INTERSESSIONAL MEETING OF SUBREGIONAL WORKING GROUP

FOR THE NORTH WEST INDIAN OCEAN

Online Meeting
8-9 December 2020

Members

Dr. Mohammad Mokhtari, Chair (Iran)
Ms. V. Sunanda Manneela, Vice-Chair (India)
Mr. Dipankar Saikia (India)
Mr. Jaifar Al-Busaidi (Oman)
Mr. Ameer Hyder (Pakistan)
Mr. Tariq Ibrahim (Pakistan)
Majed Alshkeili (UAE)
Mr. Mohammed Ali Al-Eryani (Yemen)
Mr. Ahmed Al-Jabal (Yemen)

Invited Experts

Mr. Rick Bailey (Australia)
Dr. Andrey Babeyko (Germany)
Mr. Harald Spahn (Germany)
Mr. Patanjali Kumar Chodavarapu (India)
Dr. Mahmood Reza Akbarpour Jannat (Iran)
Dr. Ali Khoshkholgh (Iran)
Dr. Juma Al-Maskari (Oman)
Mr. Khalid Al-Wahaibi (Oman)
Mr. Khalifa Al Ebri (UAE)

United Nations Representatives

Ms. Nora Gale (UNESCO-IOC)
Mr. Naeem Iqbal (UNDP)
Mr. Ardito M. Kodijat (UNESCO)

Participants at the Intersessional Meeting of the Subregional Working Group for the North West Indian Ocean, Online Meeting, 8-9 December 2020

2.1 OPENING

Dr. Mohammad Mokhtari, Chair of the Subregional Working Group for the North West Indian Ocean (WG-NWIO), declared the meeting open at 08:30 UTC and welcomed all participants to the two-day intersessional meeting. He emphasised that the 'once forgotten' Makran subduction zone is becoming an increasingly interesting area to study.

The provisional Meeting Agenda was adopted (see Annex 1). Dr. Mokhtari reviewed the terms of reference and membership of the Subregional Working Group for the North West Indian Ocean.

The terms of reference are:

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 programmes on tsunami mitigation in the region.
5. To facilitate capacity building and the sharing of tsunami-related data and information in the region.

Member States include India, Iran, Oman, Pakistan, United Arab Emirates and Yemen. The list of participants in the meeting is provided above at the start of Section 2 with more details provided in Annex 2.

2.2 PROGRESS OF ACTIVITIES

Dr. Mokhtari presented the actions and activities of the WG-NWIO, many of which are being undertaken and supported by the UNESCAP funded project "*Strengthening Tsunami Warning in the North West Indian Ocean through Regional Cooperation*". Key initiatives include NTWC product harmonisation. Significant gaps have been noted regarding the understanding of Makran tsunami hazards. These are related to a lack of observing networks, seismicity studies, tsunami hazard assessments, and large uncertainties regarding the tsunami generation from atypical sources. Disaster managers and decision makers working on the last-mile do not know how to adequately determine the Makran tsunami threat due to differences in expert findings and the lack of consensus. Harmonisation of tsunami warnings and products in the NWIO is an important initiative currently being undertaken.

Future priorities and recommendations were presented. It is important for local decision makers to guide in-country tsunami hazard assessments and inundation mapping based on the current understanding of the Makran subduction zone. The tsunami early warning strategies against the background of the current experiences with near-source tsunamis should be reviewed. An online workshop for unification should be organised by the PTHA expert team.

Ms. Nora Gale presented on behalf of the ICG/IOTWMS Secretariat. The report of the Secretariat covered the terms of reference and staffing, website development, meetings of the Working Groups and Steering Group, publications, UNESCO-IOC Tsunami Ready, Exercise IOWave20, and the UNESCAP-funded project on *Strengthening tsunami warning in the North West Indian Ocean region through regional coordination which is helping to address many of the issues mentioned above by Dr. Mokhtari*.

