CHULA ENGINEERING
Foundation toward Innovation

100th Anniversary of Chula Engineering 2013

Looking through Disaster Management of Thailand: A Focus on Earthquake and Tsunami

Dr. Natt Leelawat

Department of Industrial Engineering
Faculty of Engineering
Chulalongkorn University
Thailand

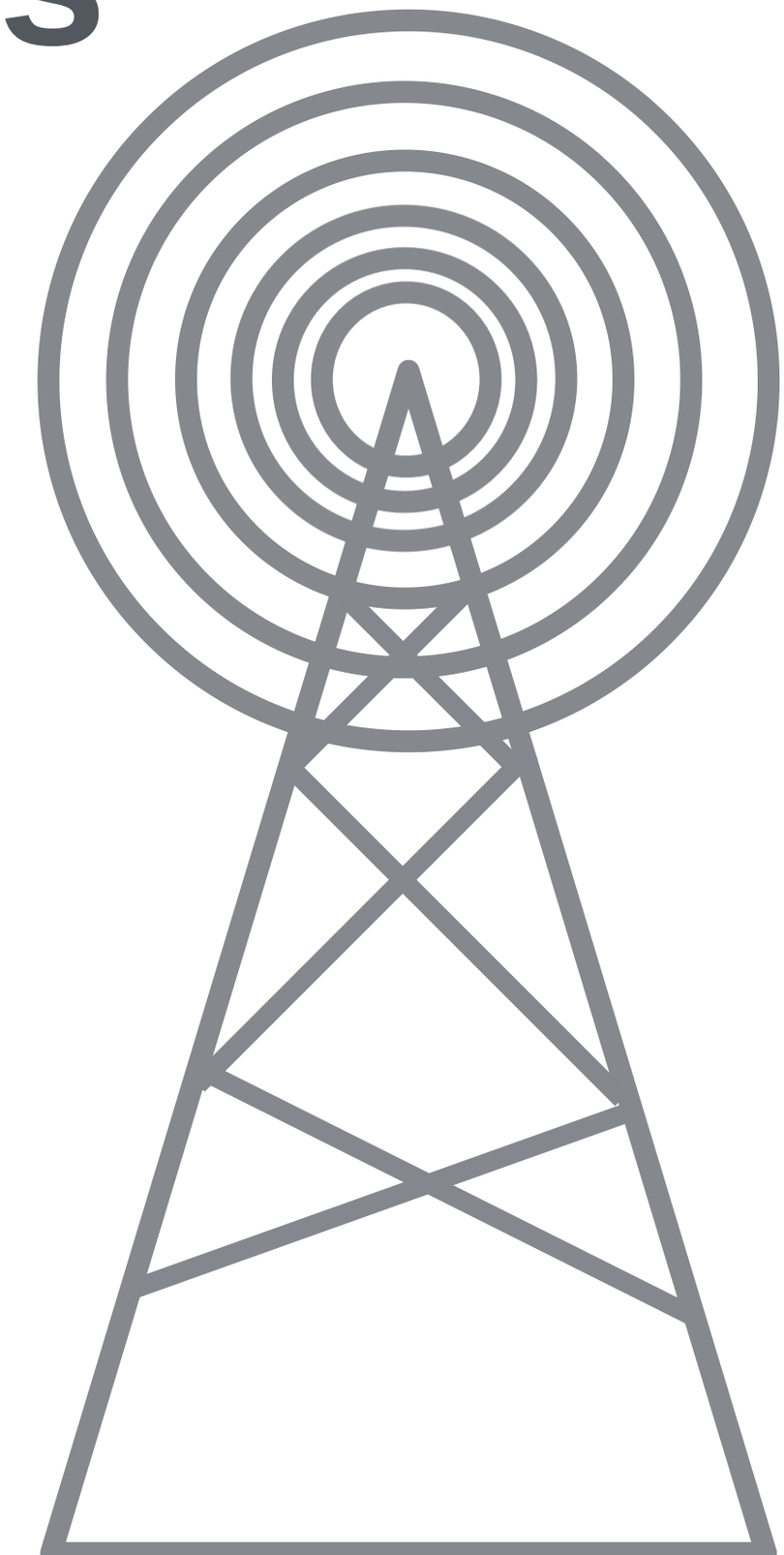
Assoc.Prof. Anawat Suppasri (Tohoku)
Dr. Mongkonkorn Srivichai (RMUTL)
Dr. Titaya Sararit (Chiang Mai)
Dr. Jing Tang (Thammasat)
Dr. Panon Latcharote (Tohoku)
Ms. Wisaruta Veerasai (DDPM)
Rear Admiral Thaworn Charoendee (DDPM)
Prof. Fumihiko Imamura (Tohoku)

