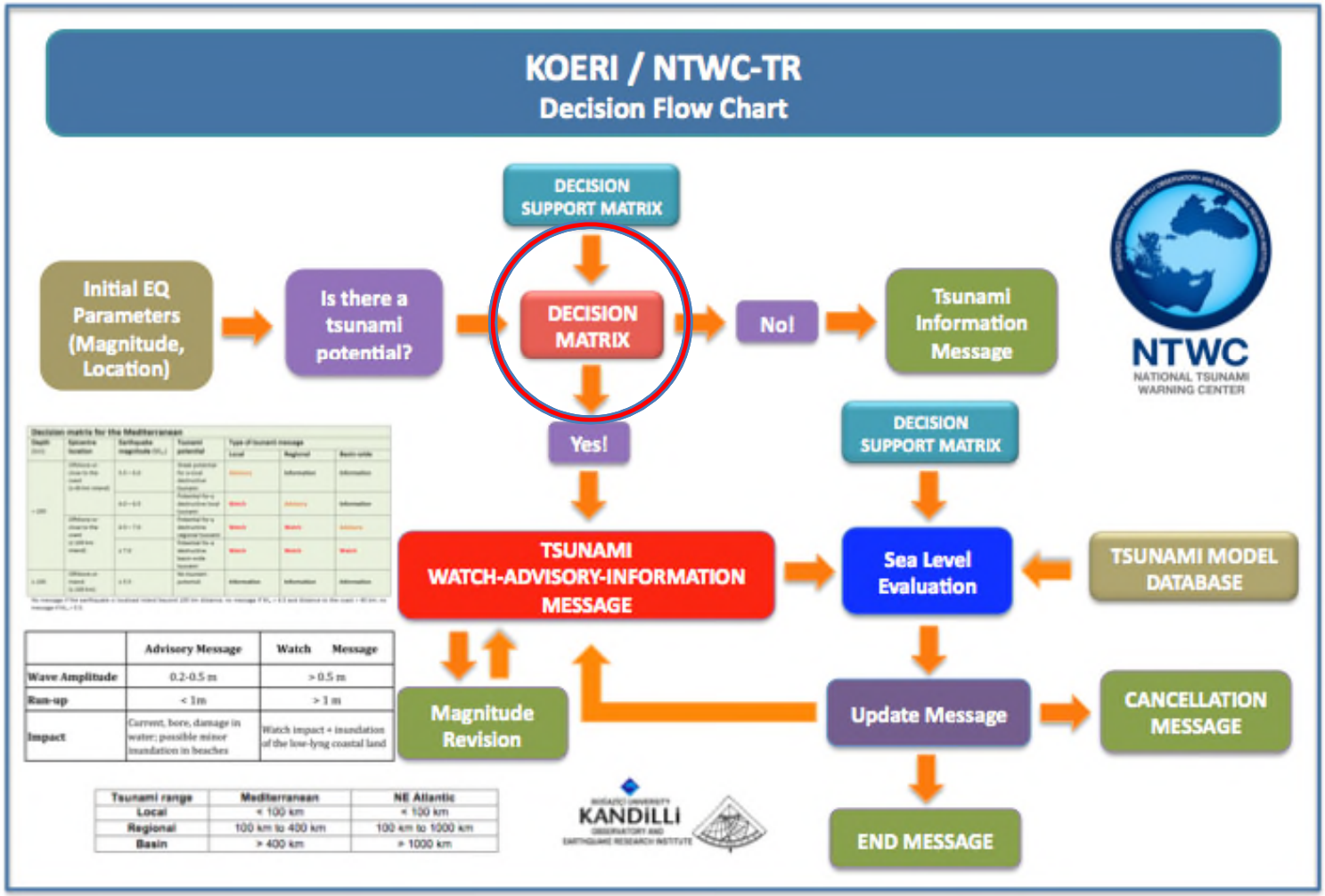
New Operations Building of RETMC






The newly established Operations Building has the Leed (Leadership in Energy and Environmental Design) Certificate and is recognized as a "Green Building" with approximately %39 less energy consumption in comparison to the old operational building. The new Operations Building is also capable of making use of solar energy supplied with 64 100Amh batteries providing Operations Room with 80 kW energy.

Concepts of Operations – Decision Support System



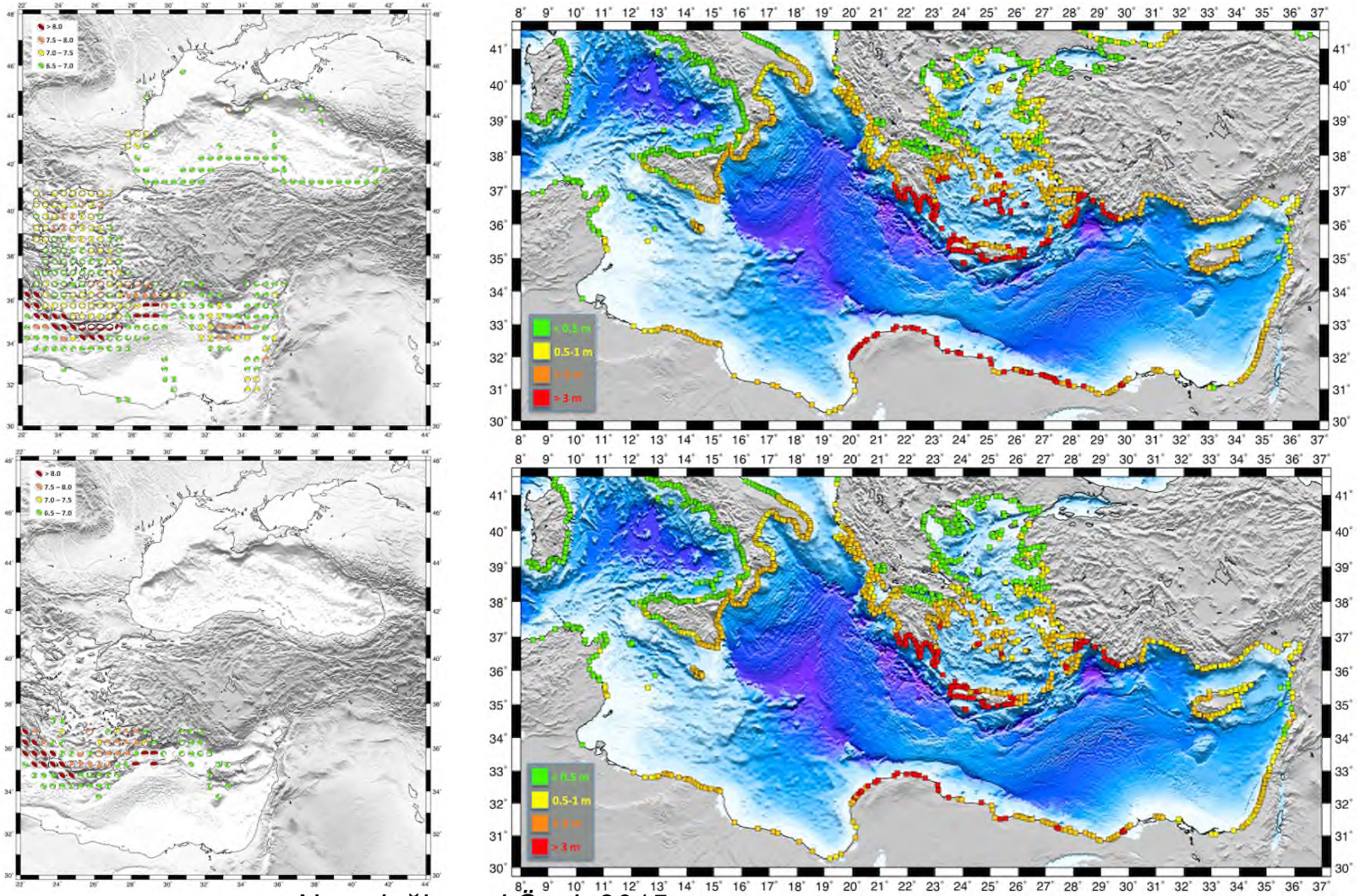
KOERI Decision Matrix

CTSP-TR (KOERI)						
Decision Matrix for the Eastern Mediterranean, Aegean and Black Seas						
Depth (km)	Epicentre Location	Earthquake Magnitude	Tsunami Potential	Type of Tsunami Message		
				Local	Regional	Basin-wide
				< 100 km	≥100 - ≤400	> 400
< 100	Offshore or close to the coast (≤ 40 km inland)	5.5 ≤ Mw < 6.0	Low tsunami potential	Information	Information	Information
		6.0 ≤ Mw < 6.5	Tsunami potential	Advisory	Information	Information
	Offshore or close to the coast (≤ 100 km inland)	6.5 ≤ Mw < 7.0	Potential for a destructive tsunami	Watch	Advisory	Information
		7.0 ≤ Mw < 7.5	Potential for a destructive tsunami	Watch	Watch	Advisory
		Mw ≥ 7.5	Potential for a destructive tsunami	Watch	Watch	Watch
≥ 100	offshore or inland (≤ 100 km)	Mw ≥ 5.5	Low tsunami potential	Information	Information	Information

NEAMTWS Decision Support Matrix		
Alert Level	Advisory	Watch
Wave Amplitude	0.2-0.5 m	> 0.5 m
Run-up	< 1m	> 1 m
Impact	Current, bore, damage in water; possible minor inundation in beaches	Watch impact + inundation of the low-lying coastal land

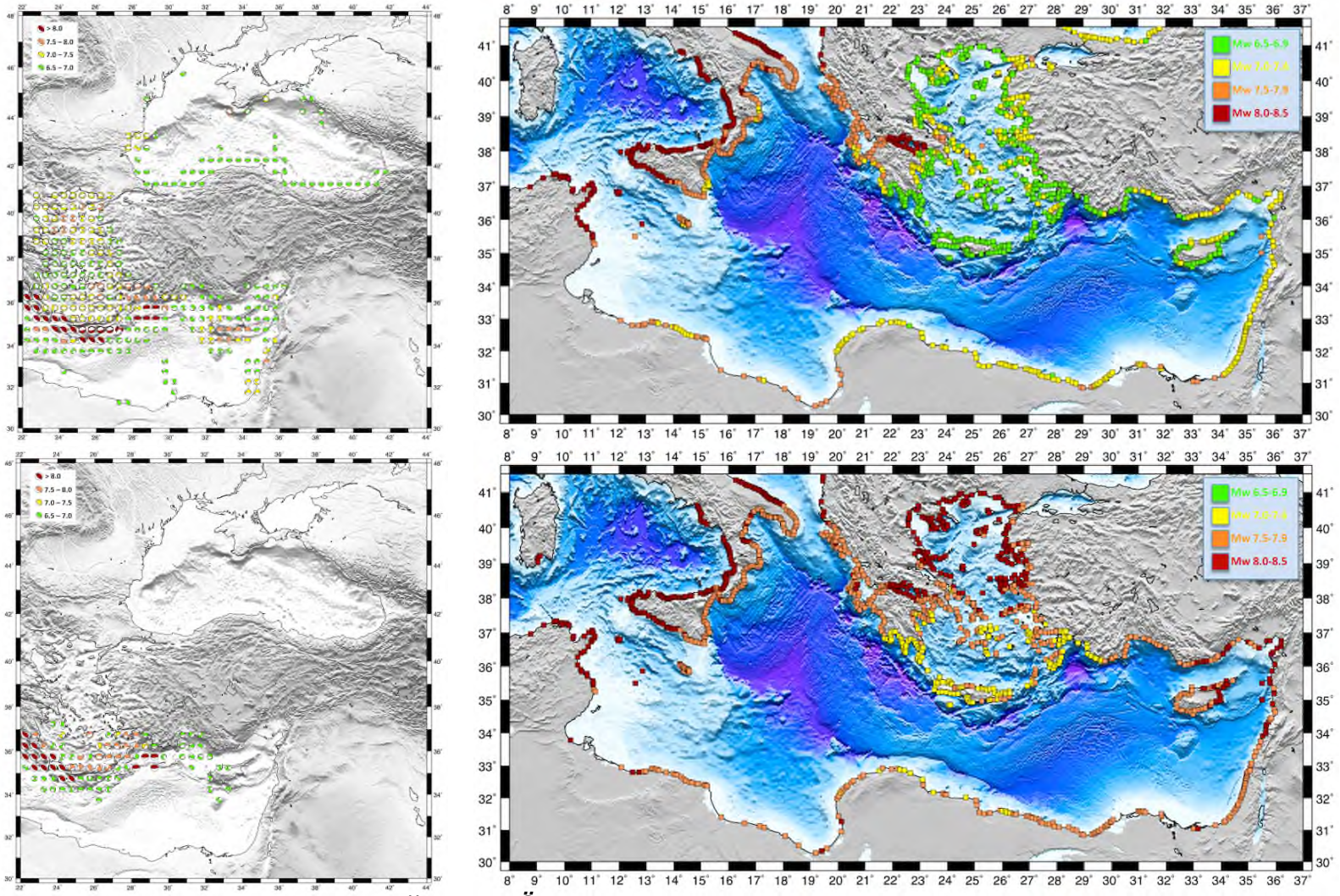
Other messages used in the operational context, such as (Regular) Communication Test and Tsunami Exercise Messages are not shown here.

