Ameer Hyder
Chief Meteorologist

Pakistan Meteorological Department
Karachi

- The mission of the National Seismic Monitoring & Tsunami Early Warning Centre **is to provide timely and well understandable tsunami early warnings when a major earthquake occurs under sea**. Tsunami Warnings are issued strictly on the procedure laid down in the Standard Operating Procedure (SOP).

- **Pakistan is a member country of Indian Ocean Tsunami Warning System** (IOTWS).There are three Regional Tsunami Service Providers (RTSPs) India, Indonesia and Australia.

- As the member of IOTWS, NTWC, Karachi participates in each Six Monthly communication tests every year.

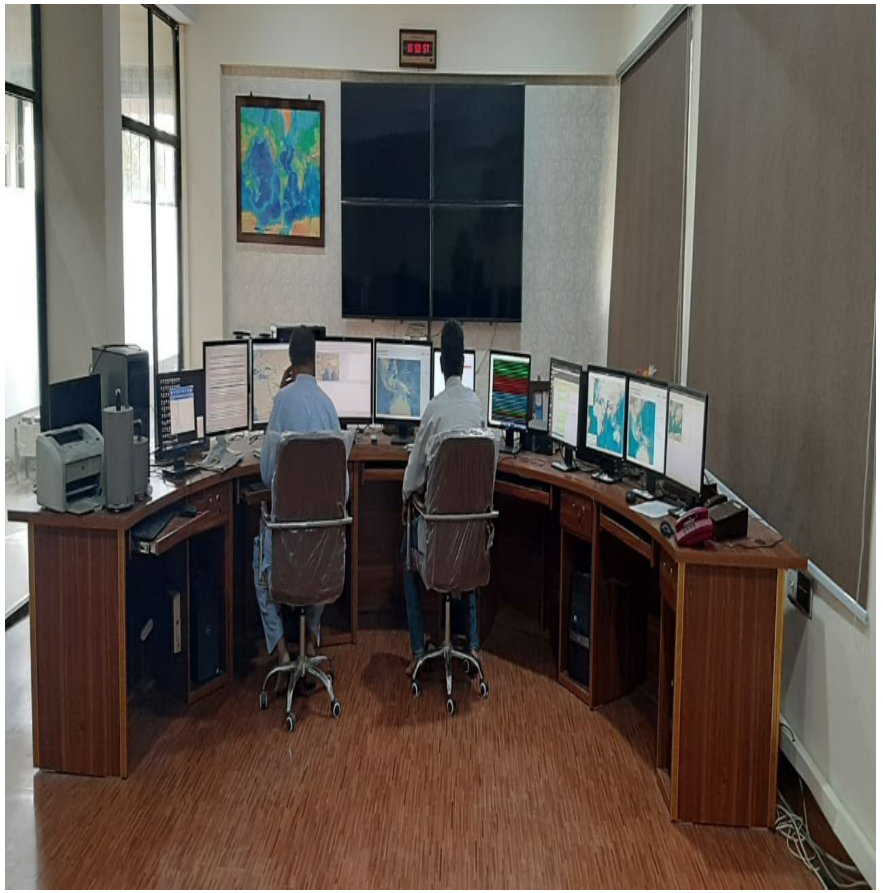
- This office has participated in 15th October exercise MAKRAN region, 2025.

- NTWC uses National and Global Seismic station networks data on real-time basis to monitor seismic activity in order to locate potential tsunami-genic earthquakes.

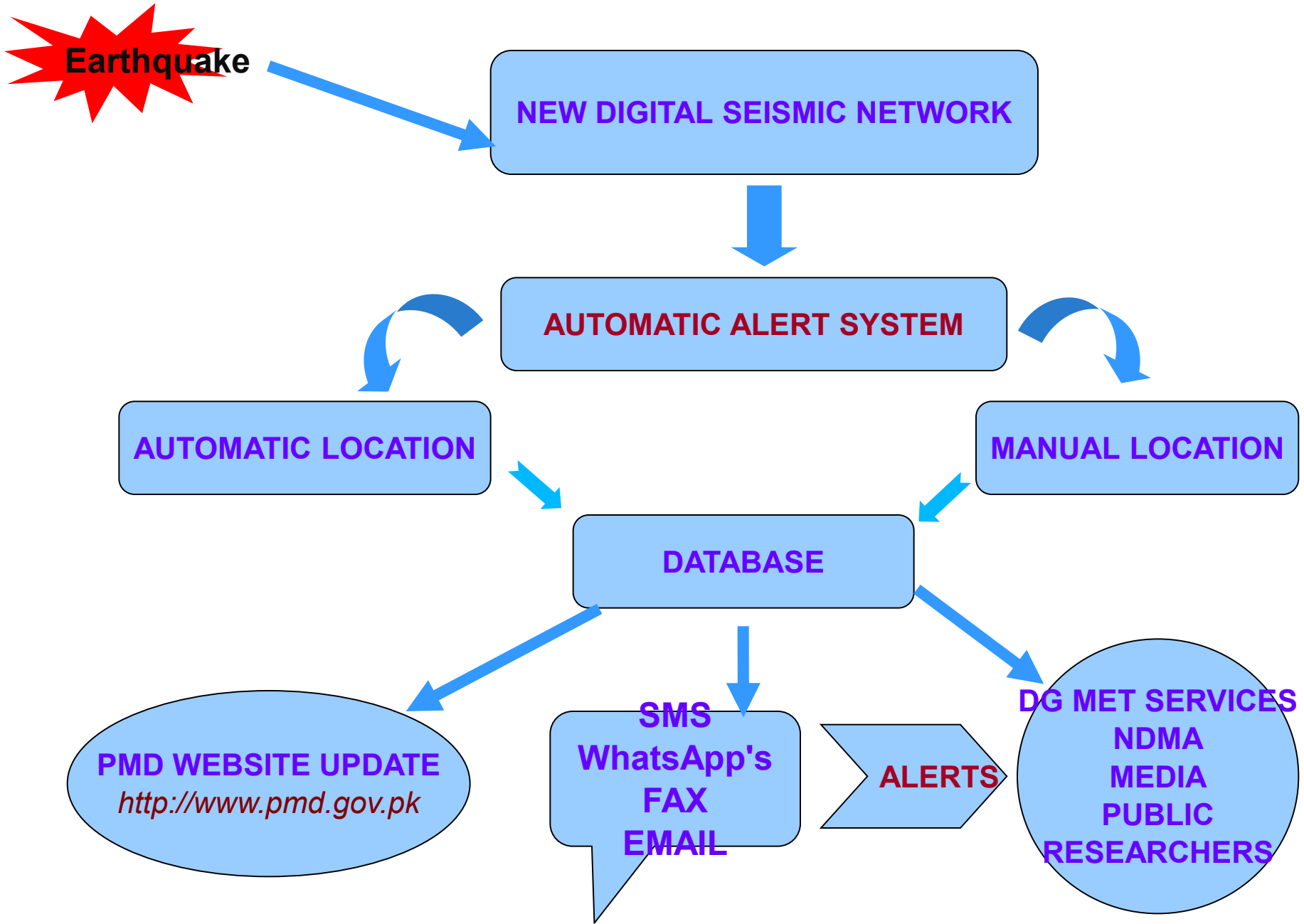
- **Seiscomp-3 earthquake analysis software & Tsunami Modeling Software Toast are used to analyses the earthquakes.**

NATIONAL TSUNAMI early warning Center Karachi

- Data processing
  - Data archiving from 150 seismic stations (local and Global stations)
  - Automatic/ Manual analysis.
  - Auto- epicenter location /shake-map
  - Archive catalog.
- Data management
  - Data storage
  - Data distribution service
  - Online inquire service



PMD Earthquake Monitoring and Operational System



yahoo!mail

Undisclosed Recipients Add keywords

Compose

Inbox 20
Unread
Starred
Drafts
Sent
Archive
Spam
Trash

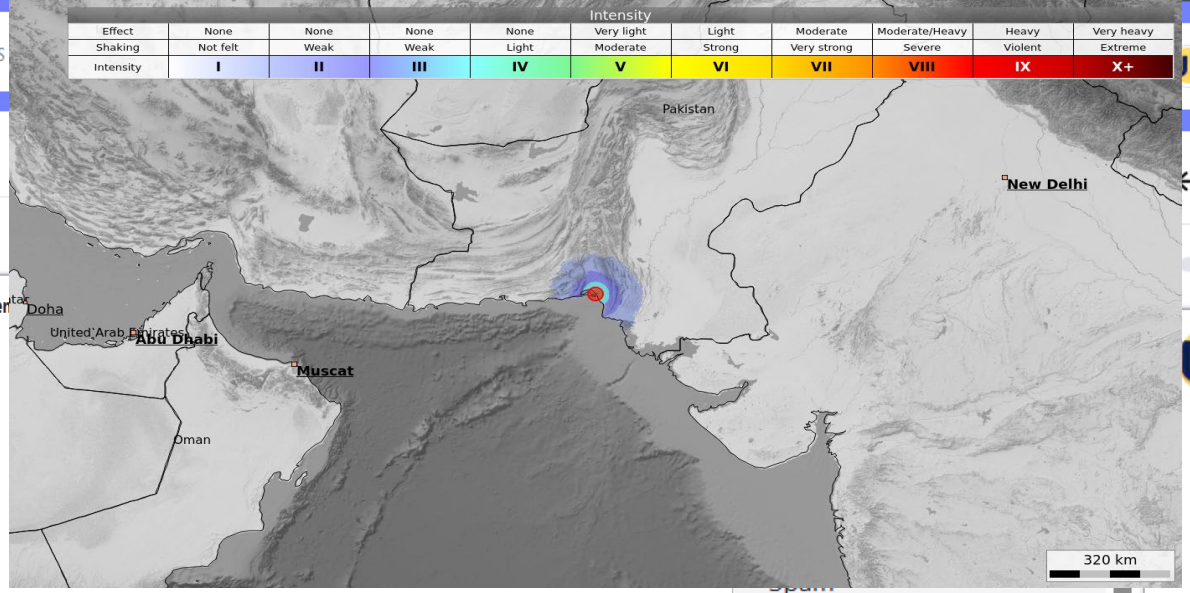
Back

Event pmd2022owop: 5.4 (M)

