



Report of Research Results in FY2011

JSPS International Training Program (ITP):  
Global On - Site Training Program for Young Researchers  
on the Protection of Cultural Heritage and Art Work

# Disaster Mitigation Measures with Focus on Hazard Information: Cultural Heritage City: Albay, the Philippines Tourism City: Patong, Thailand

Yusuke Toyoda

Doctoral Student

Graduate School of Policy Science

Ritsumeikan University

# Outline

Period: 9<sup>th</sup> September 2010 – 13<sup>th</sup> March 2011

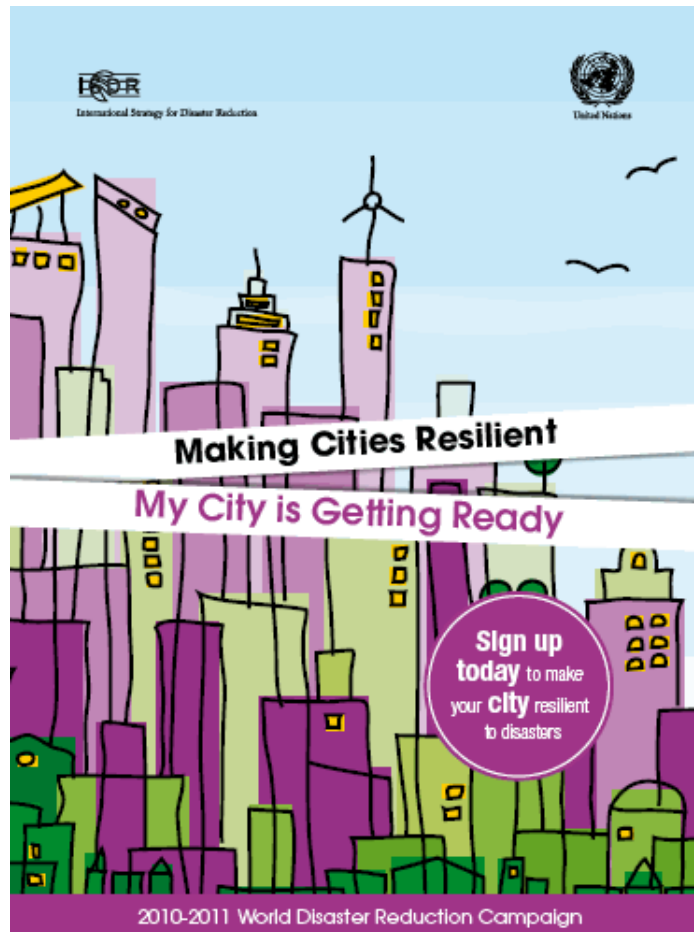
Org.: **UNISDR** (United Nations International Strategy for Disaster Reduction) Asia & the Pacific  
-Ensuring the implementation of the international strategy for disaster reduction

Study Areas:

**Albay Province**, the Philippines

**Patong Municipality** in Phuket Province, Thailand

## 2010 – 2011 World Disaster Reduction Campaign Making Cities Resilient: My City is Getting Ready!



### Objective

✓ Achieve resilient, sustainable urban communities through actions taken by local governments to reduce disaster risk