Tsunami Wave Heights in Eastern Mediterranean



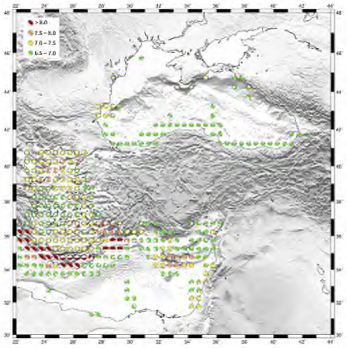
Necmioğlu and Özel, 2015

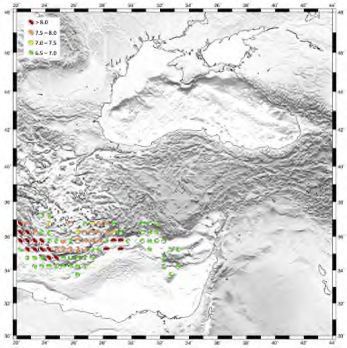
Minimum Mw for 50 cm coastal wave-height

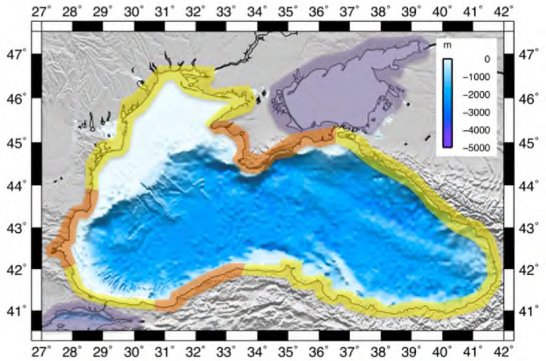


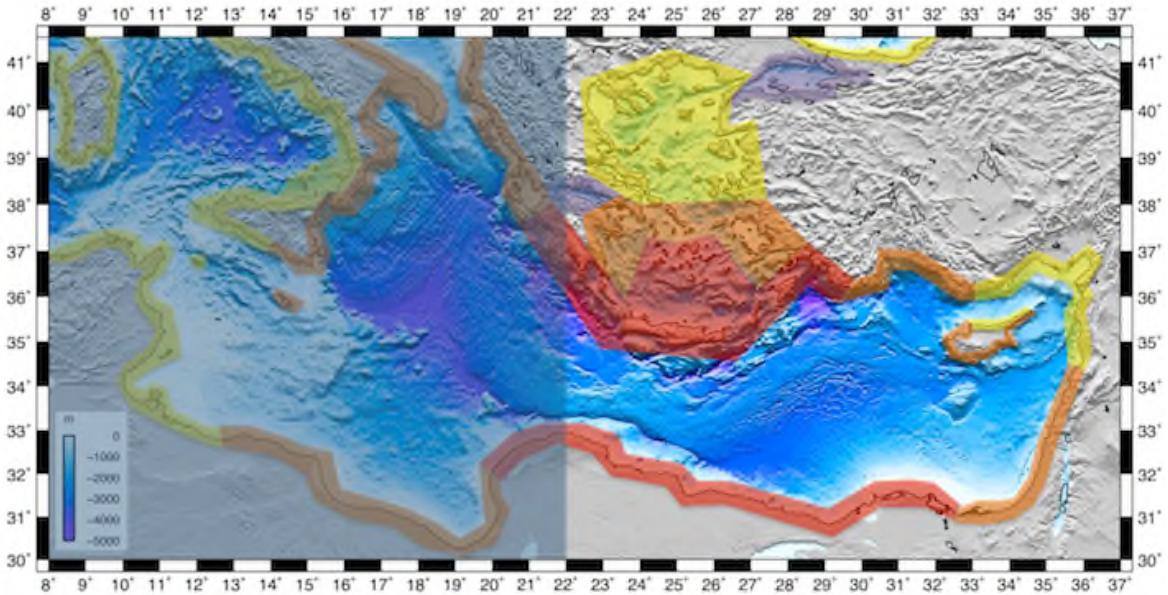
Necmioğlu and Özel, 2015

Simplified Maximum Wave Height Zonation Maps







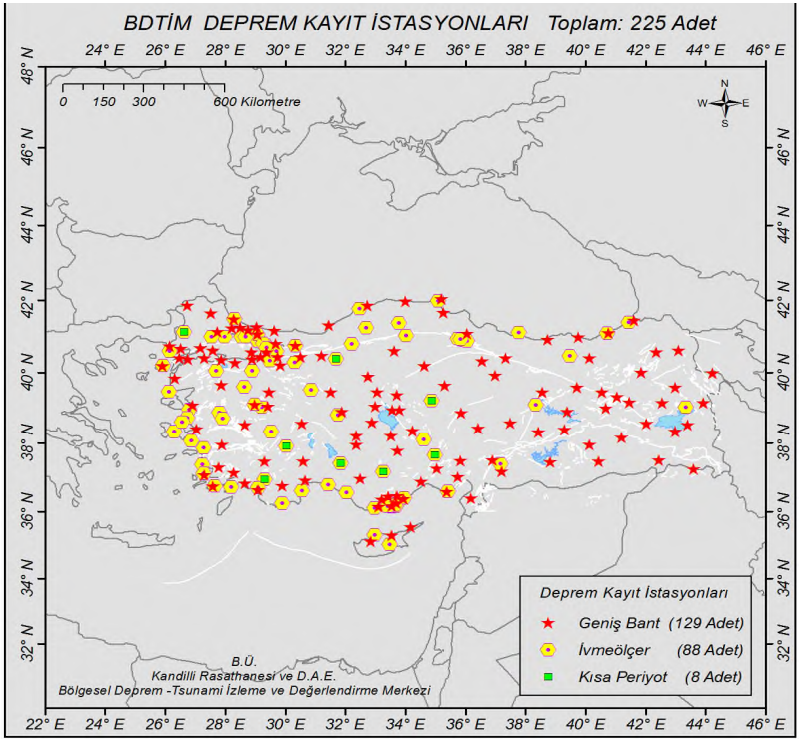


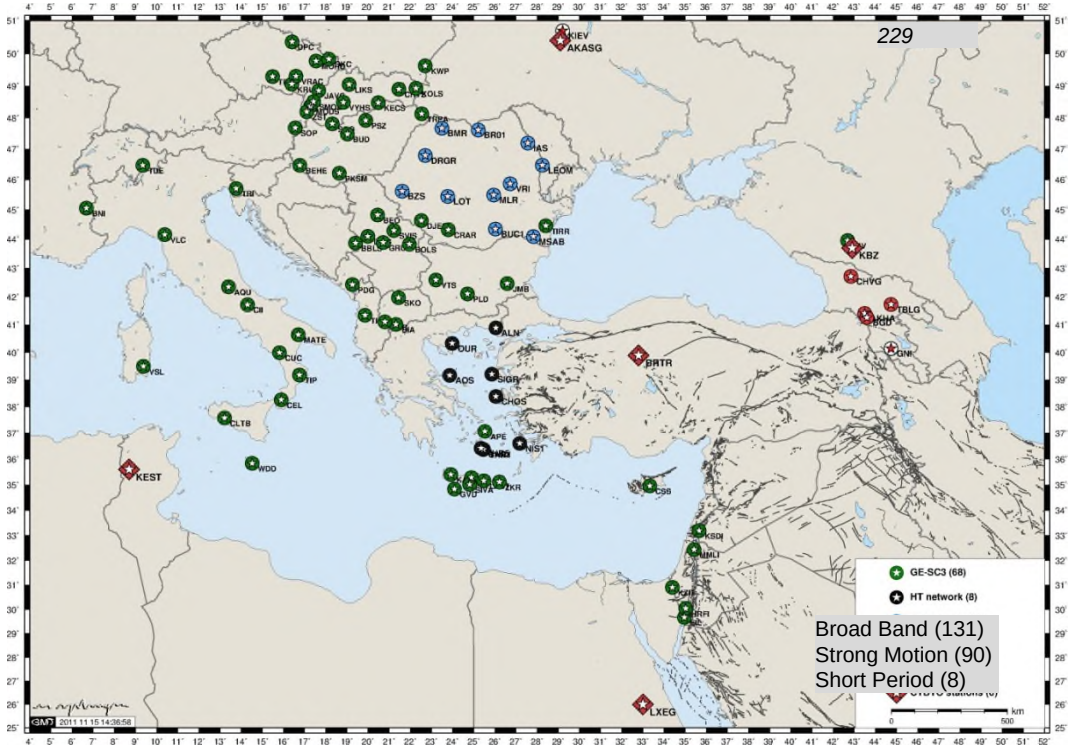
L	$H_w < 1m$
C	$1m < H_w < 3m$
H	$H_w > 3m$

Valid only for the sources defined in this study excluding any submarine landslide

Necmioğlu and Özel, 2015

Seismic Monitoring





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NTWC-TR network comprises 131 BB and 90 strong motion and 8 short period sensors. The global coverage include stations from CTBTO, GFZ and various others through bilateral agreements.

Sea Level Monitoring

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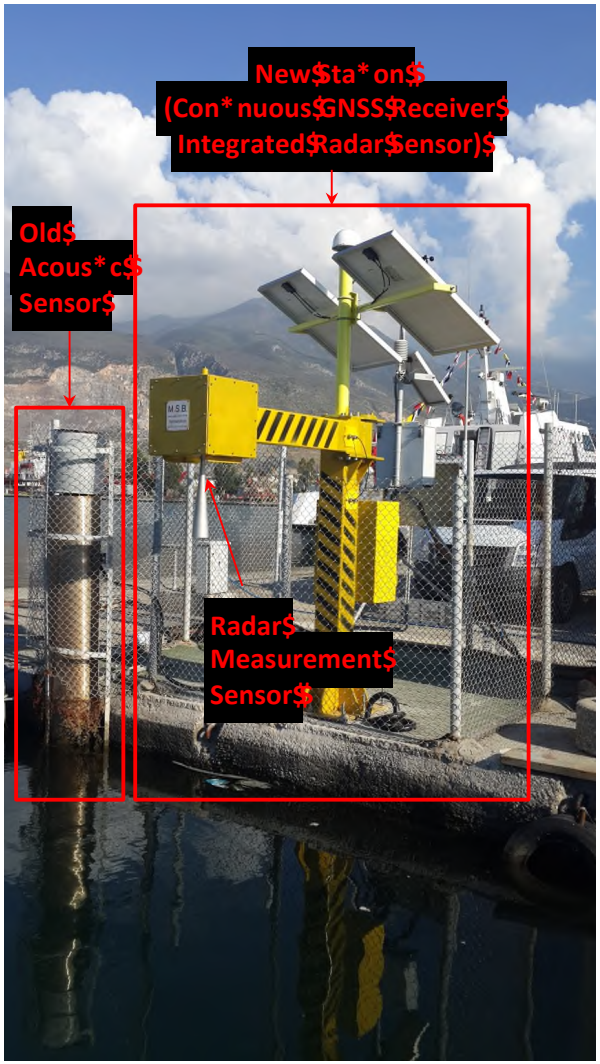
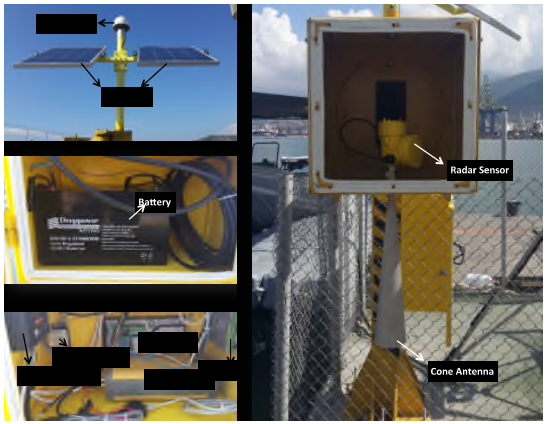
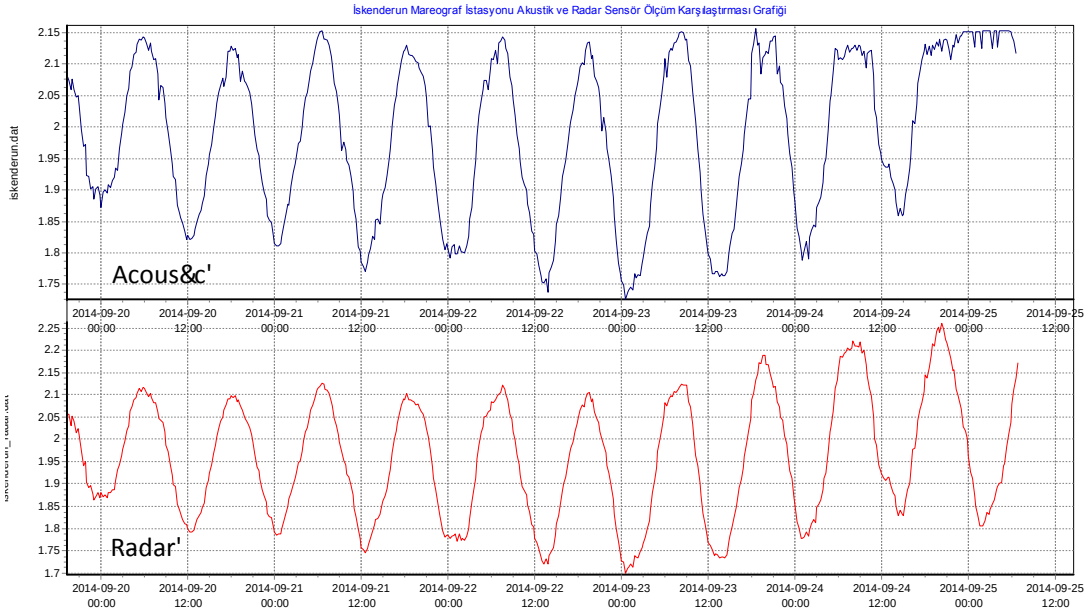
General Command of Mapping (GCM) is responsible for the operation of the tide-gauge network (19 stations). Currently 7 tide gauge stations are transmitting data via satellite to KOERI. Integration of the whole network to NTWC-TR is on-hold due to procedural issues and GCM's plans to upgrade whole network with radar type tide-gauges. 2 IDSLs donated by JRC have been installed in Fethiye and Bozcaada.

