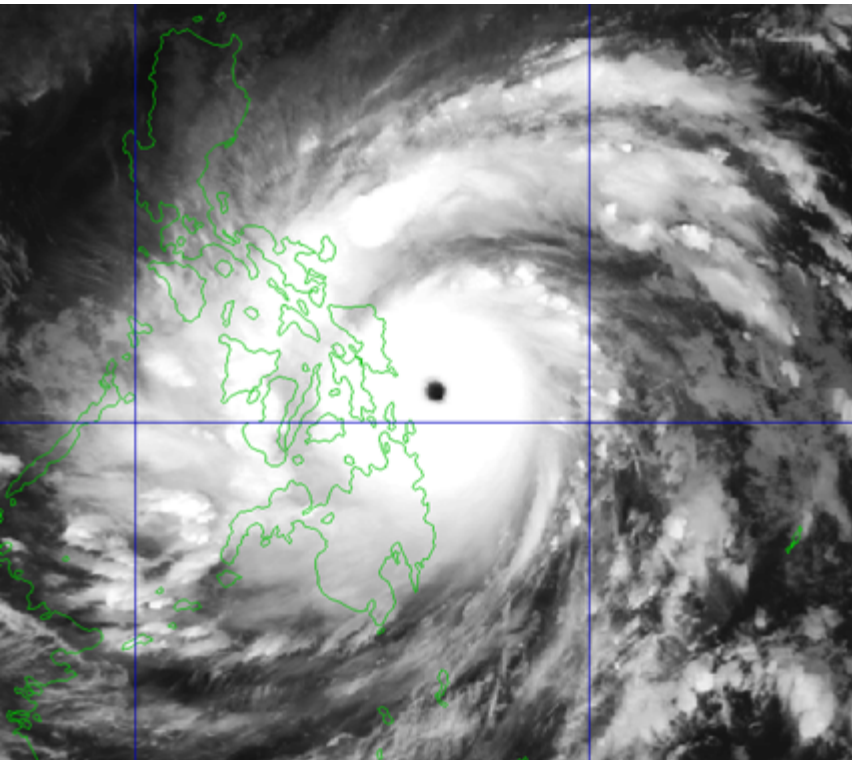


LESSONS LEARNT FROM HAIYAN/YOLANDA

SSOP TRAINING WORKSHOP

WMO RTC NANJING, CHINA, 09-11 June 2014

Olavo Rasquinho-Sec of Typhoon Committee



LESSONS LEARNT FROM HAIYAN/YOLANDA

EXPERT MISSION TO THE PHILIPPINES ON TYPHOON HAIYAN/YOLANDA (7 to 12 April 2014)

- The Typhoon Committee, at its forty-sixth session (Bangkok, 10-13 February 2014), endorsed the organization of a mission to the Philippines, which had been proposed by the Committee in December 2013, at its 8th Integrated Workshop.
- The Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) agreed to host the mission to consolidate the lessons learnt on Typhoon Haiyan (Yolanda)
- The mission team, coordinated by WMO, visited Manila and Tacloban. The team was composed of experts from:
 - Asia-Pacific Broadcasting Union (ABU)
 - NDMI (Republic of Korea)
 - NEMA (Republic of Korea)
 - RSMC Tokyo – Typhoon Center/JMA
 - United Kingdom Met Office (UKMO)
 - Typhoon Committee (TC),
 - ESCAP
 - WMO

LESSONS LEARNT FROM HAIYAN/YOLANDA

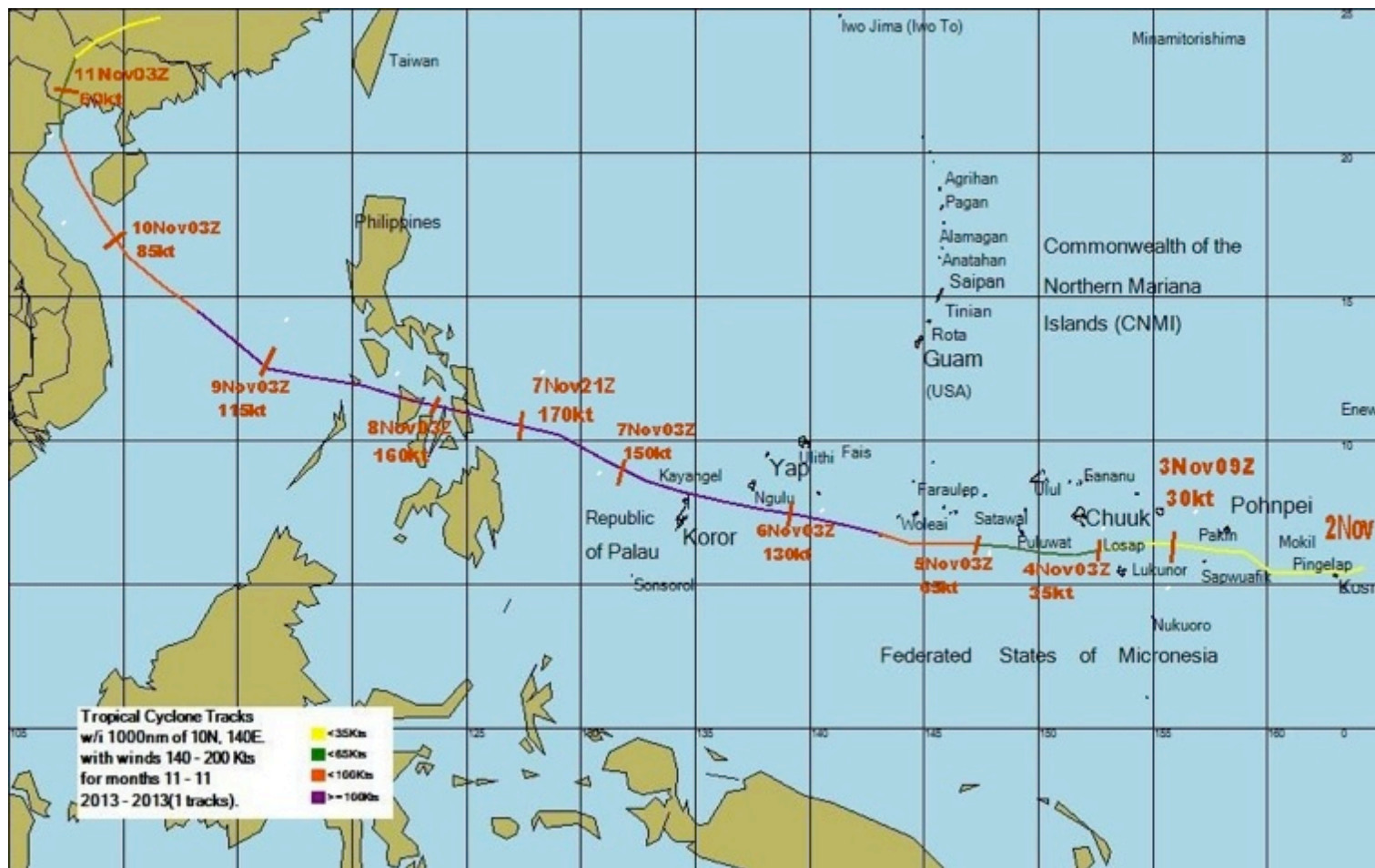
- Main objectives of the Mission:
 - To obtain valuable insights from hazards monitoring and early warning systems in the context of Typhoon Haiyan (Yolanda) in the Philippines.
 - To provide recommendations to PAGASA and the relevant Philippine authorities in order to reduce death, injury, damage and losses from future natural disasters.
- The mission tried to understand the reason of the impacts of the disaster in order to help prevent future consequences on a such a large scale.
- The lessons learnt are expected to be useful not only for the Philippine authorities but also for the Members of Typhoon Committee and Panel on Tropical Cyclones