natt.l@chula.ac.th
http://natt.leelawat.com

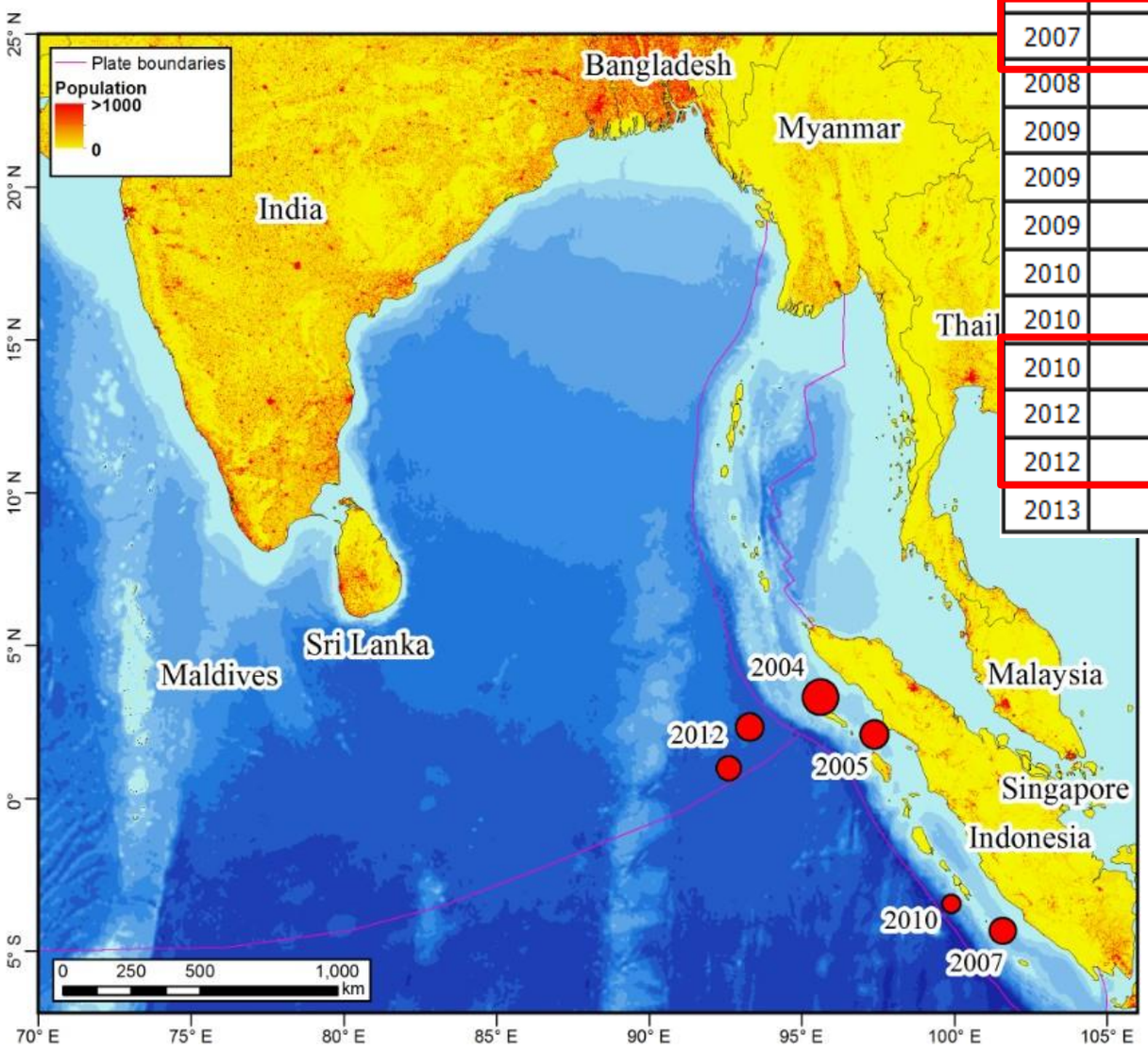
UNESCO-JASTIP Joint Symposium on Intra-Regional Water Security and Disaster Management
JASTIP-WP4 Symposium, Manila :: November 15-16, 2017

