

IRIDeS Fact-finding mission to Philippines (2nd mission, January 16 - 24, 2014)

International Research Institute of Disaster Science
Tohoku University, Japan



IRIDeS Survey Team

Hazard and Damage Evaluation Team

Dr. Shuichi Kure (Team Leader, Disaster Potential Study)

Dr. Jeremy D. Bricker (Technology for Global Disaster Risk)

Dr. Erick Mas and Mr. Bruno Adriano
(Remote Sensing and Geoinformatics for Disaster Management)

Dr. Carine J. YI (International Strategy for Disaster Mitigation)

Disaster Medicine Team

Prof. Shinichi Egawa
(Team Leader, International Cooperation for Disaster Medicines)

Prof. Toshio Hattori and Dr. Haoile C-Y
(Disaster-related Infectious Disease)

Prof. Hiroaki Tomita (Disaster Psychiatry)

IRIDeS Survey Team

From Philippines Counter Parts

Prof. Cristopher Stonewall P Espina (College of Architecture, UP)

Dr. Maritess S. Quimpo (Bureau of Research and Standards, DPWH)

Mr. Karl Taberdo (College of Architecture, UP)

Mr. Paul Tupaz (BS Economics, UP)

Mr. Christer Kim Gerona (BS Political Science, UP)

Hazard and Damage Evaluation Team

Hazard and Damage Evaluation Team

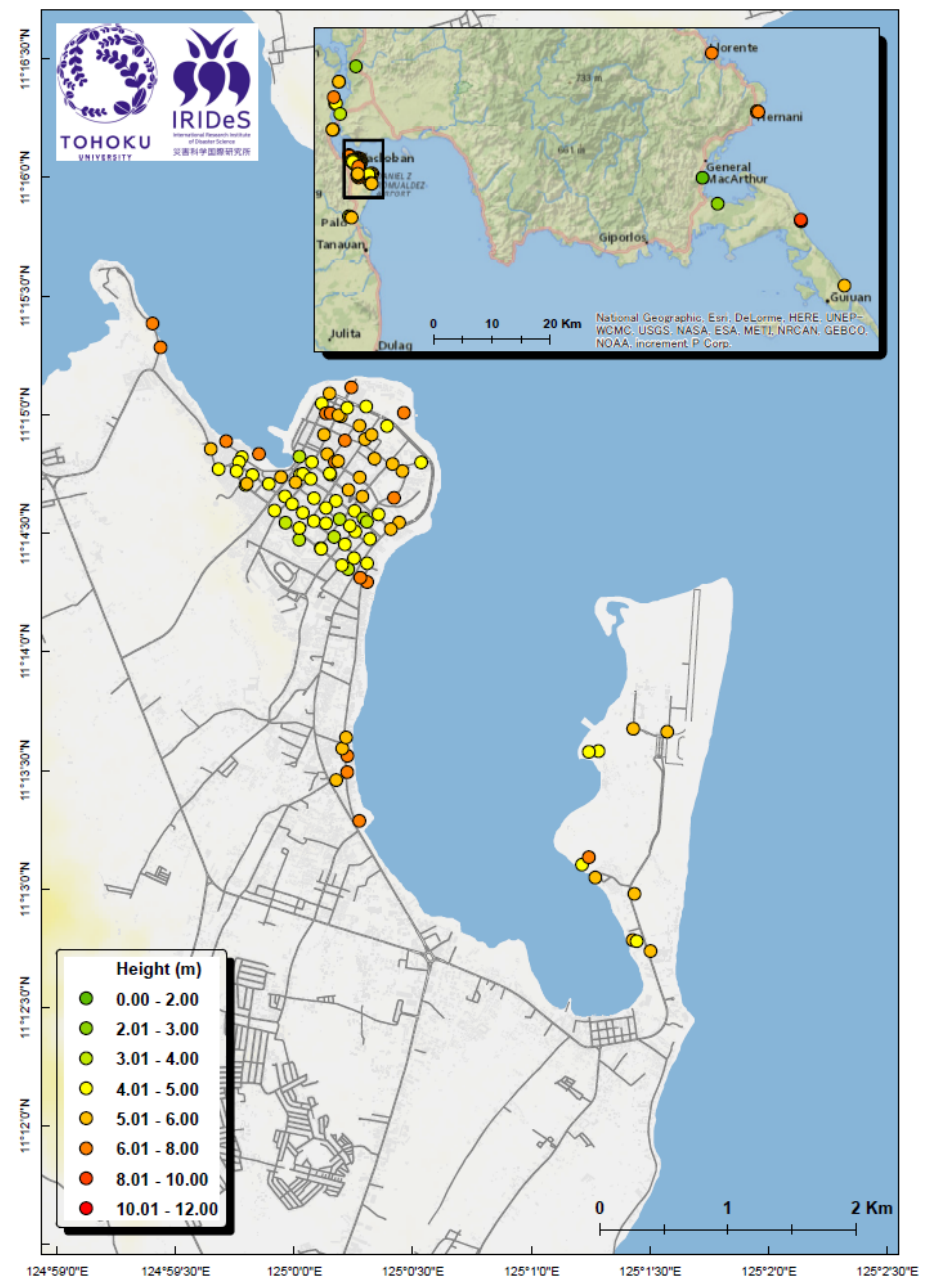
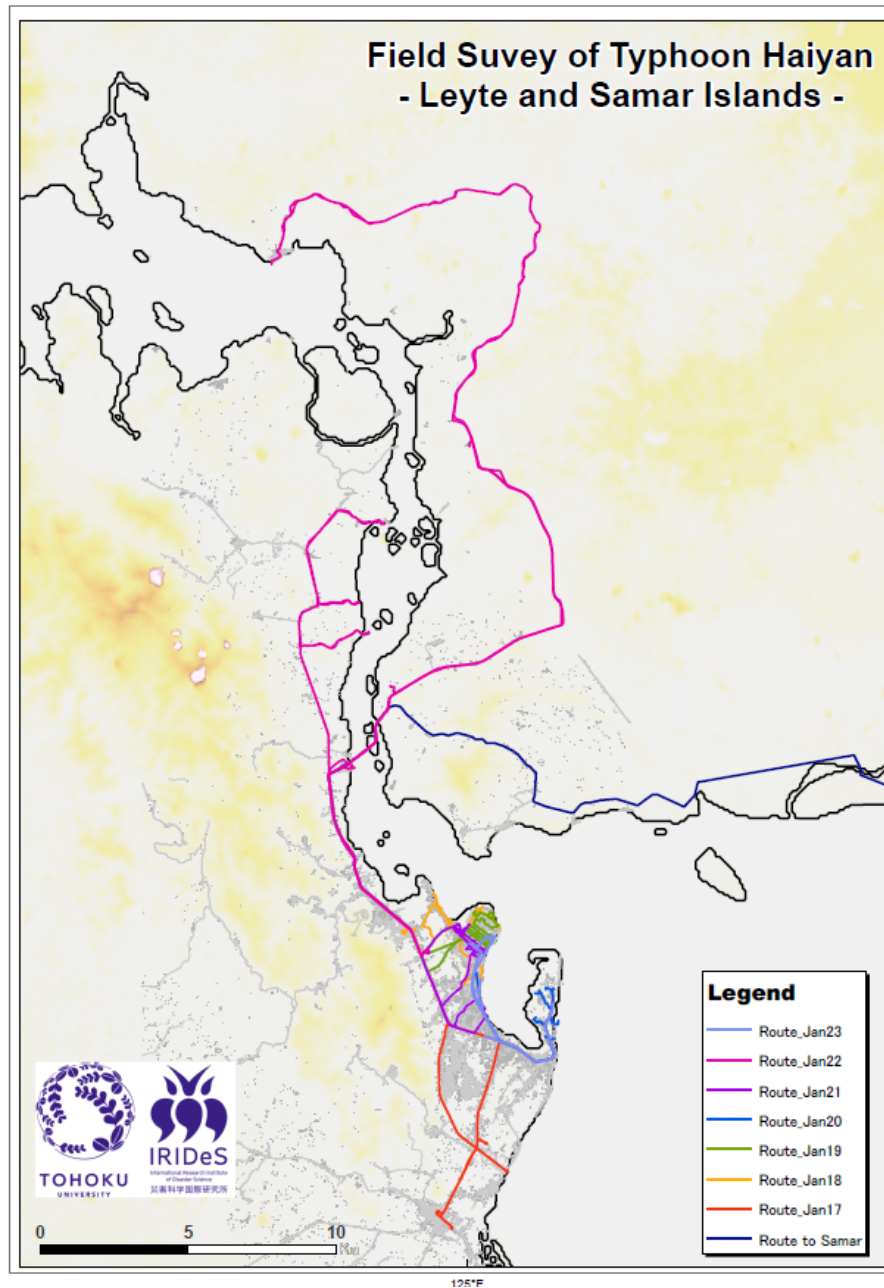
MISSIONS AND RESULTS