Deployment of Radar Type TGs by GCM

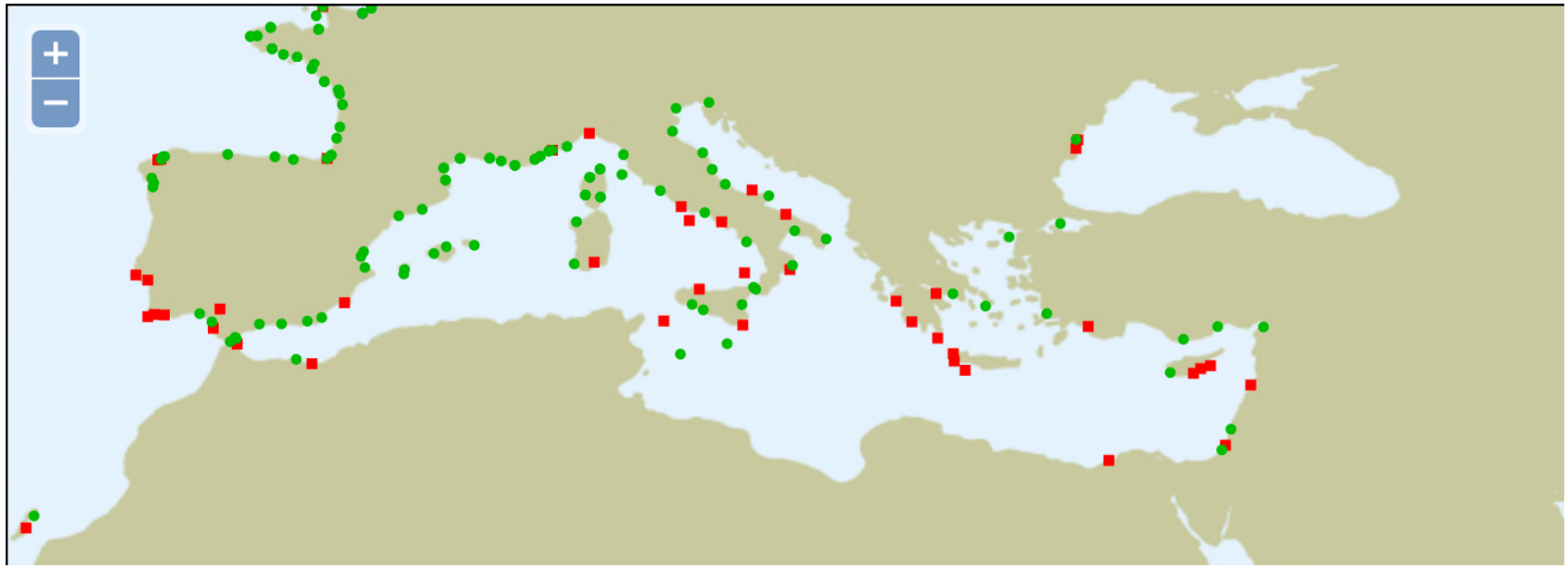




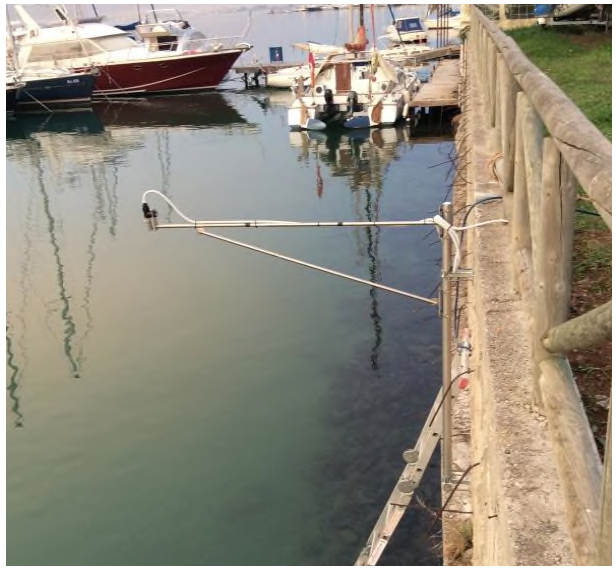


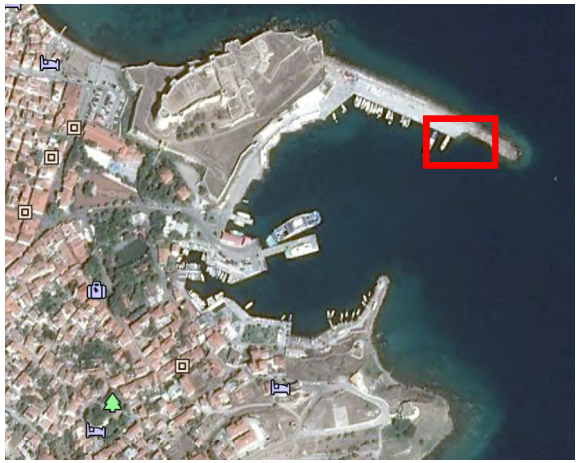
GCM Sea-Level Data Available to IOC

Code	GLOSS ID	Country	Location	Connection	DCP ID	Last observation Level	Last observation Time in GMT	Delay	Transmit Interval	View
maer		Turkey	Marmara Ereglisi	ftp		1.39	16:24	11'	2'	[open]
bodr		Turkey	Bodrum	ftp		1.15	16:24	12'	2'	[open]
feth		Turkey	Fethiye	bgan	FETH	1.31	16:15	21'	1'	[open]
iske		Turkey	Iskenderun	ftp		1.74	16:24	11'	2'	[open]
erdem		Turkey	Erdemli	ftp		1.34	16:24	11'	2'	[open]
bozy		Turkey	Bozyazi	ftp		1.16	16:24	11'	2'	[open]
gokc		Turkey	Gokceada	ftp		1.11	16:24	11'	2'	[open]
sino		Turkey	Sinop	ftp		1.49	-down-	11'	2'	[open]

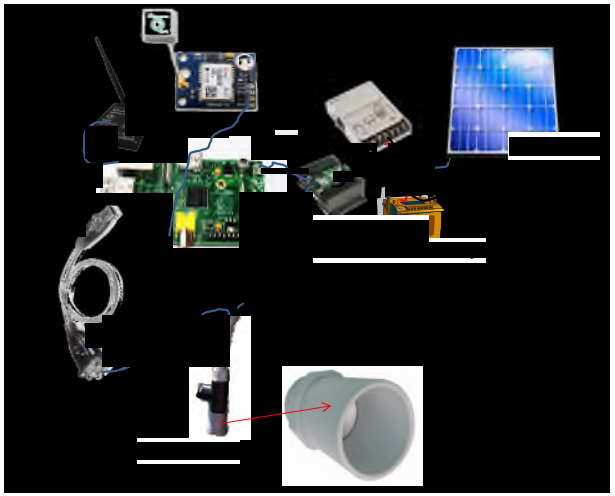


JRC-IDSL



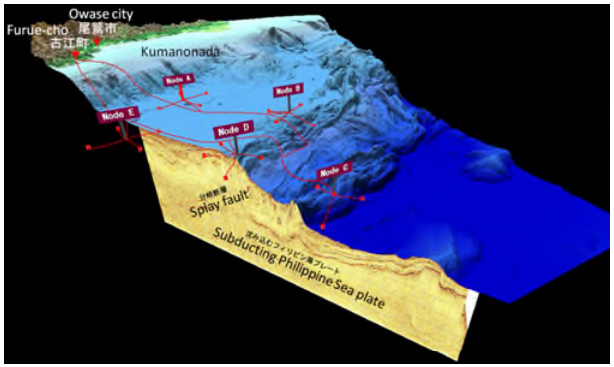


Bozcaada, Canakkale

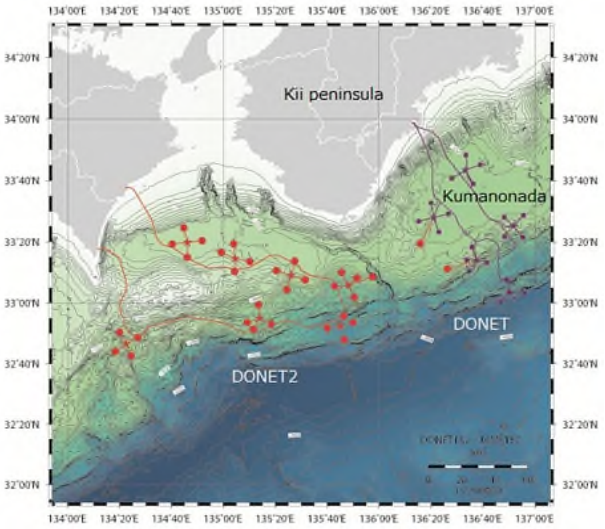


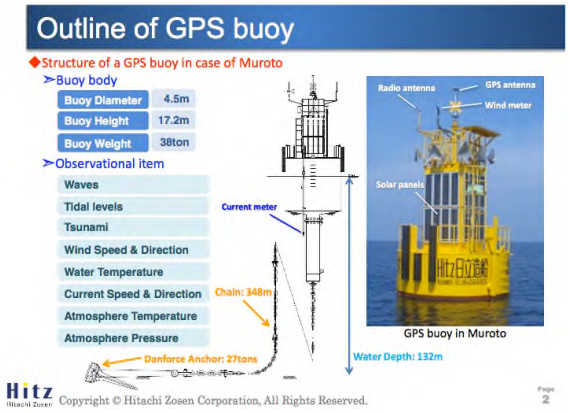
There is a strong need to improve the NEAMTWS by deploying sea-bottom and/or offshore observation systems.