Contents

- 2004 Indian Ocean Earthquake and Tsunami
- Tsunami Warning
- Housing Reconstruction
- Tsunami Memorial
- Disaster Education
- Conclusions



2004 Indian Ocean Tsunami



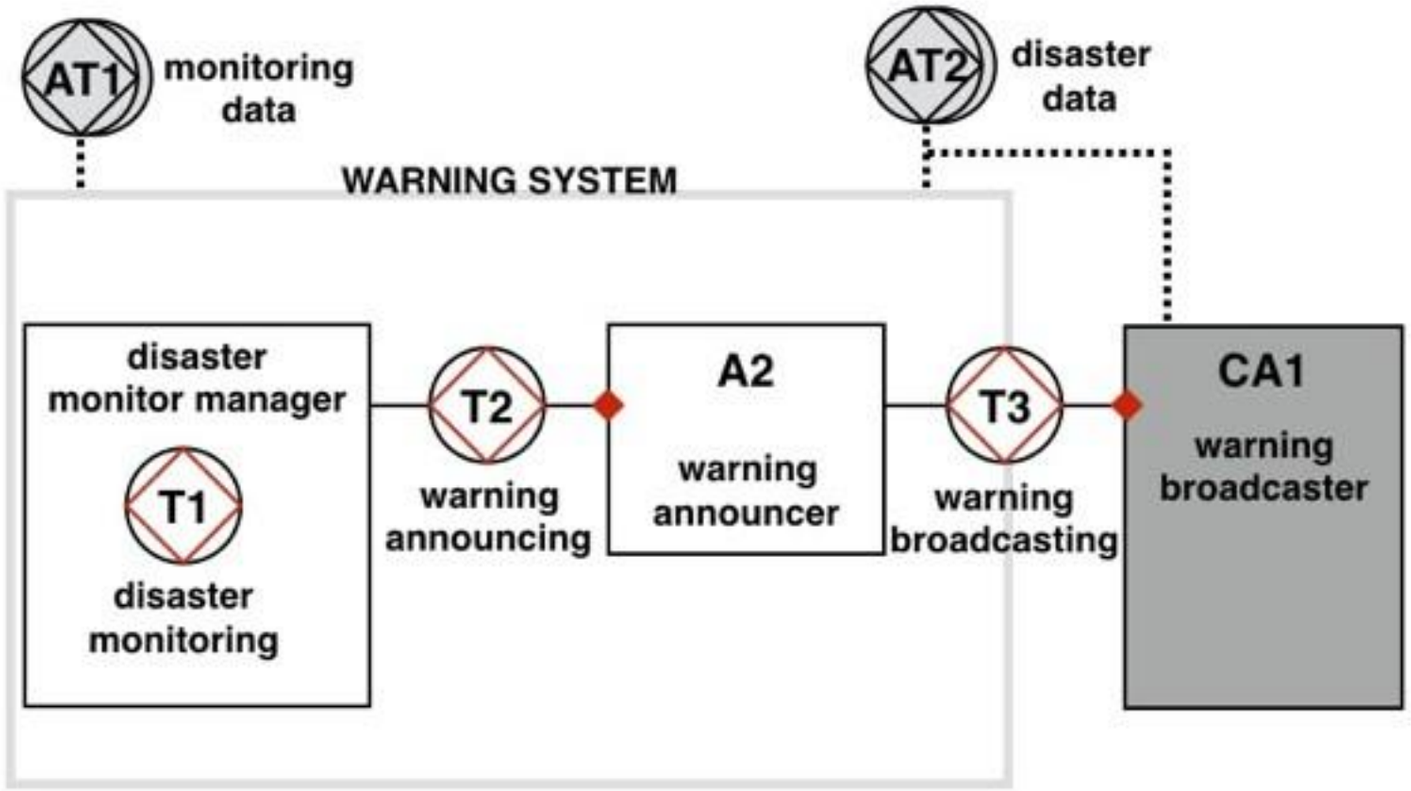
Date	Cause	Tsunami Source Location		Tsunami Parameters		Effects	
Year	Earth-quake Mag	Country	Name	Max Water Height	Num. of Runups	Deaths Num	Deaths De
2004	7.5	INDONESIA	KEPULAUAN ALOR		3		
2004	9.1	INDONESIA	OFF W. COAST OF SUMATRA	50.90	1509	226898	4
2005	8.7	INDONESIA	INDONESIA	4.20	61	10	1
2005	6.7	INDONESIA	KEPULAUAN MENTAWAI	.40	1		
2006	7.7	INDONESIA	SOUTH OF JAVA	20.90	196	802	3
2007	8.4	INDONESIA	SUMATRA	5.00	47		
2008	6.5	INDONESIA	SUMATRA	.12	1		
2009	7.5	INDIA	ANDAMAN ISLANDS	.01	1		
2009	6.7	INDONESIA	SUMATRA	.18	1		
2009	7.5	INDONESIA	SUMATRA	.27	1		
2010	7.8	INDONESIA	SUMATRA	.44	6		
2010	7.5	INDIA	LITTLE NICOBAR ISLAND	.03	1		
2010	7.8	INDONESIA	SUMATRA	9.30	89	431	3
2012	8.6	INDONESIA	OFF W. COAST OF N SUMATRA		20		
2012	8.2	INDONESIA	OFF W. COAST OF N SUMATRA		4		
2013	*	PAKISTAN	OFF COAST GWADAR	.26	4		