**Know More**

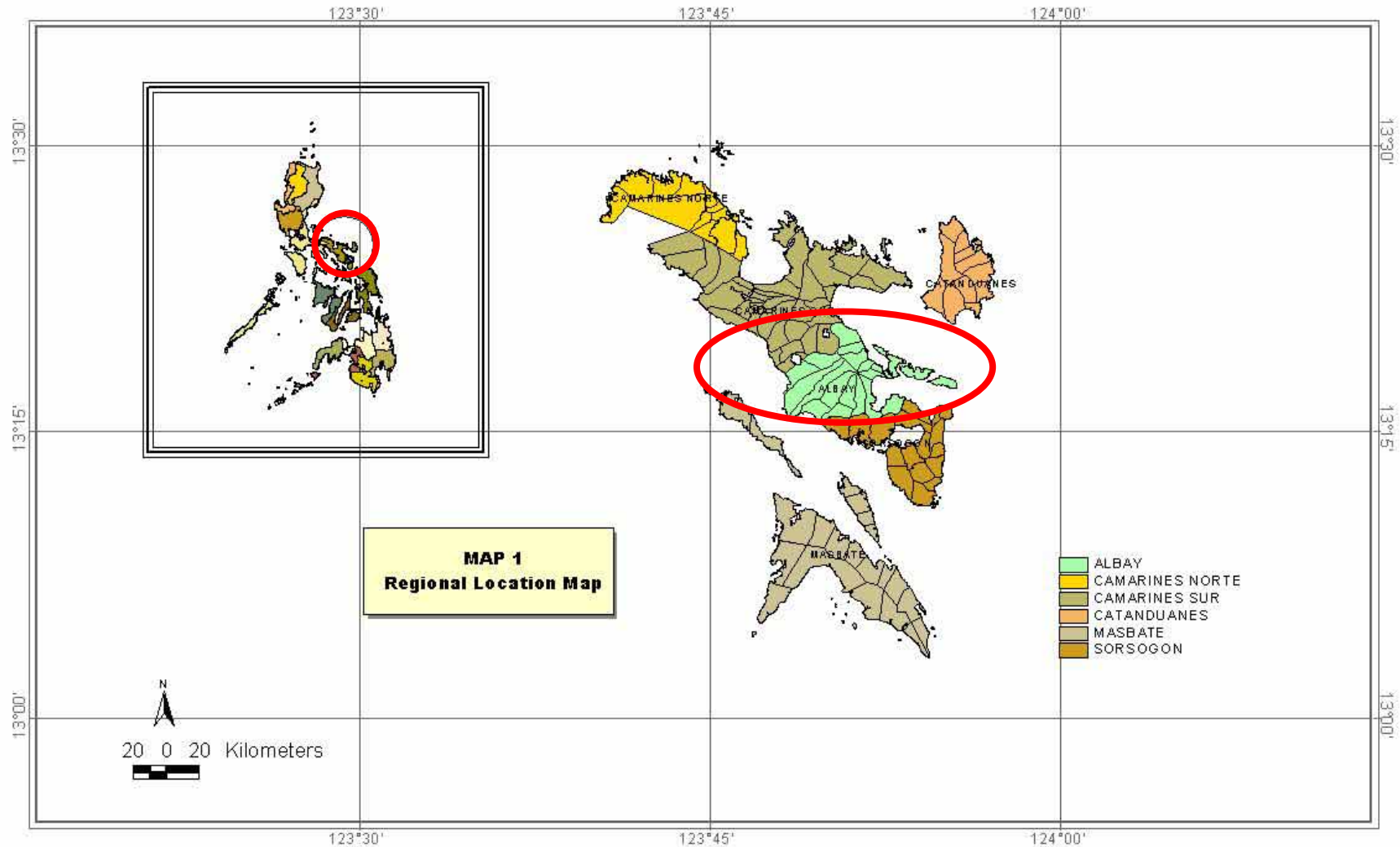


**Invest Wisely**



**Build More Safely**

# Albay Province, Philippines





# Albay hit by a variety of hazards

- Role model city of the campaign

## 1. Typhoon

1. Landslide
2. Flood

## 2. Earthquake

1. Fault
2. Seismic Sea Wave  
or Tsunami

## 3. Volcano

1. Lava Flow
2. Ash fall
3. Pyroclastic Flow
4. Mud flow or lahar

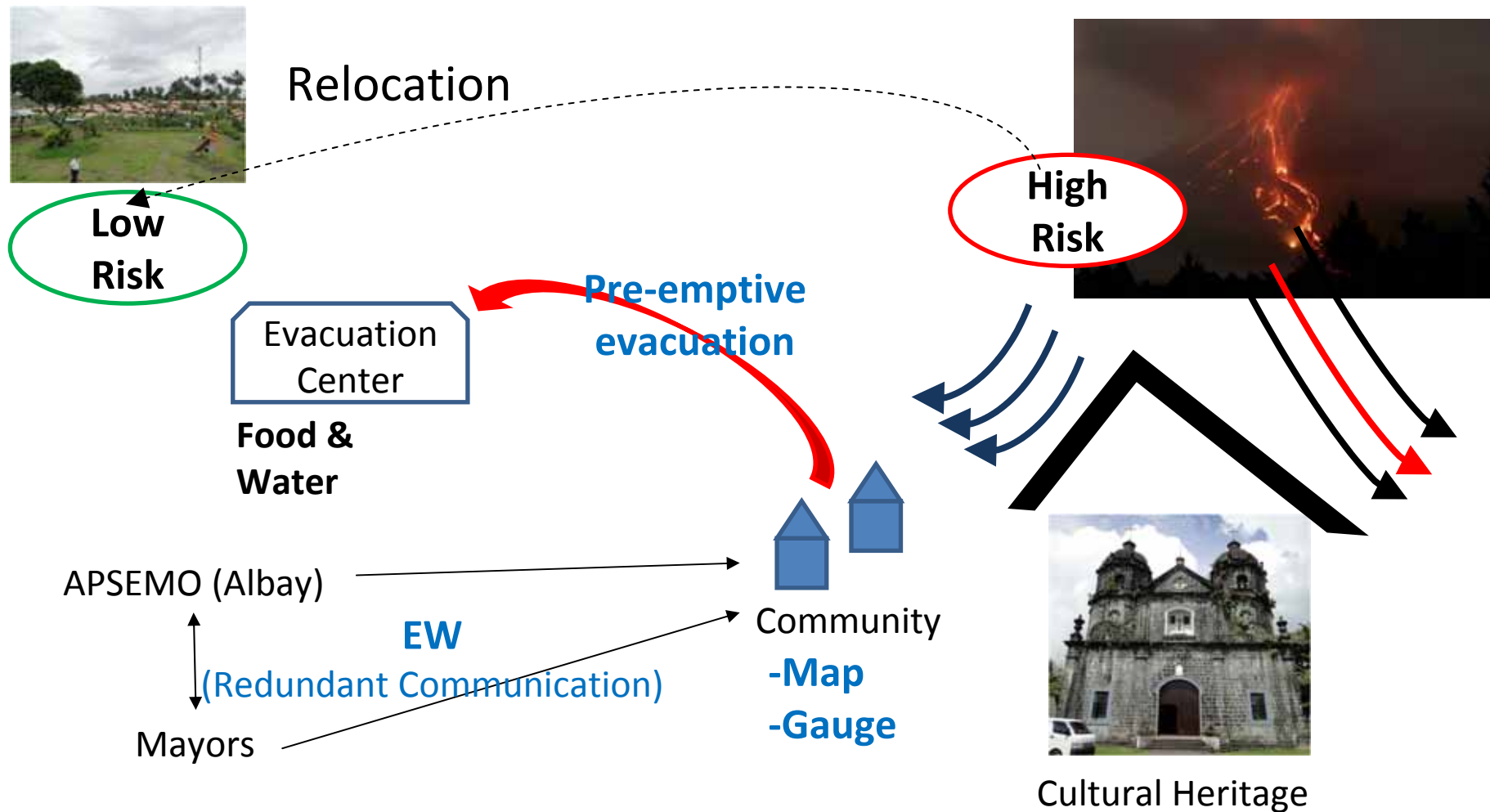
# Damage by typhoon and lahar

Calamities	Date	Classification	Casualty	Damage Cost
1. Typhoon Rosing	Nov. 1995	Destructive	ZERO	P 1.7 B
2. Typhoon Loleng	Nov. 1998	Destructive	ZERO	7.1 B
3. Mayon Eruption	Feb. 2000	Explosive	ZERO	284 M
4. Mayon Eruption	Jun. 2001	Explosive	ZERO	300 M
5. Mayon Eruption	Jul. 2006	Explosive	ZERO	50.5 M
6. Typhoon Milenyo	Sep. 2006	Destructive	14 dead	1.3 B
7. Typhoon Reming	Nov. 2006	Destructive	604 dead & 419 missing	3.7 B
8. Typhoon Mina, Lando and Nonoy	Nov. 2007	Destructive	ZERO	
9. TECF, Monsoon Rains	Feb. 2008	Destructive	ZERO	127 M
10. Typhoon Dante	Apr. 2009	Destructive	ZERO	
11. Typhoon Ondoy	Sep. 2009	Destructive	ZERO	
12. Typhoon Peping	Oct. 2009	Destructive	ZERO	
13. Mayon Eruption	Dec. 2009– Jan. 2010	Explosive	ZERO	

Source: Governor Joey Sarte Salceda (Province of Albay, Philippines) "Mobilizing resources for DRR and CCA investments to achieve MDGs by 2015: The Albay Practices" presentation in 4<sup>th</sup> AMCDR: Disaster Risk Reduction through Climate Change Adaptation, Oct. 25-28, 2010, Incheon, Korea.