NOAA DART

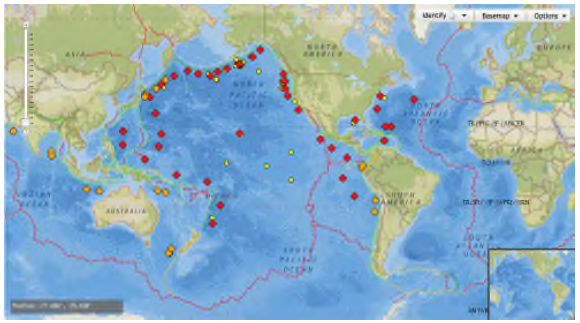


Japan DONET Example

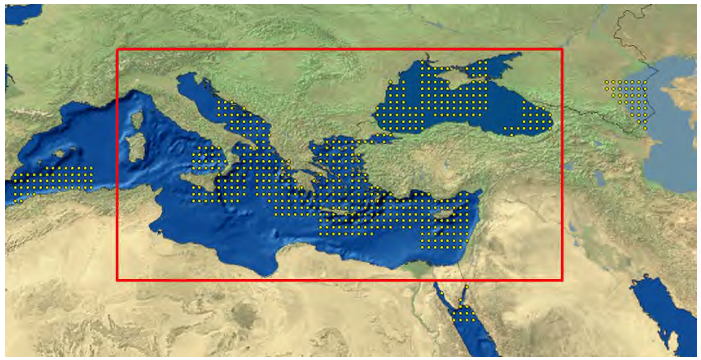


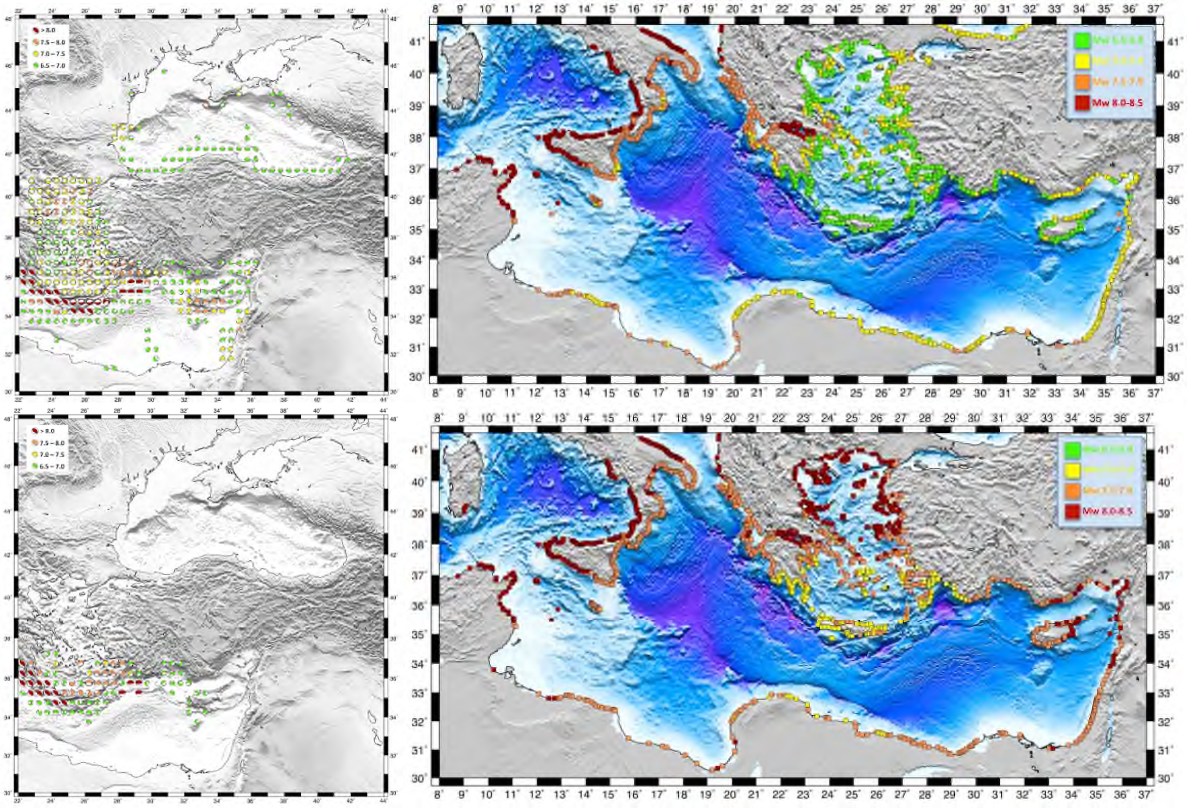


Japan Tsunameter



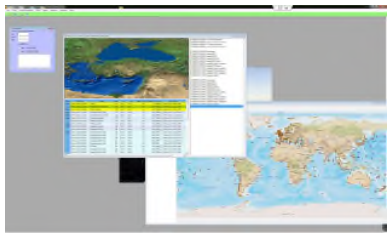
EC-JRC Collaboration / TAT and SDBs

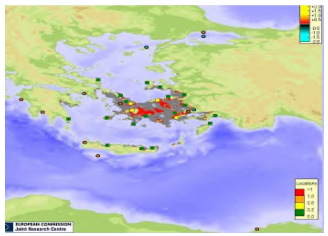


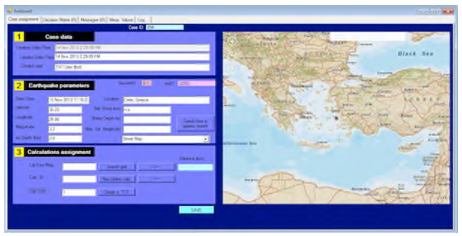


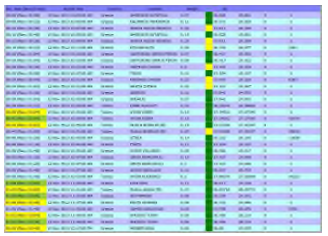
MOD1&MOD2
… available in operations …

MOD2-TR
… developed and available in operations …









TsuComp
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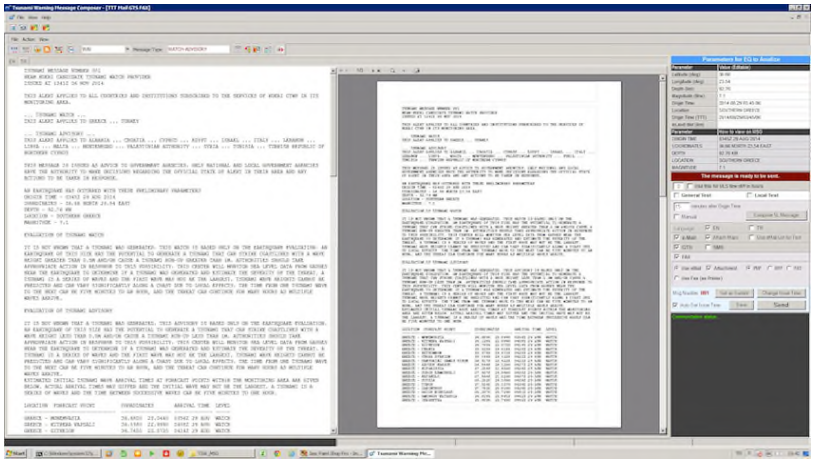
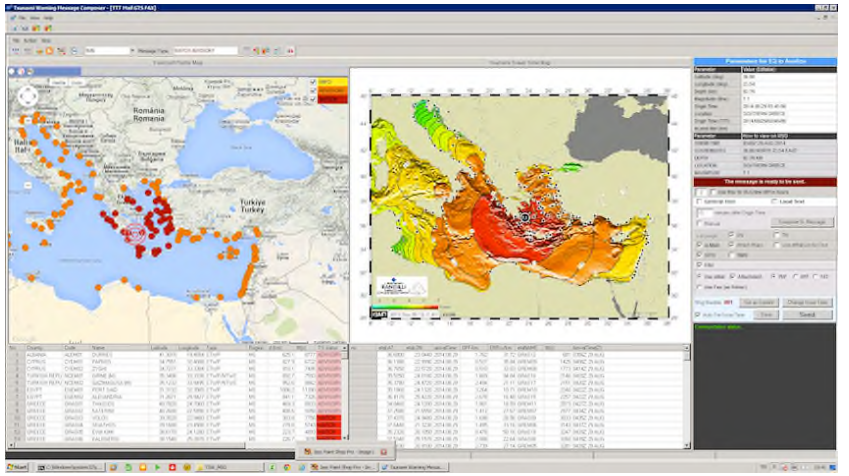
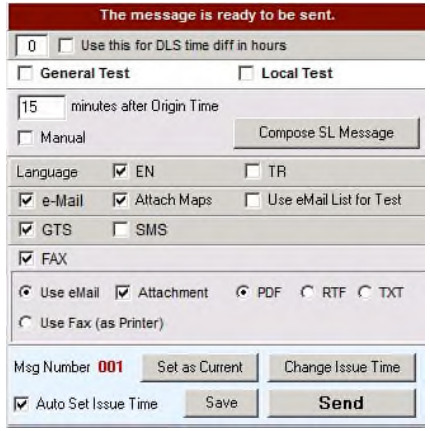
astarte

TsuComp is a software developed by KOERI within ASTARTE as a user-friendly interface to be used in the assessment of tsunamigenic potential and as a single-point entry for message dissemination.





Parameters for EQ to Analize	
Parameter	Value (Editable)
Latitude (deg)	36.66
Longitude (deg)	23.54
Depth (km)	92.76
Magnitude (Mw)	7.1
Origin Time	2014.08.29 03:45:06
Location	SOUTHERN GREECE
Origin Time (TTT)	2014/08/29/03/45/06
inLand dist (km)	
Parameter	How to view on MSG
ORIGIN TIME	0345Z 29 AUG 2014
COORDINATES	36.66 NORTH 23.54 EAST
DEPTH	92.76 KM
LOCATION	SOUTHERN GREECE
MAGNITUDE	7.1



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TSUNAMI TATBIKAT MESAJI NO 001
BOGAZICI UNIVERSITESI
KANDILLI RASATHANESI VE DEPREM ARASTIRMA ENSTITUSU
BOLGESEL TSUNAMI IZLEME VE DEGERLENDIRME MERKEZI - BTIM

... TSUNAMI TEHLIKESI ...

MESAJ GONDERI ZAMANI: 1435L 28 OCT 2014

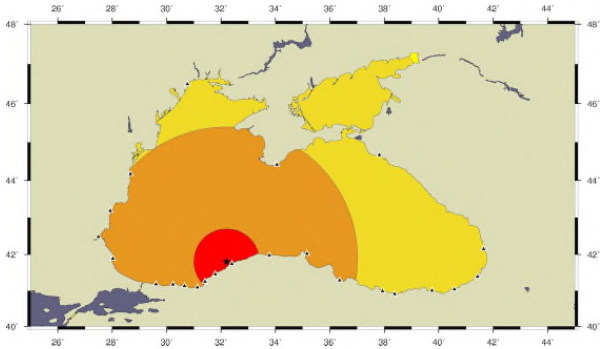
MERKEZIMIZ (BTIM) TARAFINDAN YAPILAN DEGERLENDIRMEDE, ULUSAL DEPREM IZLEME MERKEZI TARAFINDAN KAYDEDILEN VE ASAGIDA BILGILERI VERILEN DEPREMIN BIR TSUNAMIYE NEDEN OLABILECEGI BELIRLENMISTIR:

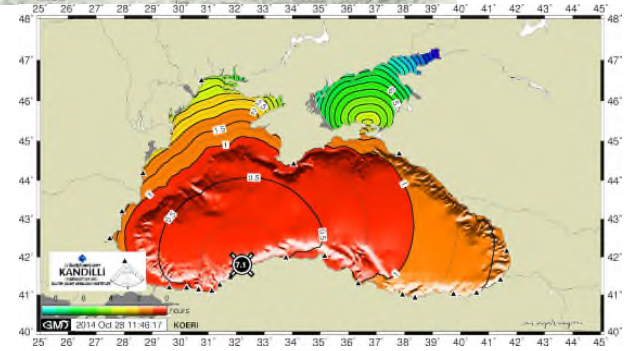
OLUS ZAMANI: 1230Z 28 OCT 2014
KONUM: 41.80 KUZEY 32.20 DOGU
DERINLIK: 7.50 KM
YER: BLACKSEA-BARTIN
BUYUKLUK (M): 7.1

ETKILENMESI OLASI KIYI BOLGELERINDE TAHMINI TSUNAMI VARIS ZAMAN VE TEHLIKE DURUMU SEVIYELERI ASAGIDA VERILMISTIR. ONGORULEN VARIS ZAMANLARI VE ICG/NEAMTWS KARAR MATRISI UYARINCA ELDE EDILEN SEVIYELER, GERCEK TSUNAMI VARIS ZAMANLARI VE TEHLIKE DURUMU SEVIYELERI ILE FARKLILIK GOSTEREBILIR.

IL	YER	ENLEM	BOYLAM	VARIS ZAMANI	SEVIYE
AMASRA (M)		41.7442	32.3916	1242Z 28 OCT	UYARI
DUZCE AKCAKOCA		41.0915	31.1208	1256Z 28 OCT	UYARI
ISTANBUL SILE (M)		41.1804	29.6045	1313Z 28 OCT	UYARI
KASTAMONU INEBOLU		41.9775	33.7697	1259Z 28 OCT	UYARI
KIRKLARELI IGNEADA (M)		41.8890	28.0237	1348Z 28 OCT	UYARI
KOCAELI KEFKEN		41.1702	30.2232	1308Z 28 OCT	UYARI
SAKARYA IHSANIYE		41.1261	30.6498	1255Z 28 OCT	UYARI
SAMSUN		41.2865	36.3482	1340Z 28 OCT	UYARI
SINOP (M)		42.0231	35.1495	1317Z 28 OCT	UYARI
ZONGULDAK		41.4549	31.7796	1244Z 28 OCT	UYARI
ZONGULDAK EREGLI		41.2556	31.4033	1254Z 28 OCT	UYARI
ARTVIN HOPA		41.3931	41.4175	1407Z 28 OCT	TAVSIYE
GIRESUN		40.9125	38.3726	1345Z 28 OCT	TAVSIYE
ORDU		40.9863	37.9281	1348Z 28 OCT	TAVSIYE
RIZE		41.0389	40.5730	1358Z 28 OCT	TAVSIYE
TRABZON (M)		41.0021	39.7444	1355Z 28 OCT	TAVSIYE

YUKARIDA SUNULAN BILGILER BIR TSUNAMININ KESINLIKLE OLUSTUGU SEKLINDE ANLASILMAMALIDIR. BU UYARI MESAJI SADECE DEPREM PARAMETRELERI (OLUS ZAMANI,BUYUKLUK, DERINLIK, ENLEM, BOYLAM) ESAS ALINARAK YAYIMLANMISTIR. ICG/NEAMTWS KARAR MATRISI TEHLIKE DURUMU SEVIYELERI KIYI BOLGELERININ 0.5 METREDEN DAHA BUYUK GENLIKLI TSUNAMI DALGALARI ILE ETKILENMESININ OLASI OLDUGU YERLERDE UYARI, KIYI BOLGELERININ 0.2 ILE 0.5 METRE ARASINDA GENLIKLI TSUNAMI DALGALARI ILE ETKILEMESININ OLASI OLDUGU YERLERDE TAVSIYE OLARAK TANIMLANMISTIR. BTIM, GOZLEM VE ANALIZLERINE DEVAM ETMEKTE OLUP, TAKIP EDECEK MESAJLARDA GUNCEL BILGILENDIRMELER YAPILACAKTIR. AFET VE ACIL DURUM YONETIMI UNSURLARININ BU TUR BIR DURUMDA TAKIP ETMELERI GEREKEN ISLEMLERI BASLATMALARI ONEMLE TAVSIYE OLUNUR.





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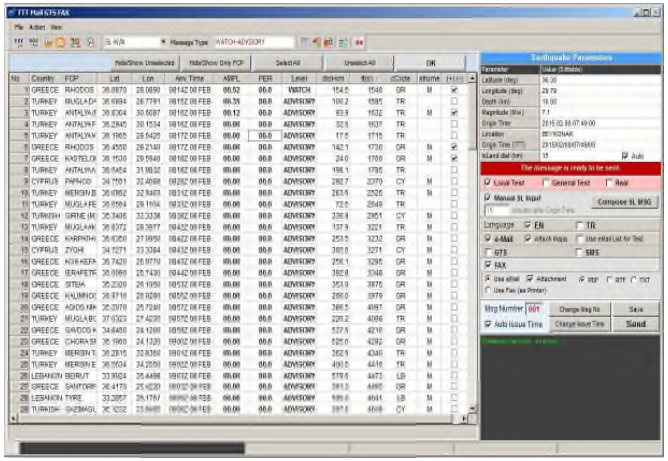
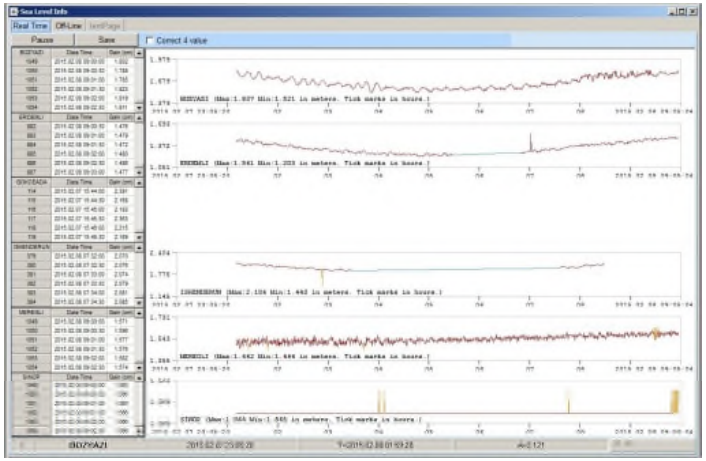
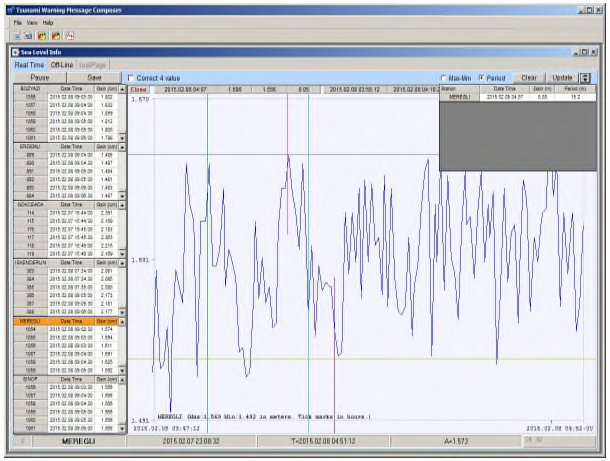






TSUNAMI MESSAGE NUMBER 001
NEAM KOERI TSUNAMI SERVICE PROVIDER
ISSUED AT 2250Z 20 JUL 2017

THIS ALERT IS ADDRESSED TO ALL COUNTRIES AND INSTITUTIONS SUBSCRIBED TO THE SERVICES OF KOERI TSP IN ITS MONITORING AREA.

... TSUNAMI WATCH ...
THIS ALERT APPLIES TO GREECE...TURKEY

THIS MESSAGE IS ISSUED AS ADVICE TO GOVERNMENT AGENCIES. ONLY NATIONAL AND LOCAL GOVERNMENT AGENCIES HAVE THE AUTHORITY TO MAKE DECISIONS REGARDING THE OFFICIAL STATE OF ALERT IN THEIR AREA AND ANY ACTIONS TO BE TAKEN IN RESPONSE.