2.3 COUNTRY REPORTS

2.3.1 India

Mr. Patanjali Kumar Chodavarapu (INCOIS) reviewed the status of tsunami activities in India and progress of the tsunami risk assessment for the Makran subduction zone. The Indian seismic network for tsunami early warning consists of 17 national broad band stations and around 400 international stations. There are 35 national GNSS station located in the Andaman and Nicobar Islands. INCOIS also maintains a network of 7 tsunami buoys. Shared data for tsunami monitoring consists of three seismic stations, seven tsunami buoys and eight tide gauges. The Indian tsunami warning chain and standard operating procedures were presented. These have been a focus of the UNESCAP project for the four participating countries: Indian, Iran, Oman, and Pakistan (UAE is also joining). A quantitative tsunami forecast includes both the Makran and Sunda seismogenic zones. Tsunami bulletins and graphic products are on the national website: *www.tsunami.incois.gov.in*. Progress on Service Level III, Tsunami Inundation for the Indian Coast, is currently experimental and being made available to disaster management officers. Mr. Chodavarapu reported on India's participation in tsunami awareness activities including WTAD 2020, IOWave20, and Tsunami Ready.

Dr. Mokhtari requested more information on the tsunami forecast. Mr. Chodavarapu elaborated that INCOIS are using the scenario database for events along the subduction zones for the tsunami forecast.

2.3.2 Iran

Dr. Ali Khoshkholgh presented on activities in Iran. A meeting of the tsunami National Working Group with representatives from key organisations in Iran including NTWC, DMO, ports, research organisations and the media was held in November 2019. They participated in the Karachi workshop (February, 2020) for the UNESCAP-funded project on *Strengthening tsunami warning in the North West Indian Ocean region through regional coordination*. They also participated at the regional workshop on NTWC harmonization in November 2020.

Iran has been developing their national tsunami warning chain and standard operating procedures, as well as participating in national consultative meetings and workshops in support of the UNESCAP-funded project. The need to include the DMO in the National Working Group and nominate a pilot community for standard operating procedure development was noted. Iran was unable to participate in IOWave20, however, they did educational outreach for WTAD at a school in Chabahar. Dr. Khoshkholgh kindly requested Dr. Mokhtari to assist by asking the national and local DMOs to prepare and submit their standard operating procedures to National Working Group Secretariat.

Dr. Mokhtari asked if they have other public education programs. Dr. Khoshkholgh replied that they currently only do outreach for the Exercise IOWave and WTAD, but it would be good to increase this activity. It was suggested that the Secretariat could write a high-level letter to encourage more tsunami outreach activities in Iran, or a general recommendation be made by this group

2.3.3 Oman

Mr. Jaifar Al-Busaidi presented on activities in Oman, noting the close proximity to the Makran subduction zone. The Oman National Multi-Hazard Warning System (ONMHWS) receives real-time data from their seismic, sea level and GNSS networks. In 2005, they began establishment of the system and in 2009 an agreement with UNESCO-IOC was signed to assist with the implementation. All data is received at the tsunami warning centre. Separate Standard Operating Procedures have been developed for near-field and far-field events. There are 3,181 scenarios in their database. Risk assessments have been undertaken at the national scale and national hazard maps include inundation length and tsunami run-up. Previous IOWave exercises were reviewed with the largest participation being in 2018. IOWave20 was conducted as a communication and table top exercise only. School curriculum includes earthquake and tsunami education.

Future activities were presented including updates to the hazard and risk assessments for the entire coastline, increase observing networks, and capacity building.

Dr. Mokhtari asked who is responsible for GPS data and is it possible to get online. Mr. Al-Busaidi replied they are part of the ONMHWS and he is not sure if they are being shared.

Dr. Mokhtari asked about the bathymetry detail in the modelling. Mr. Al-Busaidi said he is unsure as it is being done by another department, but can follow-up.

