

**International Tsunami Symposium Commemorating
50th Anniversary of the Pacific Tsunami Warning and Mitigation System
Making the Pacific Ready for the Tsunami Threat
20-21 April 2015**

NOAA Inouye Regional Center, Ford Island, Oahu, Hawaii

4.3. Thematic Session 3

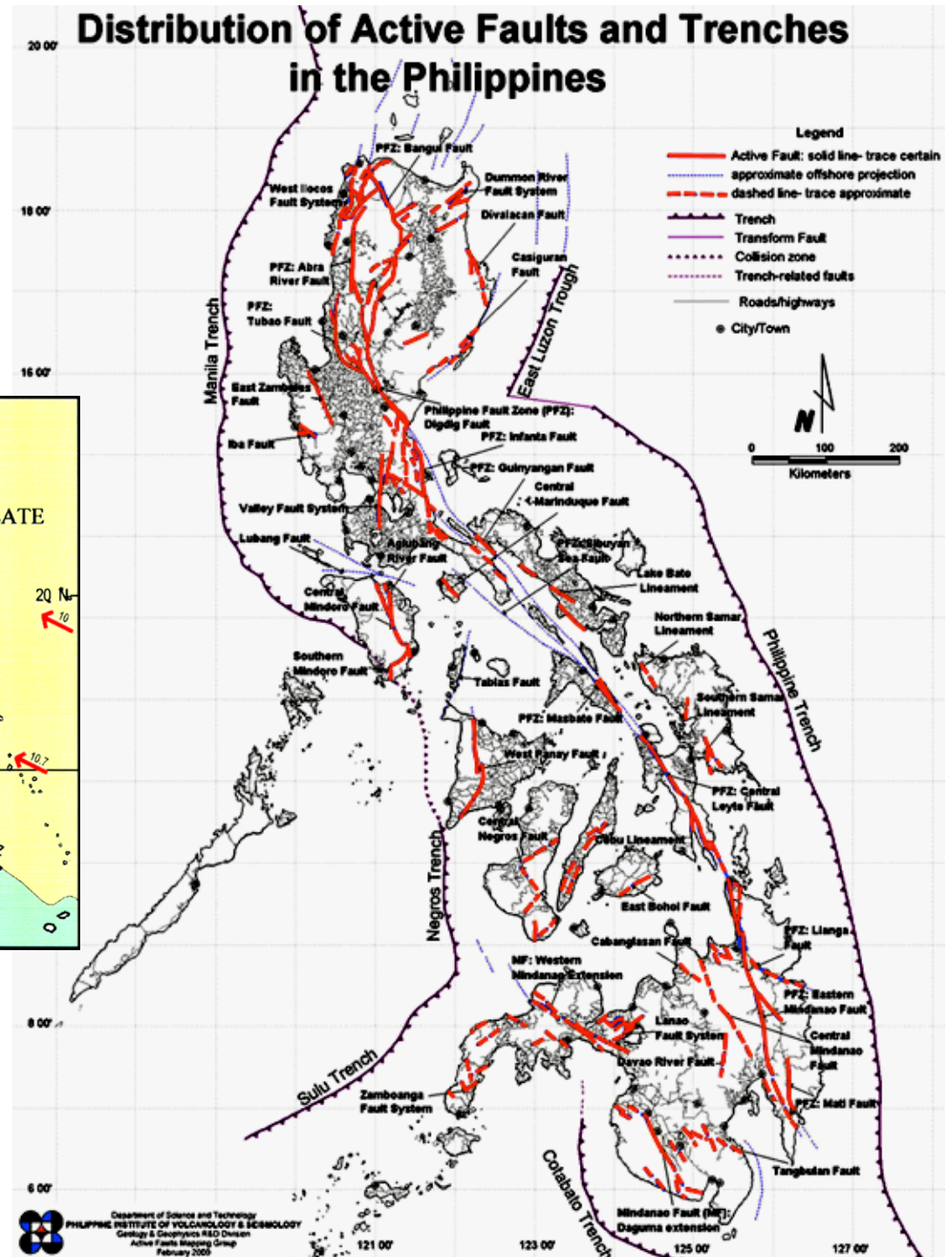
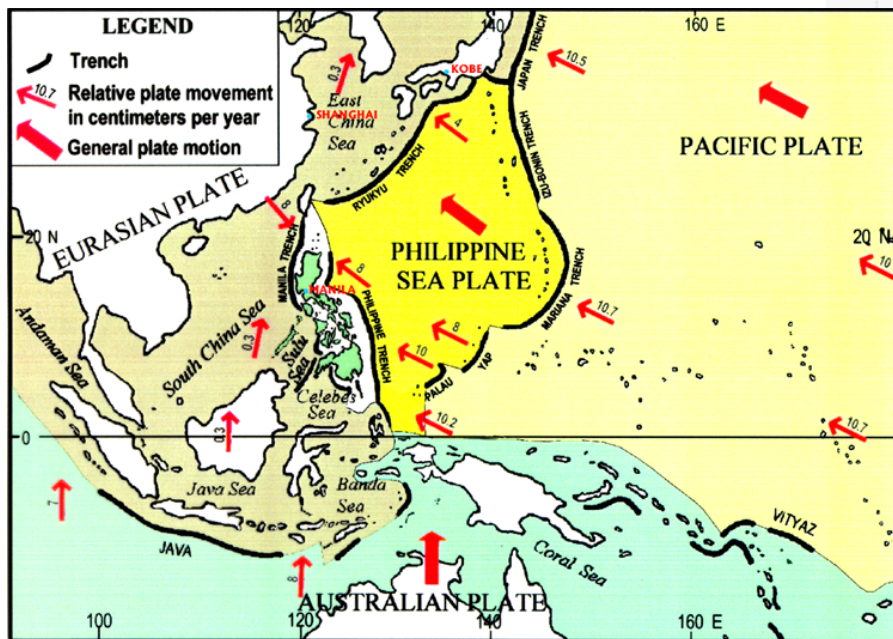
Theme 3: Awareness and Response

Preparedness, Emergency Planning and Response and Post-Disaster Response

Tsunami Community Education and Awareness: The Philippine Experience

**Ma. Mylene Martinez-Villegas and Renato U. Solidum, Jr
Philippine Institute of Volcanology and Seismology (PHIVOLCS)
-Department of Science and Technology (DOST)**