Source: NOAA Tsunami Event Database

Contributed by Assoc.Prof. Anawat Suppasri

Early-warning System in Thailand

- The system has been established following the 2004 Indian Ocean Tsunami
  - The most destructive natural disaster in the country's history (Guha-sapir et al., 2014)
- **Two key actors**: National Disaster Warning Center (NDWC) and Thai Meteorological Department (TMD)
- **Data Collection** (Aug-Dec 2013)
  - Face-to-face interviews with officers from NDWC and TMD



OCD of Early-warning System in Thailand

- **Two actor roles**: **disaster monitoring manager** (Seismic Station, etc.) and **warning announcer** (NDWC)
- **Human-based** decision making

[published] Leelawat, N., Suppasri, A., & Imamura, F. (2015). The tsunami warning system in Thailand: A part of the reconstruction process after the 2004 Indian Ocean Tsunami. In V. Santiago-Fandiño, Y. A. Kontar, & Y. Kaneda (Eds.), *Advances in Natural and Technological Hazards Research: Vol. 44. Post-Tsunami Hazard: Reconstruction and Restoration* (pp. 111-119), Cham: Springer International Publishing. doi:10.1007/978-3-319-10202-3_8

Chapter

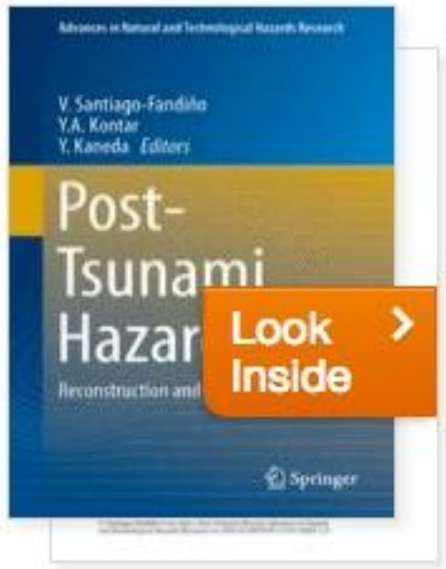
Post-Tsunami Hazard

Volume 44 of the series Advances in Natural and Technological Hazards Research pp 111-119

Date: 23 September 2014

The Tsunami Warning System in Thailand: A Part of the Reconstruction Process After the 2004 Indian Ocean Tsunami

Natt Leelawat ✉ , Anawat Suppasri, Fumihiko Imamura



Download Book (PDF, 20672 KB)

