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Intergovernmental Oceanographic Commission

SUBREGIONAL WORKING GROUP FOR THE NORTH WEST INDIAN OCEAN (NWIO)

Progress Report

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Subregional Working Group For The North West Indian Ocean (NWIO)

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Terms-of-Reference

1. To evaluate capabilities and ascertain requirements of countries in the northwest Indian Ocean region for providing end-to-end tsunami warning and mitigation services within a multi-hazard framework and within the framework of the ICG/IOTWMS.
2. To promote and facilitate tsunami hazard and risk studies and research in the region.
3. To facilitate cooperation in the establishment and upgrading of seismic, sea level, and GNSS stations and networks and communication systems in the region.
4. To facilitate improvement of the education programs on tsunami mitigation in the region.
5. To facilitate capacity building and the sharing of tsunami-related data and information in the region.

1. Progress on Activities

UNESCAP Project

Strengthening Tsunami Warning in the North West Indian Ocean through Regional Cooperation

- **Phase 1 (completed), development of PTHA, national tsunami warning chain, and SOP development.**
- **Phase 2a and 2b Completion of PTHA and scientific knowledge transfer, Finalized the national tsunami warning chains and SOPs and Identified best practices and capacity in inundation and evacuation mapping.**
- **Phase 2C training in inundation modeling and evacuation planning for the identified pilot area.**
- **Phase 3 At-risk coastal community preparedness**

1. Progress on Activities

Other Projects

- Seismic bulletin update
- Detailed bathymetry and coastal onshore topography.
- Paleo-tsunami project
- Other non-seismic data
- The GPS data.
- Atypical tsunami sources
- Earthquake forecasting ongoing project.
- Mud-Volcanos

1. Progress on Activities

IGCP Project (740)

- ✓ Tsunamis
- ✓ Paleo-tsunami studies: importance & limitation
- ✓ Why Makran Subduction Zone?
- ✓ Project IGCP UNESCO 740

No.	Description of Stage	Duration (Day)	1st Year	2nd Year	3rd Year	4th Year
Phase-1						
1	Literature review (published papers and local reports)	60				
2	Revision of the methodology and final methodology selection	20				
Phase-2						
3	Kickoff meeting	2				
4	Preliminary field visit & sites selection for trenching	30				
5	Final sites selection for trenching/training	30				
6	Trenching in 5 selected sites (20 trenches)/ training	218				
7	Trench mapping & sampling/ training	120				
8	Sediment & Stratigraphy analysis in the trenches/ training	200				
9	Reporting and samples preparation	40				
Phase-3						
10	Dating & geochemical analysis	210				
11	Data integration/ knowledge transfer	30				
12	Interpretation/ knowledge transfer	60				
13	Final report	40				
14	Technical meeting and decision making for extension of the project in Pakistan or Oman/ knowledge transfer in regional sense.	327				

1. Progress on Activities

IGCP Project (740)

Final selected sites on the western onshore Makran

1. Progress on Activities

Meteo-tsunami Persian Gulf

- Develop a building stone for further analysis to support the identification of the most probable tsunami occurrence from a meteorological point of view.

- North and South Persian Gulf are known to be affected by Meto-tsunami in the past and present.

- A paper was presented on Challenges, historical and recent, Meteo-tsunamis in the Persian Gulf and their economic impact on MENORA international conference in Spain, last year.