Pakistan Meteorological Departmer
To: Undisclosed Recipients

Event:
Public ID pmd2022owop
Description
region name: Off Coast of Pakistan
Origin:
Date 2022-07-31
Time 13:52:13.8 +/- 1.5 s
Latitude 24.59 deg +/- 17 km

Intensity										
Effect	None	None	None	None	Very light	Light	Moderate	Moderate/Heavy	Heavy	Very heavy
Shaking	Not felt	Weak	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
Intensity	I	II	III	IV	V	VI	VII	VIII	IX	X+



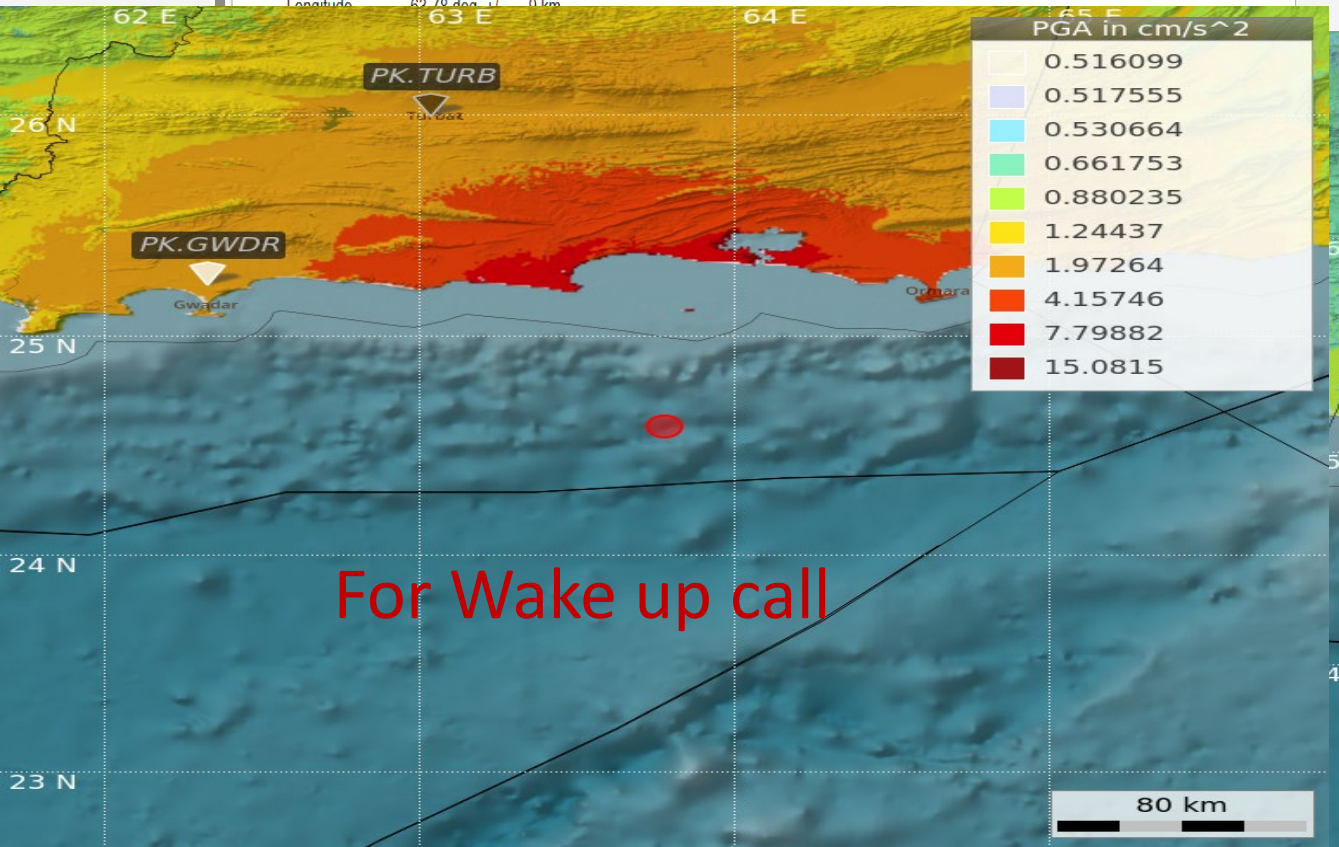
Undisclosed Recipients Add keywords

Back Archive

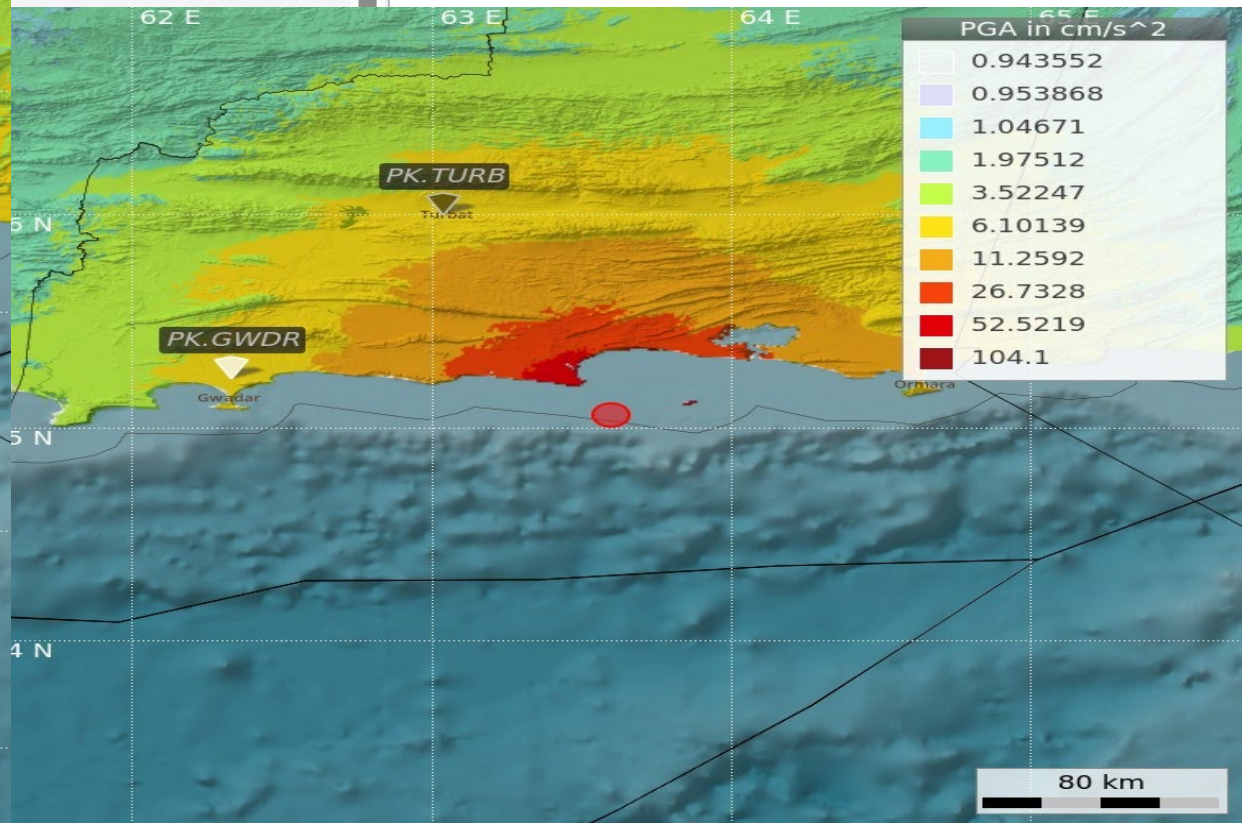
Event pmd2022owoh: 5.7 (M)

Pakistan Meteorological Department <ptws@isti.com>
To: Undisclosed Recipients

Event:
Public ID pmd2022owoh
Description
region name: Southwestern Pakistan
Origin:
Date 2022-07-31
Time 13:42:13.8 +/- 0.5 s



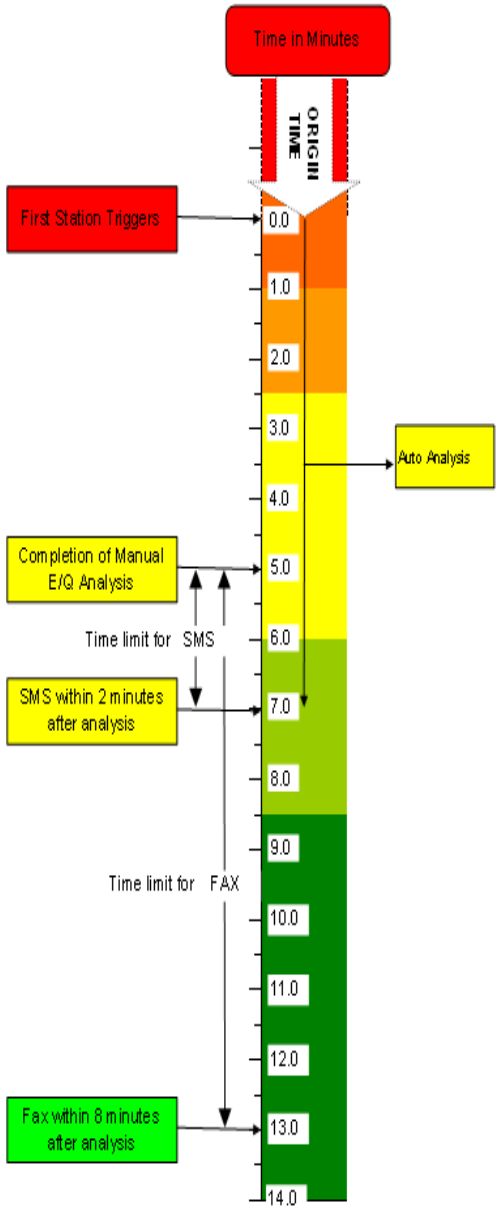
For Wake up call



STANDARD OPERATING PROCEDURE

(SOP)