AN EARTHQUAKE HAS OCCURRED WITH THESE PRELIMINARY PARAMETERS
ORIGIN TIME - 2231 UTC THU JUL 20 2017
COORDINATES - 36.96 NORTH 27.51 EAST
DEPTH - 11.0 KM
LOCATION - DODECANESE ISLANDS
MAGNITUDE - 6.6

EVALUATION OF TSUNAMI WATCH
IT IS NOT KNOWN THAT A TSUNAMI WAS GENERATED. THIS MESSAGE IS BASED ONLY ON THE EARTHQUAKE EVALUATION. AN EARTHQUAKE OF THIS SIZE HAS THE POTENTIAL TO GENERATE A TSUNAMI THAT CAN STRIKE COASTLINES WITH A WAVE HEIGHT GREATER THAN 0.5M AND/OR CAUSE A TSUNAMI RUN-UP GREATER THAN 1M. AUTHORITIES SHOULD TAKE APPROPRIATE ACTION IN RESPONSE TO THIS POSSIBILITY. KOERI WILL MONITOR SEA LEVEL DATA FROM GAUGES NEAR THE EARTHQUAKE TO DETERMINE IF A TSUNAMI WAS GENERATED AND ESTIMATE THE SEVERITY OF THE THREAT. A TSUNAMI IS A SERIES OF WAVES AND THE FIRST WAVE MAY NOT BE THE LARGEST. TSUNAMI WAVE HEIGHTS CANNOT BE PREDICTED AND CAN VARY SIGNIFICANTLY ALONG A COAST DUE TO LOCAL EFFECTS. THE TIME FROM ONE TSUNAMI WAVE TO THE NEXT CAN BE FIVE MINUTES TO AN HOUR, AND THE THREAT CAN CONTINUE FOR MANY HOURS AS MULTIPLE WAVES ARRIVE.

ESTIMATED INITIAL TSUNAMI WAVE ARRIVAL TIMES AT FORECAST POINTS WI
SERVICE AREA ARE GIVEN BELOW. ACTUAL ARRIVAL TIMES MAY DIFFER AND
INITIAL WAVE MAY NOT BE THE LARGEST. A TSUNAMI IS A SERIES OF WAVES AND THE
TIME BETWEEN SUCCESSIVE WAV TO ONE HOUR.

LOCATION	FORECAST POINT C		ME	LEVEL
GREECE-KOS KEFALOS			0 JUL	WATCH
GREECE-KALIMNOS_PANORMOS			0 JUL	WATCH
GREECE-RHODOS_TOWN			20 JUL	WATCH
TURKEY-MUGLA_BODRUM_(M)	37.03N	27.42E	2239Z 20 JUL	WATCH
TURKEY-AYDIN_DIDIM	37.35N	27.28E	2257Z 20 JUL	WATCH
TURKEY-MUGLA_AKSAZ_(M)	36.84N	28.40E	2308Z 20 JUL	WATCH

TSUNAMI MESSAGE NUMBER 002
NEAM KOERI TSUNAMI SERVICE PROVIDER
ISSUED AT 2332Z 20 JUL 2017

THIS ALERT IS ADDRESSED TO ALL COUNTRIES AND INSTITUTIONS SUBSCRIBED TO THE SERVICES OF KOERI TSP IN ITS MONITORING AREA.

... TSUNAMI WATCH ONGOING ...
THIS ALERT APPLIES TO GREECE...TURKEY

THIS MESSAGE IS ISSUED AS ADVICE TO GOVERNMENT AGENCIES. ONLY NATIONAL AND LOCAL GOVERNMENT AGENCIES HAVE THE AUTHORITY TO MAKE DECISIONS REGARDING THE OFFICIAL STATE OF ALERT IN THEIR AREA AND ANY ACTIONS TO BE TAKEN IN RESPONSE.

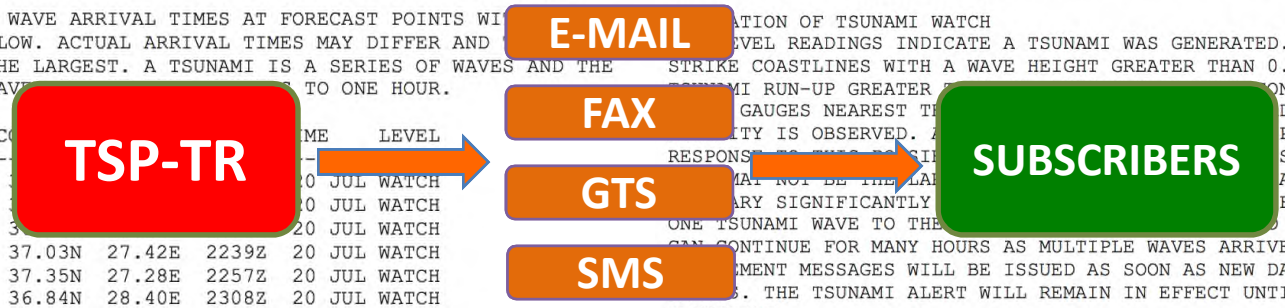
AN EARTHQUAKE HAS OCCURRED WITH THESE PRELIMINARY PARAMETERS
ORIGIN TIME - 2231 UTC THU JUL 20 2017
COORDINATES - 36.96 NORTH 27.51 EAST
DEPTH - 11.0 KM
LOCATION - DODECANESE ISLANDS
MAGNITUDE - 6.6

MEASUREMENTS OR REPORTS OF TSUNAMI WAVE ACTIVITY

COUNTRY	GAUGE LOCATION	LAT	LON	TIME	AMPL	PER
TURKEY	BODRUM	37.03	27.42	22:32	0.10	13.0

LAT - LATITUDE (N-NORTH, S-SOUTH)
LON - LONGITUDE (E-EAST, W-WEST)
TIME - TIME OF THE MEASUREMENT (Z IS UTC TIME)
AMPL - TSUNAMI AMPLITUDE MEASURED RELATIVE TO NORMAL SEA LEVEL.
IT IS ...NOT... CREST-TO-TROUGH WAVE HEIGHT.
VALUES ARE GIVEN IN METERS (M).
PER - PERIOD OF TIME IN MINUTES (MIN) FROM ONE WAVE TO THE NEXT.

ATION OF TSUNAMI WATCH
EVEL READINGS INDICATE A TSUNAMI WAS GENERATED. THIS TSUNAMI CAN
STRIKE COASTLINES WITH A WAVE HEIGHT GREATER THAN 0.5M AND/OR CAUSE A
MI RUN-UP GREATER ONTINUE TO MONITOR SEA
GAUGES NEAREST TH DDITIONAL TSUNAMI WAVE
TY IS OBSERVED. A PRIATE ACTION IN
RESPONS S OF WAVES AND THE FIRST
MAY NOT BE THE LAR ANNOT BE PREDICTED AND
ARY SIGNIFICANTLY FFECTS. THE TIME FROM
ONE TSUNAMI WAVE TO THE AN HOUR, AND THE THREAT
CAN CONTINUE FOR MANY HOURS AS MULTIPLE WAVES ARRIVE.
MENT MESSAGES WILL BE ISSUED AS SOON AS NEW DATA AND EVALUATION
. THE TSUNAMI ALERT WILL REMAIN IN EFFECT UNTIL AN END OF ALERT IS
BROADCAST.

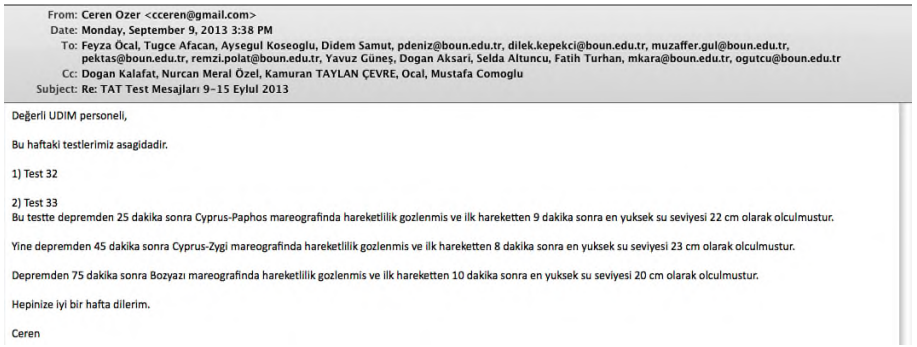


KOERI TSP Daily Tests

Duty Officers perform a test of the operational system in each shift based on a pre-defined scenario using TAT and TSUComp, including testing of the access to the sea-level data.

These test are evaluated regularly and Duty-Officers receive feedback.

Around 300 scenarios so far!!!



From: Ceren Ozer <cceren@gmail.com>
Date: Monday, September 9, 2013 3:38 PM
To: Feyza Öcal, Tugce Afacan, Aysegul Koseoglu, Didem Samut, pdeniz@boun.edu.tr, dilek.kepekci@boun.edu.tr, muzaffer.gul@boun.edu.tr, pektas@boun.edu.tr, remzi.polat@boun.edu.tr, Yavuz Güneş, Dogan Aksari, Selda Altuncu, Fatih Turhan, mkara@boun.edu.tr, ogutcu@boun.edu.tr
Cc: Dogan Kalafat, Nurcan Meral Özel, Kamuran TAYLAN ÇEVRE, Ocal, Mustafa Comoglu
Subject: Re: TAT Test Mesajları 9-15 Eylul 2013

Değerli UDIM personeli,

Bu haftaki testlerimiz asagidadir.

1) Test 32

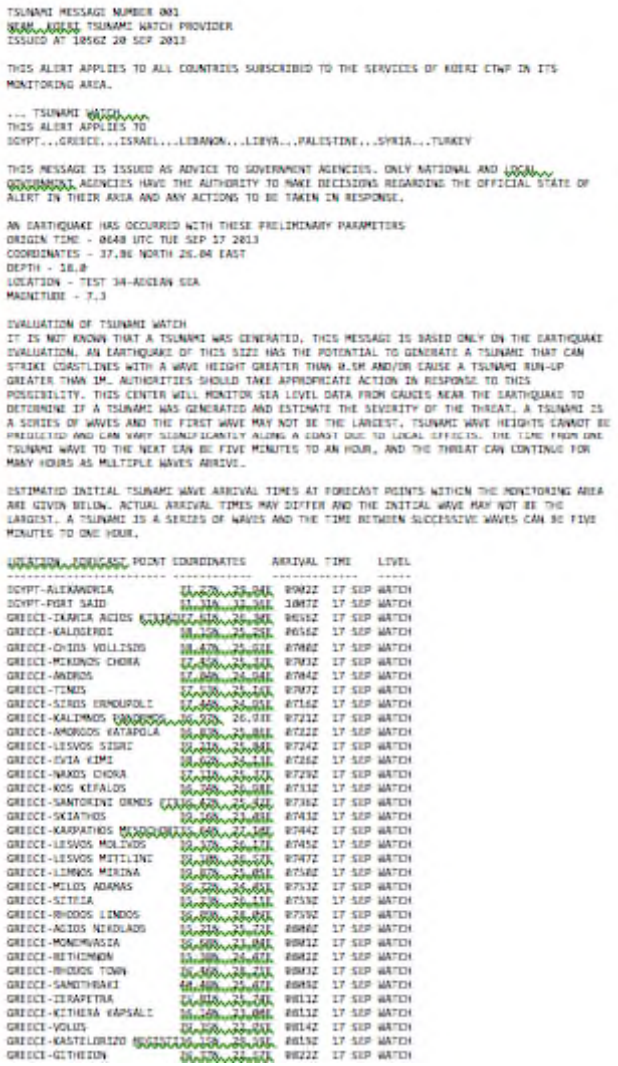
2) Test 33
Bu testte depremden 25 dakika sonra Cyprus-Paphos mareografinda hareketlilik gozlenmis ve ilk hareketten 9 dakika sonra en yuksek su seviyesi 22 cm olarak olculmustur.

Yine depremden 45 dakika sonra Cyprus-Zygi mareografinda hareketlilik gozlenmis ve ilk hareketten 8 dakika sonra en yuksek su seviyesi 23 cm olarak olculmustur.

Depremden 75 dakika sonra Bozyazı mareografinda hareketlilik gozlenmis ve ilk hareketten 10 dakika sonra en yuksek su seviyesi 20 cm olarak olculmustur.

Hepinize iyi bir hafta dilerim.

Ceren



TSUNAMI MESSAGE NUMBER 001
NEAM KOERI TSUNAMI WATCH PROVIDER
ISSUED AT 1056Z 20 SEP 2013

THIS ALERT APPLIES TO ALL COUNTRIES SUBSCRIBED TO THE SERVICES OF KOERI CTWP IN ITS MONITORING AREA.

... TSUNAMI WATCH ...
THIS ALERT APPLIES TO
EGYPT...GREECE...ISRAEL...LEBANON...LIBYA...PALESTINE...SYRIA...TURKEY

THIS MESSAGE IS ISSUED AS ADVICE TO GOVERNMENT AGENCIES. ONLY NATIONAL AND LOCAL GOVERNMENT AGENCIES HAVE THE AUTHORITY TO MAKE DECISIONS REGARDING THE OFFICIAL STATE OF ALERT IN THEIR AREA AND ANY ACTIONS TO BE TAKEN IN RESPONSE.