LESSONS LEARNT FROM HAIYAN/YOLANDA

- Typhoon Haiyan (Yolanda) is considered the most deadly natural disaster in the Philippines since reliable records have been made.
- Haiyan hit the southeastern of Samar province in the early morning of 8 November 2013 and proceeded west-northwestwards through northern parts of Leyte, Northern Cebu, Northern Negros, Northern Panay and exited the Philippines after passing through Calamian Islands, between North of Palawan and Mindoro, causing strong socio-economic impact
- The associated wind speeds, rain, storm surge, floods and landslides caused a death toll higher than 6,000

LESSONS LEARNT FROM HAIYAN/YOLANDA

Track of Haiyan



Roger T. Edson - NOAA/NWS WFO Guam, USA - Typhoon Committee - 8th IWS/2nd TRCG Forum
2 – 6 December 2013, Macao Science Center, Macao, China

LESSONS LEARNT FROM HAIYAN/YOLANDA

Track of Haiyan/Yolanda through the Philippines



Roger T. Edson - NOAA/NWS WFO Guam, USA - Typhoon Committee - 8th IWS/2nd TRCG Forum
2 – 6 December 2013, Macao Science Center, Macao, China

LESSONS LEARNT FROM HAIYAN/YOLANDA



Typhoon Haiyan

Downgraded to TD
11/11 12Z 1008 [hPa]

TC Analysis

11/10 21Z 970[hPa] Max 60[kt] Gust 85[kt]
11/11 00Z 975[hPa] Max 55[kt] Gust 80[kt]

Surface Wind Obs.

11/10 18Z 51[kt] BACH LONG VI

Surface Wind Speed Obs.