Hazard and Damage Evaluation Team

Missions

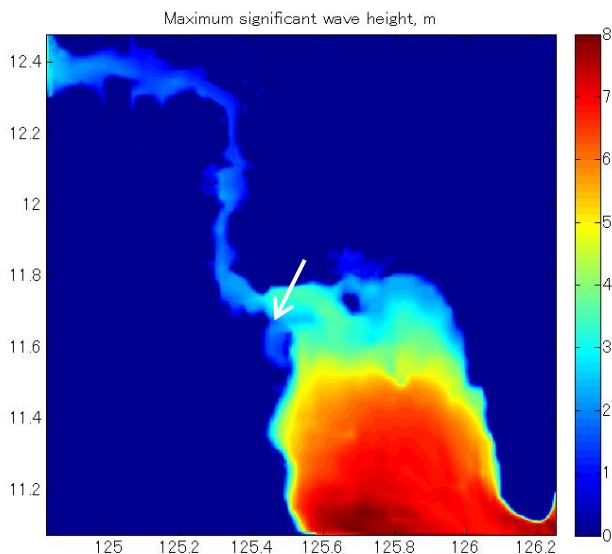
- Verify satellite image analysis using ground truth data and grasp the damage characteristics of typhoon disasters regarding building
- Data measurement and collection for detailed storm surge and wave modeling
- Investigation on other hazards (flooding, landslides, wave intrusion along the river, etc.) induced by Typhoon Haiyan To seek and establish collaborative partnerships to evaluate impact on mental health system of the affected people or Japanese residents for psychosocial postvention

Survey Results (Inundation Heights)



Types of damage in downtown Tacloban near the shoreline

- Surge up to 6 m above sea level
- On top of surge, wave height up to $0.8 \times \text{depth}$
 - Low-lying coastal areas only 1 m above sea level
 - Possible wave height up to 4 m
- Scour around structures
- Beached ships destroyed homes
- Most buildings destroyed

