Sentinel Asia DAN Updates
PHILIPPINES

MANILA OBSERVATORY
Committed to a scientific culture for sustainable development

3rd Joint Project Team Meeting for Sentinel Asia
STEP-3 (JPTM 2016)
19th-21st January 2016
Colombo, Sri Lanka

Ma. Flordeliza P. Del Castillo
RS-GIS Specialist

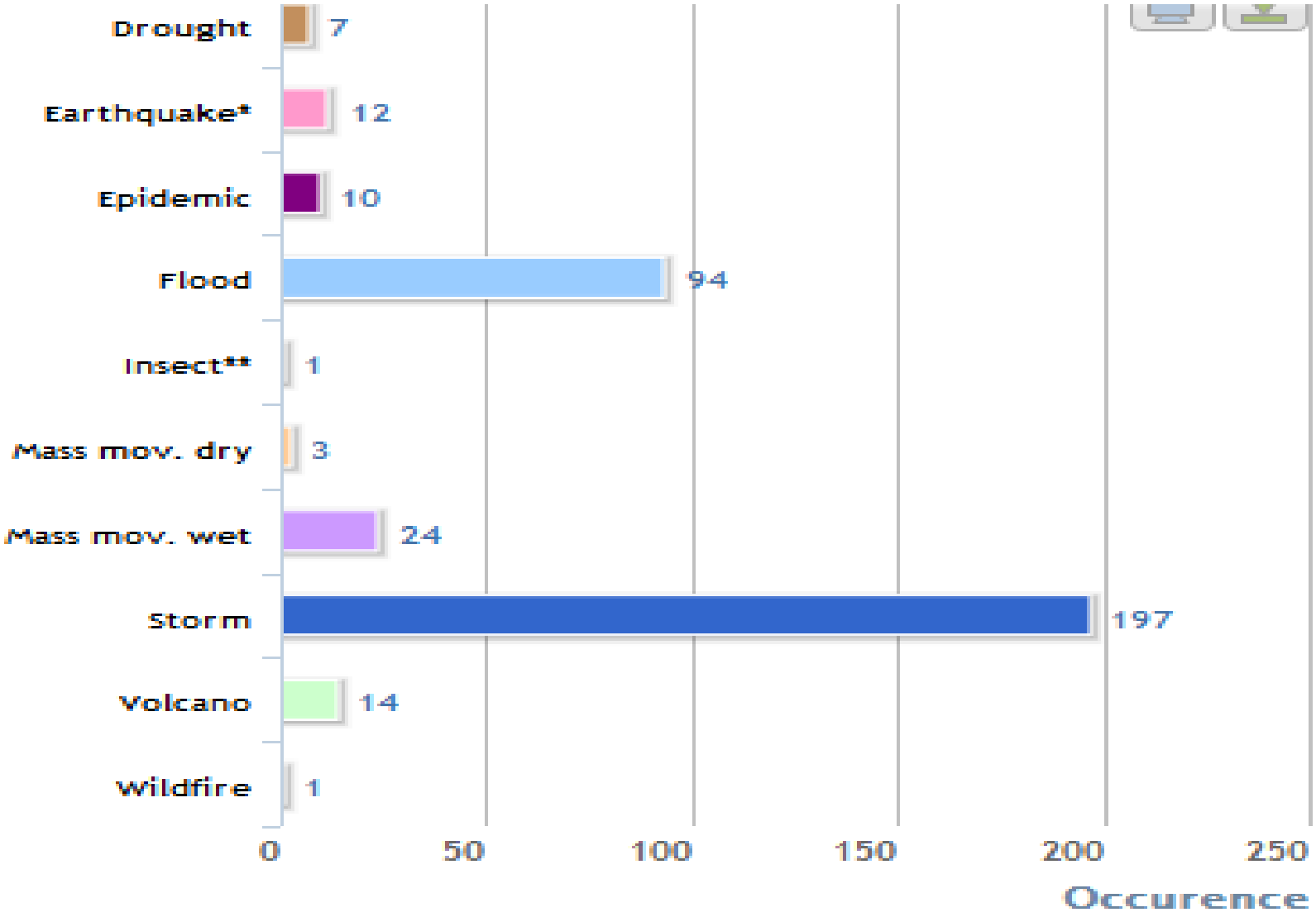
MANILA OBSERVATORY 150

OUTLINE

- Disasters in the Philippines
- Manila Observatory's Role
- MO's Emergency Observation Mapping
  - Dec. 6, 2014 - Typhoon Hagupit
  - Oct. 20, 2015 – Typhoon Koppu
  - Dec. 16, 2015 – Typhoon Melor