2.3.4 Pakistan

Mr. Ameer Hyder presented on activities in Pakistan. The Pakistan Meteorological Department (PMD) is responsible for issuing warnings for all meteorological disasters. They are increasing the seismic stations along Sindh and Balochistan coasts, as well as near Quetta. The data management center in Islamabad was upgraded in 2019 with SeisComp3 earthquake processing software. The back-up center in Karachi is in the process of being upgraded through a UNDP-project including TOAST software, new sirens, and a SeisComPro earthquake analysis system. Once the new upgrades are complete, their Standard Operating Procedure will be updated to better adhere to the time constraints of near-field sources. Consistency in levels and colour coding of warnings is being discussed with a view to harmonise across all agencies. The website is being improved to include intensity and location maps. They currently have a weather mobile application that will be improved to include an earthquake warning message to the general public.

NED University is working on hazard mapping, including identifying route and evacuation places for Gwadar with the intention to expand to Karachi, Pasni and other locations. They have 4 GPS stations installed at Gwadar, Karachi, Omara and Pasni. The Red Cross is working on awareness in communities. Pakistan is attempting to include tsunami syllabises in the school curriculum. However, much work has been stalled because of the Covid-19 pandemic.

Dr. Mokhtari asked about the memorandum of understanding with Oman on data sharing. Mr. Hyder replied that is for the Ministry to make the decision if the data can be shared or not.

2.3.4 Yemen

Mr. Mohammed Al-Eryani presented on the status of activities in Yemen. He reviewed the seismic monitoring networks, including two broadband seismometers supported by GFZ. The majority of earthquakes occur along the Gulf of Aden and the western side of Yemen. The seismological center is located in Dhamar city, which is 80-km to the south of Sanaa. Future activates in Yemen include modernization and expansion of seismic stations, linking the local seismic network with regional monitoring centers, and building the capacity of national employees.

2.4 REPORT ON IMPROVEMENT OF TSUNAMI WARNING CHAINS

Mr. Harald Spahn presented on tsunami warning chains and Standard Operating Procedures in the North West Indian Ocean countries including India, Iran, Oman and Pakistan. An outcome of strengthening early warning UNESCAP project is to have revised tsunami warning chains. He provided an overview of what has been achieved, including revised and consolidated near-field warning chains in all four countries. With the exception of Oman, decision making is by the local DMO making them main players in the warning chains.

The work that still needs to be done includes involvement of local DMOs, involvement of media, documentation about the national warning chains, process and policies, and development or update of timeline-drive and integrated institutional Standard Operating Procedures.

Mr. Rick Bailey stressed the importance of engagement of local DMOs in the warning chain. Formal documentation and recognition at the national level could assist the local DMO to resource their tsunami activities.

Mr. Khalid Al-Wahaibi asked about involvement of media in training workshops. Mr. Kodijat replied that there are plans for two Standard Operating Procedure workshops involving media as part of the UNESCAP-project. Mr. Bailey noted that holding a virtual workshop could encourage many more media representatives to become involved.

2.5 HARMONIZATION OF TSUNAMI WARNINGS AND PRODUCTS IN THE NORTH WEST INDIAN OCEAN

Mr. Spahn reported on harmonisation of NTWC warnings and products at the regional workshop on 26 November. He provided a summary chart of thresholds, warning levels and colour codes and emphasized the importance of a clear understanding of how we define thresholds. In the long term it would be ideal to have harmonised thresholds that align with what the TSPs are reporting, for example, wave amplitude at beach.

The TOWS-WG Inter ICG TT TWO, 2011 defined the warning levels in a tiered approach [0-3] defined by the potential impact and an updated scheme is provided in the NTWC Users guide 2019. Mr. Spahn recommended using the later as a reference for further discussion on harmonisation in the NWIO. In terms of the NTWC advice messages, most NWIO countries already follow the scheme with the exception of Oman which has a different logic. However, Oman has agreed to review this.

The terms ‘no threat’, ‘end of threat’, and ‘all clear’ were discussed as defined in the 2019 Tsunami Glossary. The no threat message is used for an earthquake that is felt, but does not pose a tsunami threat, and serves to help avoid any unnecessary self-evacuation. It is important to highlight that we must be certain that the earthquake has not triggered a tsunami and secondary effects can generate tsunami. Furthermore, there is the risk that such messages can result in complacency. Hence it is a complicated issue and we need to decide on how to deal with it. There are two possible ways to deal with no threat messages: 1) integrate as a warning level or 2) as a separate message.