84[kt] GUIUAN (Samar Island) 11/07 20Z
64[kt] ROXAS (Panay Island) 11/08 06Z

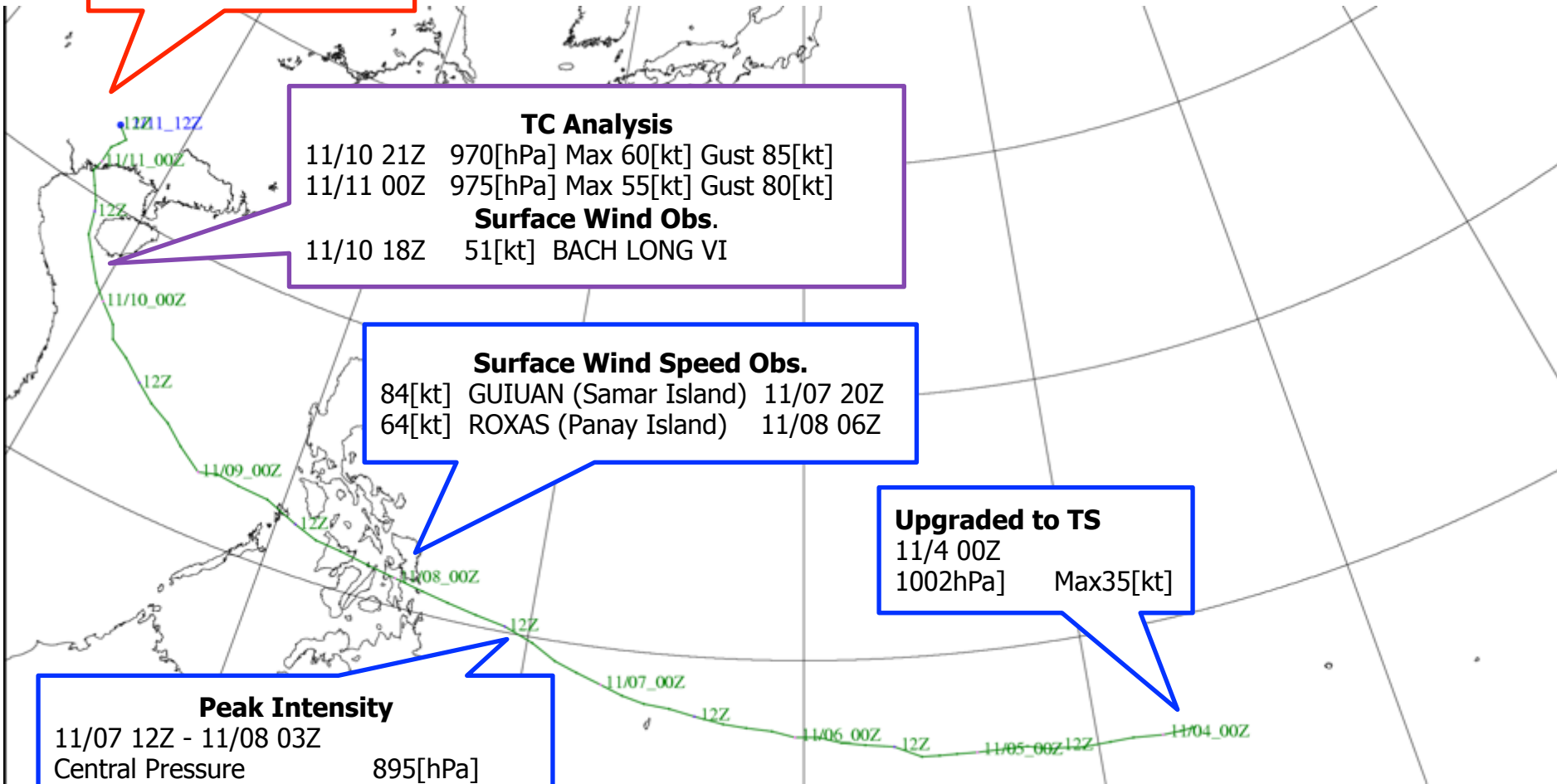
Upgraded to TS

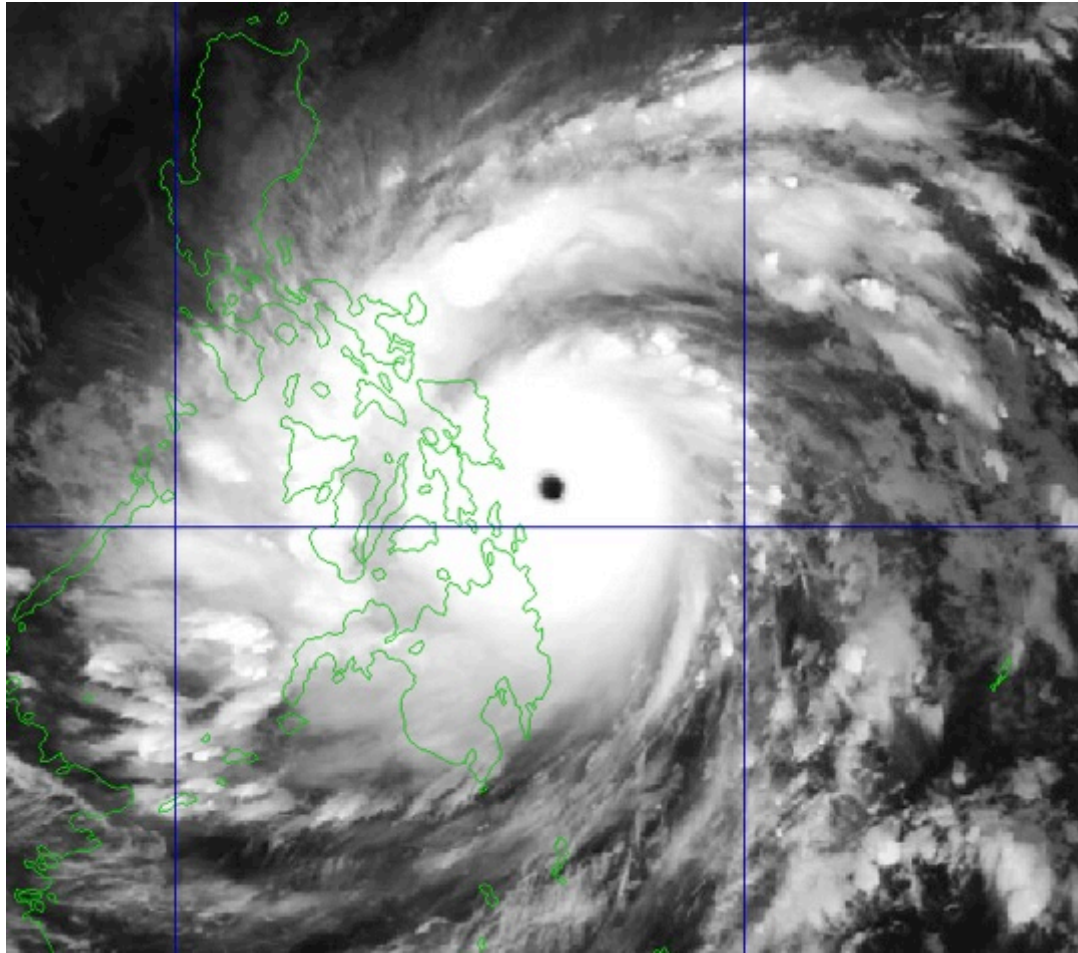
11/4 00Z
1002hPa] Max35[kt]

Peak Intensity

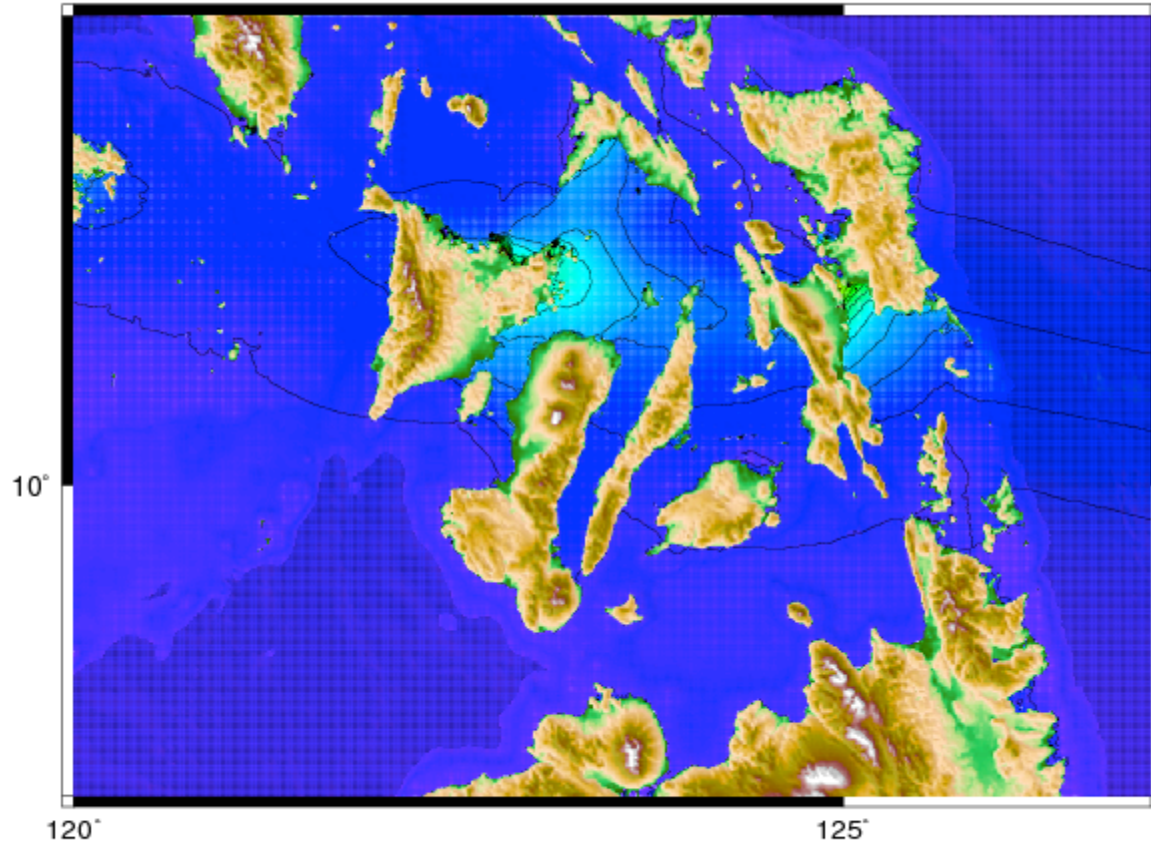
11/07 12Z - 11/08 03Z
Central Pressure 895[hPa]
MSWS 125[kt]
GUST 175[kt]