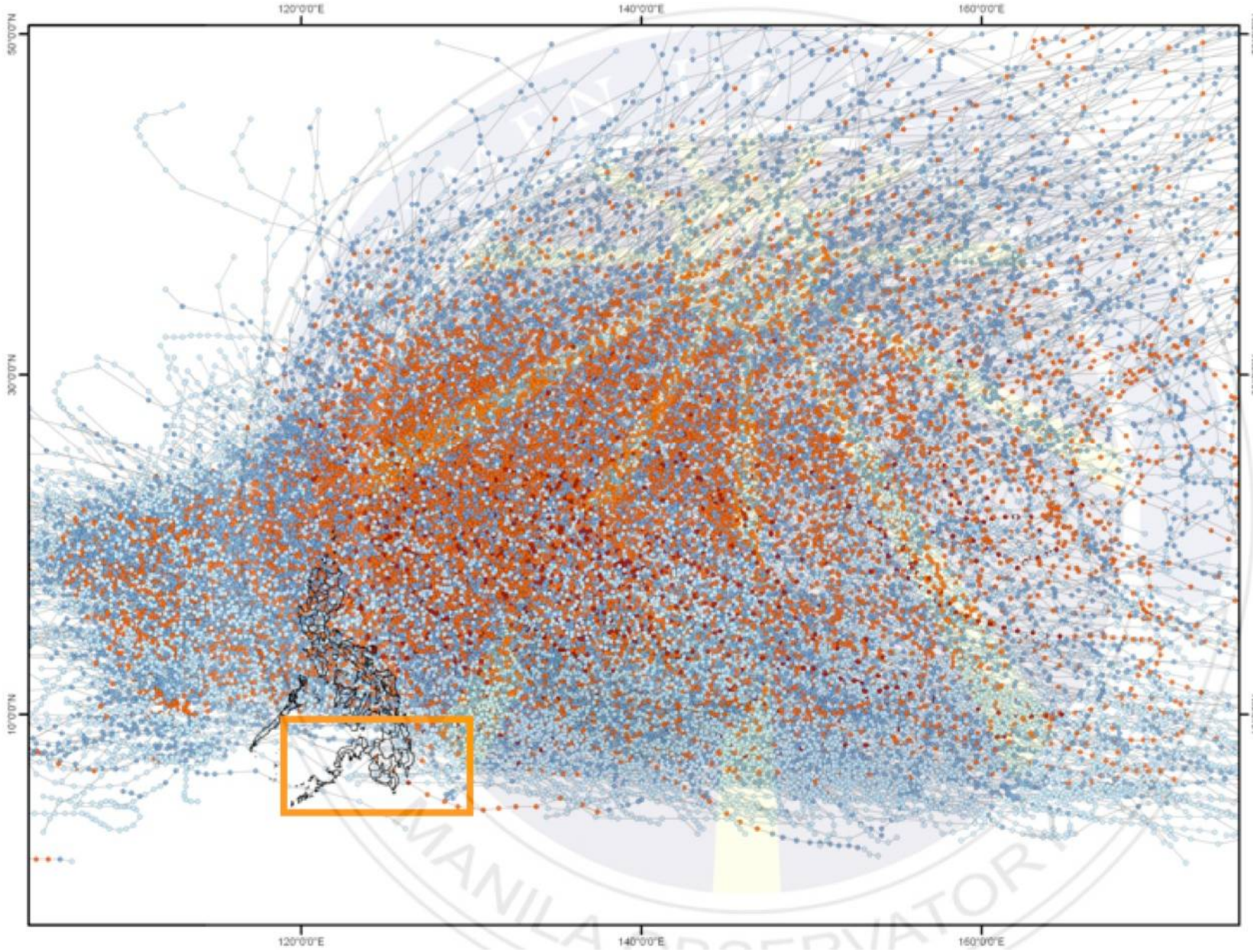
MANILA OBSERVATORY 150

Disaster Statistics in the Philippines (1980-2010)