AN EARTHQUAKE HAS OCCURRED WITH THESE PRELIMINARY PARAMETERS
ORIGIN TIME - 0648 UTC TUE SEP 17 2013
COORDINATES - 37.0S NORTH 26.0E EAST
DEPTH - 10.0
LOCATION - TEST 34-AEGEAN SEA
MAGNITUDE - 7.3

EVALUATION OF TSUNAMI WATCH
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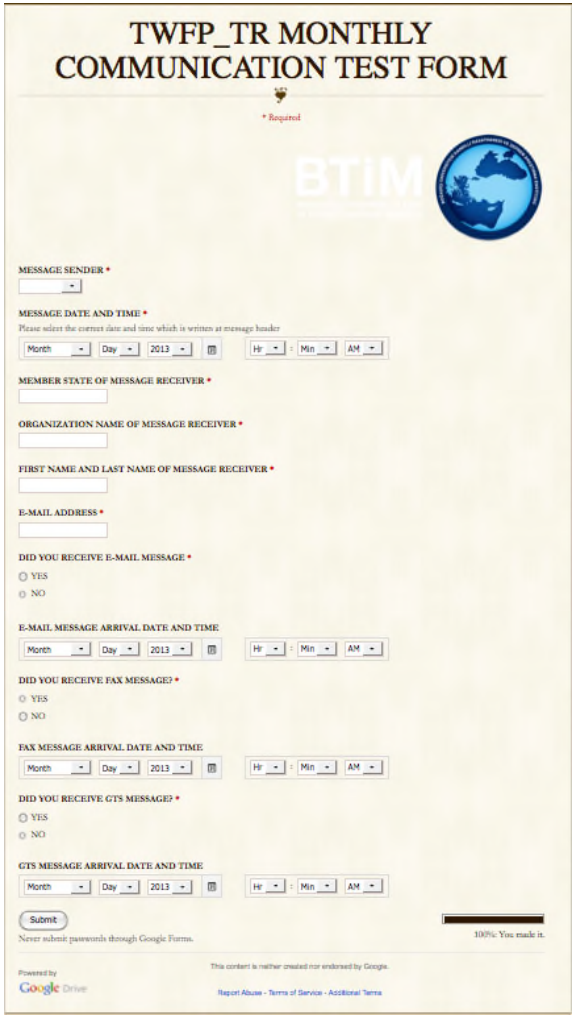
ESTIMATED INITIAL TSUNAMI WAVE ARRIVAL TIMES AT FORECAST POINTS WITHIN THE MONITORING AREA ARE GIVEN BELOW. ACTUAL ARRIVAL TIMES MAY DIFFER AND THE INITIAL WAVE MAY NOT BE THE LARGEST. A TSUNAMI IS A SERIES OF WAVES AND THE TIME BETWEEN SUCCESSIVE WAVES CAN BE FIVE MINUTES TO ONE HOUR.

LOCATION	FORECAST POINT COORDINATES	ARRIVAL TIME	LEVEL
EGYPT-ALEXANDRIA	31.2N 29.9E	0902Z 17 SEP	WATCH
EGYPT-PORT SAID	31.3N 32.3E	1007Z 17 SEP	WATCH
GREECE-IKARIA AGIOS KIRIKOS	37.6N 26.3E	0656Z 17 SEP	WATCH
GREECE-KALOGEROS	38.1N 23.6E	0656Z 17 SEP	WATCH
GREECE-CHIOS VOLLISOS	38.4N 26.0E	0700Z 17 SEP	WATCH
GREECE-MIKONOS CHORA	37.4N 25.3E	0703Z 17 SEP	WATCH
GREECE-ANDROS	37.8N 24.9E	0704Z 17 SEP	WATCH
GREECE-TINOS	37.5N 25.2E	0707Z 17 SEP	WATCH
GREECE-SIROS ERMOUPOLI	37.4N 24.9E	0716Z 17 SEP	WATCH
GREECE-KALIMNOS	37.0N 26.9E	0721Z 17 SEP	WATCH
GREECE-AMORGOS KATAPOLA	36.8N 25.9E	0722Z 17 SEP	WATCH
GREECE-LESVOS SIGRI	39.2N 25.8E	0724Z 17 SEP	WATCH
GREECE-EVIA KIMI	38.6N 24.1E	0726Z 17 SEP	WATCH
GREECE-NAXOS CHORA	37.1N 25.4E	0729Z 17 SEP	WATCH
GREECE-KOS KEFALOS	36.8N 27.0E	0731Z 17 SEP	WATCH
GREECE-SANTORINI ORMOS	36.4N 25.4E	0736Z 17 SEP	WATCH
GREECE-SKIATHOS	39.2N 23.5E	0741Z 17 SEP	WATCH
GREECE-KARPATHOS	35.5N 27.2E	0744Z 17 SEP	WATCH
GREECE-LESVOS MOLIVOS	39.2N 26.2E	0745Z 17 SEP	WATCH
GREECE-LESVOS MITILINI	39.1N 26.5E	0747Z 17 SEP	WATCH
GREECE-LIMNOS MIRINA	39.9N 25.2E	0750Z 17 SEP	WATCH
GREECE-MILOS ADAMAS	36.7N 24.4E	0753Z 17 SEP	WATCH
GREECE-SITEIA	35.2N 26.1E	0753Z 17 SEP	WATCH
GREECE-RHODOS LINDOS	36.1N 28.1E	0759Z 17 SEP	WATCH
GREECE-AGIOS NIKOLAOS	35.2N 25.7E	0800Z 17 SEP	WATCH
GREECE-MONEMVASIA	36.7N 23.0E	0803Z 17 SEP	WATCH
GREECE-RETHIMNON	35.4N 24.5E	0803Z 17 SEP	WATCH
GREECE-RHODOS TOWN	36.4N 28.2E	0803Z 17 SEP	WATCH
GREECE-SAMOTHRAKI	40.5N 25.5E	0805Z 17 SEP	WATCH
GREECE-IERAPETRA	35.0N 25.7E	0811Z 17 SEP	WATCH
GREECE-KITHERA KAPSALI	36.1N 23.0E	0813Z 17 SEP	WATCH
GREECE-VOLOS	39.3N 22.9E	0814Z 17 SEP	WATCH
GREECE-KASTELORIZO MEGISTI	36.1N 29.6E	0815Z 17 SEP	WATCH
GREECE-GITHEION	36.8N 22.4E	0822Z 17 SEP	WATCH

KOERI RegCTEs



TWFP_TR MONTHLY COMMUNICATION TEST FORM

* Required

MESSAGE SENDER *

MESSAGE DATE AND TIME *
Please select the correct date and time which is written at message header
Month Day 2013 Hr : Min AM

MEMBER STATE OF MESSAGE RECEIVER *

ORGANIZATION NAME OF MESSAGE RECEIVER *

FIRST NAME AND LAST NAME OF MESSAGE RECEIVER *

E-MAIL ADDRESS *

DID YOU RECEIVE E-MAIL MESSAGE *
YES
NO

E-MAIL MESSAGE ARRIVAL DATE AND TIME
Month Day 2013 Hr : Min AM

DID YOU RECEIVE FAX MESSAGE? *
YES
NO

FAX MESSAGE ARRIVAL DATE AND TIME
Month Day 2013 Hr : Min AM

DID YOU RECEIVE GTS MESSAGE? *
YES
NO

GTS MESSAGE ARRIVAL DATE AND TIME
Month Day 2013 Hr : Min AM

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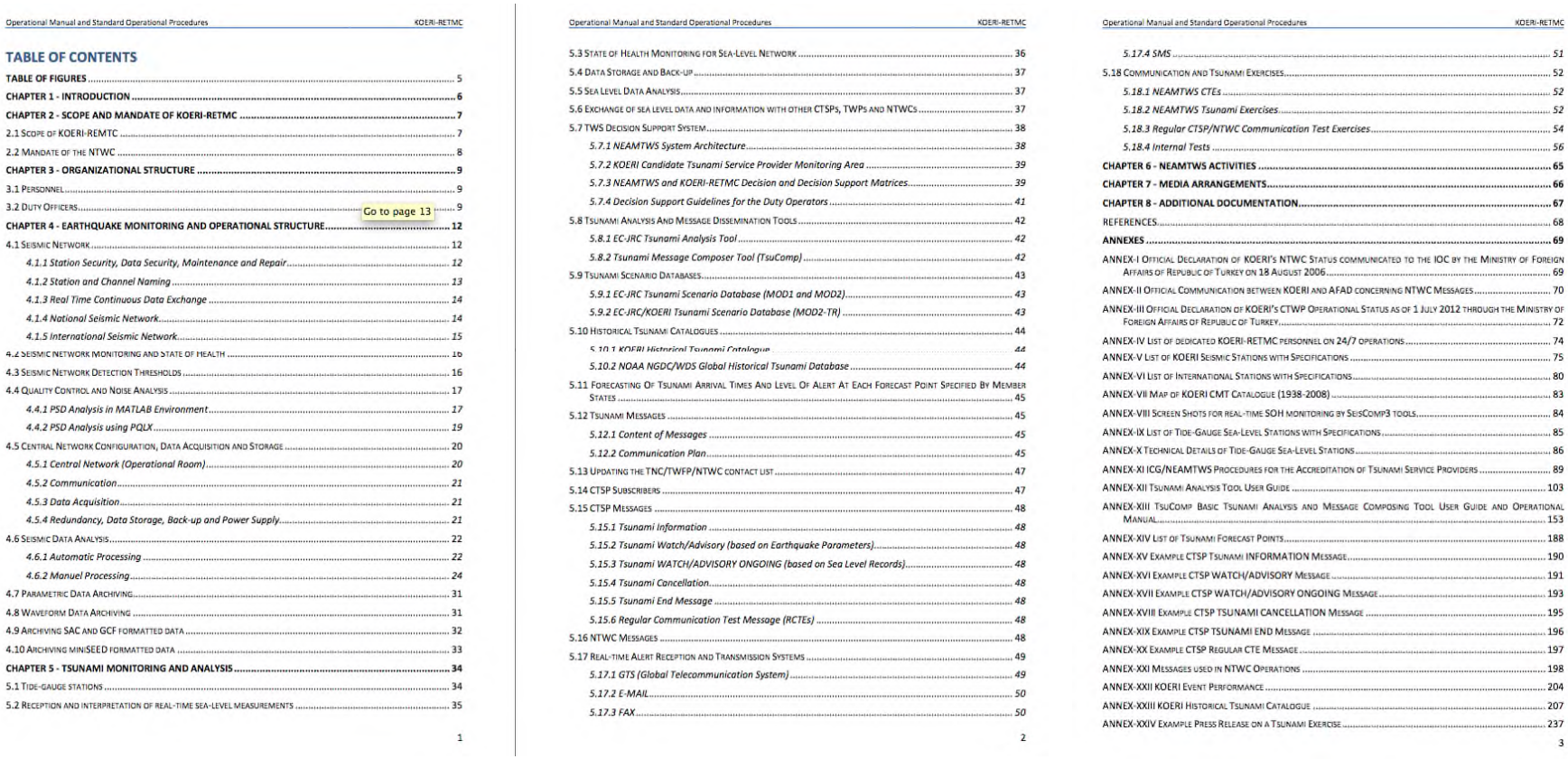
At the current stage, RegCTEs are very useful to identify and address any issue related to the Message Dissemination.

Regular CTEs are practiced every first Monday with the National CPA and every first Tuesday as TSP on the first full week of the month.

ICG/NEAMTWS Task Team on Operations is responsible for the evaluation of these RegCTEs.

TIME STAMP	MEMBER STATE OF MESSAGE RECEIVER	ORGANIZATION NAME OF MESSAGE RECEIVER	SALUTATION	FIRST NAME AND LAST NAME OF MESSAGE RECEIVER	E-MAIL ADDRESS	DID YOU RECEIVE E-MAIL MESSAGE	E-MAIL MESSAGE ARRIVAL DATE AND TIME	DID YOU RECEIVE FAX MESSAGE?	FAX MESSAGE ARRIVAL DATE AND TIME	DID YOU RECEIVE GTS MESSAGE?	GTS MESSAGE ARRIVAL DATE AND TIME	MESSAGE DATE AND TIME	MESSAGE SENDER	
10/8/2014 14:10:45	TURKEY	AFAD EARTHQUAKE DEPARTMENT		KEREM KUTERDEM	tsunami@afad.gov.tr	YES	10/8/2014 10:28:00	YES	10/8/2014 10:28:00	NO		10/8/2014 10:28:00	TWFP_TR	teşekkür ederiz.
10/8/2014 14:13:38	TURKEY	AFAD EARTHQUAKE DEPARTMENT		KEREM KUTERDEM	tsunami@afad.gov.tr	YES	10/7/2014 11:23:00	YES	10/7/2014 11:23:00	NO		10/7/2014 11:23:00	TWFP_TR	teşekkür ederiz.
10/9/2014 13:12:41	LEBANON	NCGR		Rachid Jomaa	rjomaa@cnrs.edu.lb	YES	10/7/2014 11:22:00	YES	10/7/2014 11:24:00	NO		10/7/2014 11:22:00	TWFP_TR	
11/3/2014 16:28:24	Turkey	Prime Ministry Disaster and Emergency Management Presidency		Response Department	acildurummerkezi@afad.gov.tr	YES	10/3/2014 14:17:00	YES	10/3/2014 14:17:00	NO		10/3/2014 14:17:00	TWFP_TR	
11/4/2014 15:14:08	TURKEY	AFAD EARTHQUAKE DEPARTMENT		KEREM KUTERDEM	tsunami@afad.gov.tr	YES	11/3/2014 14:17:00	YES	11/3/2014 14:13:00	NO		11/4/2014 15:00:00	TWFP_TR	teşekkür ederiz.
11/4/2014 16:52:41	TURKEY	AFAD EARTHQUAKE DEPARTMENT		CENK ERKMEN	tsunami@afad.gov.tr	YES	11/4/2014 14:47:00	YES	11/4/2014 14:47:00	NO		11/4/2014 16:50:00	TWFP_TR	TEŞEKKÜR EDERİ
11/4/2014 16:57:22	SPAIN	SACOP/DGPCE (SPAIN)		DUTY OFFICER	sacop@procivil.mir.es	YES	11/4/2014 14:47:00	YES	11/4/2014 14:51:00	NO		11/4/2014 14:46:00	TWFP_TR	As requested:
11/4/2014 17:00:44	Italy	Italian Civil Protection		Italian Civil Protection	salaoperativa@protezionecivile.it	YES	11/4/2014 15:48:00	NO		NO		11/4/2014 16:46:00	TWFP_TR	1 – The test messa Civil Protection - O Management – (Sa
11/4/2014 17:01:50	GREECE	NOA-HLNTWC		NOA-HLNTWC operator	hl. ntwc@noa.gr	YES	11/4/2014 2:46:00	YES	11/4/2014 2:47:00	YES	11/4/2014 2:56:00	11/4/2014 2:46:00	TWFP_TR	
11/4/2014 17:02:03	Germany	Bundesamt für Seeschiffahrt und Hydrographie		Steffen Reinert	wvd@bsh.de	YES	11/4/2014 14:55:00	YES	11/4/2014 14:50:00	NO		11/4/2014 14:47:00	TWFP_TR	
11/4/2014 17:13:50	FRANCE	CENALT		OPERATEUR	operateur.dase@cenalt.cnrs.fr	YES	11/4/2014 14:46:00	YES	11/4/2014 14:46:00	YES	11/4/2014 14:48:00	11/4/2014 14:46:00	TWFP_TR	
11/4/2014 17:19:00	Germany	Deutscher Wetterdienst		DWD	rz.hamburg	YES	10/4/2014 14:55:00	YES	10/4/2014 14:47:00	YES	10/4/2014 14:46:00	10/4/2014 14:46:00	TWFP_TR	
11/4/2014 17:49:54	EU	EC/ERCC		Raphaele Magoni	echo-ercc@ec.europa.eu	YES	11/4/2014 15:47:00	YES	11/4/2014 15:48:00	NO		11/4/2014 15:47:00	TWFP_TR	
11/5/2014 8:59:56	Israel	GII and PMO		Yefim Gitterman	yefimg@gii.co.il	YES		NO		NO		11/4/2014 2:46:00	TWFP_TR	e-mail message wa Meteorological Ser
11/5/2014 10:09:48	Romania	National Institute for Earth Physics (NIEP)		Raluca Partheniu, Constantin Ionescu	raluca@infp.ro, dirgen@infp.ro	YES	11/4/2014 14:46:00	YES	11/4/2014 14:47:00	NO		11/4/2014 14:46:00	TWFP_TR	No comments
11/5/2014 10:17:06	LEBANON	NCGR		Rachid Jomaa	rjomaa@cnrs.edu.lb	YES	11/4/2014 14:46:00	YES	11/4/2014 14:47:00	NO		11/4/2014 14:46:00	TWFP_TR	
11/5/2014 14:03:30	ITALY	INGV		Alberto Michelini (TWFP)	alberto.michelini@ingv.it	YES	11/4/2014 14:46:00	YES	11/4/2014 14:47:00	YES	11/4/2014 14:50:00	11/4/2014 14:46:00	TWFP_TR	

Operational Manual



Operational Manual and Standard Operational Procedures KOERI-RETMC

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2

Operational Manual and Standard Operational Procedures KOERI-RETMC

3

... learning by doing ... living document ...