TIME LINE FOR EARTHQUAKE PROCESSING AND DISSEMINATION OF TSUNAMI BULLETIN
(FOR MAKRAN SUBDUCTION ZONE)



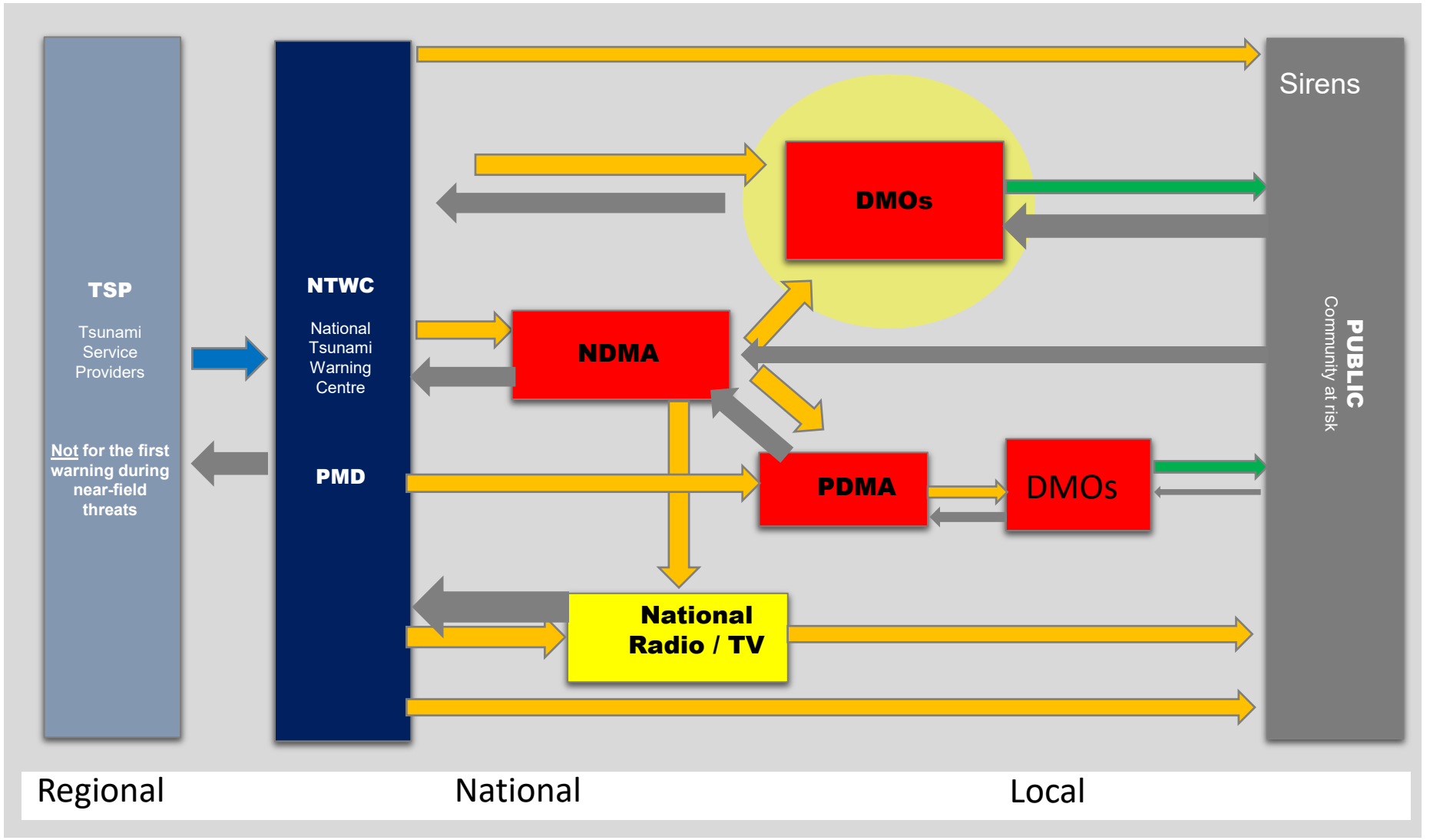
Pakistan Warning Levels/Advice

Wave Height	Level	Advice
≥2m	Warn	Evacuate inland towards higher ground.
0.5-1.9m	Alert	Stay away from beaches, rivers and low lying coastal areas.
0.2-0.5m	Watch	No immediate action required. Be prepared for action on updated information.
<0.2m	No Threat	"All clear.

Warning chain

7 Min — NTWC Internal EW SOPs Timeline — **7-13 Mint**

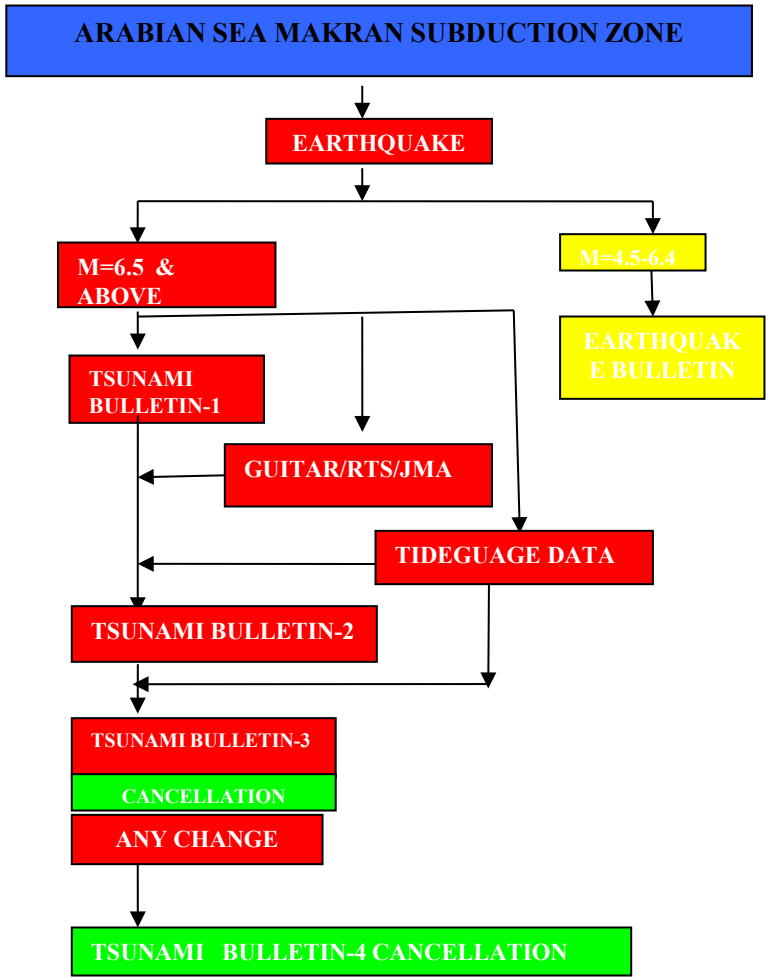
Timeline message in case of near-field threats (Minutes after EQ)



Information — Warning — Warning and Advice — Official call for evacuation — Feed Back

Pakistan

13/12/2023



SOP FOR ISSUANCE OF "TSUNAMI BULLETINS" IN ARABIAN SEA (MAKRAN SUBDUCTION ZONE)

1. For earthquakes having magnitude between **4.5** to **6.4**, only earthquake parameters will be sent to **RESPONSE AUTHORITIES** and **MEDIA** through **SMS** and **FAX.**

2. Maximum four Bulletins will be issued for earthquakes having magnitude **6.5** or above to **RESPONSE AUTHORITIES** and **MEDIA**.

3. **BULLETIN-1**:- This bulletin will contain;
i. Earthquake Parameters.
ii. Tsunami evaluation based on historical earthquake and tsunami data.
•This bulletin will be issued according to time line of Bulletin-1.(page-9)

4. **BULLETIN-2**:- This bulletin will contain;
I Revised **Earthquake Parameters** (if so).
ii. **Estimated arrival times and wave heights** at various locations along Pakistan Coast based on **TOAST/RTSps of Australia, Indonesia and India**.
Iii .**Tide gauge data** if generation of tsunami has been confirmed.
•This bulletin will be issued soon after the dissemination process of Bulletin-1 is completed.
•In case the Tsunami generation is confirmed, the first sentence of Evaluation will be deleted.

5. **BULLETIN-3**:- This bulletin will contain;
i. Revised **earthquake parameters** (if so).
ii. Tide gauge data of Pakistan Coast to confirm the generation of tsunami.
iii. Any change if tsunami has been confirmed in **Bulletin-2**.
iv. This bulletin will serve as cancellation in case a sufficient time has lapsed after the estimated arrival time but no significant change is observed in sea level. In such case it will be the last bulletin.
•This bulletin will be issued when ever tide gauge data confirms the tsunami generation (CONFIRMATION).

6. **BULLETIN-4**:- **(Cancellation)**
i. This bulletin will contain earthquake parameters and tsunami evaluation regarding cancellation.
ii. This will be the last bulletin and will serve as cancellation.
Important. Supplementary bulletins (SMS/FAX) will be issued in between regular bulletins depending upon the prevailing situation.

List of contact numbers

MAGNITUDE RANGE	MATTER TO BE SENT ON FAX	SEND TO	
Less than 6.0	No message to be passed except Chief Met.	**Chief Met**	**03343204566**
6.0-6.4	Earthquake Parameters	**1.DG Met.S** **2.NDMA** **3.DCO GAWADAR** **4.DCO LASBELLA** **5.PDMA BALOCHISTAN** **6.PDMA SINDH** **7.DCO KARACHI** **8.DCO THATTA** **9.DCO BADIN**	**051-9250368** **051-9204197** **0864-211362** **0853-610252** **081-2880189** **021-35830087** **021-9205612** **021-9232432** **0298-920069** **0297-861471**
6.5-7.0	Earthquake Parameters & Tsunami Evaluation.		
7.1-7.5	Earthquake Parameters & Tsunami Evaluation.		
7.6-8.0	Earthquake Parameters & Tsunami Evaluation.		
Greater than 8.0	Earthquake Parameters & Tsunami Evaluation.		