http://www.preventionweb.net/english/countries/statistics/?cid=135

Tropical Cyclone Tracks (1945 - 2010)



Legend

Tropical Cyclone Intensity

- Super Typhoon (ST)
- Typhoon (TY)
- Tropical Storm (TS)
- Tropical Depression (TD)
- No Data

Tropical Cyclone Tracks

1945 to 2010

This map shows the tracks of the tropical cyclones that passed within or near the Philippines from 1945 to 2010.

The tropical cyclone tracks data were taken from the Joint Typhoon Warning Center (JTWC).
The intensity was categorized as follows:

TD - less than or equal to 33 knots
TS - between 34 and 63 knots
TY - between 64 and 129 knots
ST - greater than or equal to 130 knots

Data Source: Joint Typhoon Warning Center (JTWC)

Kilometers
190 95 0 190 380 570

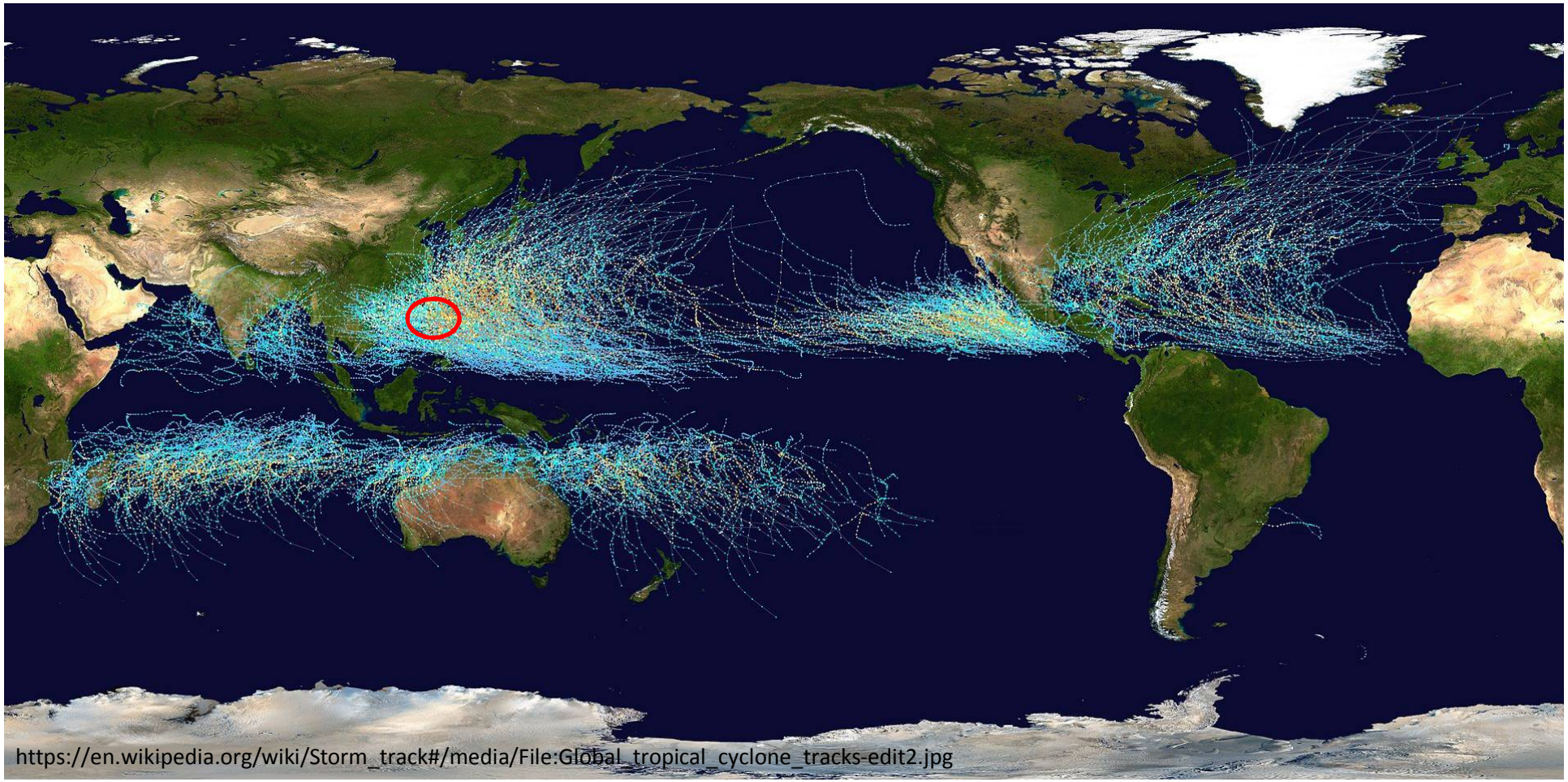
1:32,790,000

Geographic Coordinate System
Luzon Datum 1911

The Manila Observatory
Ateneo de Manila
University Campus,
Loyola Heights,
Quezon City, Philippines

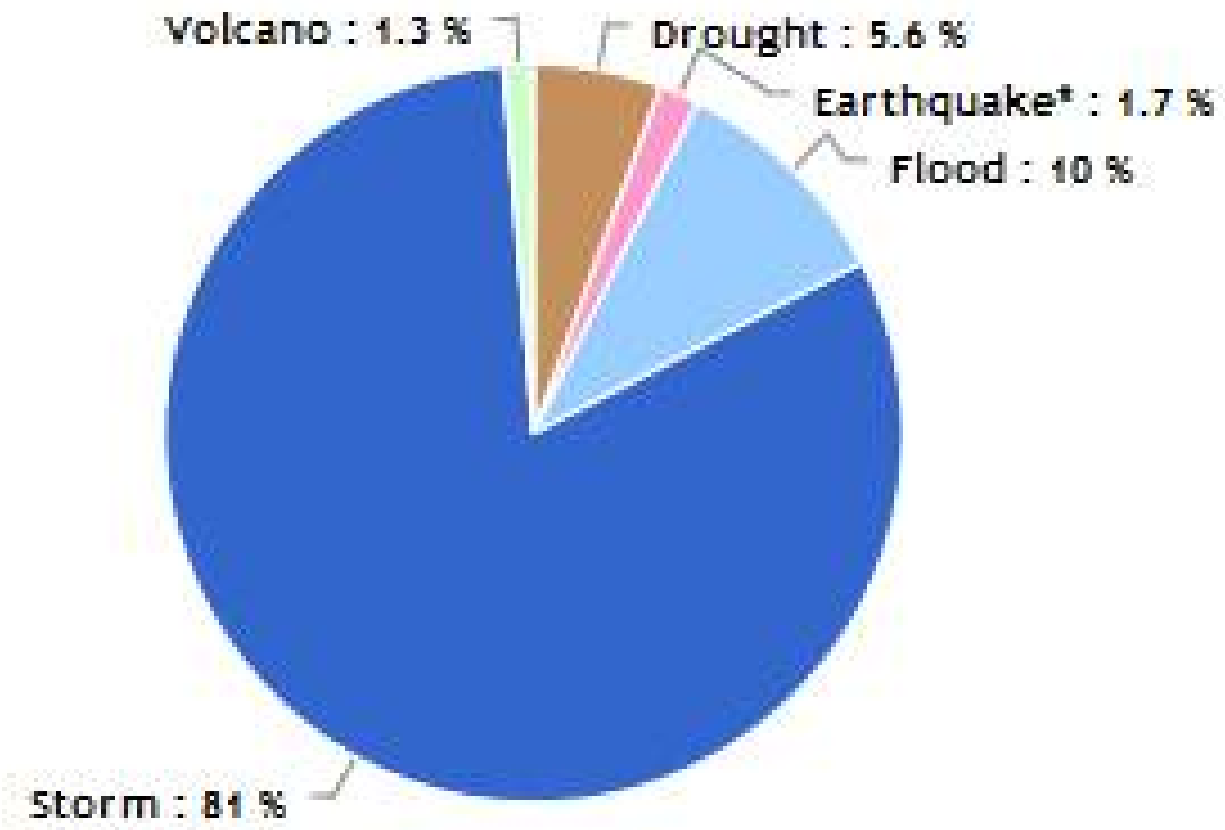
Telephone: (632)426-5921/426-0837
Facsimile: (632)426-0847/426-6141
Email: manila@observatory.ph
Website: http://www.observatory.ph