Tsukasa Fujita
RSMC Tokyo – Typhoon Center





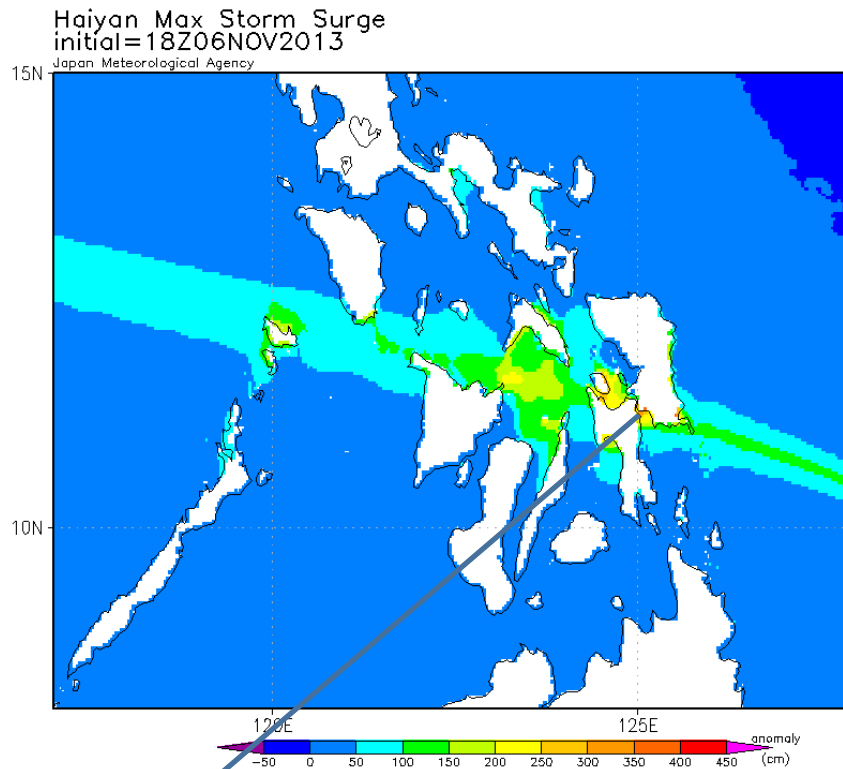
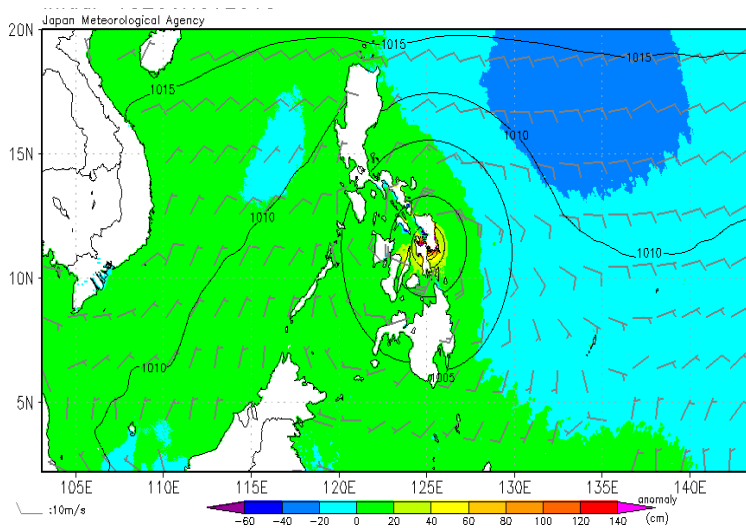
MTSAT satellite image taken on November 8, 2013



Simulation with JMA storm surge model
Predicted maximum storm surge: 3.7m

Storm Surge Watch Scheme Product for Ty Haiyan (RSMC Tokyo)

- T+33 03UTC 06 Nov 2013



Predicted maximum storm surge: 3.7m

I
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Tacloban City



PAGASA Doppler radar in Guiuan, Eastern Samar Damaged by Haiyan

GUIUAN



photo - credit: AFP Central Command from their Facebook page:
<https://www.facebook.com/media/set/?set=a.356701284467306.1073741835.323973651073403&type=1>



PAGASA Advisories and Warnings

- **Weather Advisory**– Issued once a day at 11:00 AM
- **Severe Weather Bulletins** for Tropical Cyclones
 - **Alert** – impending threat: issued 2 times per day at 11:00 AM and 11:00 PM
 - **Warning** - Public Storm Warning Signals 1 to 4 issued every 6 hours (05:00 AM; 11:00 AM; 05:00 PM; 11:00 PM)
 - **Gale Warning**
 - **Heavy Rainfall Warning** – colour coded: Yellow-Orange-Red

LESSONS LEARNT FROM HAIYAN/YOLANDA

Summary of PAGASA response

- **PAGASA issued timely Weather Advisories and Severe Weather bulletins**
- **5 November** - initial Weather Advisory with Haiyan still out of the Philippine Area of Responsibility (PAR)
- **6 November** -
 - Regular Severe Weather Bulletin (Haiyan still out of PAR)
 - PAGASA/NDRRMC meeting
 - Press conference
 - Forecaster assigned to NDRRMC Operations Center
- **7 November** - Public informed on storm surge of **5-7 meters** in some provinces, including Samar, Leyte and Northern Cebu.
 - President Benigno Aquino** addressed Pilipino people through People's Television Network calling for a nationwide preparation for Yolanda emphasizing the occurrence of storm surge.
 - Hourly updates** on the location and intensity.
 - Press conference/press briefings** every 6 hours until November 9.
- **8 November**
 - 02:20 a.m. - Bulletin issued at 2 a.m. to include other areas to be covered by Warning Signal 4 (
 - 04:40 a.m. - Haiyan made landfall over Guiuan, Eastern Samar.
 - 11:00 p.m. - Haiyan exits Northern Palawan after crossing Central Visayas.
- **9 November** - PSWS 3 and 4 were lowered as Haiyan continued to move away from the country.
 - 3:30 p.m. Final bulletin was issued when Haiyan left PAR.