# Protecting Systems from Hazards

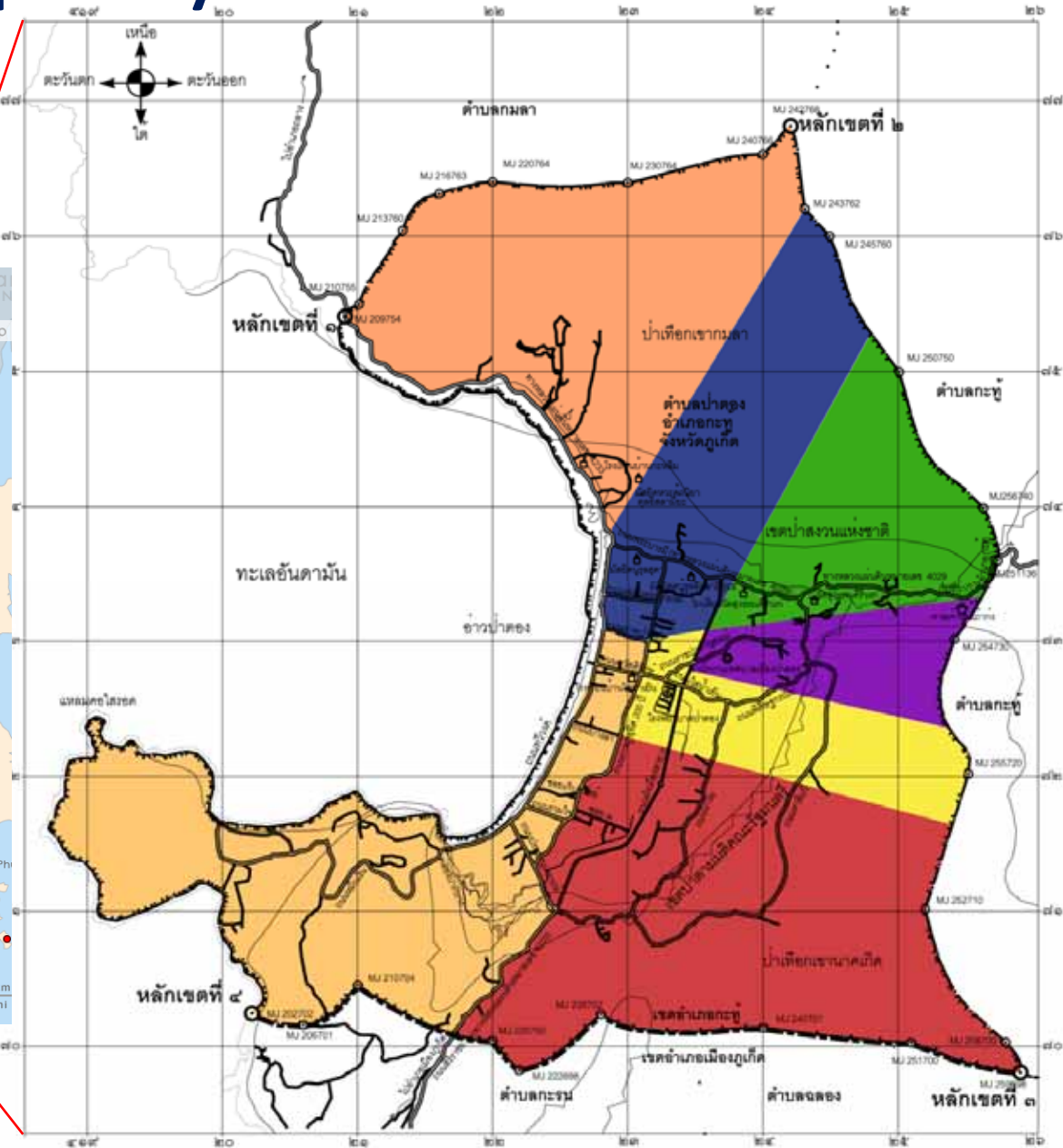
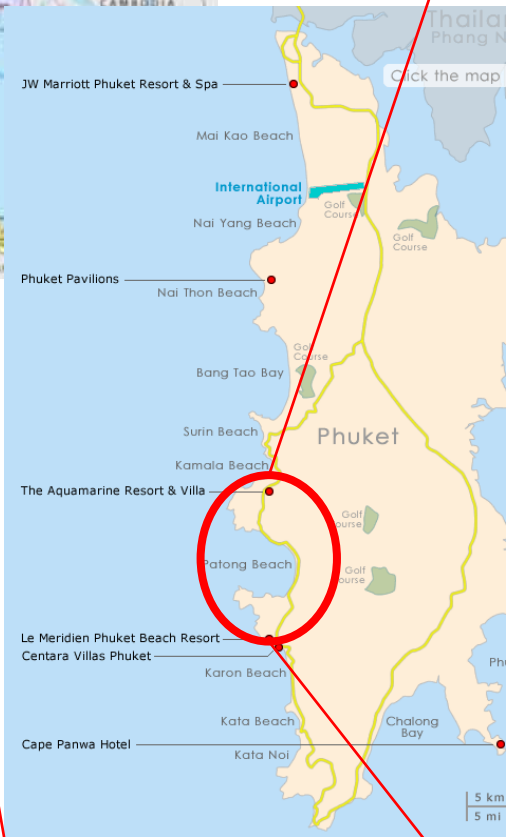