The geographic and geologic setting of the Philippines make it prone to tsunamis

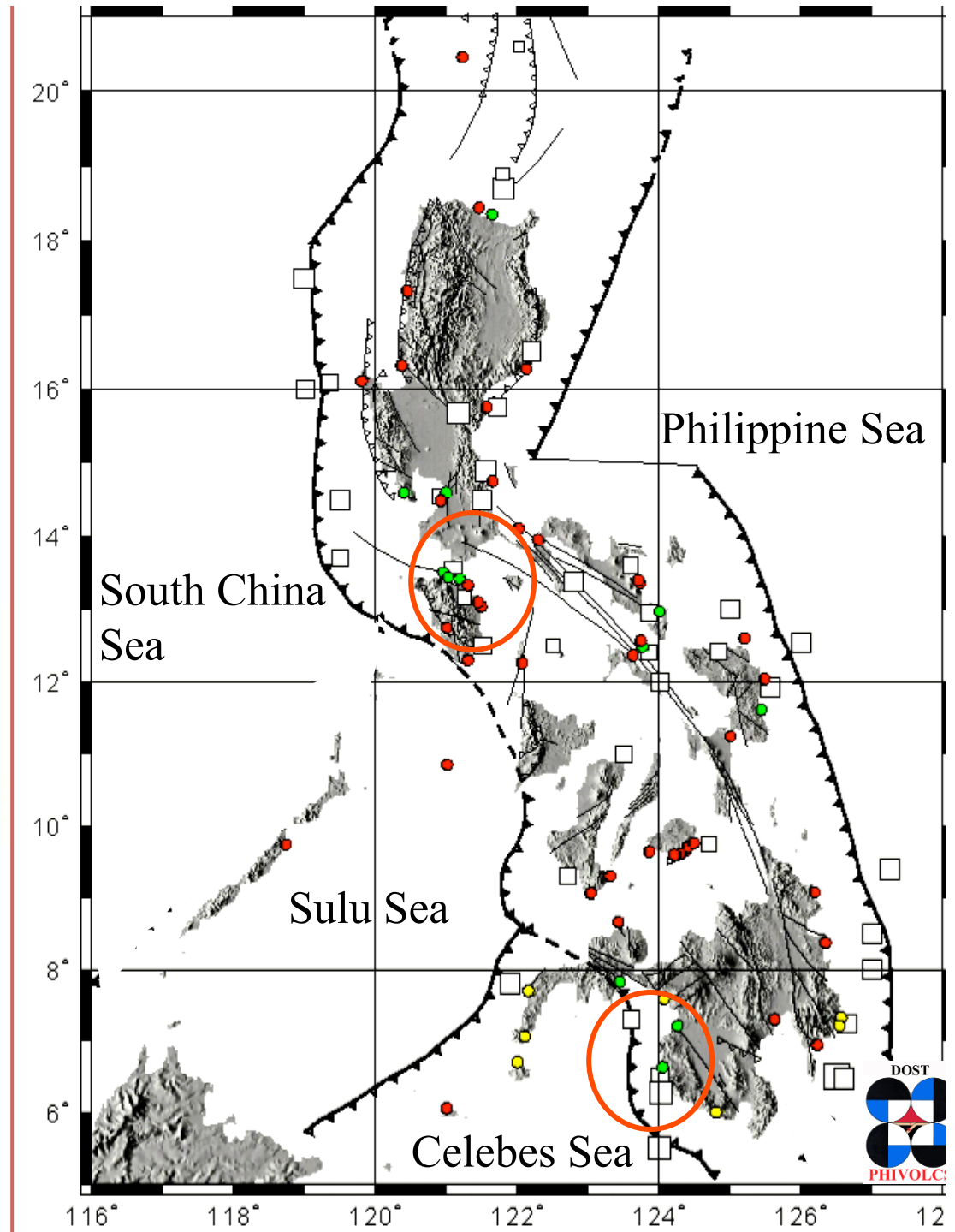
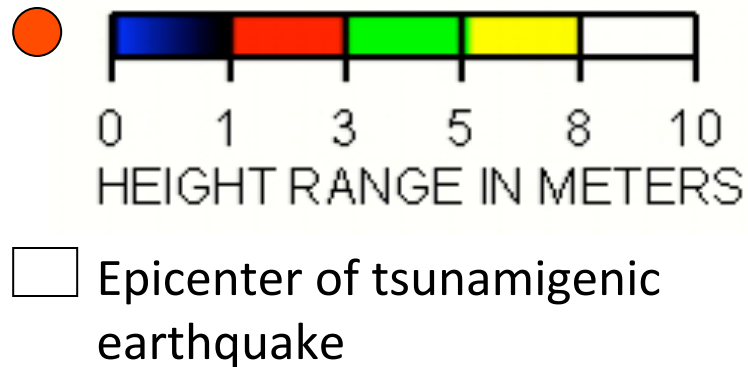


Some considerations for tsunami warning in the Philippines

- Coastlines at the eastern side of the Philippines can be affected by **near-field** (locally generated) or **far-field** (distant, Pacific Ocean) tsunamis.
- Almost all coastlines in the country can be affected by **near-field** tsunamis.
- There is generally enough time for warning for tsunamis generated within the Pacific Ocean (monitored by PTWC and NWPTAC)
- There will be less time for warning in case of locally-generated tsunamis.

Local Tsunami Affected Areas in the Philippines

~ 40 tsunamis for
past 400 years

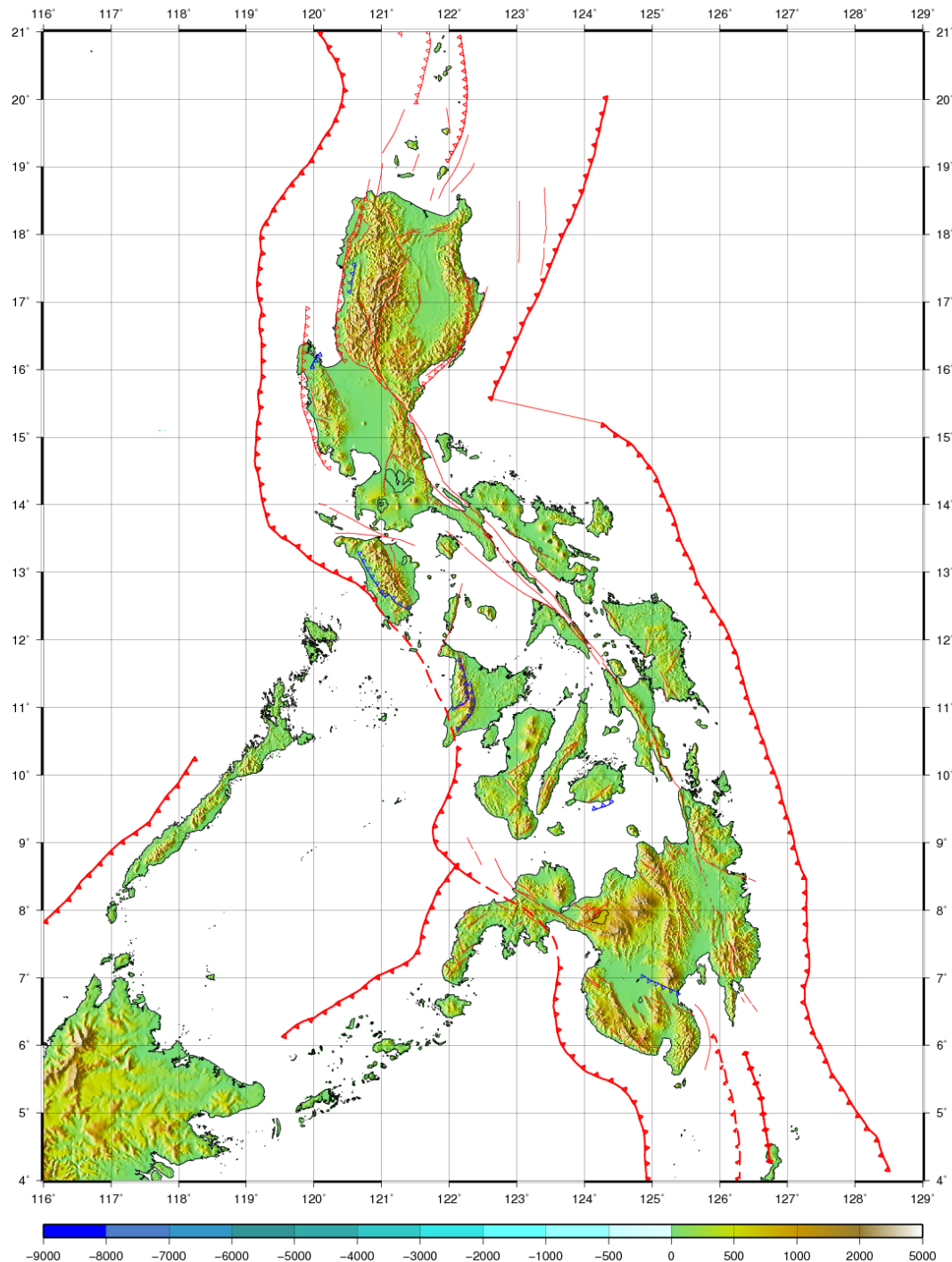


Local

- 1976 Moro Gulf
- 1994 Mindoro

International

- 2004 Banda Aceh
- 2010 Chile
- 2011 Great East Japan Earthquake



The situation

- Long coastal area with communities facing offshore earthquake generators
- Different local language N-S
- Economic, Socio-cultural, political situation
- Different levels of awareness, capacities

National Monitoring System

- Established monitoring system and sustained program to continue enhancement of earthquake and tsunami monitoring network; (seismic network, tide gages, etc)
- SOP development , review and revision (ITIC collaboration)

Research

- Earthquake and tsunami science (tsunami modeling, hazard maps, etc);
- Social aspect (understanding local perceptions and communication, needs assessment, evacuation behaviors)

Awareness and Preparedness Program

- Materials development
- Capacity building

Implementation

- Collaborations local and international
- Forging, strengthening, sustaining partnerships

Tsunami Risk Reduction

Knowing Hazard

- Understanding tsunami
- Maximum tsunami height
- Minimum arrival time
- Duration
- Inundation area (Tsunami hazard mapping)