(SEVERE TSUNAMI THREAT)

• TSUNAMI BULLETIN-01

- Issued at 11:05:00 PST
- National Tsunami Warning Centre (NTWC), Karachi of Pakistan Meteorological Department has recorded an Earthquake with the following preliminary seismological parameters:
- Origin time 10-09-2014 at 11:00:00 PST
- Magnitude: 8.8
- Depth: 10 Km
- Latitude: 24.8º N
- Longitude: 62.2 º E
- Location: Off Coast of Pakistan
- **EVALUATION:**
- **. Based on the historical** data, earthquakes of this size may cause wide-spread inland damages and Destructive Tsunami generation in the Arabian Sea and along coastline of Pakistan

–

Sd/=

Duty Seismologist

DESCRIPTION OF MESSAGE (SMS)

E/Q M 8.8 in Arabian sea on 10-09-2014 at 11:00PST. Destructive tsunami may generate. Immediate evacuation is advised along Pak. Coast.

PMD.

E/Q M 9.0 (revised) in Arabian sea on 10-09-2014 at 11:00PST. Destructive tsunami may generate. Immediate evacuation is advised along Pak. Coast.

PMD.

E/Q M 9.0 (revised) in Arabian sea on 10-09-2014 at 11:00PST. Destructive tsunami generation along coast of Pakistan has been confirmed.

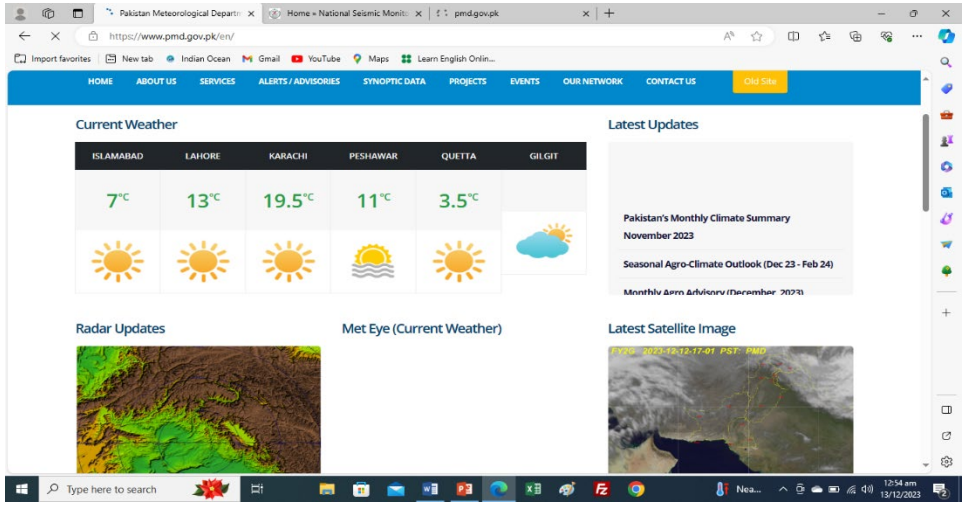
PMD.

E/Q M 9.0 (revised) in Arabian sea on 10-09-2014 at 11:00PST. Tsunami Threat has passed. All Clear will be decided by local authorities.

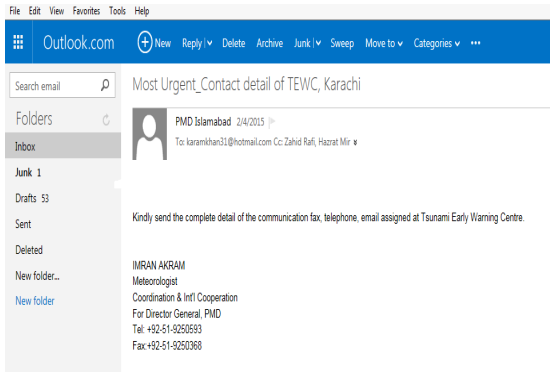
PMD.