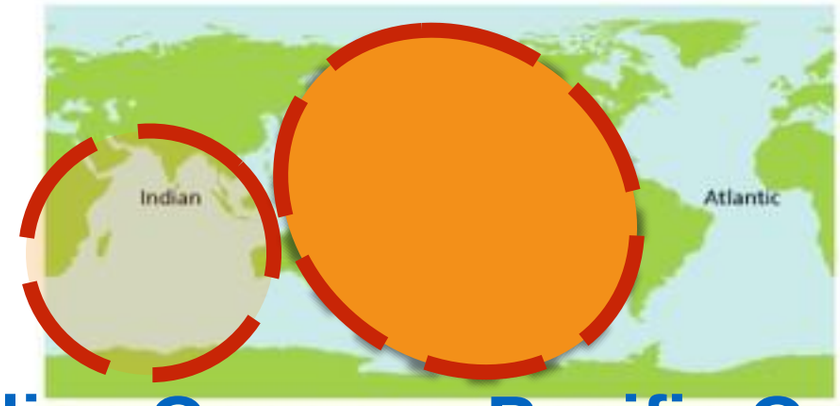
Download Chapter (230 KB)

Abstract

A disaster early warning system is an important tool to prevent a large number of human casualties from natural disasters such as earthquakes and tsunamis. In Thailand, an early disaster warning system has been established as a part of the reconstruction process after the 2004 Indian Ocean earthquake and tsunami. This chapter focuses on the establishment, development and management process of this early warning system, with particular emphasis on tsunami hazards. This study considers face-to-face interviews with executive officers from the National Disaster Warning Center (NDWC) and the Seismological Bureau of the Thai Meteorological Department (TMD). Moreover, observations of a warning drill conducted in September 2013 in Bangkok, Thailand are also considered. Relevant issues and findings are discussed while providing suggestions for the potential development of early warning systems of a similar nature in other developing countries.

Source: https://link.springer.com/chapter/10.1007%2F978-3-319-10202-3_8

Tsunami Early-warning Systems in two regions



Indian Ocean

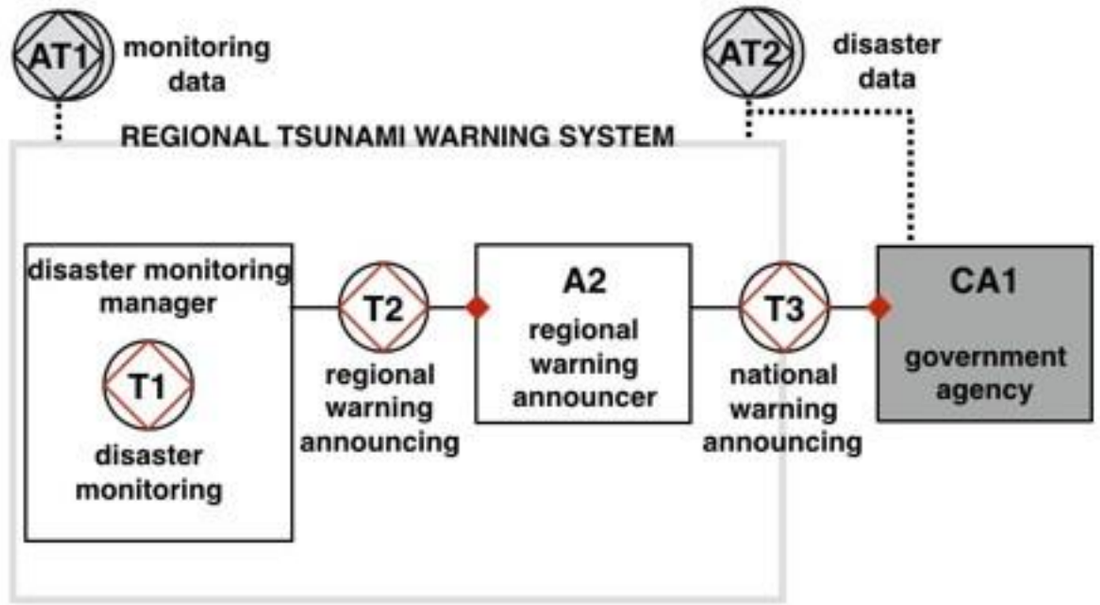
- **One key actor**: Regional Integrated Multi-Hazard Early Warning System for Africa and Asia (RIMES)
- **Data Collection** (Aug 2014)

Face-to-face interview with an officer from RIMES

Pacific Ocean

- **One key actor**: Pacific Tsunami Warning Center (PTWC)
- **Data Collection** (Aug 2014)