Knowing Vulnerability

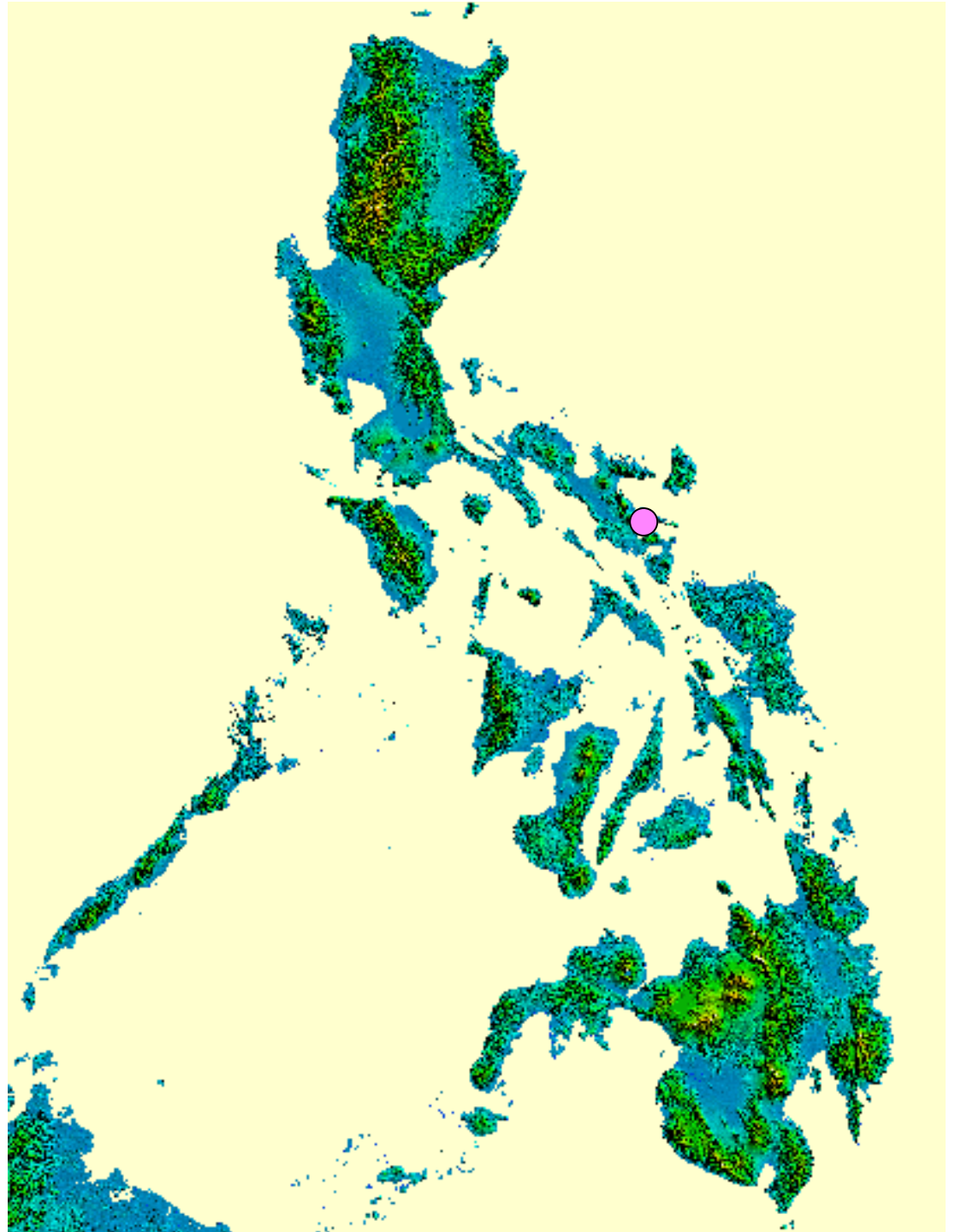
- History of tsunami disaster
- Land use management
- Loss estimation of human lives and property

Knowing Measures

- Public education (School curricula, information materials, tri-media, markers, signages, museums)
- Identification of evacuation routes and sites
- Conduct of earthquake and tsunami drills
- Capacity building on emergency management
- Tsunami warning National and community-based
- Mitigation