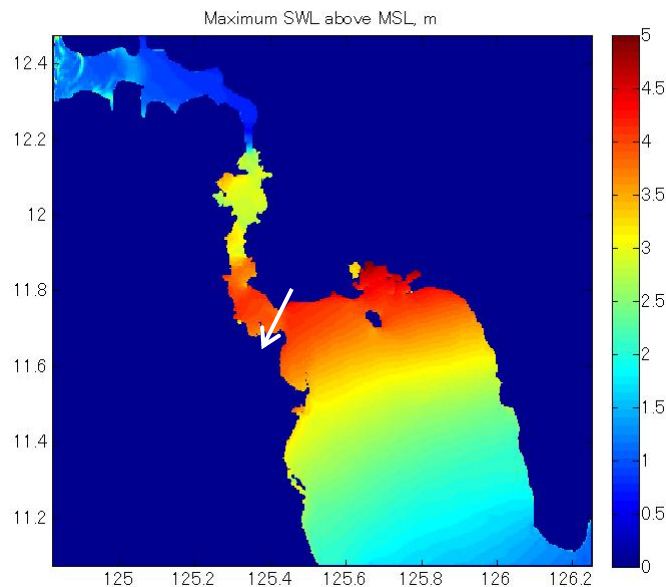


Types of damage in downtown Tacloban near the shoreline

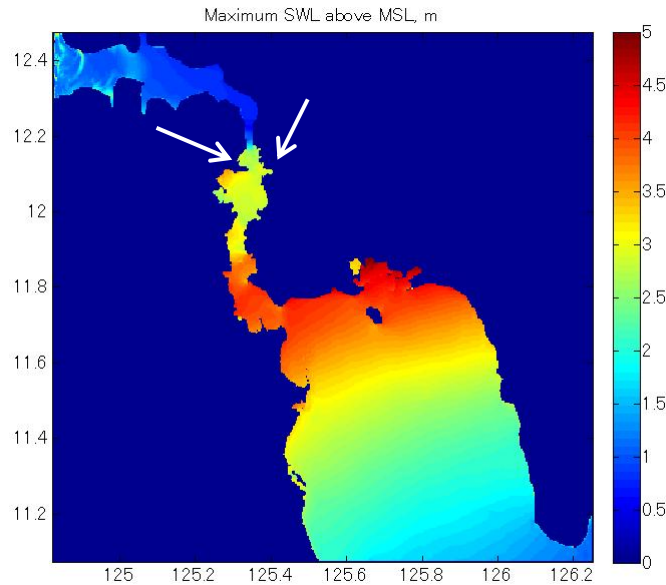


Types of damage in inland downtown Tacloban

- Surge up to 6 m above sea level, but no waves
- RC masonry buildings dirtied but standing
 - Many windows and doors destroyed
 - Some thin walls destroyed
- Some wood frame buildings destroyed (possibly due to wind)



Surge travelled far to the north in Samar-Leyte strait

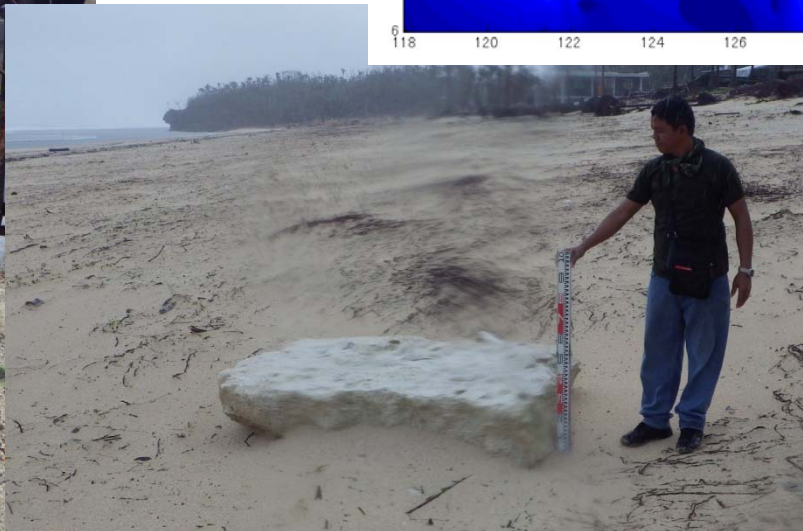
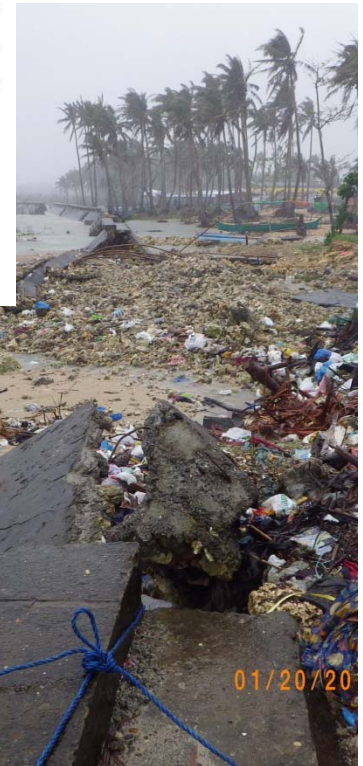
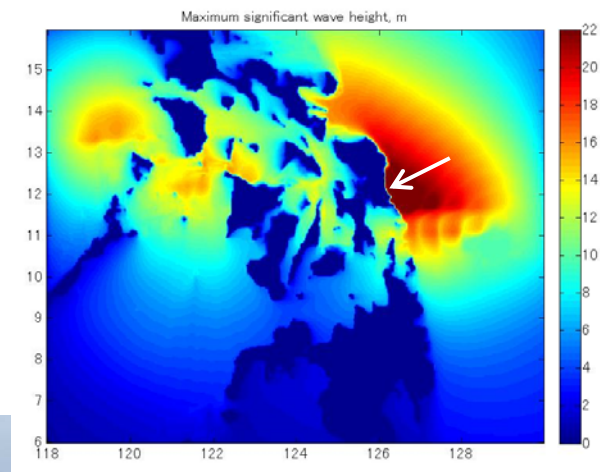


- Northern Leyte and Samar villages feel neglected because NGO's and foreign governments haven't paid attention to them