Mr. Rick Bailey noted that for a non-local event a secondary effect may not be an issue. However, for a local event there is this risk. No threat messages are also seen as important as warning messages, as the community might not understand that a tsunami may not have been generated, even though there was an earthquake. No threat messages are important for avoiding false alarms and panic, which can also be dangerous

Dr. Andrey Babeyko commented on the no threat issue. The 2013 inland Pakistan event was 200 km inland and caused an offshore landslide resulting in a tsunami. This makes the no threat message very complicated. He noted merit in accessing how other near-field warning systems (i.e. Japan, Chile, etc.) address this. However, this is exaggerated in the Makran region.

Dr. Mokhtari suggested to document this “no threat” as a paper and send to the expert modelers for comment.

Dr. Babeyko suggested a disclaimer to state that there is no effect from the primary earthquake, however, for the secondary sources a tsunami may be possible.

Ms. Gale presented on harmonisation with TSPs in terms of amplitude and wave height at the coast. Mr. Bailey noted the importance of using the same interoperable definitions to ensure similar understandings when describing a tsunami threat. There were no comments from the Makran countries. Oman fully agreed with this proposal and will discuss at the organisational level.

2.6 NON-SEISMIC TSUNAMI SOURCES

Dr. Babeyko initiated a discussion about primary non-seismic sources or cascading effects. Mr. Spahn agreed that both are important issues.

Mr. Bailey noted that the local tsunami best practices presented at TOWS-WG (2020) are dealing with these same issues including atypical non-seismic tsunamis. These issues could be further discussed with WG-2 with a view to raise at TOWS-WG.

There was a discussion about the importance of no threat messages, especially on the balance between public knowledge and forecast uncertainties. It was suggested that WG-NWIO and WG-2 could collaboratively address these issues.

2.7 STATUS OF THE UNESCAP PROJECT

Ms. Nora Gale reported on the status of the UNESCAP-funded project on *Strengthening tsunami early warning in the North West Indian Ocean region through regional cooperation*. There are two outcomes to phase 1 of the project: 1) better understanding of the risk knowledge based on scientific research and 2) improvement of warning services at NTWC level and the organization of the national warning chains to assure timely warnings and rapid response with due emphasis on self-protection for near source events. Due to ongoing international travel restrictions associated with the Covid-19 pandemic, since March the project workplan has been entirely online. Progress against both outcomes has been achieved via national consultation meetings, a regional workshop on Harmonization of NTWC Warnings and Products, and meetings on development of the Probabilistic Tsunami Hazard Assessment (PTHA) for the Makran region.

2.8 REPORT OF THE TASK TEAM ON TSUNAMI PREPAREDNESS FOR A NEAR-FIELD TSUNAMI HAZARD

Dr. Mahmood Reza Akbarpour Jannat presented on the Task Team on tsunami preparedness for a near-field tsunami hazard. He reviewed the terms of reference for the task team, which relate to activities of the UNESCAP-funded project on *Strengthening tsunami early warning in the North West Indian Ocean region through regional cooperation* including the NTWC product harmonization, national tsunami boards and warning chains. He reported on the last meeting of the Task Team that was held in Jakarta back-to-back with the Palu Symposium in September 2019.

Dr. Akbarpour Jannat shared the TOWS-WG TTTWO reference document for best practice for near-field tsunami response. Member States are encouraged to adapt their own guidelines noting the best strategy is self-evacuation based on natural warning signs. Official warning system must have simple warning chains. People must know not to wait for official warning before evacuation. Natural, official and unofficial warnings must be accounted for in the warning chain. Public education programmes should be based on natural warnings such as long and strong, get gone. The accepted best practice is to issue a warning within 5-10 minutes based on the best information available at the time. Error on the side of caution (i.e. plus 0.3 magnitude) noting that the magnitude can increase in the first 30 minutes.

Mr. Spahn asked about the comments on the document from the ICG/IOTWMS to the TOWG-WG. Dr. Yuelong Miao offered to follow up as a TOWS-WG representative.

