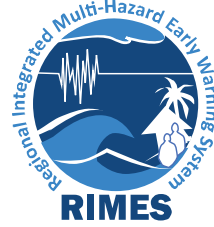




Myanmar Department of  
Meteorology and Hydrology



RIMES

Strengthening of Myanmar's Multi-Hazard Early Warning System

**WORKSHOP ON SEA LEVEL READING AND  
TIDE TOOL SOFTWARE APPLICATION AND MAINTENANCE**

17 November 2013, National Earthquake Data Center (NEDC)  
Department of Meteorology and Hydrology (DMH), Nay Pyi Taw, Myanmar

**DRAFT TRAINING REPORT**

**1. Background**

Myanmar's Department of Meteorology and Hydrology (DMH) is the government agency mandated to observe, analyze, predict, and provide warning services for weather- and climate-related hazards, including hazards of geologic and oceanic origins, to contribute to the safety and socio-economic benefit and welfare of communities through, among others, protection of lives and properties, reduction of the impact of natural hazards, and sustainable resource management and development. Donor support has contributed significantly to improving DMH provision of these services. With recent political and economic changes, manifested in the country's opening up to the west, inflow of external support could overwhelm DMH, in the absence of a framework for coherent, integrated, efficient, and effective engagement with donors.

The project on *Strengthening Myanmar's Multi-Hazard Early Warning System*, supported by the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) through the Trust Fund for Tsunami, Disaster and Climate Preparedness, shall assist DMH in developing a capacity building program framework for addressing capacity gaps, as well as fill immediate capacity gaps in earthquake monitoring and tsunami warning, and decision-support tools for disaster risk management.

**2. Workshop Objectives**

Tsunami early warning relies on various types of measurements: a) from the seismic network to provide preliminary and prompt idea on tsunami generation potential; b) from network of gauges that measure near real-time sea level anomaly in the deep sea and along the coasts to provide an indication that a tsunami does exist; and c) from deep ocean pressure sensors or tsunameters for rapid tsunami detection.

The Workshop on Sea Level Reading and Tide Tool Software Application and Maintenance aims to enhance capacity of NEDC officers in interpreting and reporting actual tsunami characteristics during a tsunami event, including tsunami wave arrival time, amplitude, and period. Specifically, it shall introduce and train participants on the functionalities and application of Tide Tool software, an operational tool developed and supported by the Pacific Tsunami Warning Center (PTWC) for decoding, display, and manipulation of near real-time sea level data, transmitted over the WMO Global Telecommunications System (GTS).

### 3. Participants

The workshop was designed for technical officers who have responsibilities in earthquake monitoring and tsunami watch at NEDC and operational system maintenance support. Fourteen (14) officers from DMH participated in the workshop, as listed in Table 1.

Table1. List of workshop participants

Participant Name	Position
1. Dr. Yin Myou Min Htwe	Assistant Director
2. Mr. Kyaw Kyaw Lin	Assistant Director
3. Mr. Tun Lin Kyaw	Deputy Superintendent
4. Mr. Phyo Maung Maung	Deputy Superintendent
5. Ms. Kyi Kyi Sue	Deputy Superintendent
6. Mr. Myat Min Aung	Senior Observer
7. Mr. Kyaw Zar Naing	Senior Observer
8. Mr. Ngun Za Tang	Junior Observer
9. Mr. Zaw Min	Junior Observer
10. Mr. Phyo Kyaw Kyaw	Junior Observer
11. Mr. Thant Zin Oo	Junior Observer
12. Mr. Kyaw Thu Aung	Junior Engineer
13. Ms. Thwet Thwet Aye	Junior Engineer
14. Ms. La Min Mo Mo	Junior Engineer

### *Participant Background*

Participants from DMH are technical officers, working as Watch Stander and IT support for the operational system. Most have experience in earthquake monitoring, but none has experience in sea level interpretation during a tsunami event. Tsunami forecast and sea level reading that are used during NEDC operation are generally extracted from RTSP and RIMES bulletins during tsunami events.