Damage in Eastern Samar

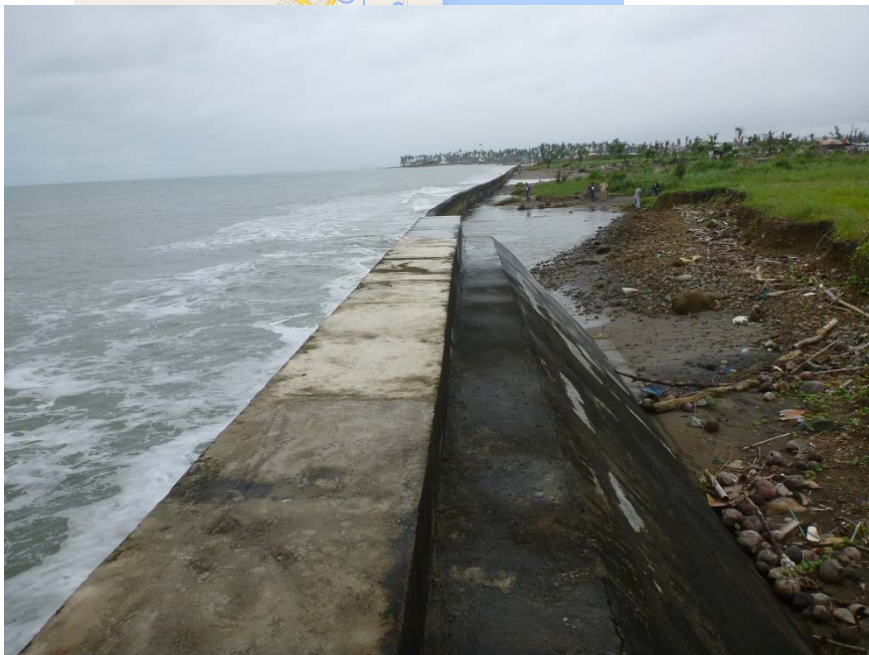
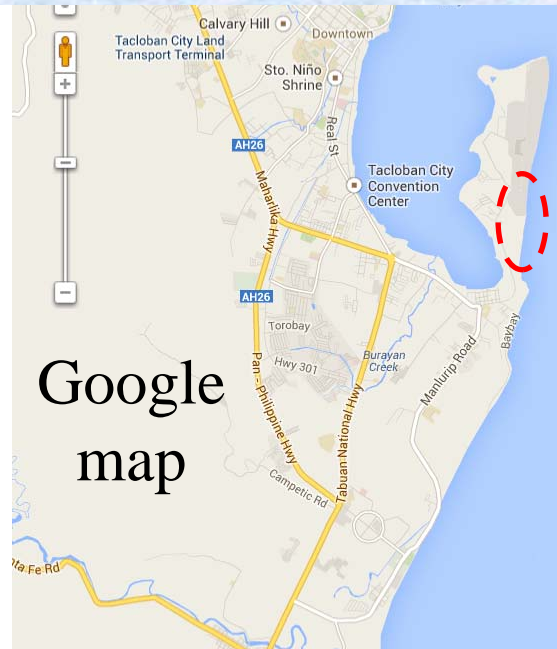
- Waves only (no storm surge)
 - Waves break over coral reef, then run up onto land as bores
 - Inundation and run-up measured up to 11 m above sea level
- Punched through coral-fill seawall
- RC structures destroyed
- Foundation blocks transported up to 30 m landward
- Scour
- Coral boulders



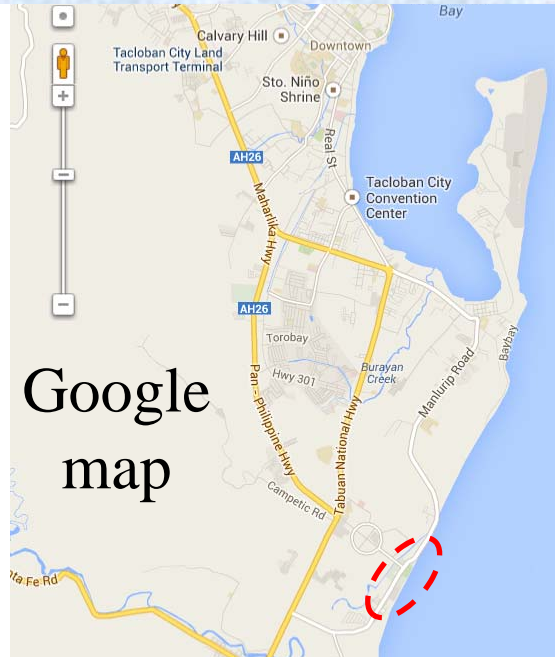
Damage in Eastern Samar



Seawall Damage (Airport)



Seawall Damage (MacArthur Landing Memorial Park)



Widespread damage due to wind

- Rafters tied to building columns well
 - Good connection, so during storm roof frames did not lift off
- Corrugated galvanized iron (GI) roofing sheets nailed to rafters
 - Sheets pulled up and ripped off ties



Widespread damage due to wind



Widespread damage due to wind



Layte Convention Center



Temporary Houses



New Findings and Observations

- Detailed inundation map in and around downtown Tacloban city was obtained.
- Significantly high waves more than 10 meters (up to 14 meter) were observed in Eastern Samar.
- Surge travelled far to the north in Samar-Layte strait
- Local flood inundation of rivers and landslides due to heavy rainfall was observed at some points around Palo city.
- Etc.

Problems for Evacuation

- “Storm Surge”

Some people do not understand “what a storm surge is”.

- Poverty

Young strong men should stay in their homes in order to protect their properties.

- Many facilities are not appropriate for evacuation.

- Many people already rebuilt houses in the highly damaged areas except for the no-build zone.

Problems

- Evacuation facilities

Many facilities such as Tacloban city convention center, Layte convention center, schools, churches were not appropriate for the evacuation (Near sea side, severely damaged by strong wind, etc.).



Tacloban City Convention Center



Layte Convention Center (Palo)

Problems

- New houses were already reconstructed in highly damaged areas.