Face-to-face interview with an officer from PTWC

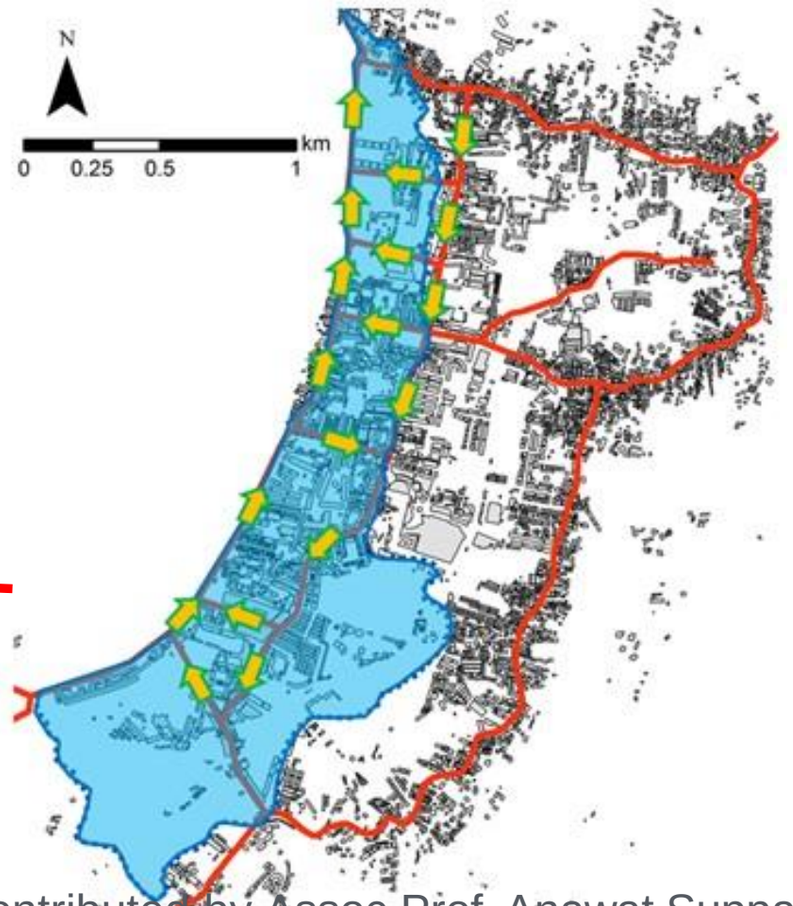


OCD of Tsunami Regional Warning Systems

- **Two actor roles**: **disaster monitoring manager** and r**egional warning announcer**
- **Same OCD** regardless different location
- **Similar** OCD as the **national level**

Image source: http://stateoftheocean.osmc.noaa.gov/sur/

Traffic Jam after Warning



Patong Beach, Phuket

Contributed by Assoc.Prof. Anawat Suppasri

Lessons from the 2004 IOT Rebuilding of the School

- At the time of the 2004 tsunami, the school had only two stories and the tsunami was higher than the school.
- The school was then rebuilt with three stories. In case of earthquake and tsunami, they will gather at the third floor.
- In case the school got some damages or the estimated tsunami is higher than the third floor, we organized a drill so that they can evacuate to the hill behind.

Contributed by Assoc.Prof. Anawat Suppasri

Others

Disaster Education Programs

- Satit Bilingual School of Rangsit University
- Samsenwittayalai School
- San Joaquin Central School
- Bislig Elementary School
- Bacagay Elementary School
- Cabuynan Elementary School
- Royal Thai Embassy, Tokyo

SBS of Rangsit University

Samsenwittayalai School

San Joaquin Central School

Bislig Elementary School

Bacagay Elementary School

Cabuynan Elementary School

Others

Social Contributions in 2016

- National Science and Technology Development Agency
- National Disaster Warning Center (NDWC)
- Ministry of Education
- Japan International Cooperation Agency (JICA)
- Kesennuma City
- Thai Students' Association in Japan under the Royal Patronage (TSAJ)
- Indonesian Student Association in Sendai (PPIS)

TSAJ

Ministry of Education

JICA

Kesennuma City

Chulalongkorn University

RDM

RISK AND DISASTER MANAGEMENT PROGRAM

LEARN FROM THE BEST

หลักสูตร

การจัดการความเสี่ยงและภัยพิบัติ

ป้องกันไว้ก่อน แก้ไขได้เร็ว ลดความสูญเสีย

วิทยาศาสตรมหาบัณฑิต (วท.ม.)
Master of Science (M.Sc.)