Modes of Early Warning Dissemination

SMS messenger

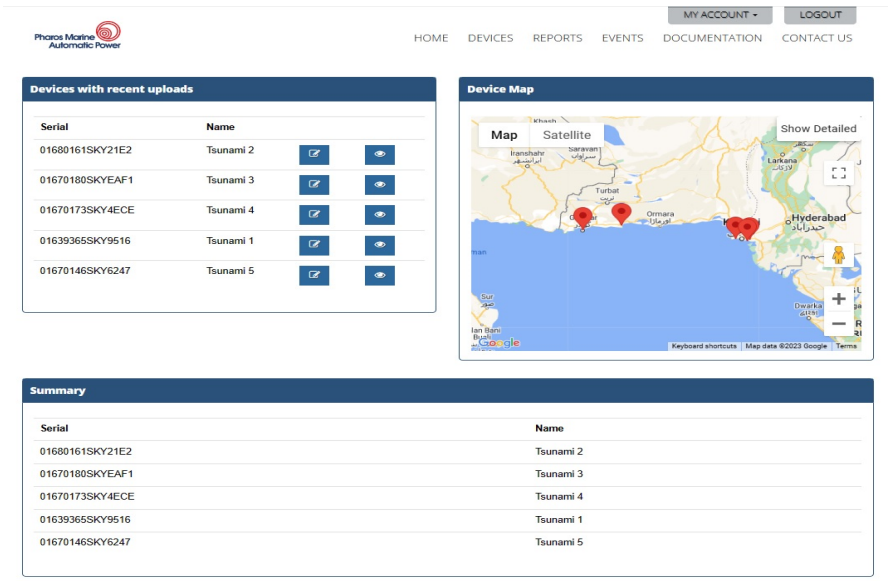


PMD Website



Email

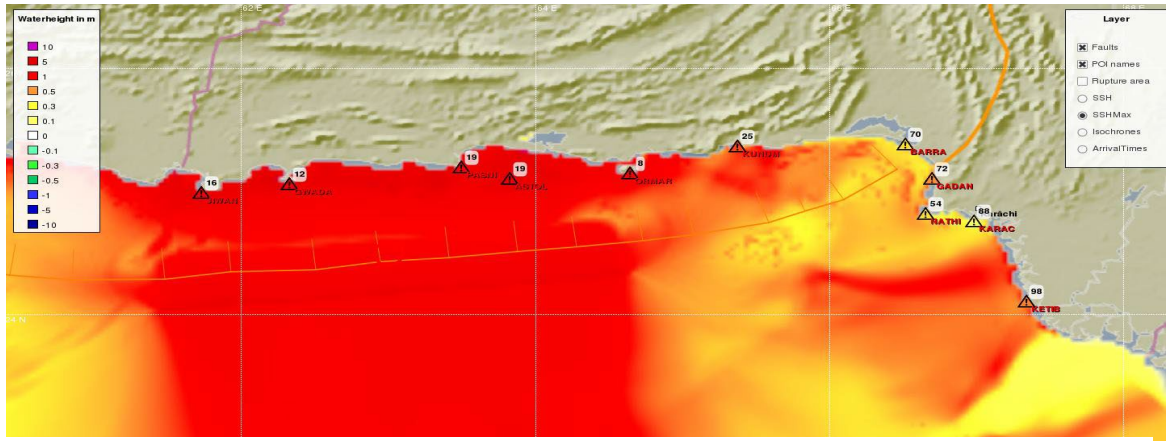
FAX

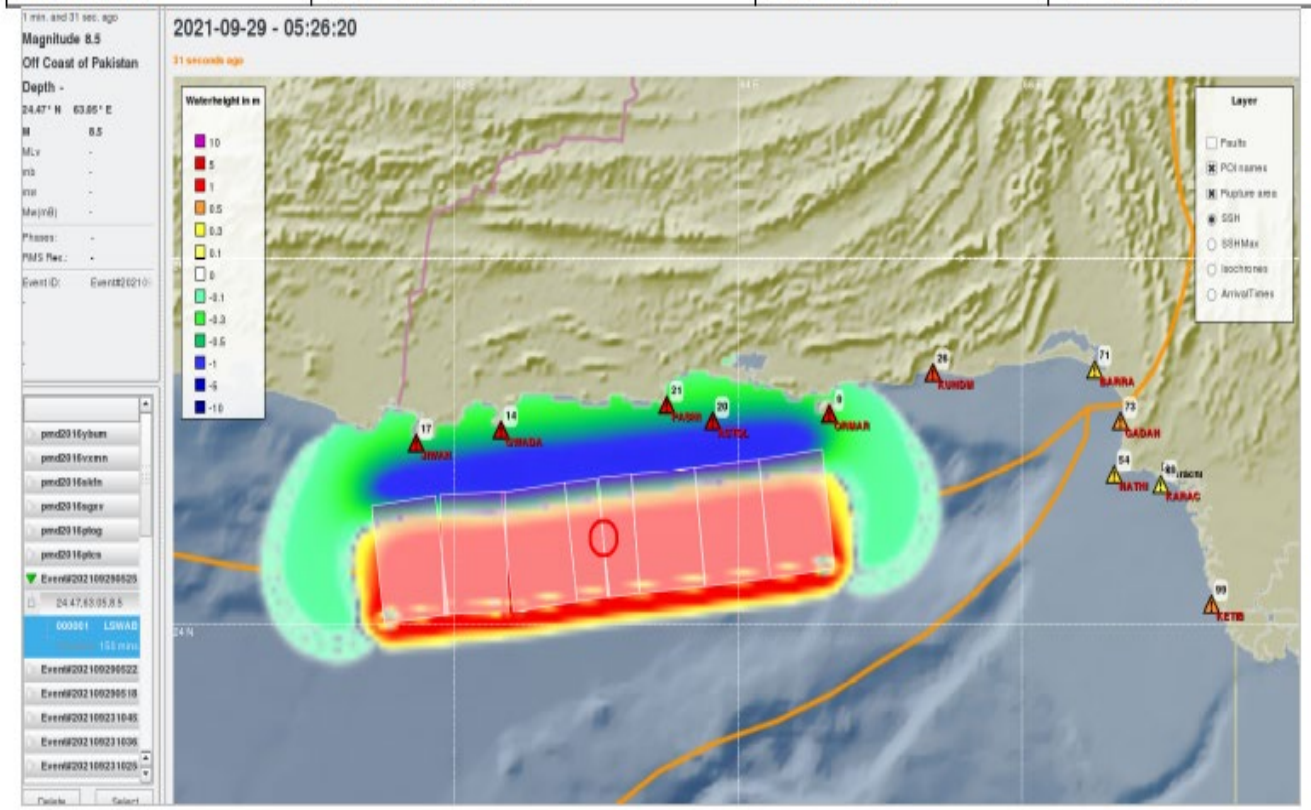


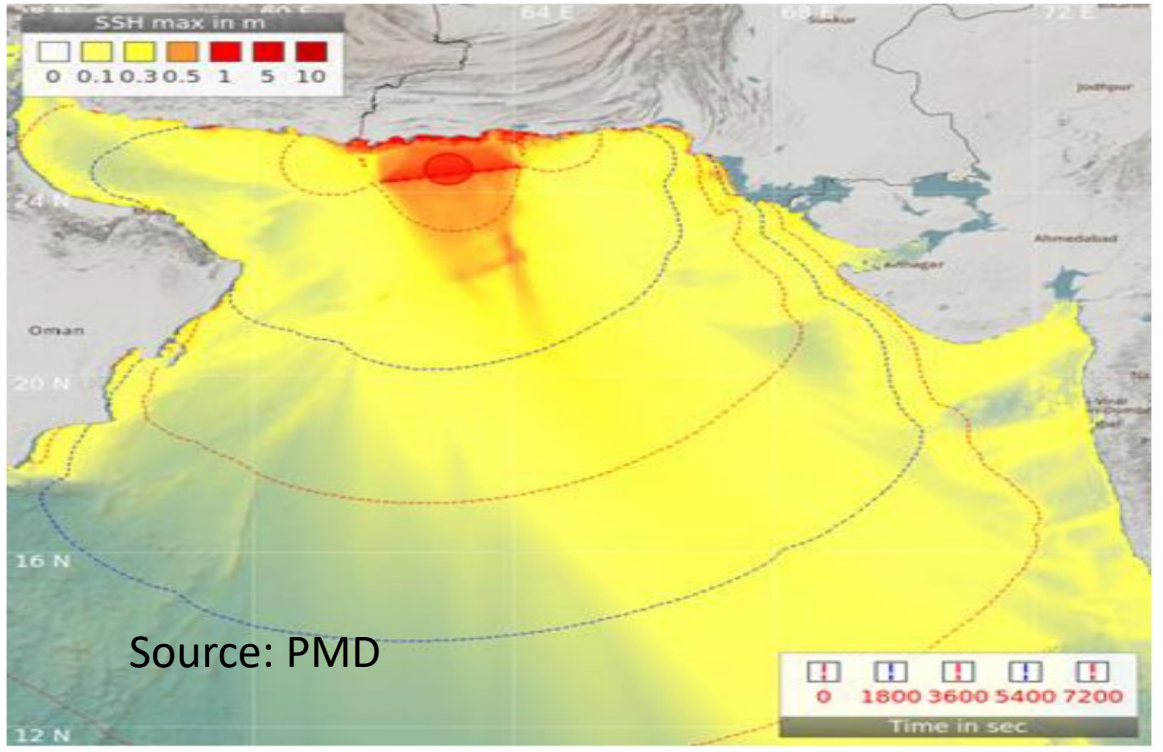
Siren Alarm System

Tsunami Simulation Results

Coastal Point	Maximum Wave Height(m)	Arrival Time (min.)	Wave Speed (m/s)
Gwadar	4.3 meters	14 min	4-6 m/s
Pasni	3.0 meters	18 min	4-6 m/s
Jiwani	3.4 meters	17 min	4-6 m/s
Ormara	3.5 meters	9 min	4-6 m/s
Karachi	0.4 meters	87 min	4-6 m/s