Disaster Medicine

Divisions of Disaster Medical Science

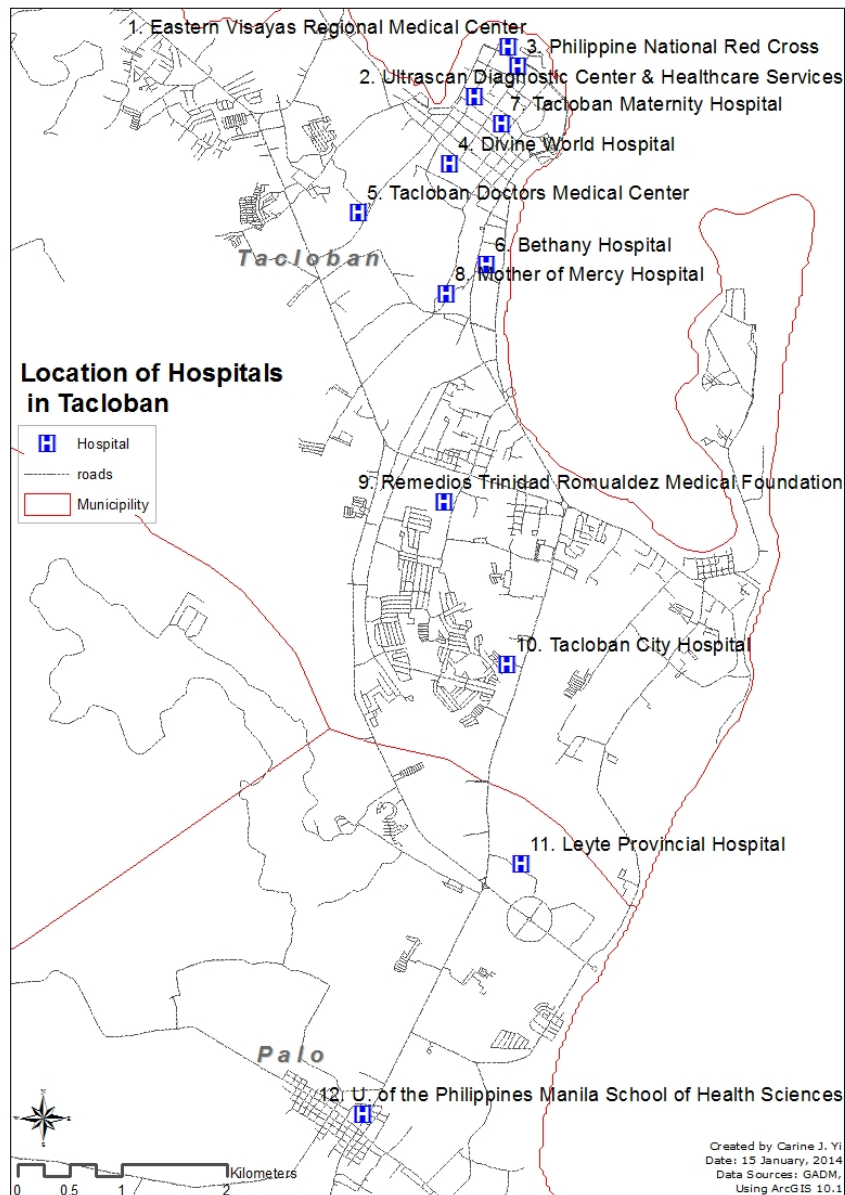
MISSIONS AND RESULTS

Divisions of Disaster Medical Science

Missions

- International Cooperation for Disaster Medicine (Prof. Egawa)
 - To summarize the medical and public health support.
 - To summarize the damage of the hospitals.
 - To assess the health conditions in evacuation centers or temporary houses
- Disaster Related Infectious Disease (Prof. Hattori)
 - To conclude MOU between UP to facilitate the project
 - Collaboration on diagnosis of Dengue, Leptospirosis and tuberculosis among febrile patients.
- Disaster Psychiatry (Prof. Tomita)
 - To seek and establish collaborative partnerships to evaluate impact on mental health system of the affected people or Japanese residents for psychosocial postvention.

International Cooperation for Disaster Medicine



Courtesy of Dr. Carine Yi

ID	Name	Address
1	Eastern Visayas Regional Medical Center	Tacloban
2	Ultrascan Diagnostic Center & Healthcare Services	Tacloban
3	Philippine National Red Cross	Tacloban
4	Divine World Hospital	Tacloban
5	Tacloban Doctors Medical Center	Tacloban
6	Bethany Hospital	Tacloban
7	Tacloban Maternity Hospital	Tacloban
8	Mother of Mercy Hospital	Tacloban
9	Remedios Trinidad Romualdez Medical Foundation	Tacloban
10	Tacloban City Hospital	Tacloban
11	Leyte Provincial Hospital	Tacloban
12	U. of the Philippines Manila School of Health Sciences	Palo
13	Zystostomiosis Research Institute	Palo

Hospital surveillance according to geographical Information and satellite images

International Cooperation for Disaster Medicine

- Hospital Surveillance in the affected area revealed
 - Hospitals close to the coastline were damaged by storm surge and strong wind. Strong wind blew off the roof and broke the window resulting in the damage of vital facilities of the hospitals.
 - One hospital had saved CT scan, that served the whole area afterward.
 - All hospital had disaster manager and trained the faculties to act properly at Typhoon, but the hazard was beyond expectation.
 - Preparedness reduced the damage in some hospitals
 - Very few actual in-patient loss and employees injury.
 - Domestic and international medical aids came in and supported each hospital by coordination in the municipal office and DOH.
 - Loss of electricity, water and communication caused serious functional damage, but most of the hospitals continued to treat patients as much as possible. Some hospitals were taken over by Aid team, but planning to restart before the Aid team will fade out.