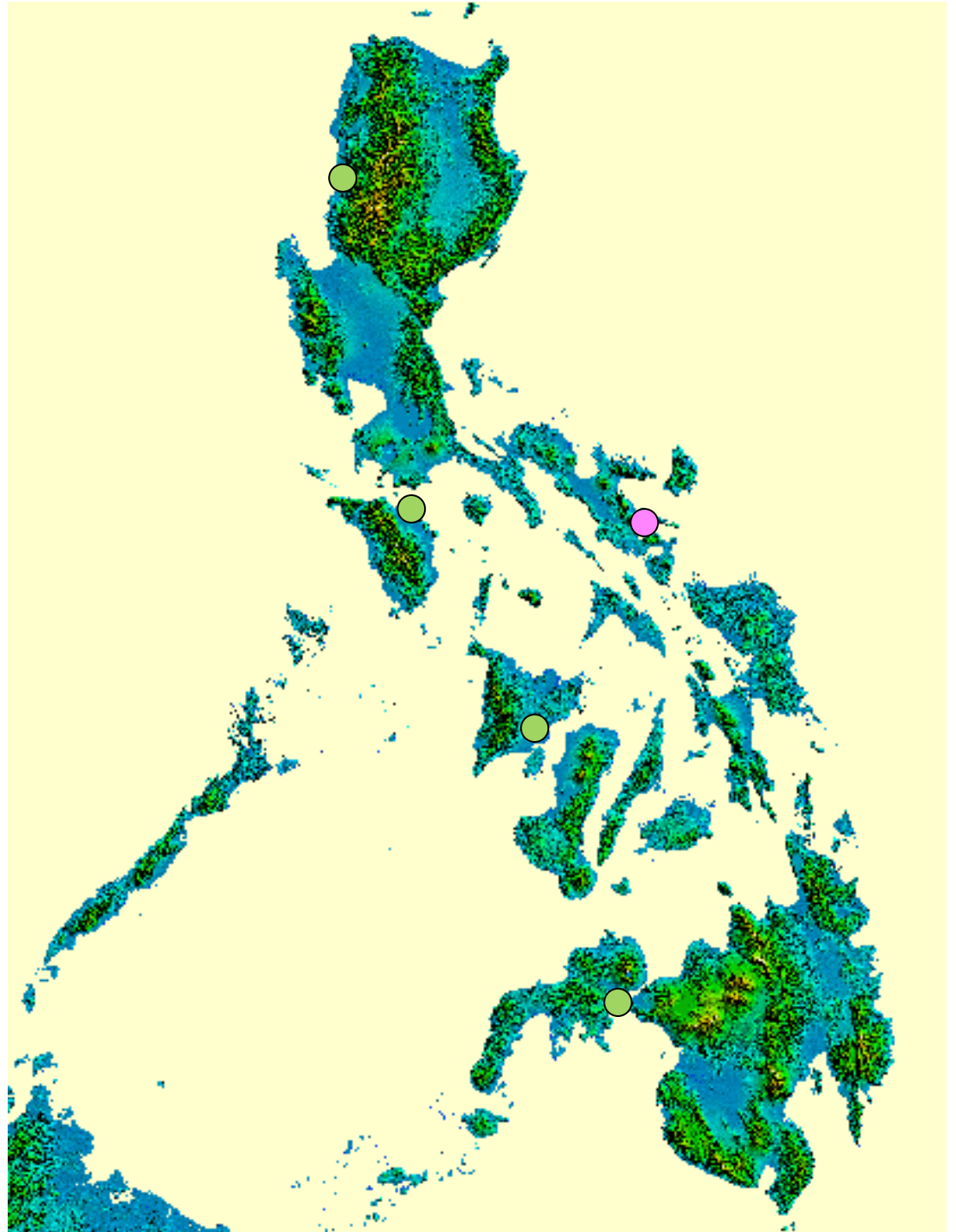
Pilot sites community-based

● EPW2006



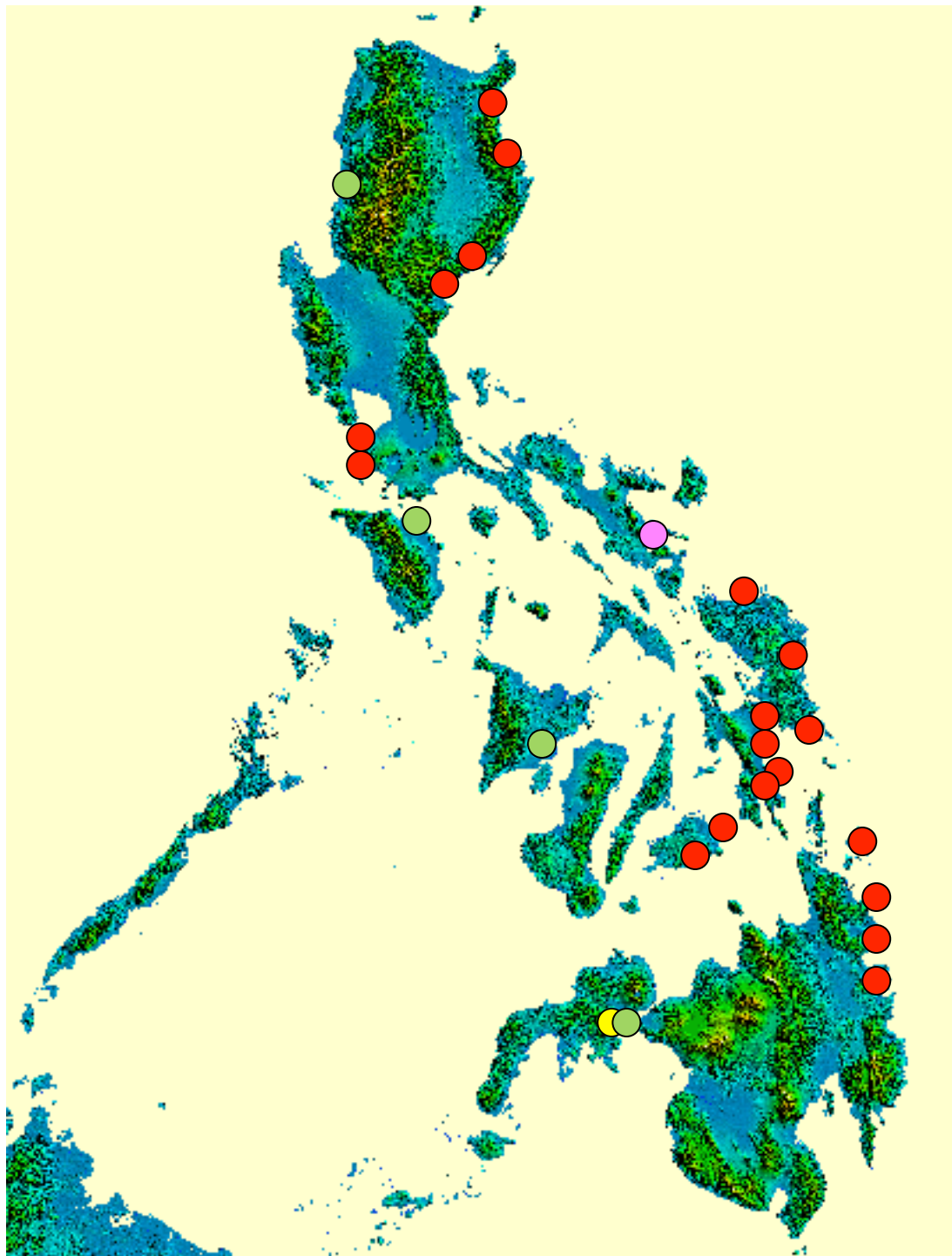
Pilot sites community-based

- EPW2006
- 2005-2007 Tsunami risk mitigation Project



Pilot sites community-based

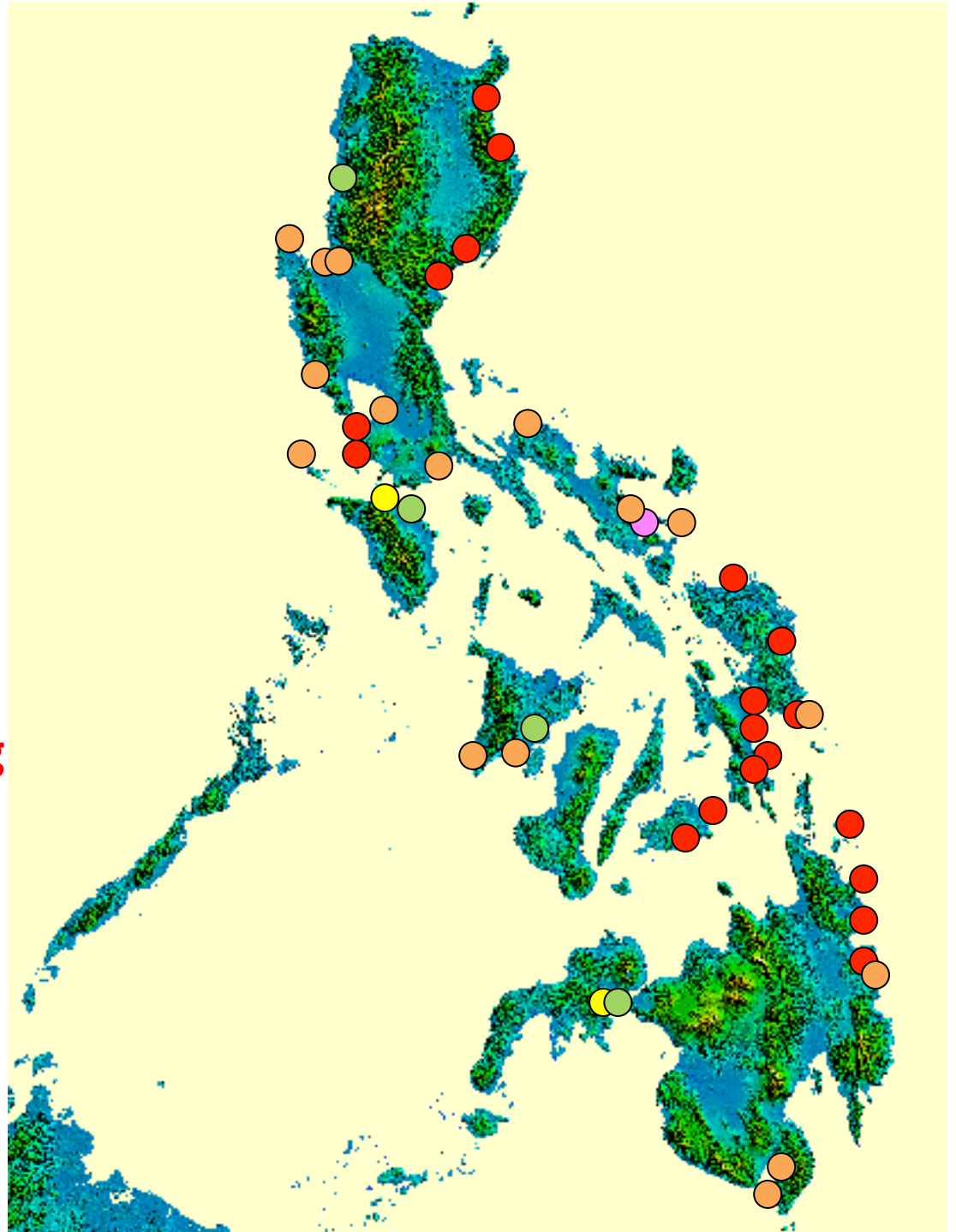
- EPW2006
- 2006-2008 READY Project
- 2005-2007 Tsunami risk mitigation Project