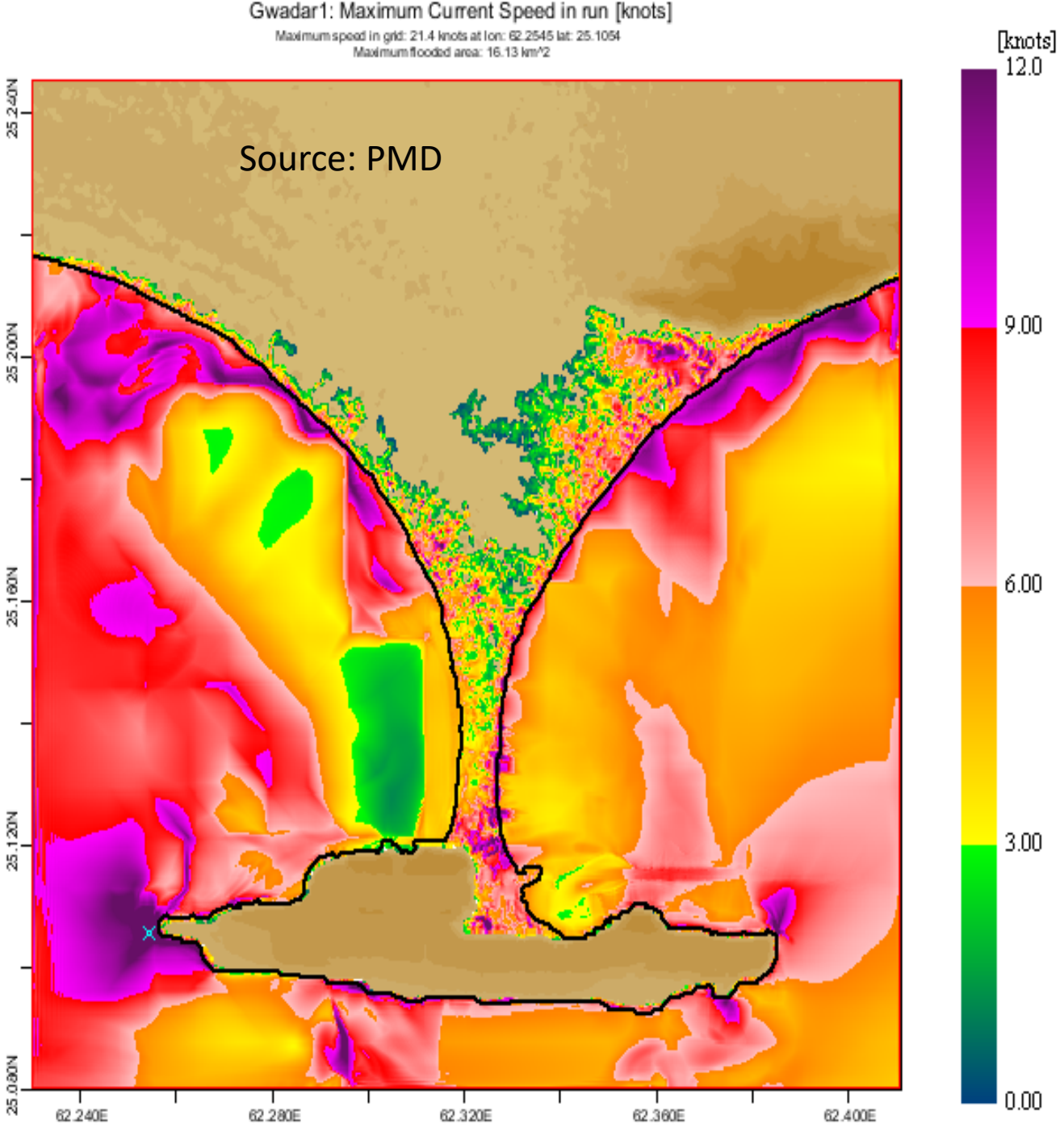


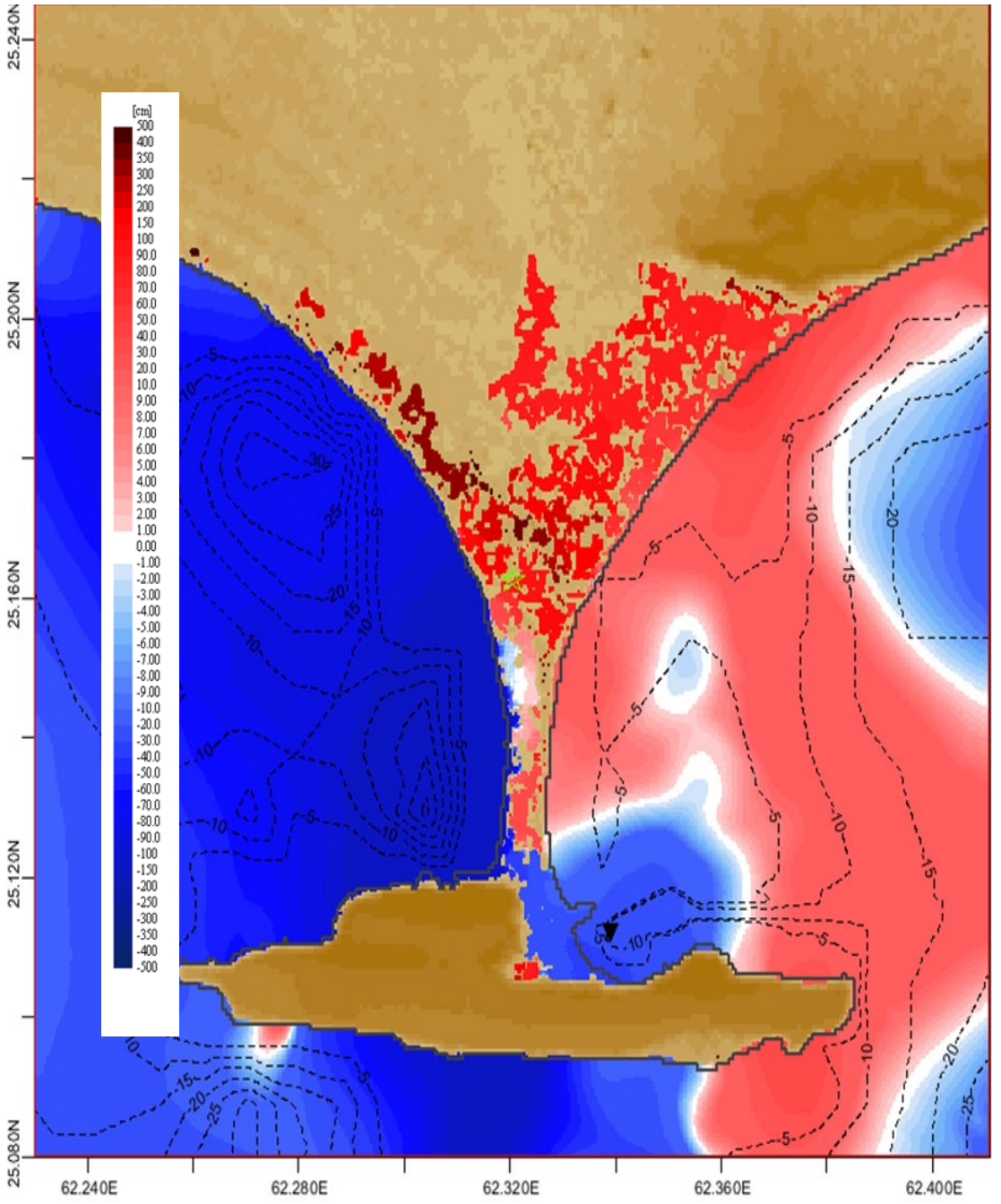




Source: PMD

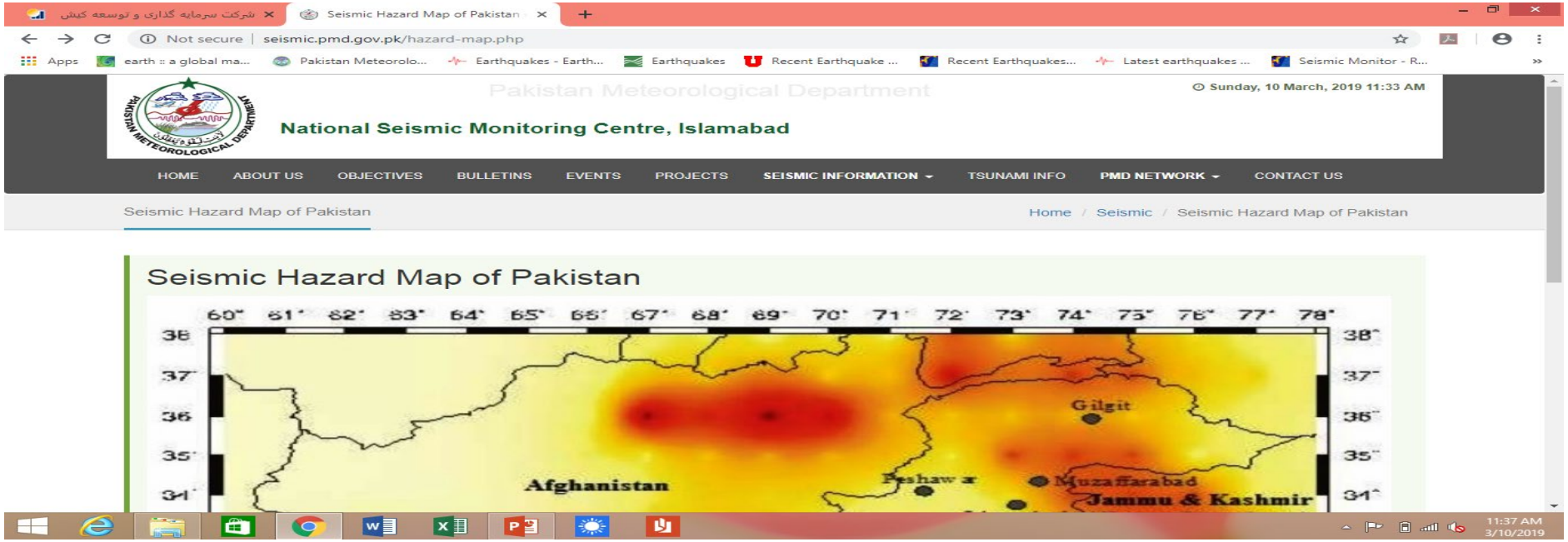
Makran Subduction Zone Mw 8.5 Simulation (Arrival Times (minutes)

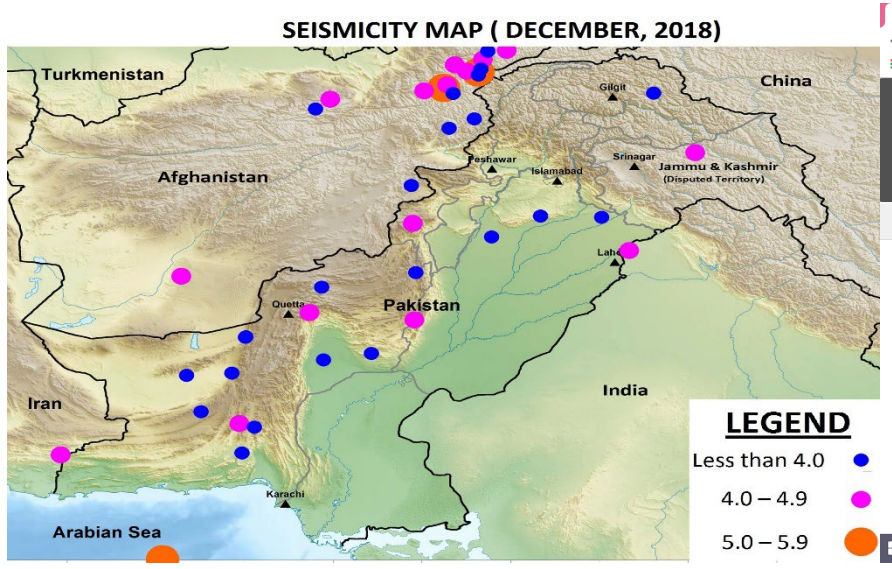

Gwadar1: Maximum Current Speed in run [knots]
Maximum speed in grid: 21.4 knots at lon: 62.2545 lat: 25.1054
Maximum flooded area: 16.13 km^2
Source: PMD
[knots]
12.0
9.00
6.00
3.00
0.00
25.240N
25.200N
25.160N
25.120N
25.080N
62.240E
62.280E
62.320E
62.360E
62.400E

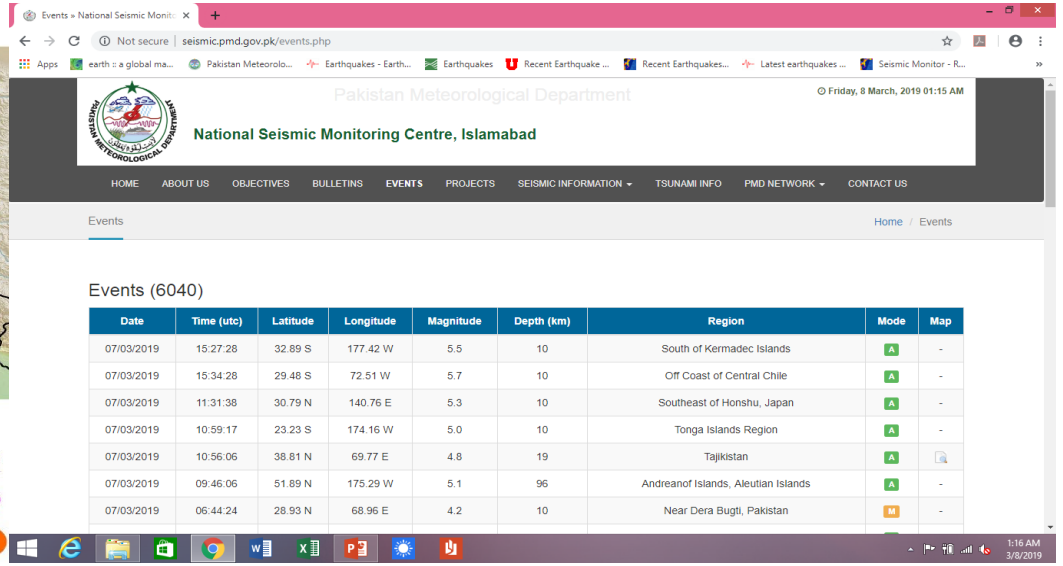

[cm]
25.240N
25.200N
25.160N
25.120N
25.080N
62.240E
62.280E
62.320E
62.360E
62.400E

PMD official web page for latest earthquake updates

http://seismic.pmd.gov.pk/events.php





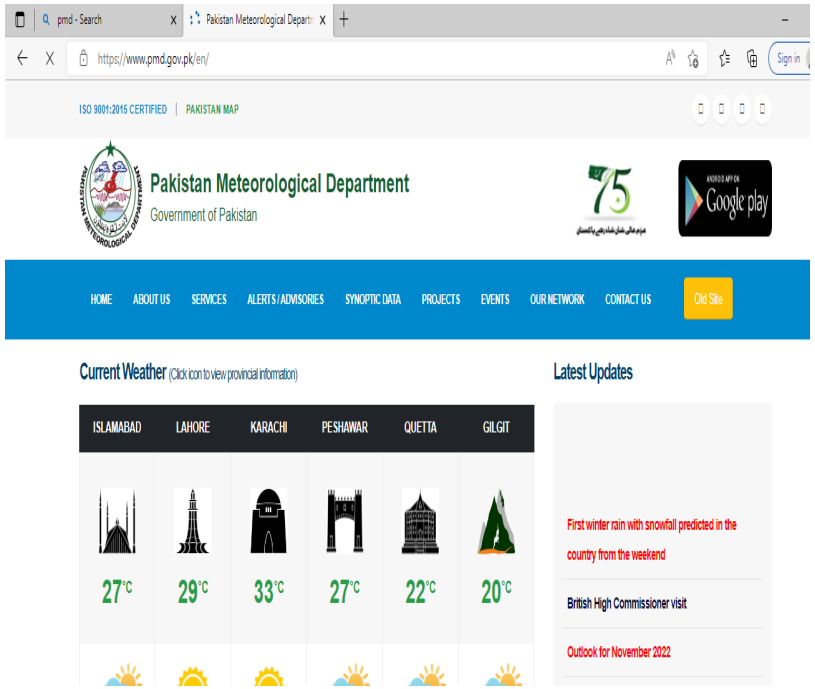


Date	Time (utc)	Latitude	Longitude	Magnitude	Depth (km)	Region	Mode	Map
07/03/2019	15:27:28	32.89 S	177.42 W	5.5	10	South of Kermadec Islands	A	-
07/03/2019	15:34:28	29.48 S	72.51 W	5.7	10	Off Coast of Central Chile	A	-
07/03/2019	11:31:38	30.79 N	140.76 E	5.3	10	Southeast of Honshu, Japan	A	-
07/03/2019	10:59:17	23.23 S	174.16 W	5.0	10	Tonga Islands Region	A	-
07/03/2019	10:56:06	38.81 N	69.77 E	4.8	19	Tajikistan	A	-
07/03/2019	09:46:06	51.89 N	175.29 W	5.1	96	Andreanof Islands, Aleutian Islands	A	-
07/03/2019	06:44:24	28.93 N	68.96 E	4.2	10	Near Dera Bugti, Pakistan	M	-