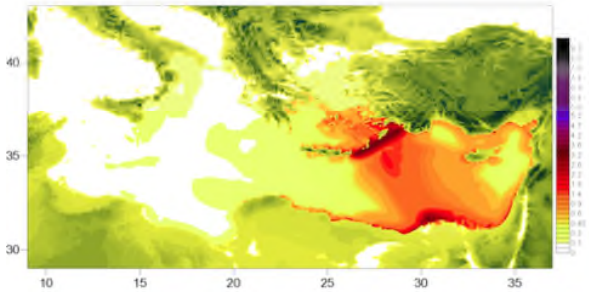
... submitted during accreditation procedure ...

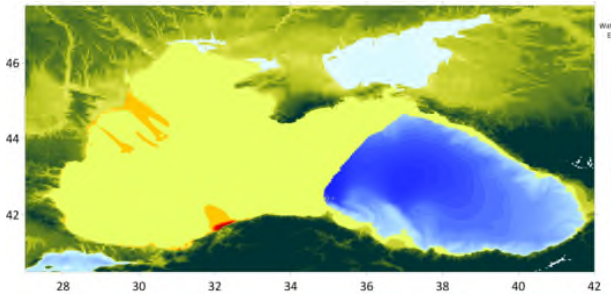
NEAMTWS Tsunami and Communication Test Exercises

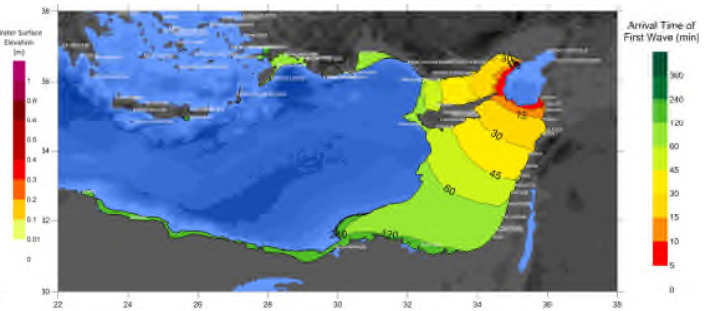
ICG/NEAMTWS TSUNAMI EXERCISE NEAMWave12

ICG/NEAMTWS TSUNAMI EXERCISE NEAMWave14

ICG/NEAMTWS TSUNAMI EXERCISE NEAMWave17







ECTE-1	10 August 2011	KOERI
CTE2	22 May 2012	CEA
CTE3	1 October 2013	NOA
CTE4	30 June 2014	IPMA
CTE5	26 March 2015	CENALT
CTE6	29 July 2015	NOA

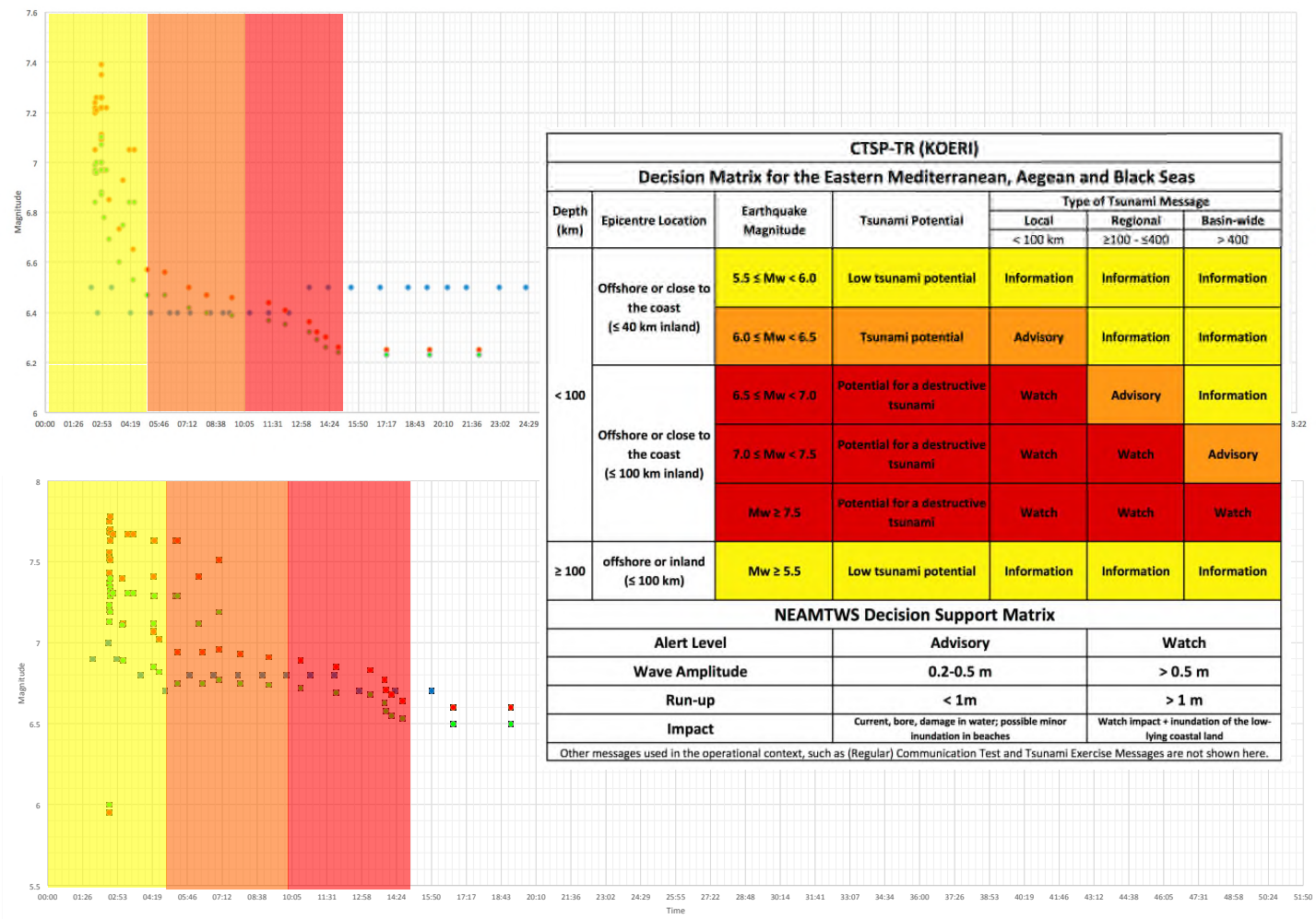
12 June 2017 and 20 July 2017 Events

Event	Location	LAT	LON	DEPTH	MAG		Message	Issue Time	Delay (min)	Comments
12 JUN 2017 12:28							KOERI & INGV sent ADIVOSORY, NOA SENT WATCH-ADVISORY	KOERI & INGV 12:38 NOA 12:39	KOERI & INGV 10 NOA 11	CANCELLATION KOERI 14:10 NOA 14:24 INGV 14:27
KOERI	LESVOS	38.83	26.32	10	6.3	Mw				
NOA		38.83	26.38	10	6.2	ML				
INGV		38.87	26.34	16	6.5	Mw				
USGS		38.87	26.37	5	6.3	mww				
EMSC		38.85	26.34	10	6.3	Mw				
20 JUN 2017 22:31							KOERI, NOA, INGV WATCH-ONGOING-END	INGV 22:41 NOA 22:49 KOERI 22:50	INGV 10, NOA 18, KOERI 19	ONGOING KOERI 23:32 INGV 01:02 NOA 01:53 END KOERI 01:30 INGV 01:46 NOA 02:37
KOERI	BODRUM-KOS	36.96	27.51	11	6.6	Mw				
NOA		36.96	27.59	10	6.4	ML				
INGV		36.90	27.46	10	6.8	Mw				
USGS		36.925	27.414	7	6.6	mww				
EMSC		36.96	27.45	2	6.6	Mw				





12 June 2017 and 20 July 2017 Events



CTSP-TR (KOERI)

Decision Matrix for the Eastern Mediterranean, Aegean and Black Seas

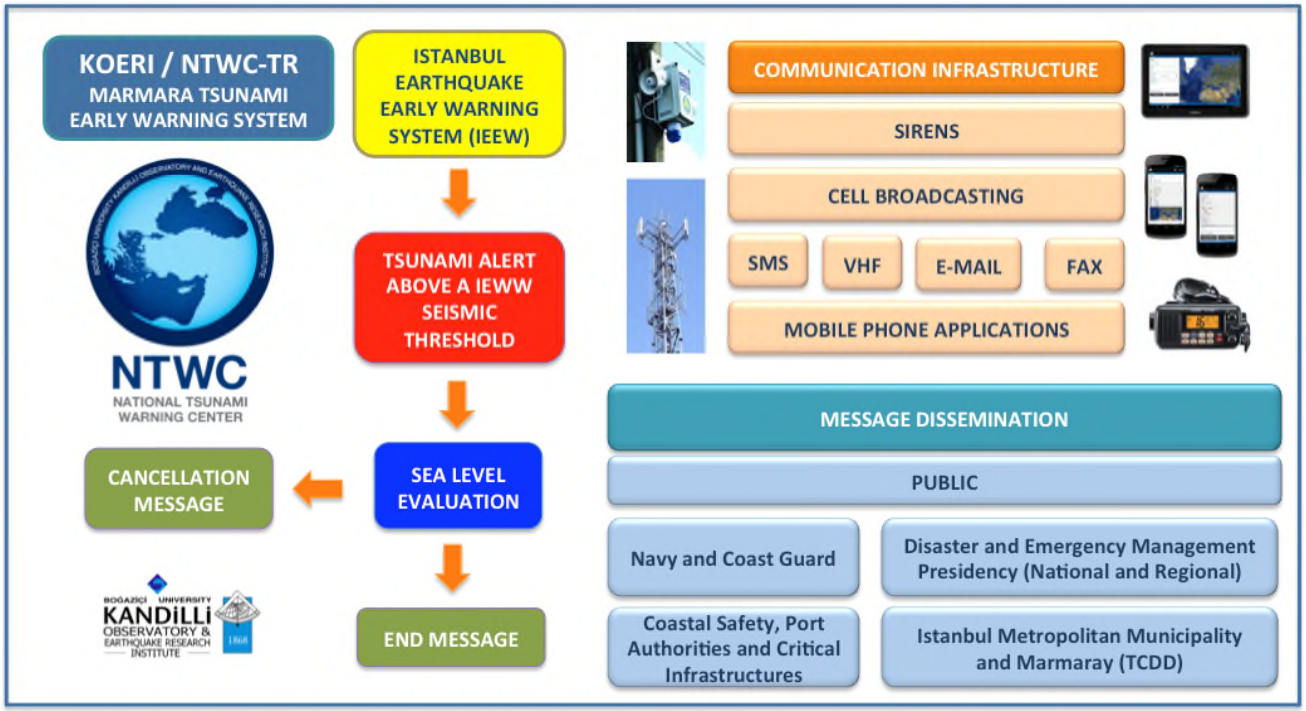
Depth (km)	Epicentre Location	Earthquake Magnitude	Tsunami Potential	Type of Tsunami Message: Local < 100 km	Regional ≥100 - ≤400	Basin-wide > 400
< 100	Offshore or close to the coast (≤ 40 km inland)	5.5 ≤ Mw < 6.0	Low tsunami potential	Information	Information	Information
		6.0 ≤ Mw < 6.5	Tsunami potential	Advisory	Information	Information
	Offshore or close to the coast (≤ 100 km inland)	6.5 ≤ Mw < 7.0	Potential for a destructive tsunami	Watch	Advisory	Information
		7.0 ≤ Mw < 7.5	Potential for a destructive tsunami	Watch	Watch	Advisory
		Mw ≥ 7.5	Potential for a destructive tsunami	Watch	Watch	Watch
≥ 100	offshore or inland (≤ 100 km)	Mw ≥ 5.5	Low tsunami potential	Information	Information	Information

NEAMTWS Decision Support Matrix

Alert Level	Advisory	Watch
Wave Amplitude	0.2-0.5 m	> 0.5 m
Run-up	< 1m	> 1 m
Impact	Current, bore, damage in water; possible minor inundation in beaches	Watch impact + inundation of the low-lying coastal land

Other messages used in the operational context, such as (Regular) Communication Test and Tsunami Exercise Messages are not shown here.