- **2-year Master's program @ Chulalongkorn University**
- **Multidisciplinary program = Including experts from Engineering, Science, Communication Arts, Medicine, Economics, Law, Social Science, Nursing, etc.**
- **Start in August 2018!!**

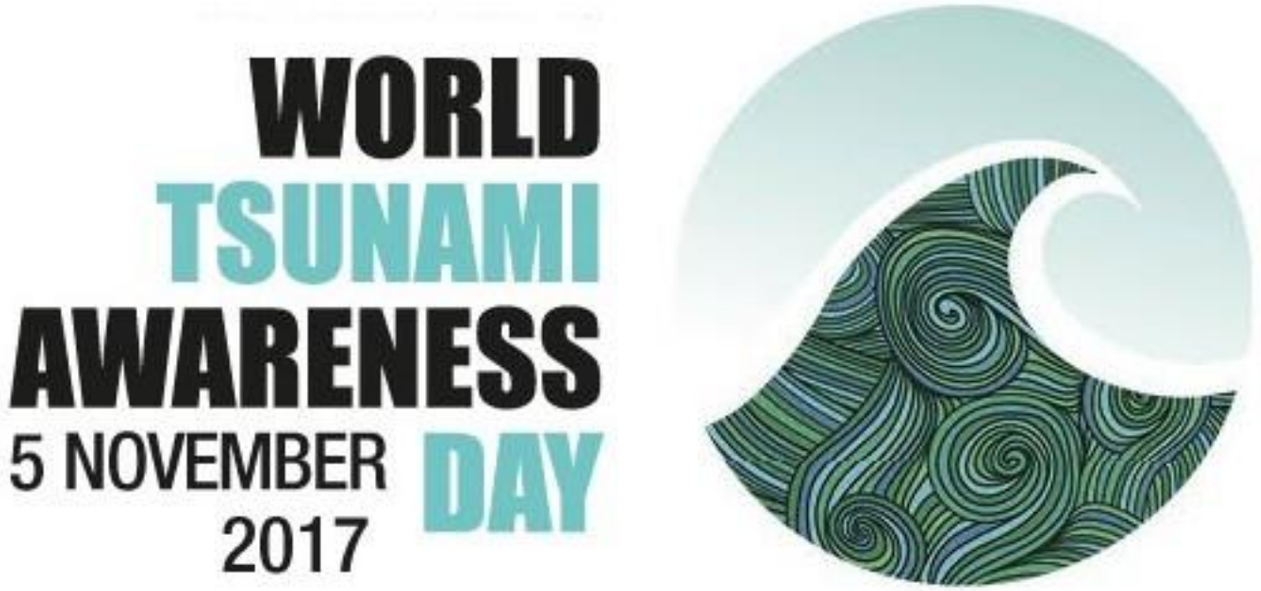


Image source: http://www.unisdr.org/2017/tsunamiday/

- "A Global Assessment of Historical and Future Tsunami Hazards Based on Seismic Records Over the Last 400 Years and Estimated Seismic Gaps" was produced **by Fumihiko Imamura, Anawat Suppasri, Panon Latcharote, Takuro Otake, Natt Leelawat, and David N. Nguyen** for this year's World Tsunami Awareness Day on November 5

Source: https://www.unisdr.org/archive/55710

Conclusions

- **Tsunami Warning**
  - Greatly improvement
- **Tsunami Memorial**
  - Need great effort of maintenance and attraction
- **Housing Reconstruction**
  - A challenge in applying the lessons to reconstruction of future events
- **Disaster Education**
  - Importance of media for warning dissemination and basic knowledge on faulty mechanisms/tsunami characteristics

THANK YOU

Acknowledgments
JASTIP
Kyoto University
Tohoku University
Chulalongkorn University
Thammasat University
Chiang Mai University
National Disaster Warning Center,
Department of Disaster Prevention and Mitigation Department

Natt Leelawat, D.Eng.
natt.l@chula.ac.th
http://natt.leelawat.com
@evonova

CHULA ENGINEERING
Foundation toward Innovation