PMD OWN MEDIA CENTER

Mobile applications

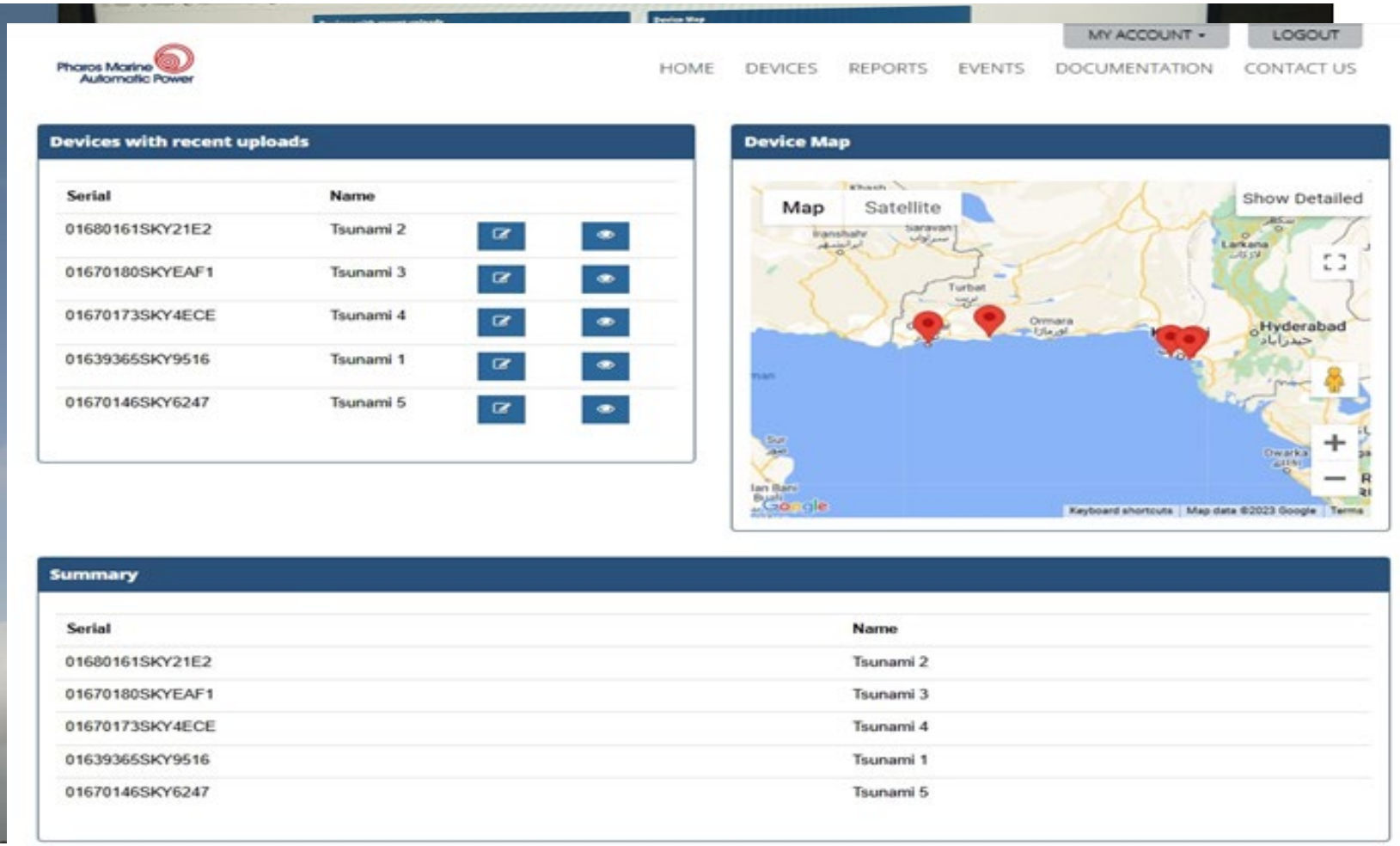
websites



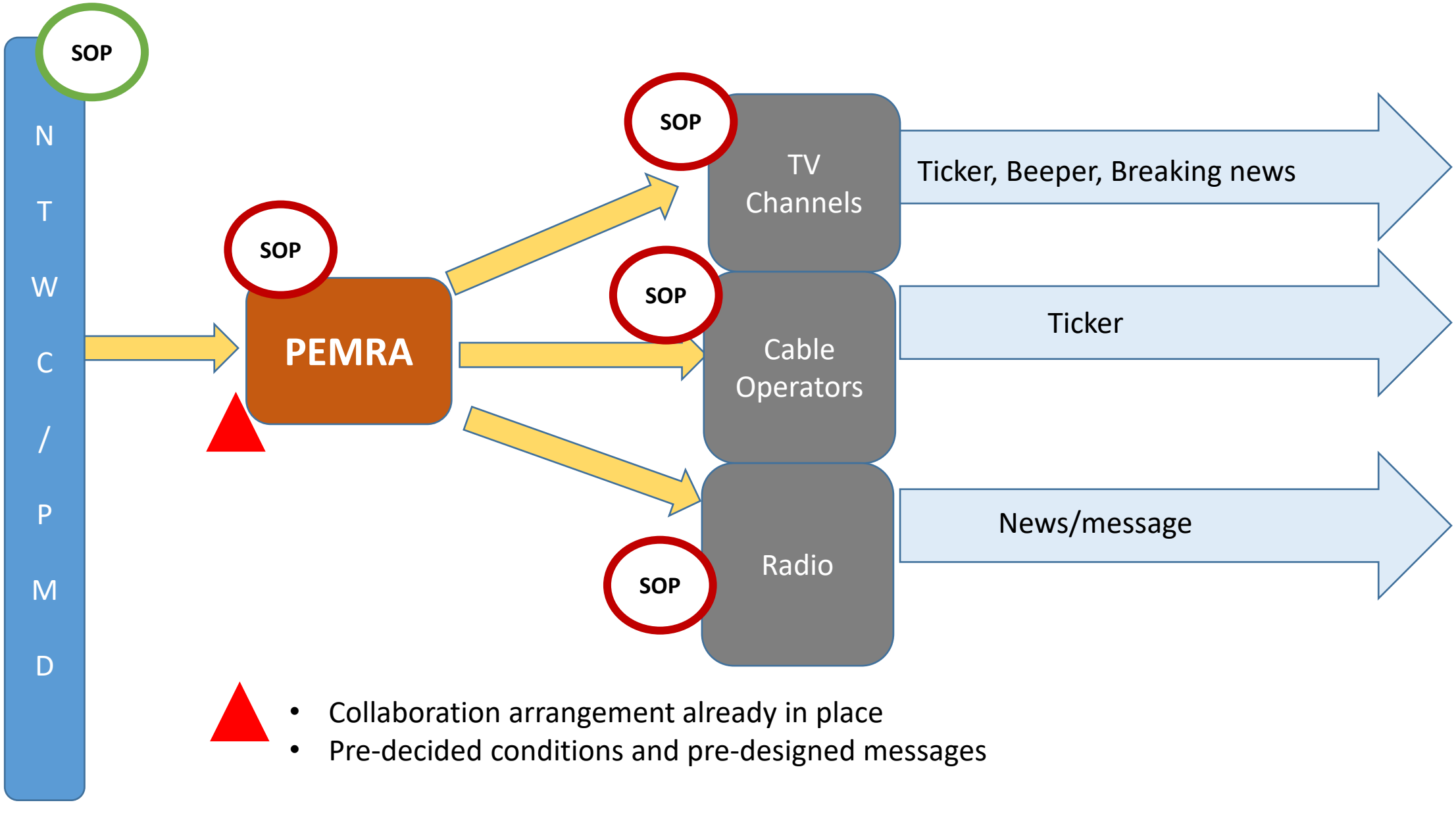
Available on YouTube clip

Tsunami Sirens

Five Tsunami Sirens have been installed Gwadar, Pasni, two at Karachi district Malir and one Sirens at Karachi west.



Pakistan Electronic Media Regulatory Authority



- Collaboration arrangement already in place
- Pre-decided conditions and pre-designed messages

APPENDIX B: COMMS TEST LOG 05th November 2025 for NTWC:
1. TSP AUSTRALIA Messages

Message	Time Received (UTC)				TSP Australia Website Accessible? (Y/N)	Time NTWC Warning Status Reported***	Comments
	SMS	GTS	Email	FAX			
0300 UTC Test Start	N/R	N/R	03:01	N/R			GTS Message Not Received
0305 UTC Notification Message 1	N/R	03:10	N/R	N/R			Email Message Not Received
0315 UTC Notification Message 2	N/R	03:16	N/R	N/R			Email Message Not Received
0330 UTC Notification Message 3	N/R	03:36	N/R	N/R			Email Message Not Received
0345 UTC Notification Message 4	N/R	04:36	04:36	N/R			Smooth Communicate
0400 UTC Notification Message 5	N/R	05:36	05:36	N/R			Smooth Communicate
0415 UTC Notification Message 6	N/R	06:36	06:36	N/R			Smooth Communicate
0430 UTC Notification Message 7	N/R	07:35	07:36	N/R			Smooth Communicate
0445 UTC Notification Message 8	N/R	08:36	08:36	N/R			Smooth Communicate
0500 UTC Notification Message 9	N/R	09:36	09:36	N/R			Smooth Communicate
0515 UTC Notification Message 10	N/R	10:36	10:37	N/R			Smooth Communicate
0530 UTC Notification Message 11	N/R	11:36	11:37	N/R			Smooth Communicate
0545 UTC Notification Message12	N/R	12:38	12:38	N/R			Smooth Communicate
0600 UTC Notification Message13	N/R	13:36	13:36	N/R			Smooth Communicate
0615 UTC Notification Message14	N/R	14:36	14:37	N/R			Smooth Communicate
0630 UTC Notification Message 15	-	-	-	-			
0645 UTC Notification Message 16	-	-	-	-			

*** Note that the NTWC Warning Status only needs to be reported on *one* TSP website, and only after Notification Messages 2, 3 and 4 from one TSP only (i.e. send a total of 3 NTWC status reports).