Mr. Rick Bailey noted that the ICG/IOTWMS should work towards the inclusion of atypical sources such as landslides and volcanos in tsunami warnings.

2.9 STRENGHTHENING TSUNAMI AND EARTHQUAKE PREPAREDNESS IN PAKISTAN

Mr. Naeem Iqbal presented on the UNDP project on *Strengthening tsunami and earthquake preparedness in the coastal areas of Pakistan* funded by the Government of Japan. Key stakeholders include PMD, national and provincial DMOs, and Red Crescent Society. The first project output is to enhance capacity for earthquake and tsunami risk (through development of tsunami guidelines) and comprehensive tsunami risk in Gwadar, Majeed and Karachi. UNDP is working with PMD to strengthen end-to-end early warning. Furthermore, search and rescue operations are being enhanced and national building codes are being updated. The second project output is focused on community preparedness and capacity building through ducation and outreach material, training of trainers, district and sub-district community response plans and school safety plans. Tsunami evacuation sights will be developed in the vulnerable communities they are working in. Furthermore, a risk assessment is being completed by NED University as a partner to the UNDP-funded project.

Dr. Andrey Babeyko asked about implementation with the Japanese partners. He noted they are also trying to run a project on the risk assessment and it is important to correlate the activities and exchange information about the approaches at the correct time. Mr. Iqbal explained that although the overall project is funded by the Government of Japan there is a second tier of activities, which includes the risk assessment along the 1,000 km coastline. Dr. Mokhtari noted that it is important to know the database they are using.

Mr. Kodijat noted that for the warning chain component of the UNESCAP-funded project is closely coordinated with UNDP, so what is being done at the regional level can be taken through to the national level. The PTHA component of the UNESCAP-funded project should also be well aligned and coordinated with the UNDP project. Mr. Hyder noted that PMD is coordination with UNDP to ensure there is no overlap and the projects synergize. Dr. Mokhtari noted that we will work towards more coordination between UNDP and UNESCO-IOC.

2.10 DRAFT AGREEMENT DOCUMENT FOR REAL-TIME DATA EXCHANGE

Dr. Juma Al-Maskari presented the draft agreement for real-time multi-lateral data sharing in the North West Indian Ocean region. The agreement was drafted by the Task Team on Scientific Tsunami Hazard Assessment of the Makran Subduction Zone and presented at ICG/IOTWMS-XII (Kish, March 2019). The importance of sharing real-time data for tsunami modelling started as early as 2005 with the Mauritius Declaration. The first bilateral agreement for the exchange of real-time seismic data was signed in November 2016 for two stations between Iran and Oman. There is progress for a similar agreement between Pakistan and Oman and in fact they thought it was ready for signing in 2015. In July 2018, a meeting was held in Hyderabad where all attendees agreed on the need to exchange real-time data for tsunamis.

Parallel to this, Dr. Adrienne Mosely from Australia drafted a comprehensive multi-lateral agreement, which can also be used on a bilateral basis or between TSPs and NTWCs. This was provided to the ICG/IOTWMS Secretariat in March 2019. Ms. Moseley also drafted a communique on open data sharing, which was presented to the recent TOWS-WG meeting (February 2020).

Dr. Mokhtari noted that the University of Hormozgan in the south of Iran plans to establish more monitoring stations. The head of the university agreed to exchange these stations once functional. Further, the GPS data should be evaluated for use in real-time warnings. Lastly, CTBTO has stations in nearby counties (such as in Saudi Arabia) NWIO countries could gain access to.

Dr. Babeyko noted the difficulty in the task of exchanging seismic data. He asked if it would be easier to exchange GPS and sea level data. Dr. Al-Maskari commented that sea level data is already being shared. Dr. Babeyko further suggested that the institutions do more work in explaining to the governments that this data is very important to getting the whole story.