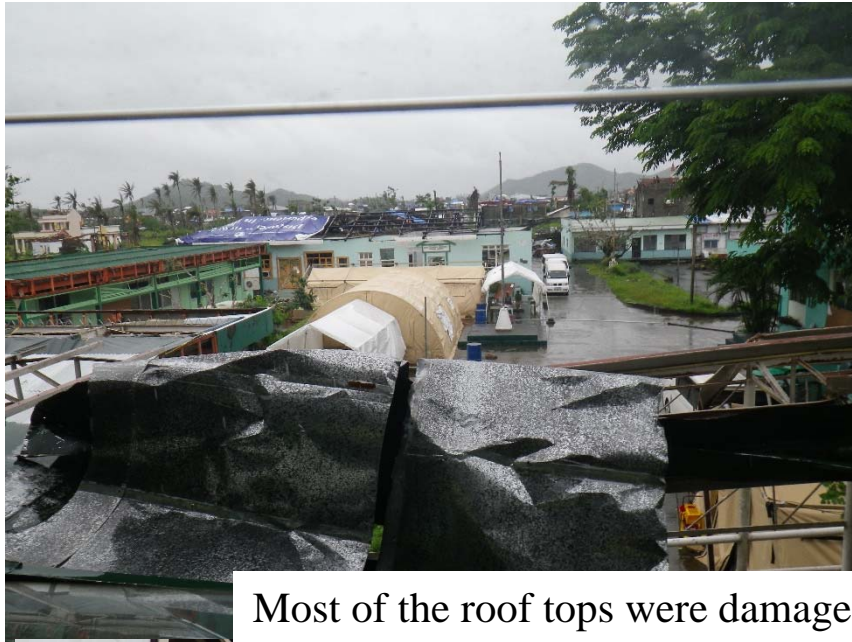
#12 University of Philippines Manila-School of Health Science



Damage by wind

- Serves as the local medical, nursing and midwifery school
- Classrooms and maternity facilities were destroyed.
- Very important as the human resource supplier
- Loss of communication facility is remarkable

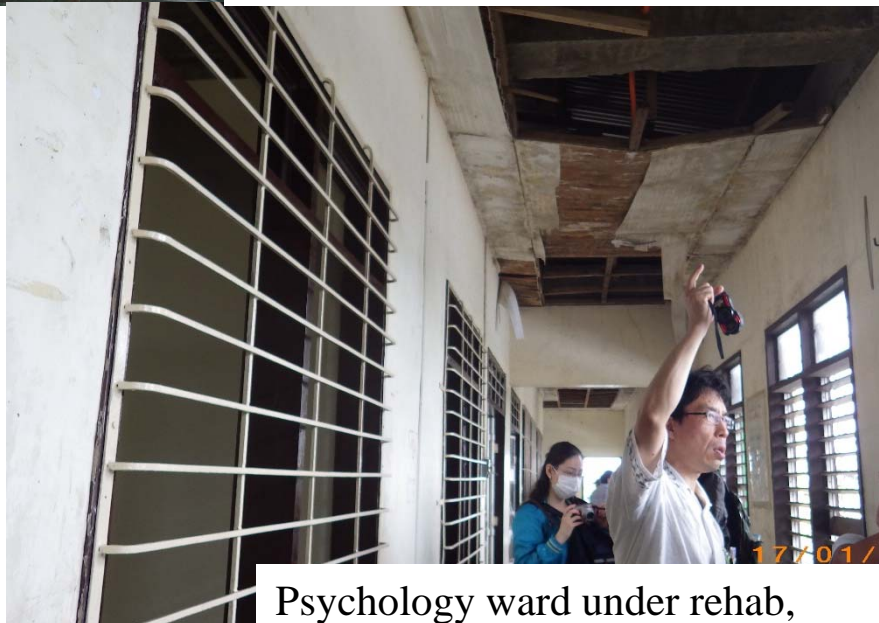
#13 Zystostomiosis Research Institute



Most of the roof tops were damaged



Open out patient



Psychology ward under rehab,

Damage by wind

- Only this hospital had psychiatry ward in this region
- Out patient was restarted two months later and few numbers of in-patient
- In the process of rehabilitation

#11 Leyte Provincial Hospital



Newly built operation room



Newly build meal facility

Damage by surge and wind

- Three months old new buildings and facilities were broken. Some of them were even before use,
- Medical and reconstruction aid from China and Korea
- Out patient was continued
- In-patients in the emergency area

#10 Tacloban City Hospital



Out Patient Department



Roof damaged ward

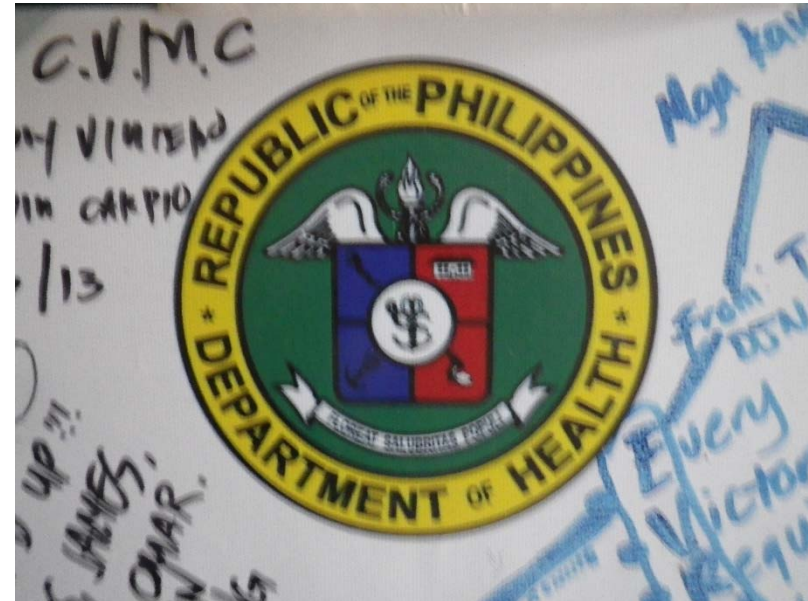
Damage by wind

- Surge was prevented by outer wall
- Functional damage by wind and rain
- Restarted out patient a week later
- Aid from municipal office and JICA