### 4. Resource Persons

***Sea level interpretation and Tide Tool application:*** The resource person has a strong background and experience in earthquake monitoring and tsunami watch. Currently, she is working at the RIMES Earthquake Monitoring and Tsunami Watch division as coastal hydrodynamics scientist. She leads RIMES research and development activities in tsunami early warning, tsunami risk assessment, and tsunami forecast model and database development.

***Tide Tool installation and system maintenance:*** The resource person has expertise in software development, database development, website development, multi-media communication networks, broadband satellite communication networks, training delivery, and research. At RIMES, he leads system development and management for earthquake monitoring, tsunami warning, weather and flood forecasting, climate prediction, impact and risk assessments, and other decision support systems for hazard early warning and response.

### 5. Sea Level Data Acquisition and Monitoring Servers at NEDC

Under the current project, two servers were installed at NEDC for acquiring near real-time sea level information. Tide Tool software was installed on both servers for the decoding, display, and manipulation of sea level data transmitted over the GTS.

One Windows OS-based server is connected to PTWC ftp for acquiring sea level data transmissions through Internet, as shown in Figure 1. Another server, which is UNIX OS-based, is connected to the GTS server for more reliable acquisition of the sea level data, streaming through GTS, as shown in Figure 2.

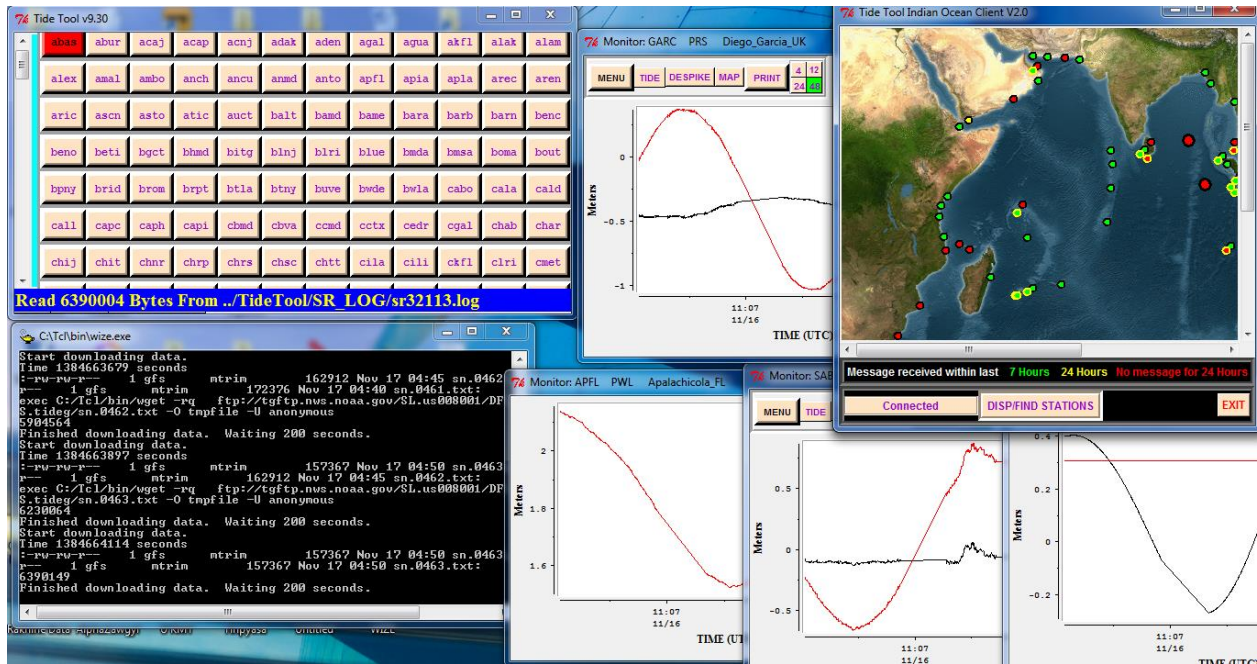


Figure 1. Screen capture of Tide Tool software installed in Windows-based server, connected to Internet