Ms. Sunanda Manneela clarified that INCOIS will start again on the data sharing note with the new director, Dr. Srinivas Kumar Tummala. She was expecting a map of the minimal stations for data sharing that could be attached to the proposal. INCOIS plan to take the proposal it to the Ministry and a recommendation from the United Nations on the importance of data sharing would be of great benefit when they presenting the agreement to the Ministry.

2.11 PROGRESS REPORT OF DEVELOPMENT OF PROBABILISITIC TSUNAMI HAZARD ASSESSMENT FOR THE MAKRAN REGION

Dr. Andrey Babeyko presented on development of a Probabilistic Tsunami Hazard Assessment (PTHA) for the Makran region and provided an introduction to the propagation simulations. The tsunami propagation from the deep water to the coast and the shoreline inundation are computed. Secondary sources, such as landslides triggered by the earthquake and splay faulting, are not accounted in the model. Finally, hazard aggregation is performed. He noted the importance of coordination of the UNDP initiative with their work.

The seismic source model from the Oman group (El-Hussain et al., 2018) will be used to give reoccurrence of sources noting the seismic source area is much larger than the Makran. Furthermore, this zone has been

extended to include west India based on work by Dr. Sumer Chopra. The predominate seismicity will be modelled along the Makran subduction zone plate interface. Millions of scenarios will be computed with the inclusion of areas outside of the Makran region.

Mr. Patanjali Kumar Chodavarapu explained the tsunami modelling pilot study in more detail including data preparation and model set-up. The modelling area covers the Arabian Sea, Red Sea and Persian Gulf regions with a simulation time of ~70 seconds. The model has shown stable results at 27 arc-seconds resolution. The finite element mesh and Cartesian grid were used on two modelling platforms. Comparison of these results indicate that Red Sea and Persian Gulf require full simulations whereas the Arabian sea will have partial simulations.

Dr. Babeyko noted the importance of incorporating all possible scenarios (an advancement on previous models). Allocating 20 minutes for each simulation, the study will take 30 months using Green's function. Reducing the study period to three months will require ten parallel threads. Notably, by using the INVG super computers this can be achieved in a couple of weeks.

Dr. Al-Maskari asked if the Arabian sea also includes the Gulf of Oman. Dr. Babeyko replied that the Gulf of Oman is included in the deep domain.

2.12 RECOMMENDATIONS AND ACTIONS

ICG/IOTWMS Subregional Working Group for the North West Indian Ocean Recommendations and Actions arising during the intersessional meeting are provided below.

Recommendation 1: Requests the ICG/IOTWMS to encourage all Member States in the NWIO region to:

a) 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.
b) ***E***xchange real-time data with the TSPs. It is also strongly suggested to go towards a multi-lateral agreement for sharing of real-time data.
c) Incorporate a response to atypical tsunami events into tsunami early warning systems, including community evacuation and emergency plans.
d) Engage the local DMOs in the warning chain. Formal documentation and recognition at the national level could assist the local DMO to resource their tsunami activities.
e) Develop broad community outreach on the tsunami risk and what to do in the event of a tsunami.
f) Adopt the TOWS-WG Inter ICG Task Team on Tsunami Watch Operations (2011) warning levels, defined in a tiered approach [0-3] according to the potential impact. An updated scheme is also provided in the NTWC Users Guide 2019., recognizing the importance of harmonizing tsunami warning products to better facilitate community awareness.
g) Recognise that No Threat messages are also seen as important as warning messages, as the community might not understand that a tsunami may not have been generated, even though there was an earthquake. No threat messages are important for avoiding false alarms and panic, which can also be dangerous
h) Include a disclaimer in near-field tsunami warnings to state that if there is no effect from the primary earthquake, a tsunami generated by secondary sources (such as submarine landslides) may still be possible
i) Use the same interoperable definitions in tsunami warnings to ensure similar understandings when describing a tsunami threat

Action 1: On-job training also needs to be initiated among NWIO member countries, may be when international travel is safe and we can start one by one with Member States.

Action 2: Initiate building a 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).

Action 3: Paleotsunami study initiated in Iran by the University of Hormozgan, should be extended in the region, helping to better understand the historical seismicity and also achieve the required Mmax for hazard studies.