#1 Eastern Visayas Regional Medical Center



Outer wall of sewage system



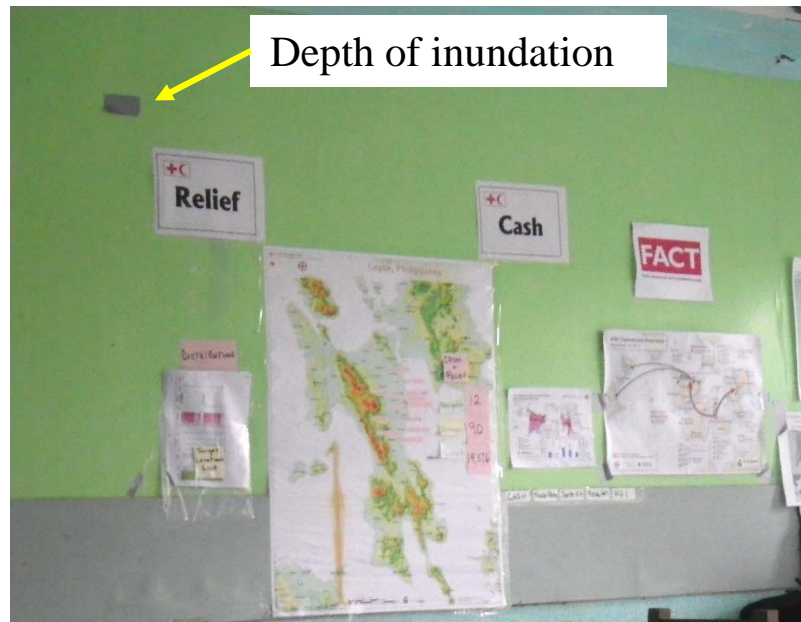
Damage by surge and wind

- Located by the coast
- Largest governmental hospital in the region
- Kept running out patient and in-patient care and accepted community referrals



Inundated hospital ramps

#3 Philippine National Red Cross (operation center)



Damage by surge and wind

- Mini and mobile clinic right after Yolanda
- Relief operations by sectors
- Cooperation with health and welfare sector in the Airport
- Kept supply of blood transfusions
- Rapid assessment according to SPEED system and prevention

#7 Tacloban Maternity Hospital



Damage by surge and wind

- Several deliveries at the time of Yolanda, but unable to keep running due to lack of resource
- Closed its history as the oldest maternity hospital in Tacloban
- No detailed information about re-opening.

#4 Divine Word Hospital



Less damage by
board protection



Protected and functional ICU



Medical record on the 3rd floor

Damage by surge and wind

- Protected the glass window in front of ICU by hard board two days before Yolanda
- Roof tops were blown off, X-ray, MRI, labs were damaged
- Kept running out patient and in-patient
- New facilities reduced the risk

#5 Tacloban Doctors Medical Center



5th floor with roofs blown out



Glass windows in the front

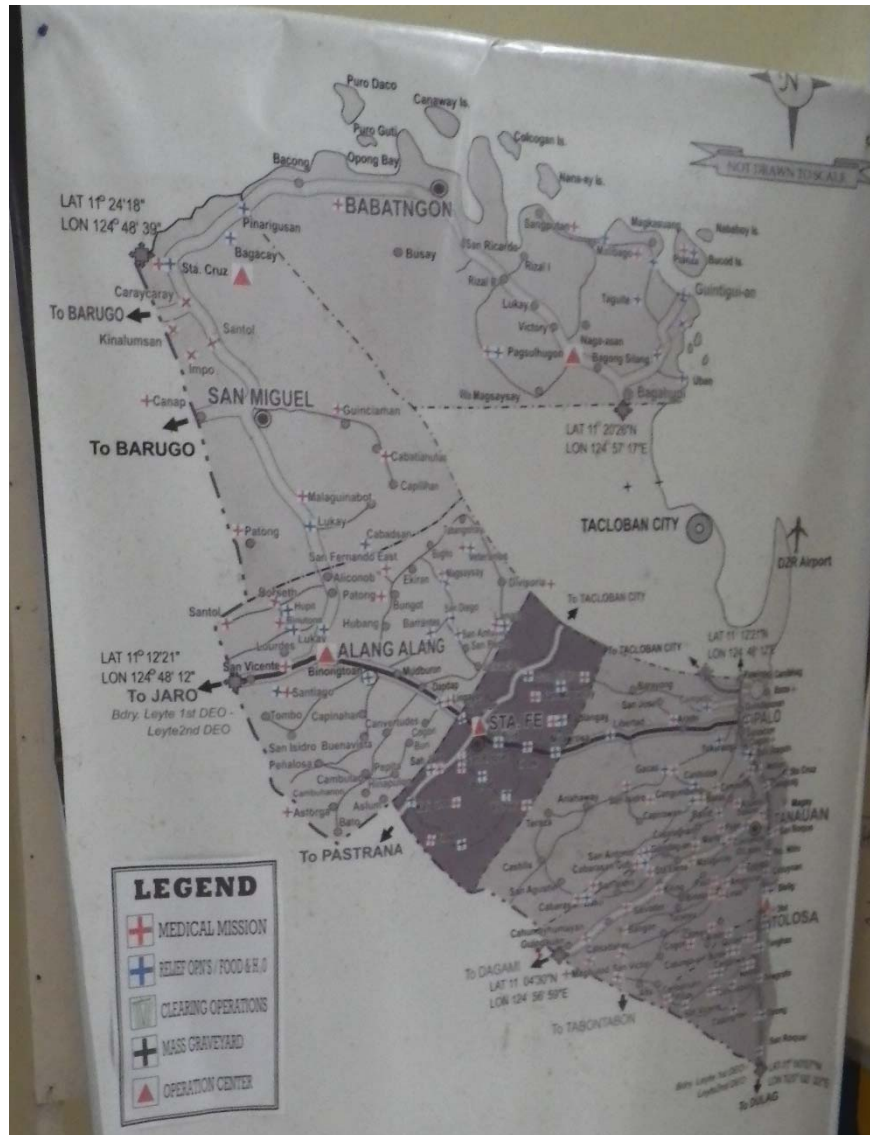


CT was saved at the center of building

Damage by wind

- Kept running out patient and in-patients
- Only functional CT in the region
- Aid from parental group
- Emergency power generator was functional