Early warning system in the Philippines

Overview of hazards and associated risks and impacts; roles and responsibilities

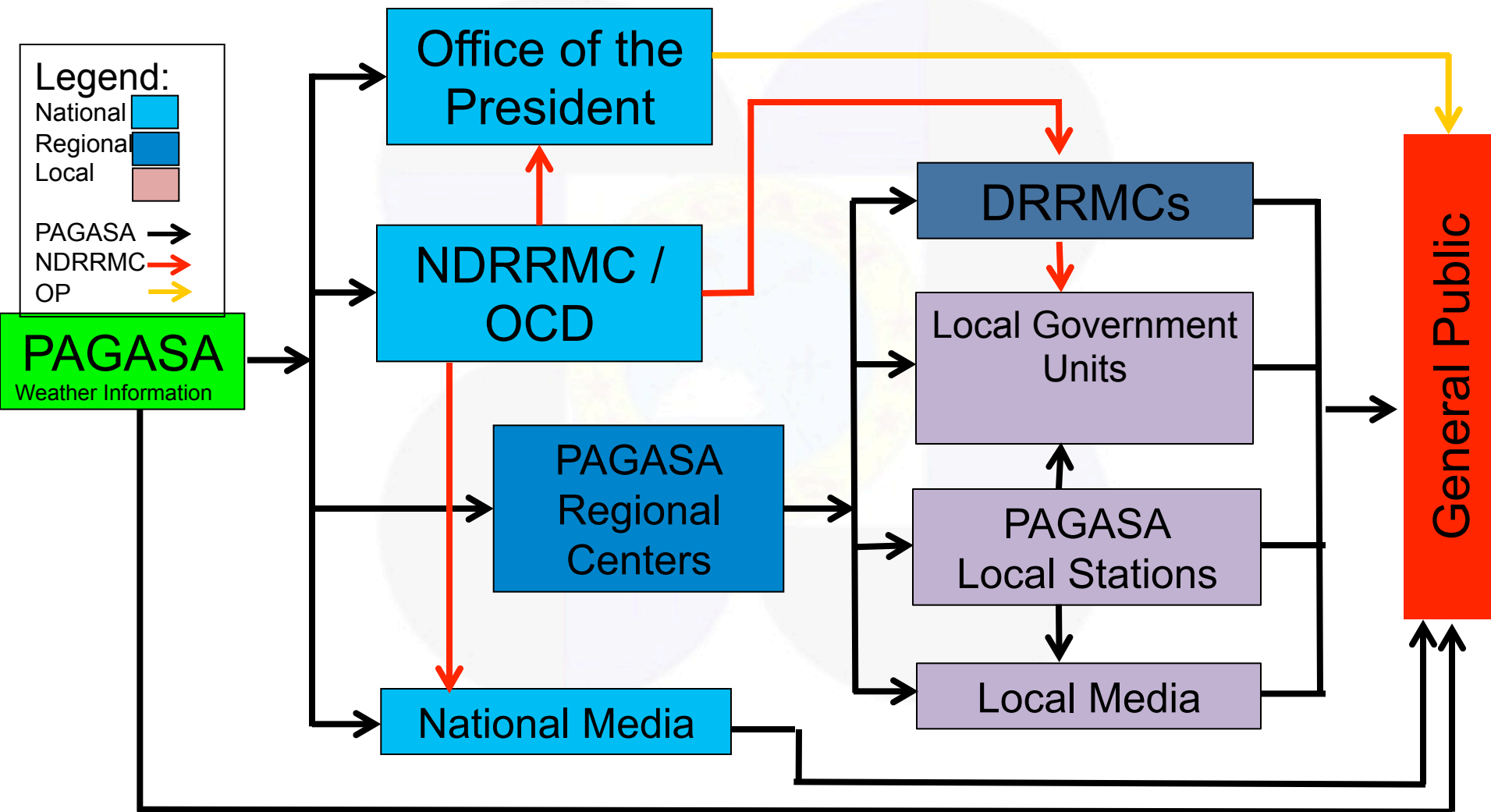
- The Philippines is one of the most disaster-prone countries in the world, and faces multiple hazards including:
 - tropical cyclones,
 - storm surges,
 - flooding,
 - landslides,
 - volcanic eruptions,
 - earthquakes
 - tsunamis.
- Tropical cyclones, particularly typhoons, and the related risk of storm surges represent a particular challenge, as the Philippines is affected by 20 named TCs per year, on average.
- Traditionally, the north-eastern parts of the country are particularly affected by typhoons;
- In recent years southern parts such as Mindanao have also experienced strong tropical cyclones causing large-scale loss of lives and material damage.

Early warning system in the Philippines

Overview of hazards and associated risks and impacts; roles and responsibilities (Cont)

- - The National Disaster Risk Reduction and Management Council (NDRRMC) is the highest policy-making, coordinating and supervising body for disaster management in the Philippines.
 - NDRRMC is administered by the Office of Civil Defence under the Department of National Defence, and brings together all the relevant parts of the government in order to ensure coordination.
 - The NDRRMC model is replicated at the provincial and local levels.
 - PAGASA (for hydro-meteorological and climatological hazards) and the Philippine Institute of Volcanology and Seismology (PHIVOLCS) (for geophysical hazards) transmit forecast and warning information to the NDRRMC,
 - NDRRMC consolidates information from various parts of the Government and disseminates it to the members of the NDRRMC as well as provincial and local councils and the general public.
 - PAGASA's information is also sent directly to the public at the national level.
 - The provincial and local councils ensuring that warnings reach the populations at risk and that appropriate actions are taken.

Information Dissemination Flow



DRRM Council Networks

National Disaster Risk Reduction and Management Council

17 Regional Disaster Risk Reduction and Management Councils

80 Provincial Disaster Risk Reduction and Management Councils

122 City Disaster Risk Reduction and Management Councils

1, 511 Municipal Disaster Risk Reduction and Management Councils

42,026 Barangay Disaster Risk Reduction and Management Committees

NDRRMC OPCEN INFO FLOW

Chairperson, NDRRMC

President of the Philippines

**Executive Director, NDRRMC/
Administrator, OCD**

Media/ Other Stakeholders

NDRRMC SITREPs

**NDRRMCs
Member-Agencies**

- DSWD-DROMICS
- DOH-HEMS
- AFP COMMAND CTR
- PNRC
- DEPED
- DPWH
- DENR/EMB
- DA/BFAR/FARMC
- DILG/BFP/PNP MARITIME GROUP
- DOTC/PCG/NTC/MARINA
- ULAP
- LCP
- LMP
- LnB



OCD

RDRRMCs/OCDRCs

PDRRMCs

Situation Reports

C/M DRRMCs

B DRRMCs

**LOCAL DRRMOs
P/C/M/B**

PUBLIC

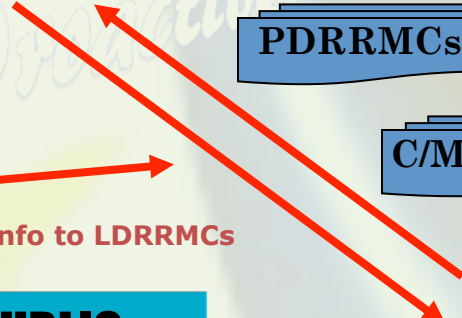
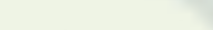
^Field Stations Info to LDRRMCs