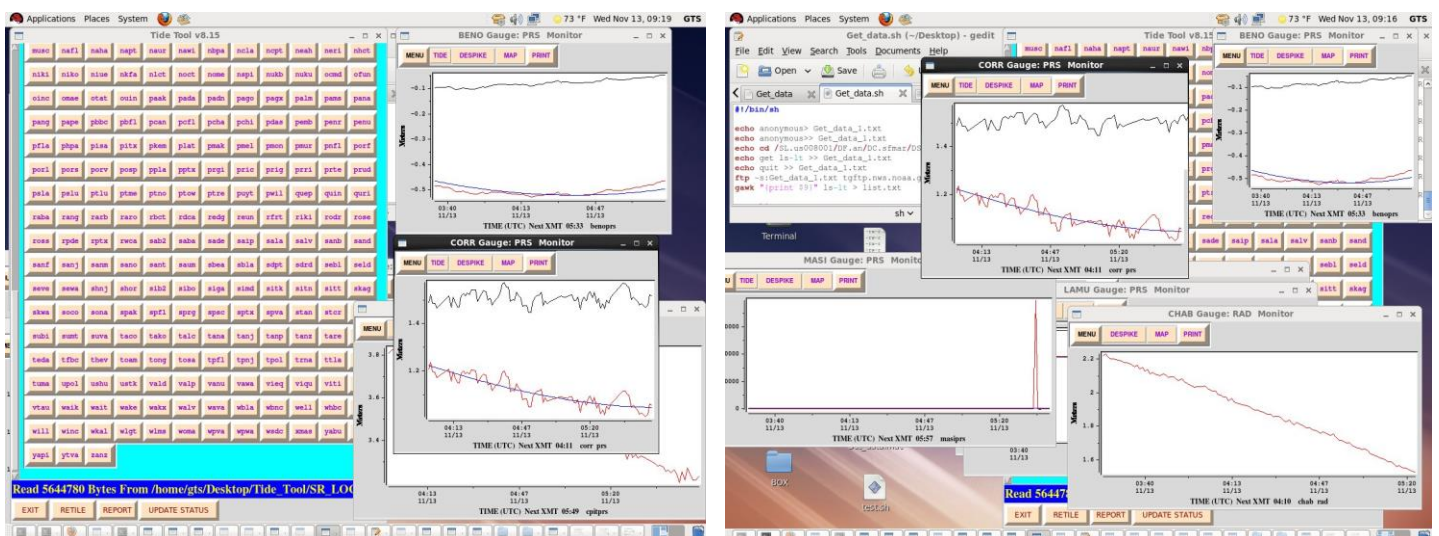


Figure 2. Screen capture of Tide Tool software installed in UNIX based server, connected to GTS

## 6. Workshop Highlights

The one-day workshop was separated into morning and afternoon sessions (Table 2). The morning session started with a lecture on sea level sensors (types and method used to measure sea level) and the technique for sea level reading and interpretation, especially during tsunami events. Group exercises followed, for extracting tsunami parameters (i.e. tsunami arrival time, amplitude, and wave period) from sea level records. Each group then presented the exercise results, followed by discussion.

The afternoon session introduced the Tide Tool software and its functionalities, and discussed the potential uses of each option for monitoring and measuring tsunami waveform during the events. A lecture on Tide Tool server maintenance followed. An exercise assisted participants in Tide Tool installation and configuration on their laptops.

The workshop adopted a hands-on training approach, with close supervision by and instruction from the resource persons. Discussions and feedback were exchanged during the course, which fostered a good learning relationship between the participants and the resource persons.