Pilot sites community-based

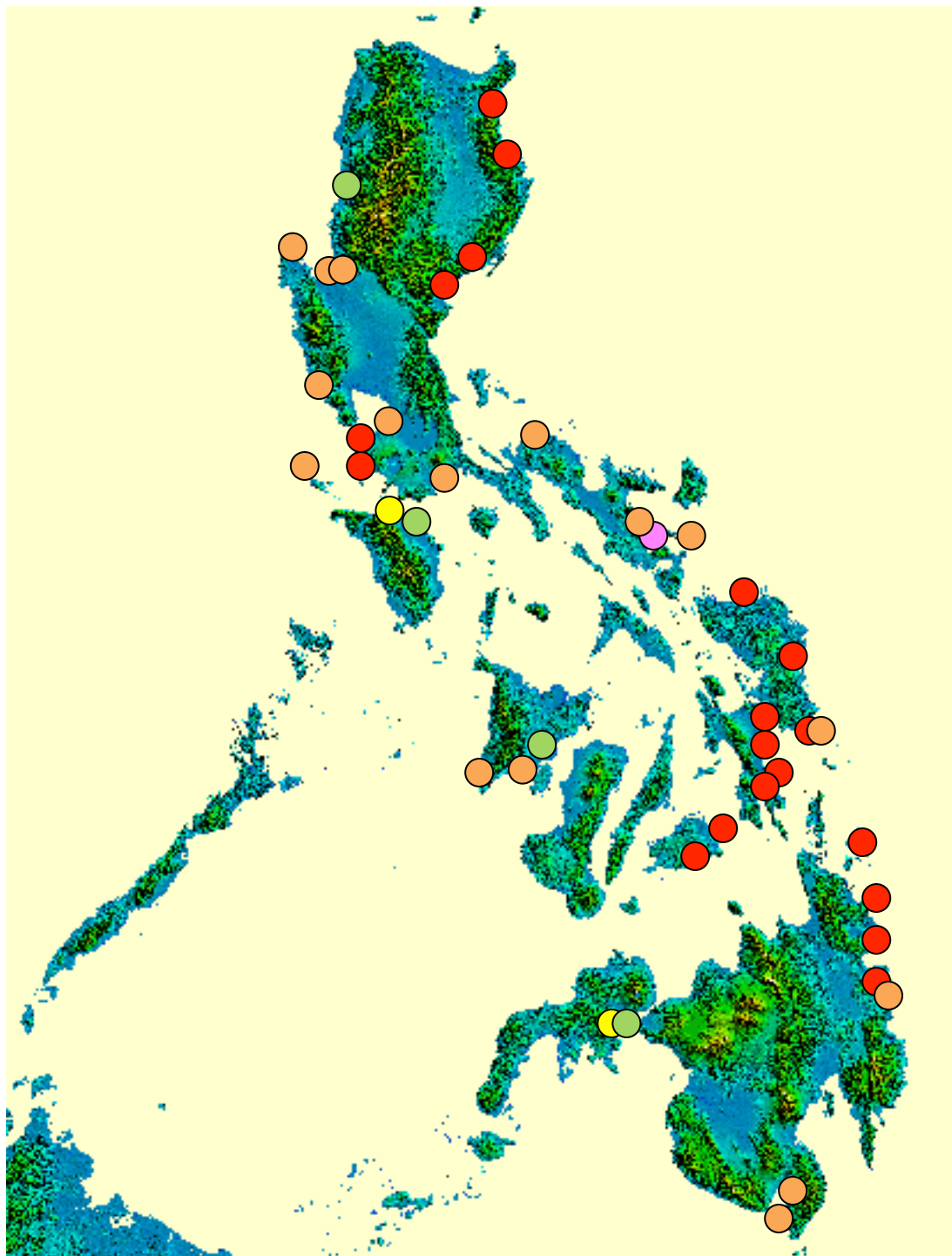
- EPW2006
- 2006-2008 READY Project
- 2005-2007 Tsunami risk mitigation Project
- 2013-2015 Tsunami Early Warning System (TEWS)

10 pilot sites to test the local detection and warning system



Pilot sites community-based

- EPW2006
- 2006-2008 READY Project
- 2005-2007 Tsunami risk mitigation Project
- 2013-2015 Tsunami Early Warning System (TEWS)
- Others: OCD-, LGU- initiated



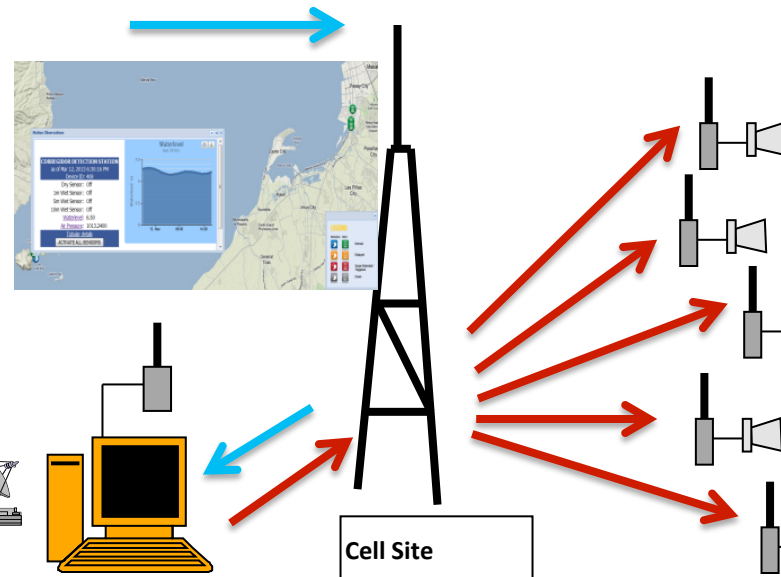
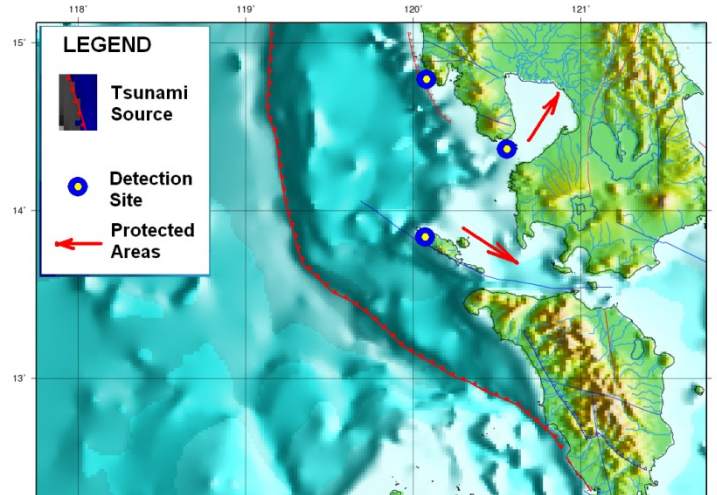
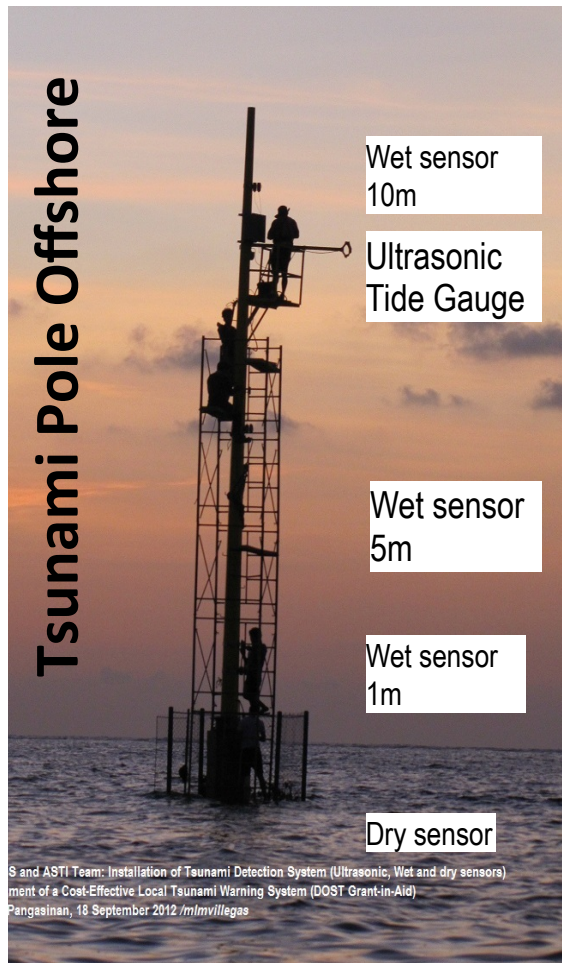
Research:

Historical tsunamis
Survivors' Accounts
Evacuation behaviors
Communication flow



Hazard Awareness and
Preparedness, Perception
Survey

Community Tsunami early Warning System – PHIVOLCS



PHIVOLCS/ASTI and LGUs
Tsunami Visualization and Decision Tool

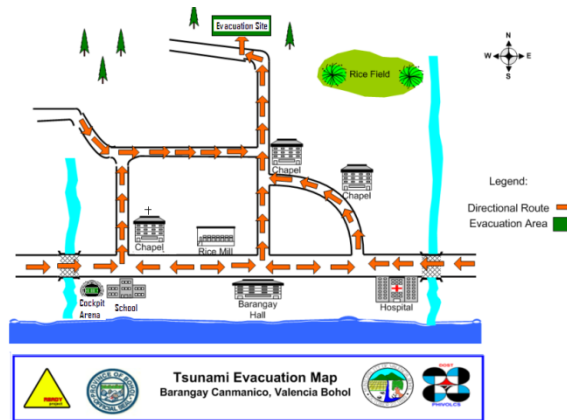
Communities



Community-based Tsunami Preparedness Activities



Familiarization with Hazard and Evacuation Maps



- hazard assessments
- preparation of evacuation maps
- installation of tsunami signage
- coastal village education campaigns
- tsunami drills
- other related activities