Surveillance Agencies*

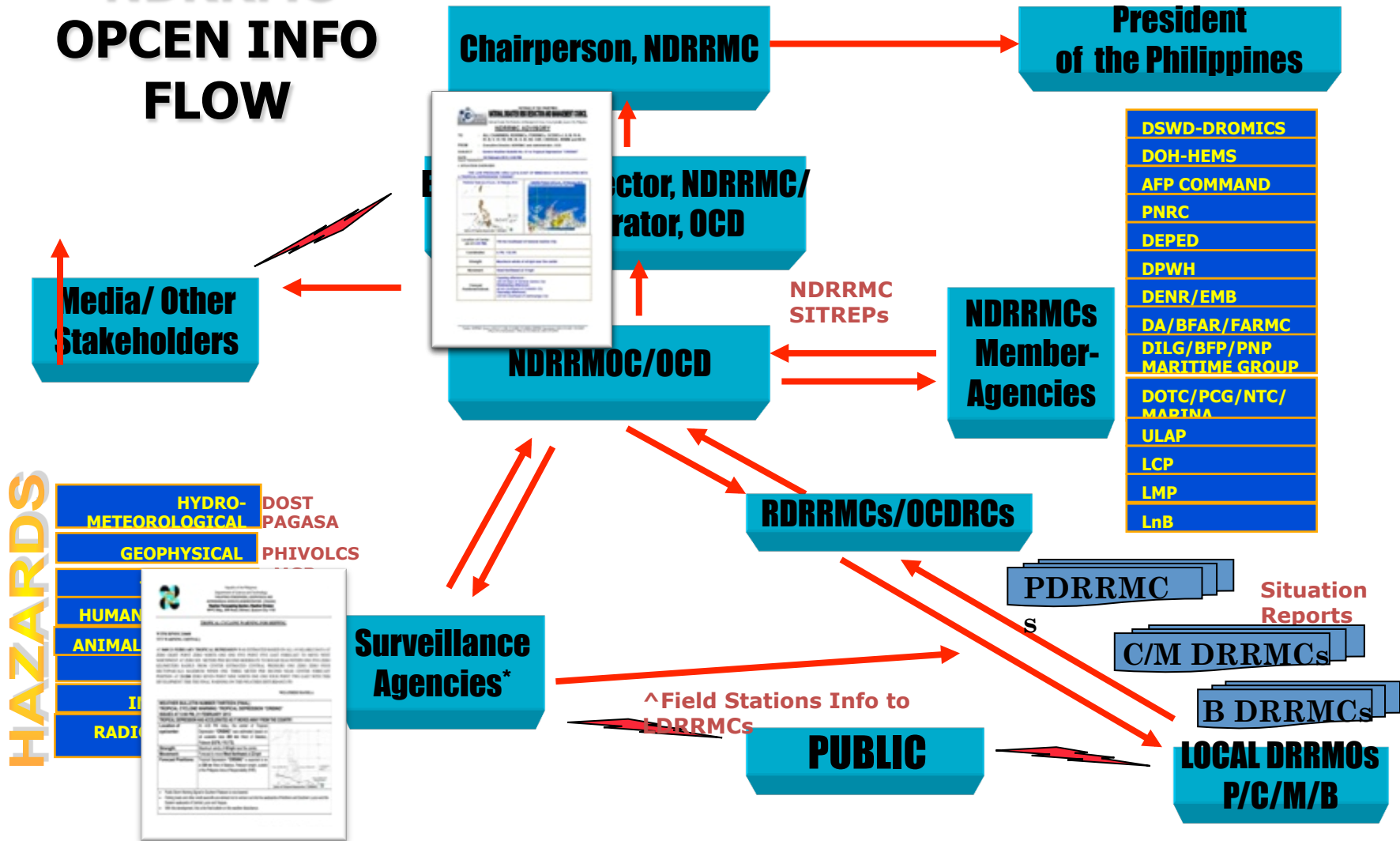


HAZARDS

- HYDRO-METEOROLOGICAL** DOST PAGASA
- GEOPHYSICAL** PHIVOLCS, MGB
- TERRORISM** AFP
- HUMAN EPIDEMICS** DOH
- ANIMAL EPIDEMIOLOGY**
- CIVIL DISTURBANCES**
- INFESTATIONS**
- RADIOLOGICAL AND NUCLEAR**