Table 2. Workshop schedule:

17 November 2013	
Morning	Sea level reading <ul style="list-style-type: none"><li>○ Lecture on sea level sensors and sea level reading technique</li><li>○ Group exercise for sea level reading</li><li>○ Presentation by participants and discussion</li></ul>
Afternoon	Tide Tool application and maintenance <ul style="list-style-type: none"><li>○ Lecture on Tide Tool functionalities</li><li>○ Lecture on Tide Tool system maintenance</li><li>○ Installation of Tide Tool software to participants laptop</li></ul>

## 7. Workshop Outputs

### *Sea level reading and interpretation*

Participants did the exercises to extract tsunami wave parameters from actual sea level records at coastal tide gauges for three events: 1) October 2010 Sumatra earthquake (Mentawai Islands), 2) March 2011 Tohoku earthquake, and 3) April 2012 Off West Coast of Northern Sumatra earthquake. Representatives from three groups presented and discussed about their measurements of tsunami arrival time, maximum amplitude, and tsunami wave period. Most of the groups can appropriately interpret the tsunami wave parameters. Only one group had some misunderstandings on the measurements. During the discussion, participants from other groups assisted to explain in Myanmar language, to correct and guide the group having a misunderstanding.

### *Tide Tool application and maintenance*

Participants successfully installed and configured Tide Tool software into their own laptops for receiving near real time data and using Tide Tool functionalities. Participants also tried using the Tide Tool software installed in two servers at NEDC. RIMES resource person listed out and recommended to participants the routine works for Tide Tool server maintenance.

## 7. Participant Feedback

Participants expressed that the content of the course was useful and relevant for enhancing NEDC operation. Time allocated for discussing theoretical concepts, group discussions, and exercises were found somewhat short. Participants expressed that they gained experience and are now more confident in sea level monitoring, for making decision to issue/ cancel tsunami warning. Some participants expressed interest on programming parts for Tide Tool software development. This topic, however, is beyond the scope of this project.

## 8. Workshop Photos



Figure 3. Lecture and exercise on sea level reading from records of past tsunami events



Figure 4. Group discussion among participants and with resource persons



Figure 5 Installation of Tide Tool Software in participant laptops

## ANNEX 1

### Workshop on sea level monitoring and Tide Tool software application 17 November 2013, DMH, Nay Pyi Taw, Myanmar

#### COURSE FEEDBACK

##### 1. Presentations (in %)

	Needs Improvement	Satisfactory	Good	Comments
1) Content	-	36	64	
2) Method of delivery	-	36	64	
3) Question and answer	7	35	57	

##### 2. Course materials (readings, course booklet, supplementary materials) (in %)

	Needs Improvement	Satisfactory	Good	Comments
Quality	29	14	57	
Relevance	-	43	57	

##### 3. Time allocated to theoretical part (in %)

Too Much	Enough	Not Enough	Comments
-	36	64	

##### 4. Time allocated to group discussions (in %)

Too Much	Enough	Not Enough	Comments
-	64	36	

##### 5. Time allocated to exercises (in %)

Exercise	Too Much	Enough	Not Enough	Comments
Sea level reading technique	14	79	7	
Tide Tool Software application	14	79	7	
Extract near real time sea level data from IOC sea level monitoring website	14	79	7	

**6. Usefulness of the session covered (in %)**

Sessions and Exercises	Very Useful	Useful	Not Useful	Comments
Sea level reading technique	43	57	-	
Tide Tool Software Application	29	71	-	
Extract near real time sea level data from IOC-Sea level monitoring website	21	79	-	

**7. How much have you learned from this course? (%)**

[ 72 ] more than expected    [ 14 ] same as expected    [ 14 ] less than expected

**8. Subjects that could be deleted from the course:**

-

**9. Subjects that could be added to the course:**

- Subjects are enough for this training, but if RIMES can include more times (days) of training, this would be better for NEDC, DMH
- The training should include some parts of mapping tool in general related to Tide Tool

**10. Do you have any general comments about the workshop?**

- I get valuable knowledge and now clearly understand Tide Tool. This training is very useful for my present work. Moreover, I feel more confident on my work.
- Sea level monitoring is very useful for NEDC, DMH which is only the agency having responsibility for issuing tsunami early warning in Myanmar.
- The workshop is very useful for NEDC. All staffs need to know how to monitor sea level changes.
- The workshop should include general knowledge in programming and mapping tools for Tide Tool since the participants are not familiar with it.
- We need more times of training.
- We expect more future trainings from RIMES.