#9 Remedios Trinidad Romualdez Medical Foundation



Operations at Tacloban and vicinity



Owens its medical and nursing school

Damage by wind

- Kept running out patient and in-patients
- Lost CT by power outage
- Got aid from congressman RTR and served as a center for medical and relief operations under control of disaster manager (medical director)
- Schools restarted two month later

Red Cross Base Camp



Water purification system



Medical room for delegates



Shower and toilets

Operation led by Danish RC

- Concept started from Denmark
- To be functional and comfortable to support the delegates
- Logistics including location, facilities, conflict with local economy, timing of withdrawal are fundamental issues

#6 Bethany Hospital



Medical director and staffs planning restart



ER as the office of MSF



Debris still remaining

Damage by surge and wind

- Closed on Nov. 22, but was taken over by MSF. Employees were hired by MSF until restart.
- Only one severe in-patient in ICU could not survive the power outage

Affected people living on the sea shore



Cooking by burning the debris



House built on wrecked container



Toilet on the sea

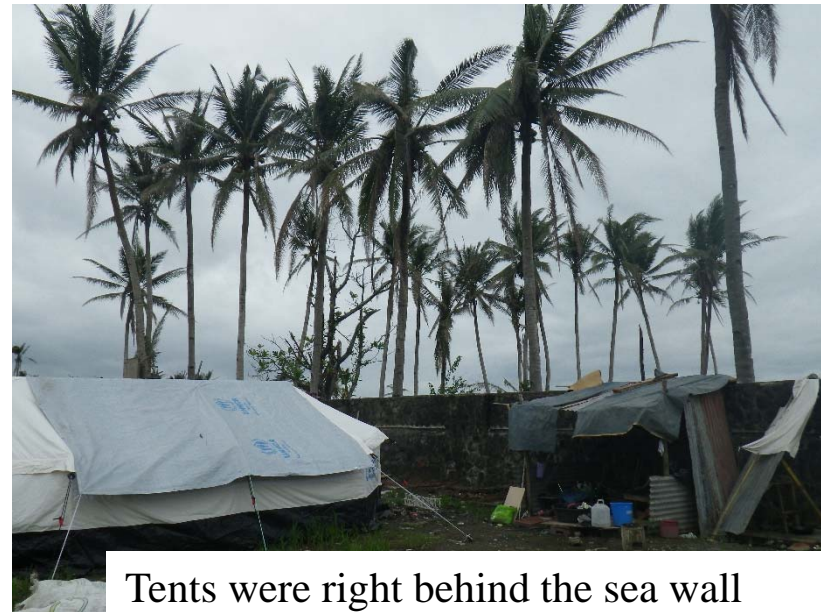
Possible threat to the health

- Water and food supplies periodical
- Mass vaccination for tetanus and measles were provided
- No lunch provided in school
- Cooking by burning woods and coals polluted the air
- Direct sewage to the sea

Affected people living in the tent



Information varies by the community



Tents were right behind the sea wall



No floor in the tent

Possible threat to the health

- Food supplies periodical but lack of information was remarkable
- No lunch provided in school
- Increasing diarrhea and asthma
- Tent has no floor and only limited space of ground cover. Several families live in one tent

Safe Hospital: Last Building Standing in Disasters

Opening remarks: Hon Secretary Dr. **Enrique Ona**

Introduction and opening	Dr Roland Cortes , Assistant Secretary of Health Dr Julie Hall , WHO Representative in the Philippines
Technical presentations	Overview: Dr Arturo Pesigan , WHO Philippines: Safe Hospitals Programme: Assessment of Hospitals Dr Marilyn Go , Preparedness Div. Chief, HEMS Disaster Base Hospitals and Business Continuity Management: Lessons from the Great East Japan Earthquake: Prof Shinichi Egawa , Tohoku University, IRIDeS
Panel of reactors	Representative, Bureau of Design, DPWH Atty Violeta Seva , Earthquakes and Megacities, Inc (EMI) Professor Ruel Ramirez , UP Diliman
Technical inputs from participants and recommendations	Guided discussion on recommendations for Post Haiyan Recovery and safe hospitals Moderator: Dr Sandra Tempongko Deputy Director, SEAMEO-TROPMED Network

Safe Hospital Technical Discussion in DOH



Disaster Related Infectious Disease



Dean, UP Medicine:

Dr. Agnes Dominguez Mejia (4th from right)

Ass. Dean UP Medicine:

Dr. Armando Crisostomo (Right)

Discussion with Dr. Armando Crisostomo

Mission: To conclude the MOA with University of Philippines:

- UP System requires the Inter-university agreement
- Previous agreement with Akita University will serve as a model case (Dr. Crisostomo).

Embassy of Japan



Meeting with Drs. Junichi Nitta, Yasuyuki Matsumoto, and Akira Yokoyama @ Embassy of Japan in the Philippines. Topics: How Japanese residents were affected by the super typhoon Yolanda, How Embassy of Japan have been dealing with the Japanese residents in the affected area, and involved in the recovery process of the affected area.

Picture: Hattori, Tomita, Dr. Yokoyama, Egawa, Haorile, Dr. Nitta (from Lt to Rt)

Disaster Related Infectious Disease



Collecting samples of leptospirosis



Drs. Telan, Dimaano, Talitha, Susan
(from left)

San Lazaro Hospital @ SACCL

Mission: Collaboration on diagnosis of Dengue, Leptospirosis and tuberculosis among febrile patients.

Disaster Psychiatry



Meeting with Dr. Lourdes L. Ignacio @ 40th Annual Convention of the Philippine Psychiatric Association (PPA), who is a founder of PPA and the Mental Health Task Force in Disaster Management (MHTFDM). Dr. Ignacio recently published a book entitled “Ginhawa: Well-being in the Aftermath of Disasters” based on her and her colleagues’ experiences post-disaster psychosocial interventions.