Tsunami Signage



Tsunami Drill

Community-level activities



Vigan City



Pagadian City

***Importance of local knowledge
in tandem with scientific results***

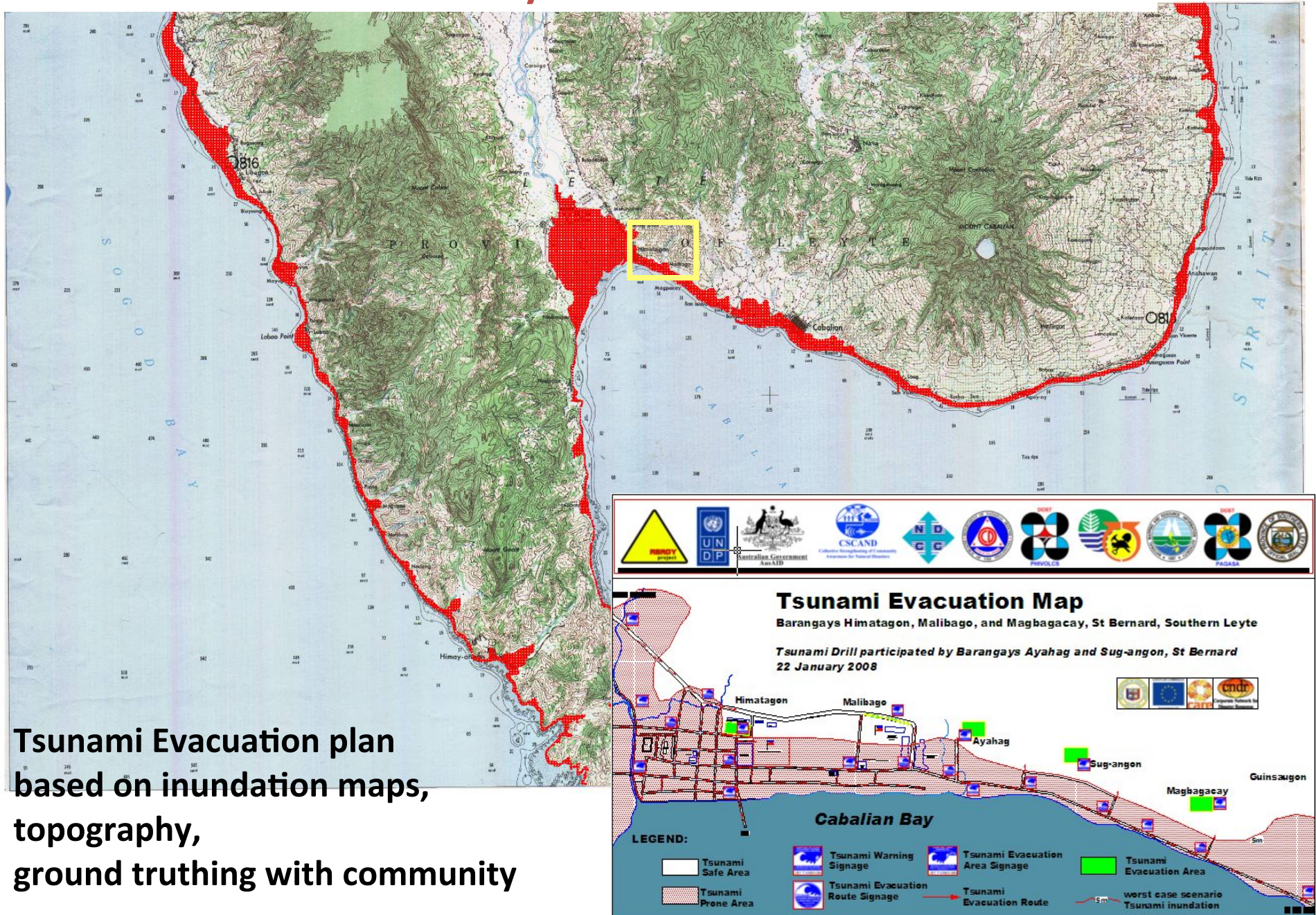
Tsunami Evacuation Drill



Knowing by doing



Establishment of Community-based EWS for Tsunami



Establishment of Community-based EWS for Tsunami

Various Tsunami Signage – READY Project



Hazard Prone Area Signage



Directional Signage



Evacuation Site Signage

Tsunami Signage done by local people



Tsunami Warning Signage at Barangay Dumagok



Tsunami Evacuation Route at Barangay Kawit



Establishment of Community-based EWS for Tsunami

*Science-based:
results of research is shared*



Orientation for local chief executives, disaster action officers, planners and community leaders in partnership with local NGOs, and others



The community leader explains the tsunami evacuation map



Use of improvised bells to warn residents



Residents walk to the evacuation site during the tsunami drill



- 20th year commemoration of the 15 November 1994 Mindoro Earthquake and Tsunami
- School-based activities in collaboration with Local Government and Department of Education**
- Essay writing
Poster making

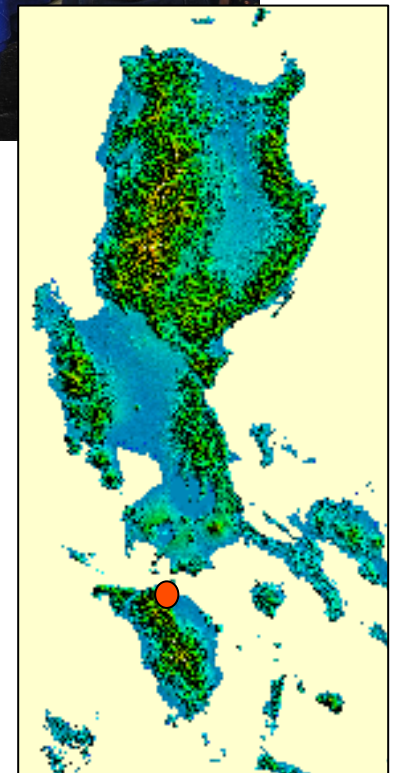


Any community activity to promote preparedness..
Run-Tsunami-Run...



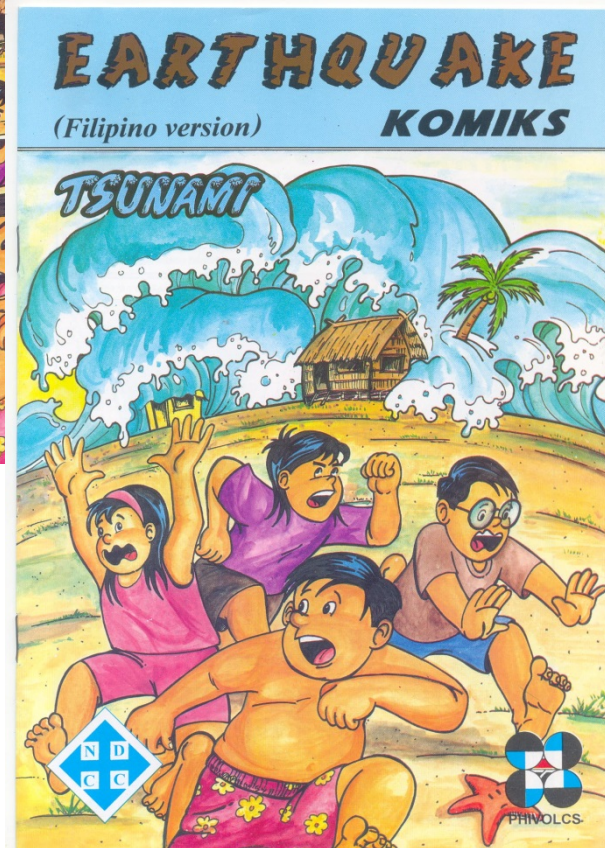
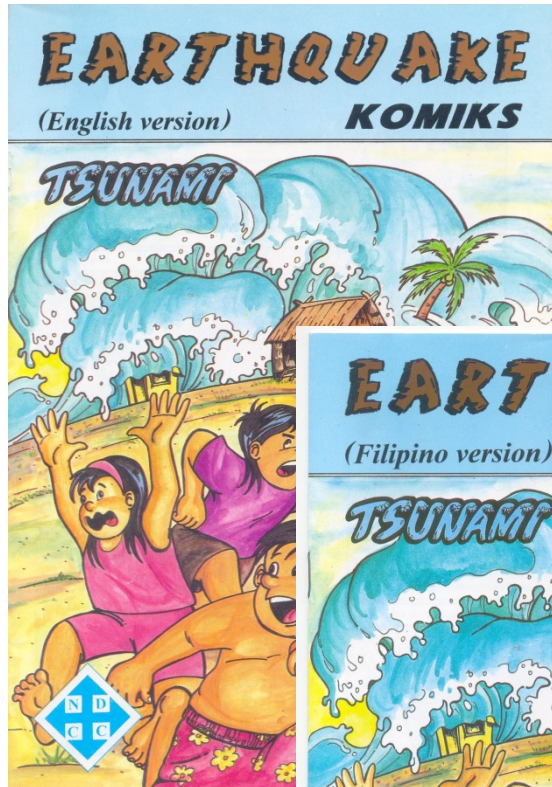