20 July 2017 Bodrum-Kos Earthquake/Tsunami



… regardless of any model, the effectiveness of any tsunami early warning depends purely on the awareness and preparedness of the civil protection authorities and the public.

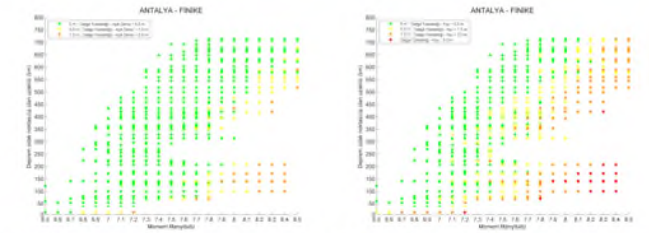
Inundation Maps

T.C. BOĞAZİÇİ ÜNİVERSİTESİ
KANDİLLİ RASATHANESİ VE DEPREM ARAŞTIRMA ENSTİTÜSÜ
BÖLGESEL DEPREM-TSUNAMİ İZLEME VE DEĞERLENDİRME MERKEZİ
(BDTIM)

BDTiM

TSUNAMİ TAHMİN NOKTASI BİLGİ NOTU

ANTALYA – FİNİKE



MOD2-TR Tsunami Senaryo veritabanı uyarınca Ege ve Doğu Akdeniz'de meydana gelebilecek bir deprem için deprem büyüklüğü (Moment Manyitüdü-Mw) ve depremin Antalya-Finike'den uzaklığına bağlı olarak açık denizde (sol) ve kıyıda (sağ) beklenebilecek tahmini tsunami dalga yükseklikleri. Finike için tsunami tehlikesinin Mw > 7 depremler için söz konusu olabileceği düşünülmekle beraber daha küçük depremlerin tetikleyebileceği denizaltı heyelanları nedeni ile yerel tsunamiler oluşabileceği dikkate alınmalıdır.

MOD2-TR Tsunami Senaryo veritabanında Antalya-Finike için en büyük dalga yüksekliği veren deprem senaryosu kullanılarak yapılan tsunami sayısal modellemesi uyarınca, topografik eşyükselti eğrileri esas alınarak hazırlanan en kötü senaryo tsunami baskın haritası. Modelleme çalışmaları 150m çözünürlüklü çalışma alanları kullanılarak yapılmış olup tsunami baskın haritaları 3m çözünürlüklü topografik veri üzerine görsellenmiştir.

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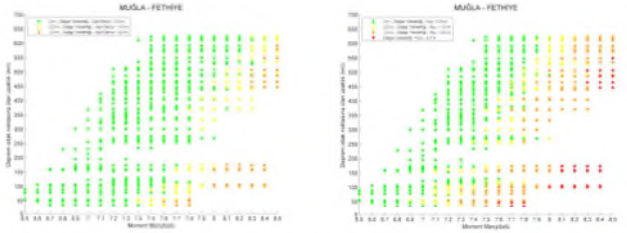
T.C. BOĞAZİÇİ ÜNİVERSİTESİ
KANDİLLİ RASATHANESİ VE DEPREM ARAŞTIRMA ENSTİTÜSÜ
BÖLGESEL DEPREM-TSUNAMİ İZLEME VE DEĞERLENDİRME MERKEZİ
(BDTIM)

BDTiM

TSUNAMİ TAHMİN NOKTASI BİLGİ NOTU

MUĞLA – FETHİYE



MOD2-TR Tsunami Senaryo veritabanı uyarınca Ege ve Doğu Akdeniz'de meydana gelebilecek bir deprem için deprem büyüklüğü (Moment Manyitüdü-Mw) ve depremin Muğla-Fethiye'den uzaklığına bağlı olarak açık denizde (sol) ve kıyıda (sağ) beklenebilecek tahmini tsunami dalga yükseklikleri. Fethiye için tsunami tehlikesinin Mw > 7 depremler için söz konusu olabileceği düşünülmekle beraber daha küçük depremlerin tetikleyebileceği denizaltı heyelanları nedeni ile yerel tsunamiler oluşabileceği dikkate alınmalıdır.

MOD2-TR Tsunami Senaryo veritabanında Muğla-Fethiye için en büyük dalga yüksekliği veren deprem senaryosu kullanılarak yapılan tsunami sayısal modellemesi uyarınca, topografik eşyükselti eğrileri esas alınarak hazırlanan en kötü senaryo tsunami baskın haritası. Modelleme çalışmaları 150m çözünürlüklü çalışma alanları kullanılarak yapılmış olup tsunami baskın haritaları 3m çözünürlüklü topografik veri üzerine görsellenmiştir.

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Boğaziçi University
Kandilli Observatory and Earthquake Research Institute

NEAMTIC Material in Turkish

KOERI participated in NEAMTIC on a self-funded base for the translation of selected material in Turkish.

Translation of : i) educational poster into Turkey, ii) website/virtual library interface into Turkey, iii) coastal inundation online course into Turkish, iv) good practices compendium into Turkish, v) guidelines/poster on hotel evacuation into Turkish.

NEAMTWS Performance Monitoring Framework

- Provide a service …based on requirements and functions defined in the Accreditation Procedure…
- Ensure that combination of the services provided cover whole NEAM region…
- Ensure the sustainability of the services

- Address interoperability issues
- Implement KPIs
- Implement the Performance Monitoring Framework to continuously evaluate TSPs based on KPIs

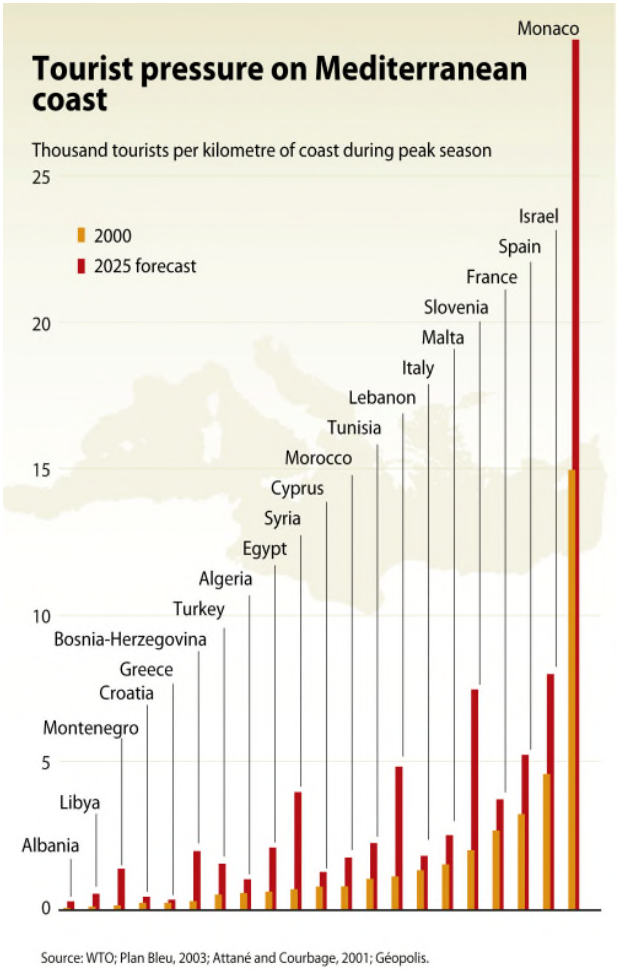
KPI#	Description	value	Target
KPI01:	Elapsed time from earthquake to the issuance of the first tsunami message	time	10 min
KPI02:	Elapsed time from the re-calculation of the earthquake magnitude to the issuance of corresponding tsunami message	time	3 min
KPI03:	Conformity of the threat level in the message according to the Decision Making Criteria Implemented by the CTSP as described in its Operational Manual	+ / -	+
KPI04:	Compliance of the type of magnitude used in the issued message according to the description given in the CTPS' Operational Manual	+ / -	+
KPI05:	The detection of the earthquake within the service area	yes/no	yes
KPI06:	Difference between the epicenter of the earthquake in the initial message and revised location calculated after 30 min of the earthquake occurrence, with reference to GFZ/NEIC/EMSC (to be decided)	km	30 km
KPI07:	Difference between the depth of the earthquake in the initial message and revised depth calculated after 30 min of the earthquake occurrence, with reference to GFZ/NEIC/EMSC (to be decided)	km	15 km
KPI08:	Difference between the magnitude of the earthquake in the initial message and revised magnitude calculated after 30 min of the earthquake occurrence, with reference to GFZ/NEIC/EMSC (to be decided)	value	0.3
KPI09:	Accuracy of the forecasted tsunami threat level at 90% of TFPs in case a tsunami is generated and observed	+ / -	+
KPI10:	Accuracy of the forecasted arrival time of the initial tsunami in case a tsunami is generated and observed	min	5

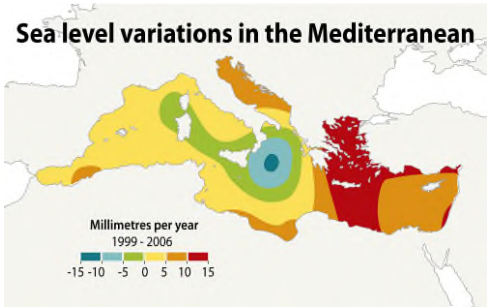
Real-Life Events

> 3,100,000 in Turkey

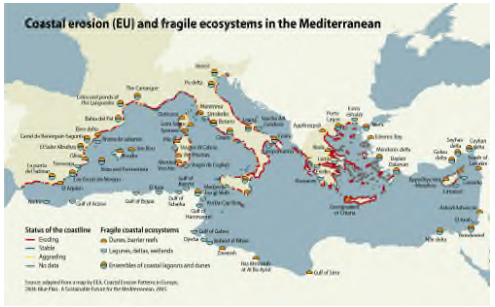
- 3.8% of Turkey
- 3.9% of Germany
- 4.8% of France
- 5.2% of Italy
- 28.5% of Greece
- 30.2% of Portugal

Other factors...



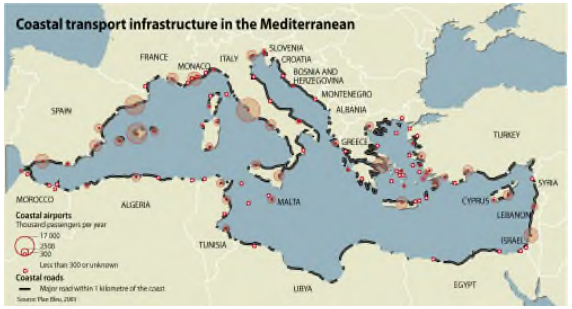


Sea-level rise...



Coastal erosion...

Coastal Infrastructure development...



source: www.grida.no

Challenges

Science must inform policy maker.

Scientific Challenges*:
- Improving methodologies
- Avoiding false alerts

Operational Challenges*:
- Translating scientific information into operational language and procedures

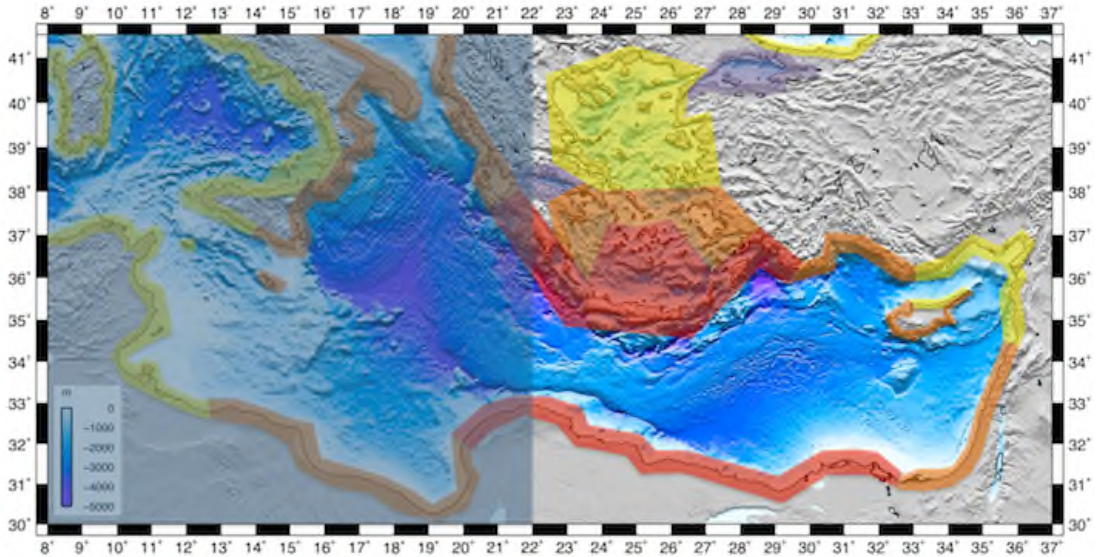
Policy Challenges*:
- Reaching decision-makers
- Reaching the people: the “last mile“ issue

**from Peter Billing – EU/MIC presentation at EGU 2012:*
“The role and responsibilities of Geoscientists for Warning and Mitigation of Natural Disasters”

Boğaziçi University
Kandilli Observatory and Earthquake Research Institute

What if there would be a tsunami tomorrow?

**A tsunami in the Eastern Mediterranean triggered by an earthquake
In Hellenic Arc (Mw > 8) or Dead Sea Fault (Mw > 7)
should also be considered as a potential threat to Global Security
due to the humanitarian crisis it may generate
and the political instability it could trigger
as a result of the catastrophe generated by the earthquake and tsunami!**



THANK YOU...

KOERI, Istanbul

Real Time Data Exchange

At NEAMTWS-IX, the following was included:
... recognizes in particular the importance of real time sea level data exchange for completing the NEAMTWS

This was again reemphasized during NEAMTWS-X:
...as a priority, all sea level data should be made available to the CTWPs and NTWCs using bilateral agreements between NTWC's whenever possible…

In the NEAMTWS-XI Report, the following is stated:
The WG3 recommends:
(i) That all sea level data should be made available to the CTSP's and NTWC's using bilateral agreements, between NTWC's whenever possible.

Accreditation
WF7 Exchange sea level data and information with other CTSPs,TSPs and NTWCs

Official requests have been made to INGV and NOA on 23 January 2015 for a bilateral agreement concerning real time seismic (NOA) and sea-level (INGV and NOA) data….

To evacuate or not to evacuate?