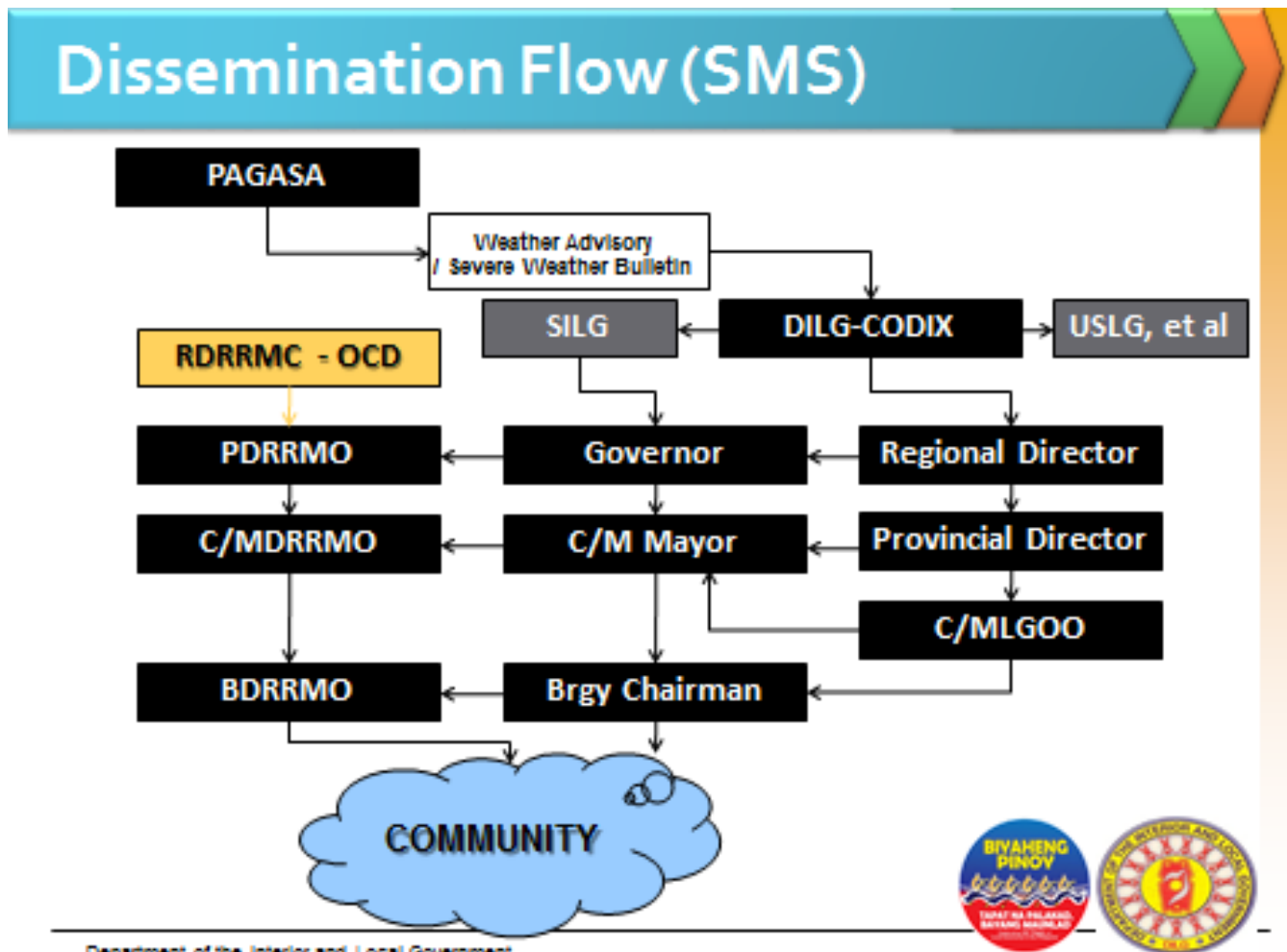


NDRRMC OPCEN INFO FLOW





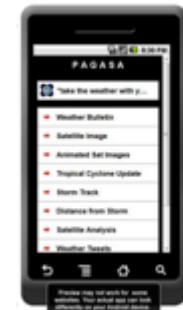
Dissemination Flow (SMS)

Department of Interior and Local Government (DILG)



Mode of Dissemination

- Telephone/Fax/SMS
- Radio & TV (Presscon)
- Print Media
- Website/E-Mail Alerts
- Social Media: Facebook  twitter 
- Mobile Apps
- Message Signs/Billboard
- Indigenous (e.g. Bells, drums)



"tracking the sky.....helping the country"

LESSONS LEARNT FROM HAIYAN/YOLANDA

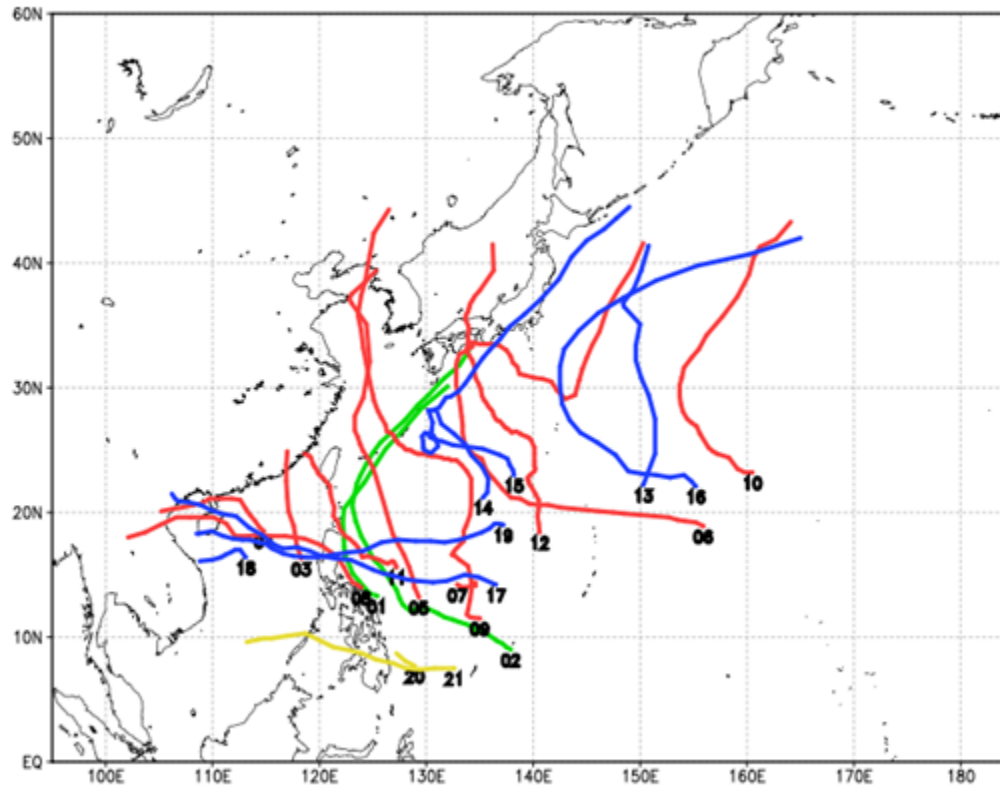
What and who failed?

- The National Disaster Risk Reduction & Management Council (NDRRMC), of the Philippines is considered an efficient specialized institution.
- The four components (Risk knowledge, Monitoring and warning Service , Dissemination and communication, Response capability) of the Philippine EWS work well
- UNISDR considered the EWS of the Philippines an advanced system
- **Nevertheless**... in recent years something has failed:
 - The severe tropical storm **Washi/Sendong** (in December 2011) caused about 1,300 confirmed deaths and more the 1,000 missing mainly in Cagallon de Oro and Iligan, in Northern Mindanao
 - The typhoon **Botha/Pablo** (December 2012) caused more than 600 fatalities

- Mindanao is located in low latitudes, less than 10 N, and not many tropical cyclones occurred before 2011;
- According to the Filipino writer Ruben R. Canoy, born in Cagayan de Oro city, *“although there’s lots of water everywhere, floods rarely occur in Mindanao, mainly because of its unique geographical location. Lying well outside the so-called typhoon belt, Mindanao has the advantage of a mild and even climate all year round”* (as he has written his book “The History of Mindanao”, Volume 1- published in 2003)