Tsunami Marker unveiled, November 2014 Mindoro Oriental to commemorate 1994 Mindoro Tsunami -collaboration of local private groups and community



Collaboration with Local Community, private sectors and PHIVOLCS

Development of materials



1997

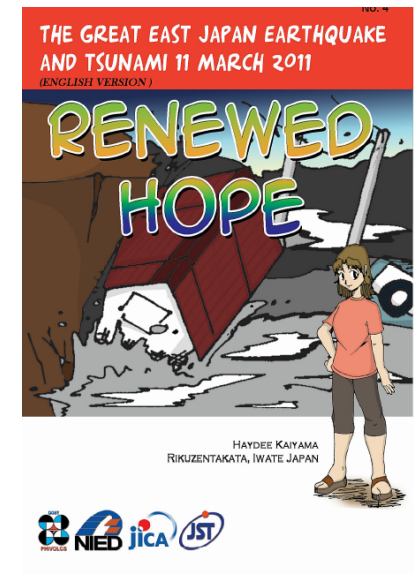
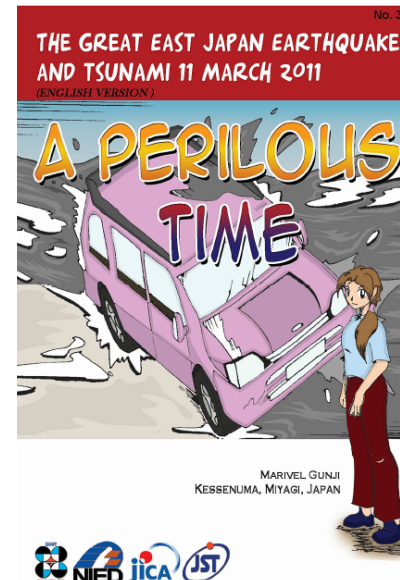
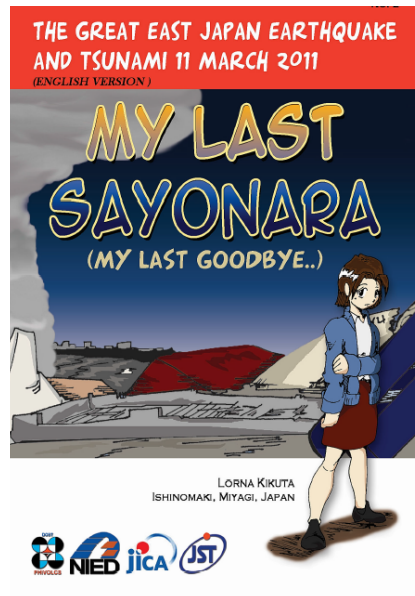
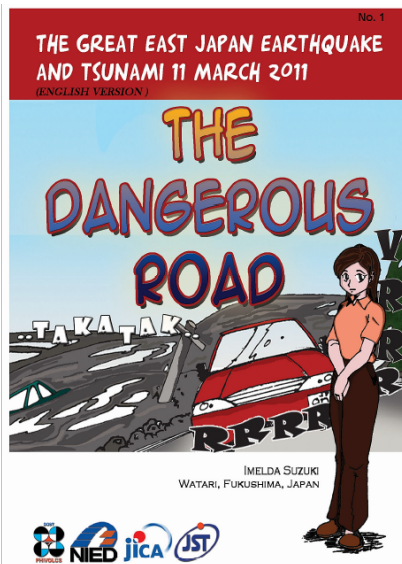
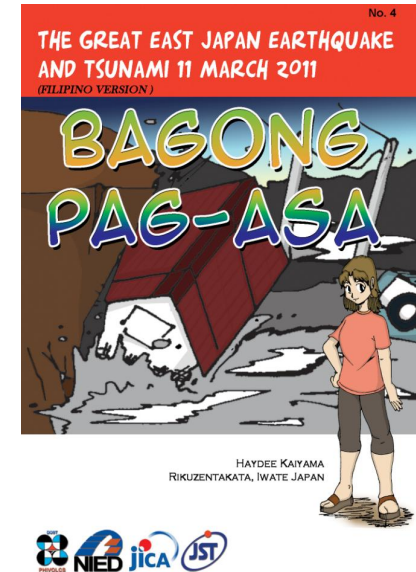
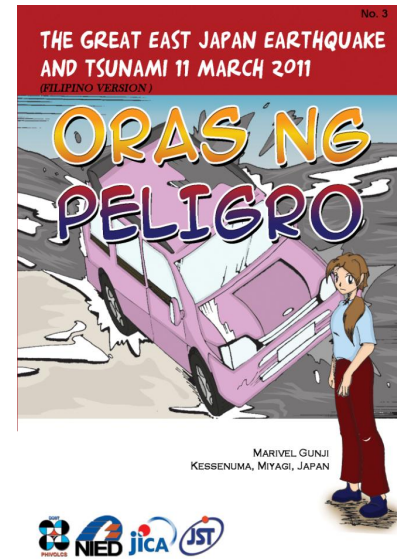
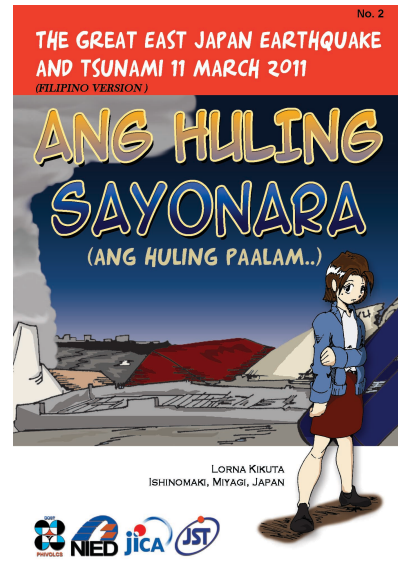
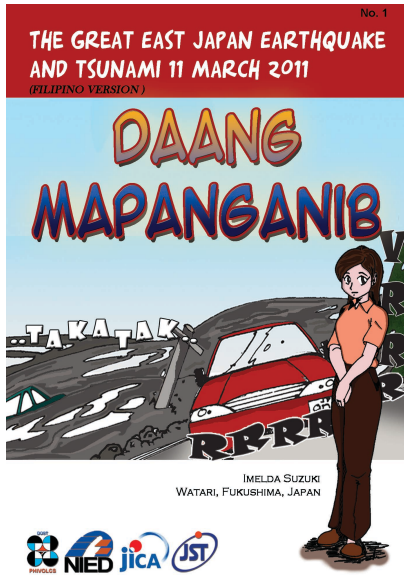
Lessons learned from past events



2006

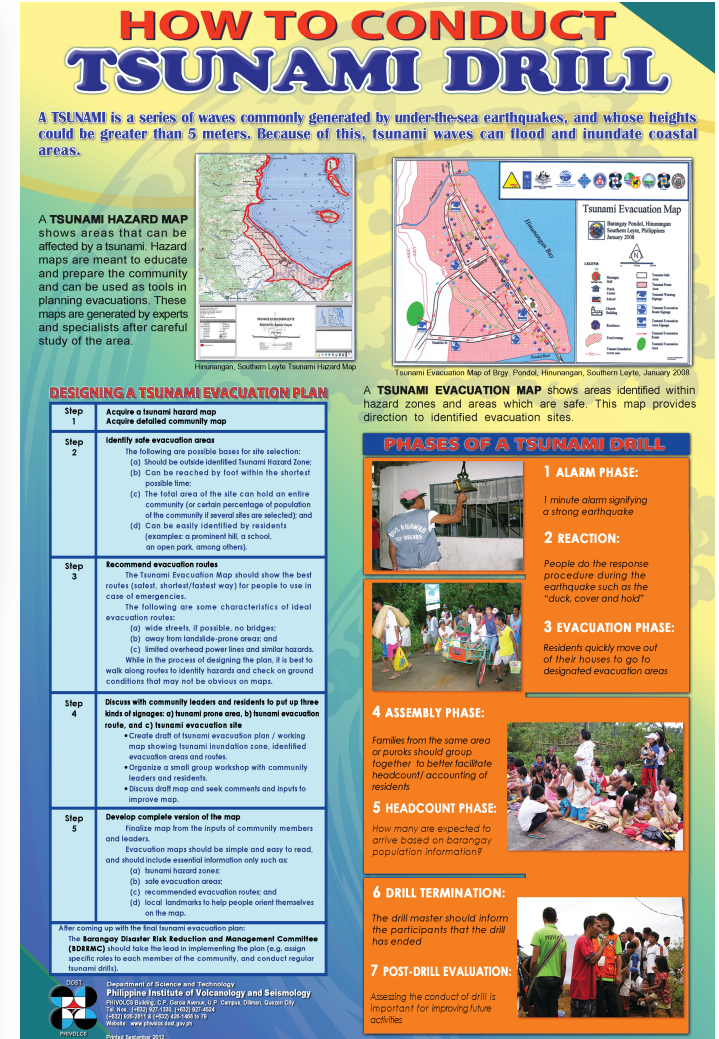
Lessons learned from 11 March 2011 Great East Japan Earthquake