NOTE: NO SMS and FAX Messages was received From TSP AUSTRALIA .

APPENDIX B: COMMS TEST LOG 05th November 2025 for NTWC:
2. TSP INDIA Messages

Message	Time Received (UTC)				TSP India Website Accessible? (Y/N)	Time NTWC Warning Status Reported***	Comments
	SMS	GTS	Email	FAX			
0300 UTC Test Start	N/R	02:59	02:59	N/R			Smooth Communicate
0305 UTC Notification Message 1	N/R	03:08	03:08	N/R			Smooth Communicate
0315 UTC Notification Message 2	N/R	N/R	03:16	N/R			GTS Message Not Received
0330 UTC Notification Message 3	N/R	N/R	03:31	N/R			GTS Message Not Received
0345 UTC Notification Message 4	N/R	04:50	04:01	N/R			Smooth Communicate
0400 UTC Notification Message 5	N/R	05:01	05:01	N/R			Smooth Communicate
0415 UTC Notification Message 6	N/R	06:18	06:00	N/R			Smooth Communicate
0430 UTC Notification Message 7	N/R	07:41	N/R	N/R			Email Message Not Received
0445 UTC Notification Message 8	N/R	08:07	08:00	N/R			Smooth Communicate
0500 UTC Notification Message 9	N/R	09:00	09:00	N/R			Smooth Communicate
0515 UTC Notification Message 10	N/R	10:01	10:00	N/R			Smooth Communicate
0530 UTC Notification Message 11	N/R	11:00	11:00	N/R			Smooth Communicate
0545 UTC Notification Message12	N/R	12:00	12:00	N/R			Smooth Communicate
0600 UTC Notification Message13	N/R	N/R	13:00	N/R			GTS Message Not Received
0615 UTC Notification Message14	N/R	14:01	14:00	N/R			Smooth Communicate
0630 UTC Notification Message 15	N/R	15:01	15:01	N/R			Smooth Communicate
0645 UTC Notification Message 16	-	-	-	-			

*** Note that the NTWC Warning Status only needs to be reported on *one* TSP website, and only after Notification Messages 2, 3 and 4 from one TSP only (i.e. send a total of 3 NTWC status reports).

NOTE: NO SMS and FAX Messages was received From TSP INDIA.

APPENDIX B: COMMS TEST LOG 05th November 2025 for NTWC :
3. TSP INDONESIA Messages

Message	Time Received (UTC)				TSP Indonesia Website Accessible? (Y/N)	Time NTWC Warning Status Reported***	Comments
	SMS	GTS	Email	FAX			
0300 UTC Test Start	03:03	03:00	03:00	N/R			Smooth Communicate
0305 UTC Notification Message 1	03:18	03:07	03:07	N/R			Smooth Communicate
0315 UTC Notification Message 2	03:29	03:12	03:12	N/R			Smooth Communicate
0330 UTC Notification Message 3	03:46	03:31	03:30	N/R			Smooth Communicate
0345 UTC Notification Message 4	04:10	04:01	04:00	N/R			Smooth Communicate
0400 UTC Notification Message 5	05:14	05:00	05:00	N/R			Smooth Communicate
0415 UTC Notification Message 6	06:10	06:00	06:00	N/R			Smooth Communicate
0430 UTC Notification Message 7	07:15	N/R	07:01	N/R			GTS Message Not Received
0445 UTC Notification Message 8	08:12	08:00	08:00	N/R			Smooth Communicate
0500 UTC Notification Message 9	09:07	09:03	09:00	N/R			Smooth Communicate
0515 UTC Notification Message 10	10:10	10:02	10:00	N/R			Smooth Communicate
0530 UTC Notification Message 11	11:14	11:00	11:00	N/R			Smooth Communicate
0545 UTC Notification Message12	12:04	12:00	12:00	N/R			Smooth Communicate
0600 UTC Notification Message13	13:10	13:02	13:00	N/R			Smooth Communicate
0615 UTC Notification Message14	-	-	-	-			
0630 UTC Notification Message 15	-	-	-	-			
0645 UTC Notification Message 16	-	-	-	-			

Is the Warning Receiver System (WRS) of TSP Indonesia accessible? Yes/No
url:https://inatews.bmkg.go.id/wrs/tsp/index.html

*** Note that the NTWC Warning Status only needs to be reported on *one* TSP website, and only after Notification Messages 2, 3 and 4 from one TSP only (i.e. send a total of 3 NTWC status reports).

NOTE: NO FAX Messages was received From TSP INDONESIA.


DELL

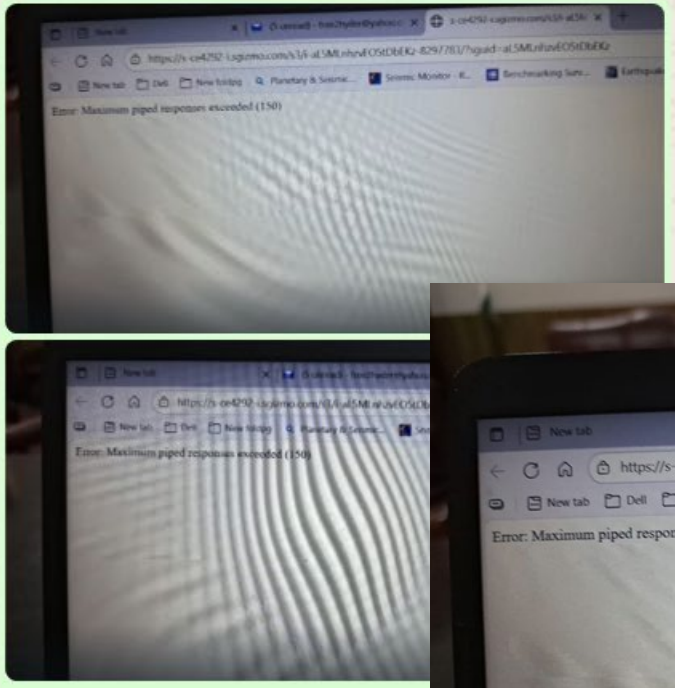

BEWARE OF TSUNAMI

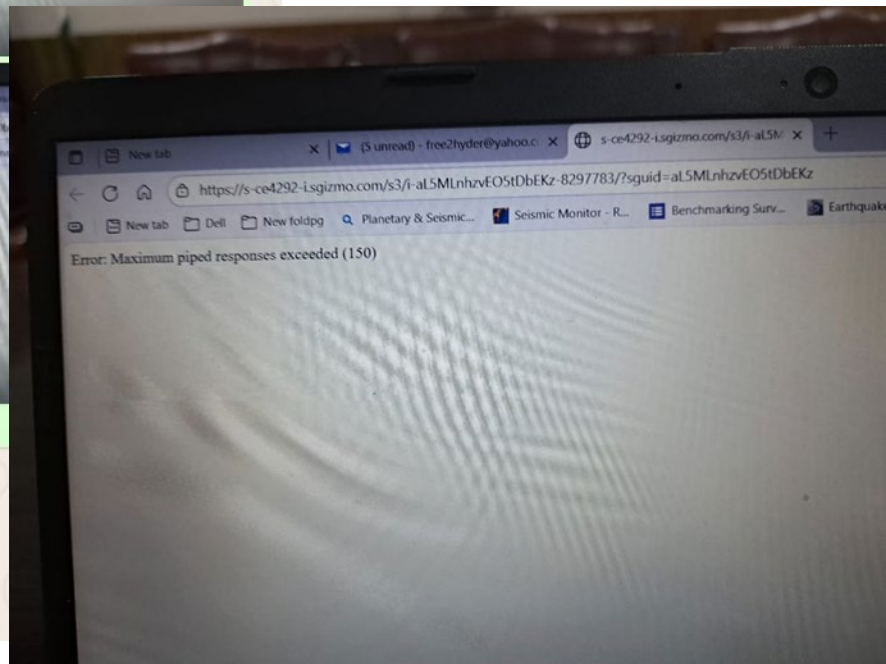

DELL

Error found during filling post-exercise evaluation form.

Hope you are doing well. 12:22

When I am filling out online post-exercise evaluation forms so I don't, and this appeared enclosed picture 12:25





Dear Ameer, Thanks for your message. I will try to help you. Please check your answer to the question 'How many communities participated in evacuations?' Did you enter a number greater than 150? If so, please change it to a smaller number. Let me know if this fixes the issue. 12:48

Conclusion

- Oceanic disasters such as tsunamis, cyclones have a devastating impact on the coastal belt of Pakistan.
- These disasters can cause loss of life, damage to infrastructure, and distraction of livelihoods.
- It is important that we take serious actions to address the impact of these disasters and implement prevention and mitigation strategies to reduce their impact.
- Prevention and mitigation strategies such as include
  - Building resilient infrastructure near coastal belt
  - Educating communities on how to prepare for disasters.

suggestion

- Since the first peak of the mock tsunami in Gwadar arrives at the open coast and at the harbor 12 – 20 minutes after the origin time of the dis-location.
- National early warning system, evacuation routes and emergency shelter locations should be indicated in the hazard map to help the population and local authorities in the event of a future tsunami occurrence.

Self-response training for communities is the best solution.

- Detection of early warning via on natural sign
- Basic emergency response (how and where to evacuate)

Thank You