Tracks of Tropical Cyclones in 2011

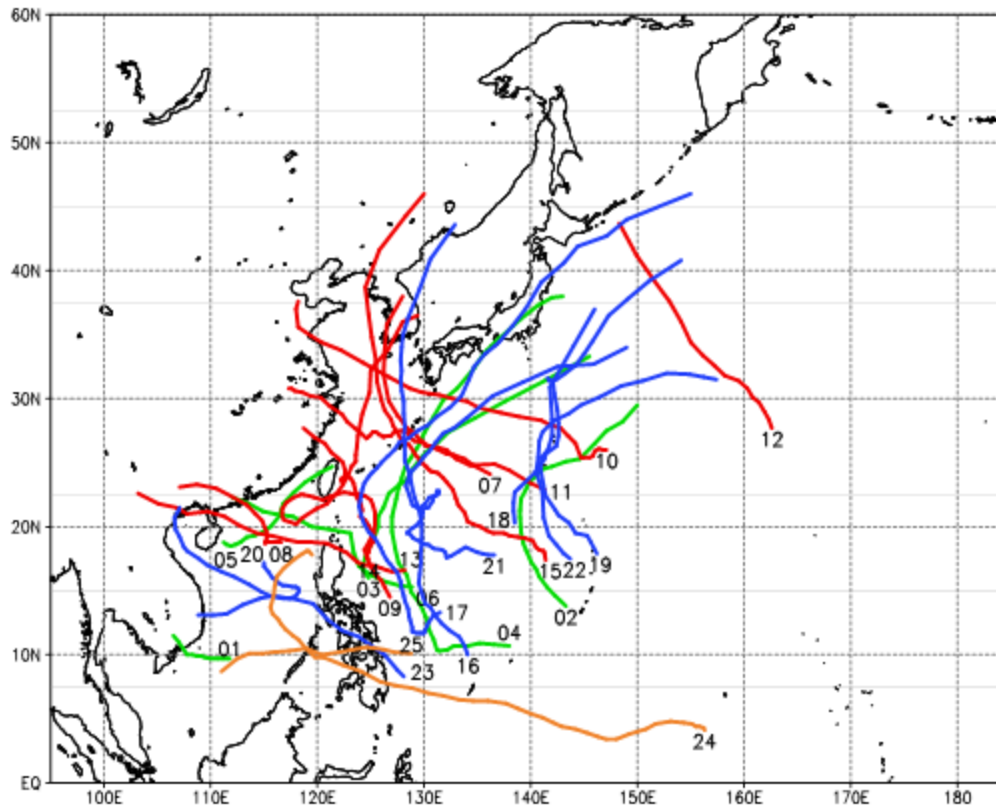
Provided by RSMC-Tokyo



The ST Storm WASHI (1121) formed at latitude approximately 7 degrees north (west of Palau island), in December

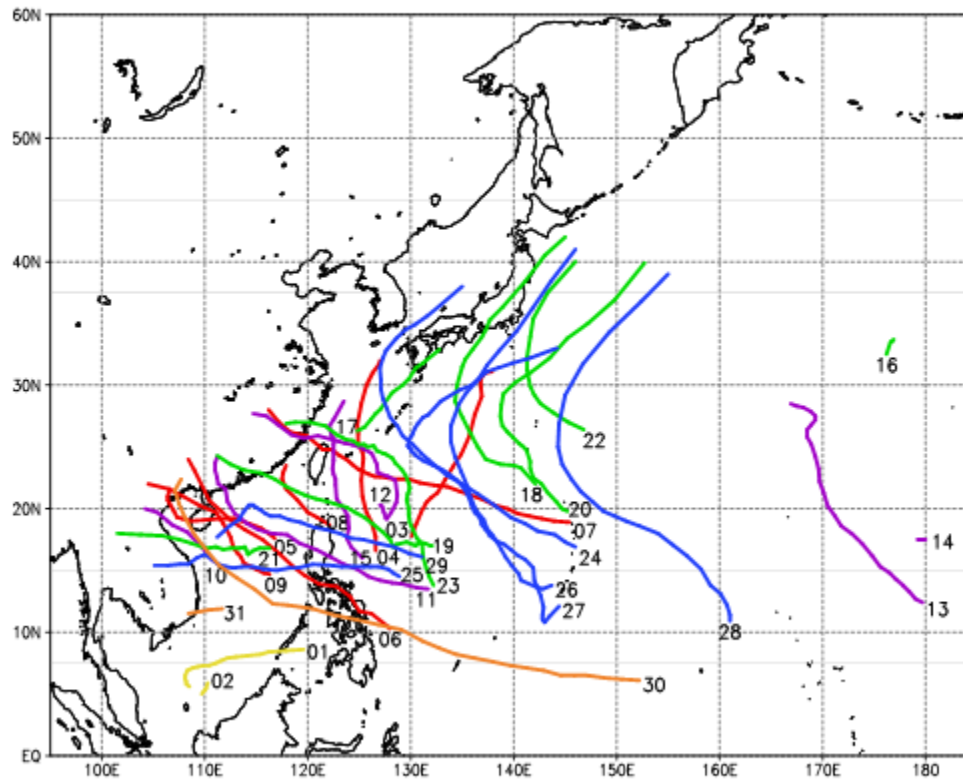
Tracks of Tropical Cyclones in 2012

Provided by RSMC-Tokyo



Typhoon Bopha (1224) formed southwest of Pohnpei Island at a latitude near 4 degrees north, in November

Tracks of Tropical Cyclones in 2013 Provided by RSMC-Tokyo



Haiyan (1330) formed as a tropical depression (TD) over the sea southwest of Pohnpei Island at 06 UTC on 3 November 2013

- Washi and Botha have hit Mindanao, in relatively low latitudes. We can say (as the writer ...) that disaster with such characteristics are not frequent in this region and the local authorities were too much confident on the fair climate conditions of the region,
- But... in Visayan Islands (*Panay, Negros, Cebu, Bohol, Leyte, Samar* and other minor islands) tropical cyclones are much more frequent and the populations and local authorities are more aware of the consequences of typhoons. What failed then? (WHAT?)

Lessons learnt

- According to a recent survey by the Department of Science and Technology (DOST), the public still finds the terms too scientific to be understood.
- Most people do not understand weather bulletins.
- It is not enough to translate weather bulletins from English to the native languages. The weather advisories should also translate technical terms into words that the public can understand (layman's language).
- After Haiyan the Philippine people already know what “storm surge” means, but before most people did not know its implications.

Lessons learned

- The non-existence of an organized body of community-based volunteers to establish the link between the LGUs and fishermen and other communities, in the last mile warning dissemination, prevented the warnings from reaching the addressees in some areas affected by Haiyan. (In the aftermath of Washi and the 6.9 magnitude earthquake in Negros In the province of Cebu, Philippines, in 2012, it was conducted a training course involving 940 community-based volunteers from the municipalities of Borbon, Sogod, Carmen, Catmon and Moalboa)
- Storm surge hazard maps did not contemplate storm surges as such caused by Haiyan.
- Some people moved to evacuation centres that were affected by the storm surge and some died there.

Lessons learnt

- In Guiuan, a very sensible Mayor, facing the forecast of storm surge, consulted the internet where he got the information that a storm surge has similar consequences to tsunamis and has taken the necessary measures, sending staff in motorbikes warning the communities.

Lessons learnt

- Memorandums of Understanding (MoU) need to be established between warning issuers and EWS related stakeholders.
- Well structured Standard Operating Procedures (SOPs) are needed, with particular focus in the last-mile of warning dissemination of coastal hazards, at neighbourhood level.
- Internal PAGASA SOPs on safety of staff in emergency situations are also needed.

- There is a Filipino word (Bayanihan) that means spirit of communal effort, cooperative endeavor, that reflects the state of mind of the Filipino people after the disaster
- I pay tribute to the Filipino people for the efforts that have been done to recover from the damage caused by Haiyan

THANK YOU