2012-2013 Filipino Version



2015 English Translation

Specific materials for TSUNAMI



2006-2007:
English, Filipino, Ilocano, Bicolano,
Maguindanaoan, Cebuano

TSUNAMI

Facts:

- series of waves commonly generated by earthquake under the sea
- wave heights could be greater than 5 meters
- sometimes incorrectly called tidal wave
- sometimes mistakenly associated with storm surges
- can be generated when the earthquake occurs at shallow depth and strong enough to displace parts of the seabed and disturb the water over it



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NATURAL SIGNS OF AN APPROACHING TSUNAMI

A felt earthquake



Unusual sea level change: sudden seawater drop or rise



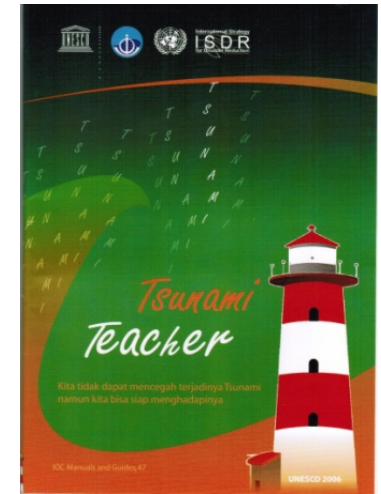
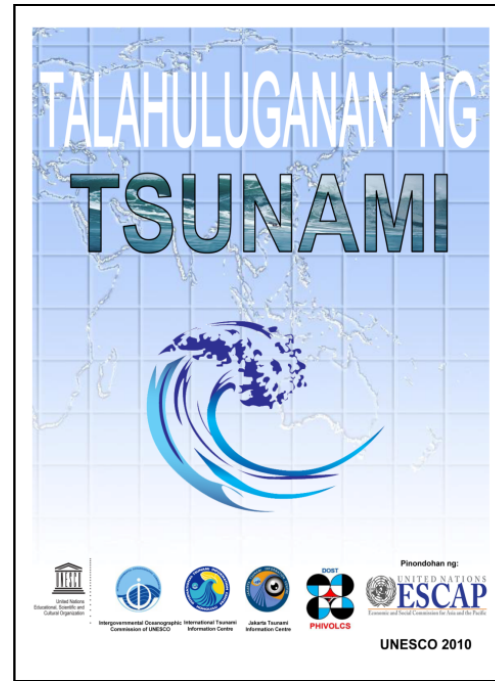
Rumbling sound of approaching waves



Focus on natural signs

Tsunami Awareness Materials and Preparedness Tools Assessment Project (2010-2011) UNESCO-Jakarta

Filipino Translations



Earthquake Safety for Deaf (11-page flashcards)

Aah...Ngayon Alam Ko Na! (16-page picture story flashcards)



Date : 31 August 2012

Time : 8:47:00 PM

**Location: 10.83°N, 126.71°E
112 km S 78° E of Guiuan
(E Samar)**

Depth of Focus (km) : 45

Magnitude : M 7.4



DEPARTMENT OF SCIENCE AND TECHNOLOGY
PHILIPPINE INSTITUTE OF VOLCANOLOGY AND SEISMOLOGY

EARTHQUAKE INFORMATION NO. : 5

PHIVOLCS Bldg, C.P. Garcia Avenue, U.P. - Diliman, Quezon City, PHILIPPINES
Tel.: 426-1468 Fax: 927-1087

Date/Time : 31 Aug 2012 - 08:47:00 PM
Location : 10.83°N, 126.71°E - 112 km S 78° E of Guiuan (Eastern Samar)
Depth of Focus (Km) : 045
Origin : TECTONIC
Magnitude : Mw 7.6



Reported Intensities : Intensity VII - Guiuan, Oras, Sulat, Gen. MacArthur, Llorente, Eastern Samar; Borongan City; Tacloban City

Intensity VI - San Julian, Eastern Samar; Palo, Leyte; Siargao Island, Surigao del Norte

Intensity V - Saint Bernard and Hinunangan, Southern Leyte; San Policarpo, Eastern Samar; Bobon, Northern Samar; Kananga, Leyte; Mati City; Compostela, Compostela Valley; Legaspi City; Iloilo City; Bislig City; Davao City; Cateel, Davao Oriental; Roxas City; Sorsogon City; Pangasinan, Catanduanes; Dueno, Bohol; Talibon Bohol; Tagbilaran City

8.11
2012_0831_0540_M76D45_B5F

[\(Please see separate page for additional intensity report\)](#)

Expecting Damage : YES
Expecting Aftershocks : YES
Issued On : 1 Sept 2012 - 5:29 AM
Prepared by : SOEPD

“We did not take note how many times, because when we saw the water level suddenly went down and then up, we started running. We went to the high ground in Bry Kalutang.

*Yes I know that there might be a tsunami. **I remember last year, from television,** we saw what happened in other places..When I saw what happened in Japan... ”*

-J. Barcil , Resident, Gen MacArthur



M2U00220_cesario_labotap_mmv.MPG - VLC media player



*“The order to evacuate came from us in the community, then from the Mayor-through the municipal DRRMO. We ordered the evacuation first.. I did not wait from the orders from the municipality....as I learned from the seminar not to wait. So I have already ordered evacuation before the MDRRMO arrived. We need to initiate and not wait, for example, if our communication signal goes down, so we will not wait. . We should not wait. While the evacuation was ongoing, the mayor called, then the municipal disaster officer. **All of this I earned from the seminar.**”*

Cesario Labutap/ Brgy Chair- Sulangan
Guiuan

*"I was scared. It was like.... Swaying..It was so strong.. **We went under the table.** That's where we went, we put our hands to cover our head.. (gesture hand covering head).. We prayed.*

Where did you learn "Duck cover and hold?"

*We were **taught here in school.** We were **taught when we were in Grade 3.**"*

Cathy, 12 years old,
Grade 6 Student, Guiuan



PHIVOLCS Strategies (1/2)

- Identify specific target groups for earthquake and tsunami risk reduction. **Emphasis on community-based EWS for local events.**
- ***Utilize the results of scientific research*** as strong basis for action.
- ***Emphasize natural signs-*** develop observational skills
- ***Learn and apply the lessons*** from past events (local and international)
- Ensure production, distribution and utilization of information and education materials- ***using local experience, local language***
- ***Use of cost-effective, locally available materials for tsunami early warning system and communication***

PHIVOLCS Strategies (2/2)

- ***Multi-stakeholder and multi-sectoral*** approach for effective hazards information dissemination
- Engage in ***multi-agency collaborations*** – *education, local government, health, etc*
- Nurture to strengthen ***public sector- private sector partnerships***, establish and **maintain** linkages with international partners and further explore and expand linkages
- Explore funding schemes from outsourcing resources and cost sharing

PHIVOLCS

Pre - 2004

- Information Materials
 - natural signs

(based on
1976 Moro Gulf
1994 Mindoro)

- Indicative map-tsunami prone areas in the Philippines

Post -2004

- Information Materials
 - natural signs
 - Tsunami Alert levels
 - CBEWS
- Upgrade of EQ and tsunami monitoring (+R&D tsunami wet sensor)
- Strengthening of International linkage (PTWC, SOPs and communication, simulation exercises)
- Community-based Early Warning System and conduct of drills
- DOST-GIA preliminary tsunami Inundation maps covering the whole Philippines (1:50,000 scale)

Post -2011

- Information Materials
 - natural signs
 - Tsunami Alert levels
 - CBEWS
- (1976,1994,2004,2011)
- Strengthening of International linkage (ITIC-PTWC, SOPs and communication, simulation exercises, RIMES, JICA)
 - Community-based Early Warning System and conduct of drills
 - More detailed tsunami inundation maps (municipal/ barangay level?)