Tropical Cyclones 1985-2010

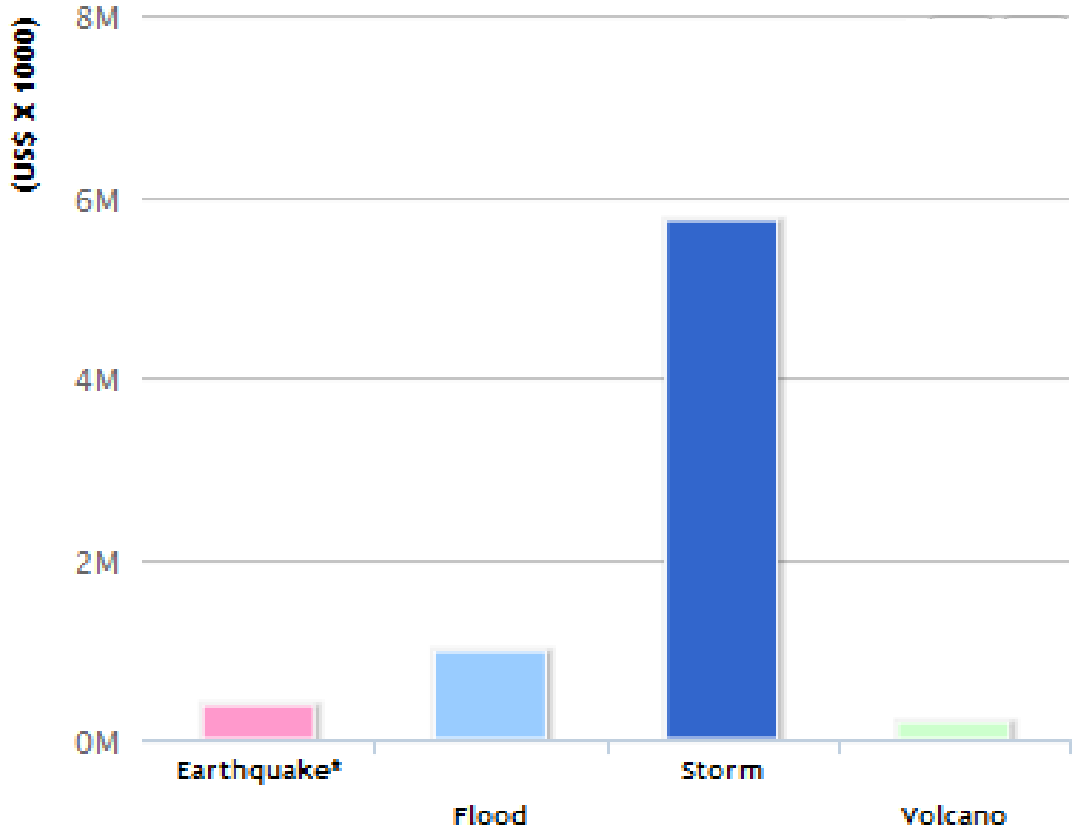


https://en.wikipedia.org/wiki/Storm_track#/media/File:Global_tropical_cyclone_tracks-edit2.jpg