1. Progress on Activities

Meteo-tsunami Persian Gulf

Meteotsunamis on 19 March 2017 in the Port of

1. Progress on Activities

Status of Action Items from Intersessional Steering Group December 2020

Sl No.	Actions & Recommendations	Status
1	Requests the ICG/IOTWMS to encourage all Member States to work on their tsunami warning chain with a view to minimize the number of steps (between the NTWC and Public) in the warning chain, and with clear authorization of responsibilities amongst the NTWCs, NDMOs, LDMOs and Public.	As part of UNESCAP Project Warning Chains of all MSZ member states were refined and SOPs are being prepared
2	NWIO-WG member states are urged to exchange real-time data with the TSPs. It is also strongly suggested to go toward the multi-lateral.	Currently bi-lateral agreements between member states is in progress
3	The reaction to atypical tsunami events needs to be incorporated into tsunami early warning systems including community evacuation and emergency plans.	'Atypical' events needs to be further studied to incorporate them in TEWS
4	On-job training also needs to be initiated among NWIO member countries, may be when international travel is safe we can start with one by one member state.	Member states to consider after COVID-19 situation comes under control
5	Initiate building knowledge-based database of risk assessment (approaches adopted for hazard, vulnerability and risk assessment) that is accessible to all Member States (possibly IOTIC site or other portal).	Yet to initiate. NWIO will coordinate with IOTIC, A working plan to be initated
6	Paleotsunami study has been initiated in Iran by the University of Hormozgan, to be extended in the region, this can help us to know more historical seismicity and also achieve the required Mmax for hazard studies.	Frist workshop conducted in October. To be extended to other member states in future
7	Encourage the participation **and experts of North** West Indian Ocean representatives in webinars and workshops with a focus on the Makran region.	On going
8	Chairs of WG1, WG2, WG-NWIO, and Task Teams to prepare a proposal for UN Ocean Decade with support from IOTIC and the Secretariat for enhancement by the Steering Group. Consider focusing on 1) Near-field tsunami warning and mitigation including: transforming tsunami warning services through new technology (GNSS, smart cables) through to community preparedness and infrastructure; and/or 2) Tsunami monitoring gaps in NWIO. In-particular enhancing the observing networks, PTHA development, and data sharing. These activities could be expanded to the entire Indian Ocean basin	Ongoing **?? Need to be completed or Removed**
9	Working Groups to review the recommendations of the Capacity Assessment of Tsunami Preparedness: Status report 2018.	To review? **To be checked**
10	WG-2 and WG-NWIO to provide advice to Makran project team on harmonisation issues of NTWC products and warnings in the NWIO	Completed

2. Challenges

- Identifying all potential sources of the tsunami in the Makran Subduction **Zone including non-seismic, suggest a new zonation map in the Makran region.**
- Assess and mitigate local tsunami threats, **Near Field**
- Integrating national tsunami warning chains with other multi-hazard frameworks
- Timeliness of tsunami warnings for near-field tsunami events, **SOP at its final stage in many countries in the region.**
- Need to further research the seismicity of the region and how to include features such as splay faulting, and non-seismic sources in the PTHA, that is including atypical tsunamis in the PTHA **(The result to be reported and knowledge transfer to the region, this is a big challenge**).
- **Optimal network design for Data Sharing**
- Strengthening of observation network with advanced technologies (GNSS/SMART Cables/OBS etc.)
- **Local language barrier needs some action**

3. Way Forward & New Opportunities

- Phase 2 UNESCAP Project to be finalized in 2022 and phase 3 to be started in 2023.
- Paleo-tsunami project is now supported with limited funding by IGCP. The work is being continued and trenching locations are being finalized and online trenching will start soon. Now Pakistan also will be involved soon in the activity, 2023
- Utilize National Tsunami Working Groups established by UNESCAP Project to further coordinate, maintain, and develop national tsunami warning chains.
- Utilize national and next IOWAVE exercises to test and enhance national tsunami warning chains
- **Engage local communities in pilot areas identified by UNESCAP Project in the region.**
- **Tsunami Ready implementation should be further enhanced and knowledge transfer within NWIO or other groups should be followed up.**
- **The unified inundation and evacuation are on their way to be established, which will have the task of major advice to states of NWIO, so the maps to be produced.**
- **Mud-volcanos as hazardous sources should take more attention in the region.**
- **A typical tsunami source should be worked on and given priority so the result could be implemented in the PTHA simulation and …….**

3. Way Forward & New Opportunities

- **Seismicity study and updating of the seismic bulletin in the region.**
- **Planning a detailed bathymetry and possible coastal onshore topography investigation.**
- **Paleo-tsunami project supported by IGCP UNESCO with limited funding (4 years project). Cooperation with Pakistan and Oman 2023.**
- **Other non-seismic data gatherings or using international databases, such as gravity and magnetic data in the western Makran.**
- **To improve a better understanding of deformation uses the GPS data among the regional states.**
- **Atypical tsunami sources such as meteotsunami, splay faulting, Normal faulting, and Landslides.**

- **Looking at improving earthquake forecasting through one project again supported by IGCP UNESCO the other project is ongoing in the Makran region, hopefully, could be expanded to Pakistan and Oman.**

3. Way Forward & A suggestion

IOWAVE DRILL DAY

- 1945 November 28 Makran Tsunami


The Daily Gazette

TIDAL WAVE CAUSES INRUSH OF SEA-WATER

Sequel To Quake Shock In Karachi

REPORTED DAMAGE TO KEAMARI GROYNE

- I would like to suggest on this day in the future we perform an
- **IOWAVE DRILL DAY** to give us a remembrance of this disastrous area.