**Calamity Fund** for victims of natural disasters  
(5% of their total annual budget)

Source: Interview, etc.



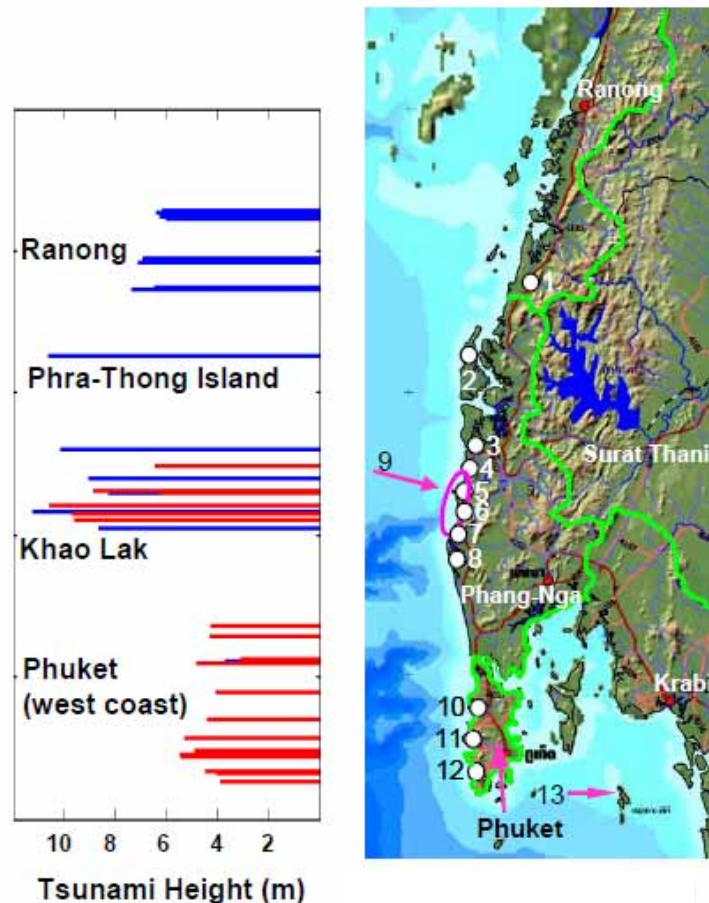
# Patong Municipality







# Patong hit by tsunami in 2004

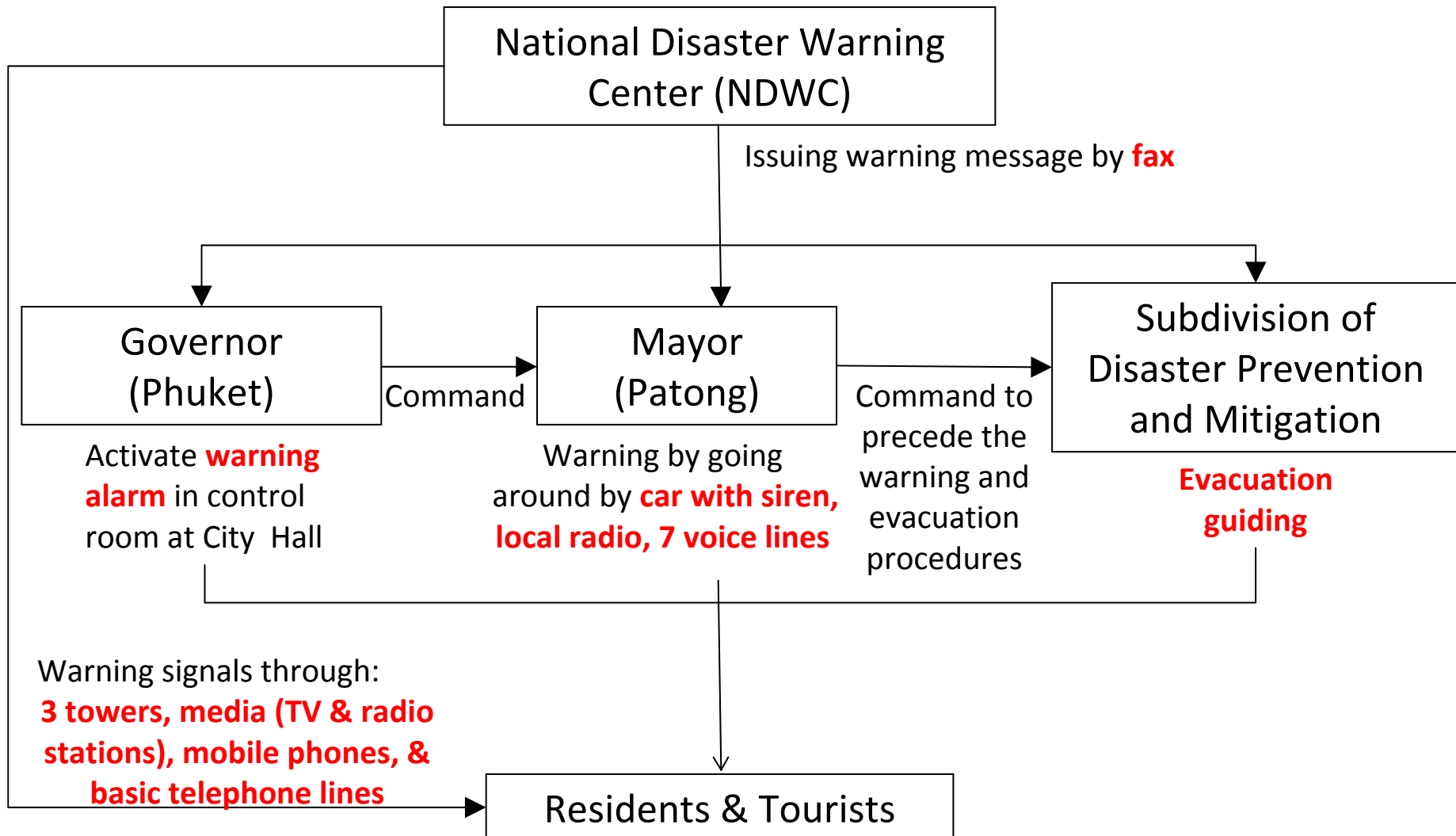


Tsunami wave height distribution

- Tsunami height: 6m
- Death toll: 157
- Role model city of the campaign

Source of the figure: Pennung Warnitchai 'The 26 December 2004 Tsunami Disaster in Thailand: Experience and Lessons learned' "Proceedings of the Fifth Workshop on Safety and Stability of Infrastructures against Environmental Impacts" December 5-6, 2005, De La Salle University, Manila, Philippines, pp. 1-16.

# Early Warning Systems



Source: Interview, etc.