Action 4: Mr. Al-Busaidi to advise on the general availability of bathymetry data collected by Oman.

2.13 WORK PLAN AND CLOSING OF THE MEETING

Dr. Mokhtari reviewed the topics discussed and asked all participants for final feedback. He noted that he will send an email to everyone asking for their inputs to the workplan. Dr. Mokhtari thanked all for their participation in a productive meeting and declared the meeting closed.

Annex 1

ICG/IOTWMS Subregional Working Group for the North West Indian Ocean

Agenda

08-09 December 2020

Chair: Dr. Mohammad Mokhtari

Time: 8:30 – 11:30 UTC*, 9:30 – 12:30 Germany, 11:30 - 14:30 Yemen, 12:00 – 15:00 Tehran, 12:30 – 15:30 Muscat/UAE, 13:30 – 16:30 Karachi; 14:00 – 17:00 Hyderabad; 15:30 – 18:30 Jakarta, 16:30 – 19:30 Perth*

Day-1: 08 December 2020 (Tuesday)

Time	Topic / Speaker
8:30 – 8:45 UTC	**1. Opening** *Dr. Mohammad Mokhtari (Chair of WG-NWIO)* *Ms. Nora Gale (ICG/IOTWMS Secretariat)* • **Welcome and Opening** • **Opening Remarks** • **Adoption of Agenda** • **Designation of the Rapporteur** • **Conduct of the meeting, Time table and Documentation**
8:45 – 9:30 UTC	**2. Progress of Activities** • **Report of the Chair** *(30 min)* *Dr. Mohammad Mokhtari (Chair of WG-NWIO)* • **Report from the Secretariat** *(15 min)* *Ms. Nora Gale (ICG/IOTWMS Secretariat)*
9:30 – 10:45 UTC	**3. Country Reports** *(10-15 min)* • **India** • **Iran** • **Oman** • **Pakistan** • **Yemen**
10:45-11:00 UTC	**4. Report on Improvement of Tsunami Warning Chains** *Mr. Harald Spahn (DRR consultant)*
11:00 – 11:15 UTC	**5. Harmonization of Tsunami Warnings and Products in the NWIO** *Mr. Harald Spahn (DRR consultant)*
11:15 - 11:30 UTC	**6. Discussions**
	Group Photo

Day-2: 09 December 2020 (Wednesday)

Time	Topic / Speaker
8:30 – 8:45 UTC	**1. Status of the UNESCAP Project** *Ms. Nora Gale (ICG/ITOWMS Secretariat)* *Dr. Mohammad Mokhtari (Chair of WG-NWIO)*
8:45 – 9:15 UTC	**2. Report of Task Team on "Tsunami Preparedness for a Near-Field Tsunami Hazard"** *Dr. Mahmood Reza Akbarpour Jannat (Chair of TT-Near-Field)*
9:15 – 9:30 UTC	**3. Strengthening Tsunami and Earthquake Preparedness in Pakistan** *Mr. Naeem Iqbal (UNDP-Pakistan)*
9:30 – 10:00 UTC	**4. Draft Agreement Document for Real-time Data Exchange** *Dr. Juma Said Al-Maskari (Chair of TT-MSZ)*
10:00 - 10:30 UTC	**5. Progress report of "Development of Probabilistic Tsunami Hazard Assessment (PTHA) for the Makran Region"** *Mr. Patanjali Kumar Chodavarapu (INCOIS)* *Dr. Andrey Babeyko (GFZ)*
10:30 – 11:00 UTC	**6. Summary of Recommendations and Action** *Dr. Mohammad Mokhtari (Chair of WG-NWIO)*
11:00 – 11:30	**7. Work Plan and Closing of the Meeting** *Dr. Mohammad Mokhtari (Chair of WG-NWIO)*
	Group Photo

Annex-2

DETAILED LIST OF PARTICIPANTS
ICG/IOTWMS SUBREGIONAL WORKING GROUP
FOR THE NORTH WEST INDIAN OCEAN

Online Meeting
8-9 December 2020

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