Percentage of reported people affected by disaster type



Estimated economic damages reported by disaster type (US$ X 1,000)

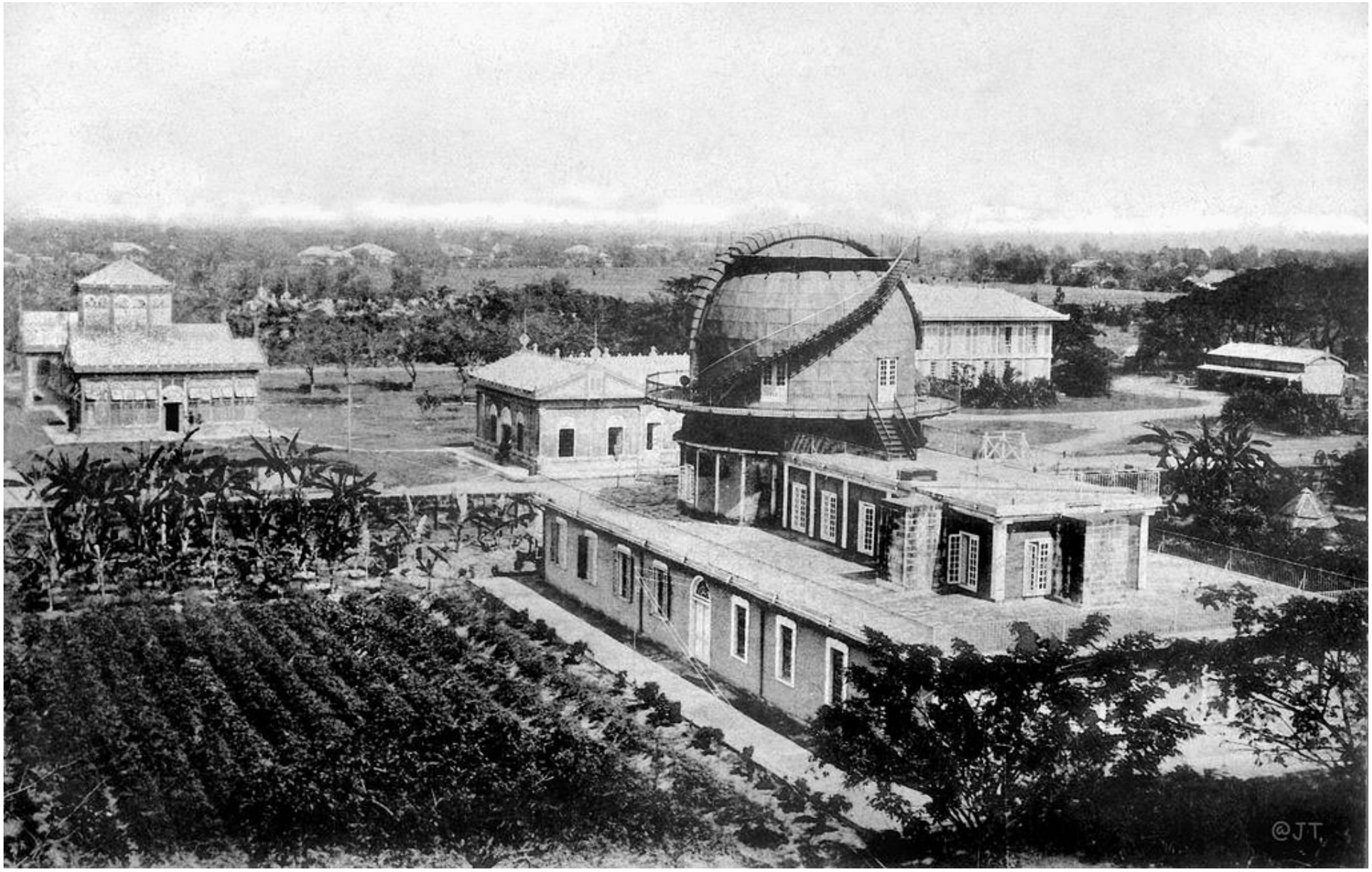


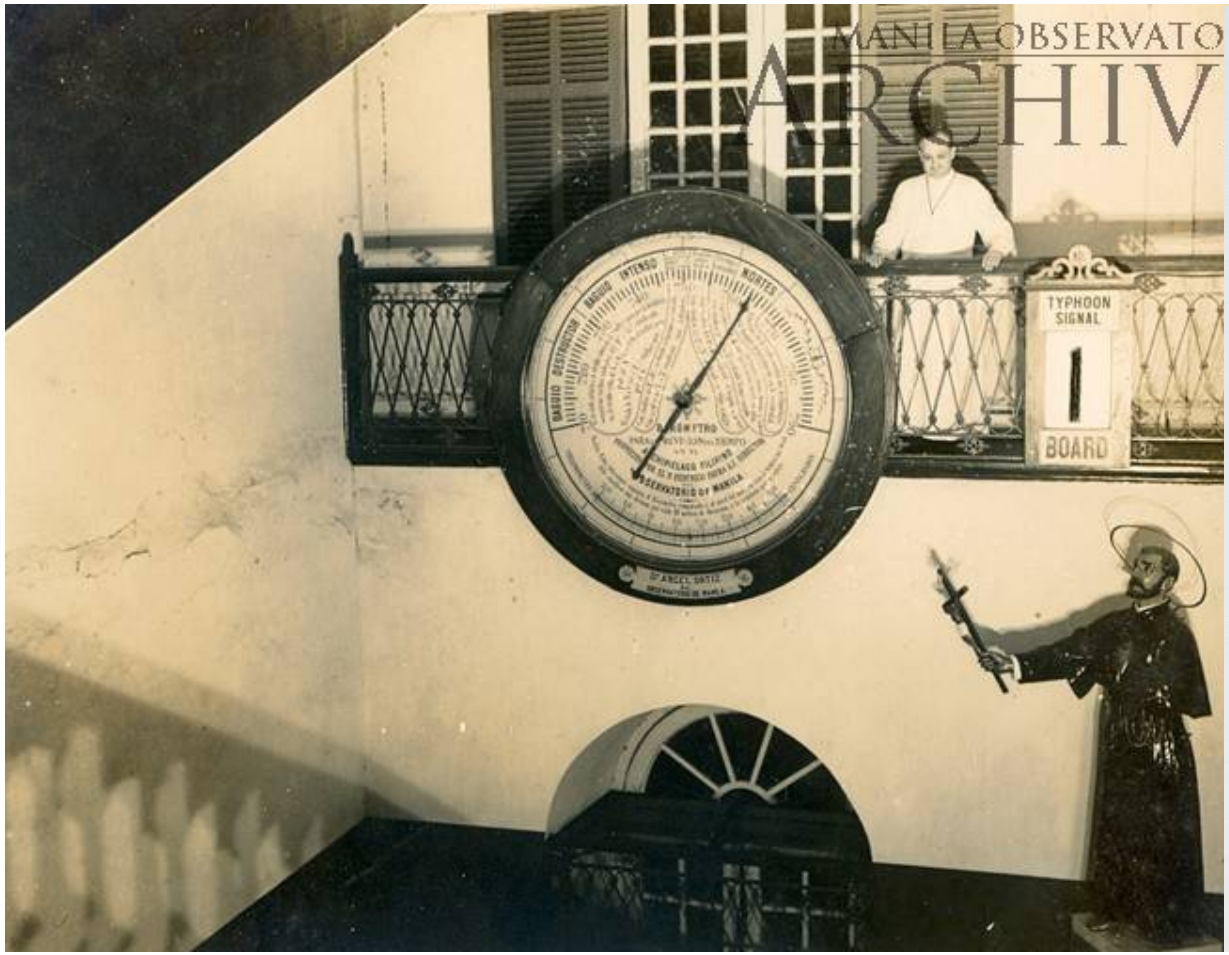
*: Including tsunami

More information and data on: www.emdat.be/

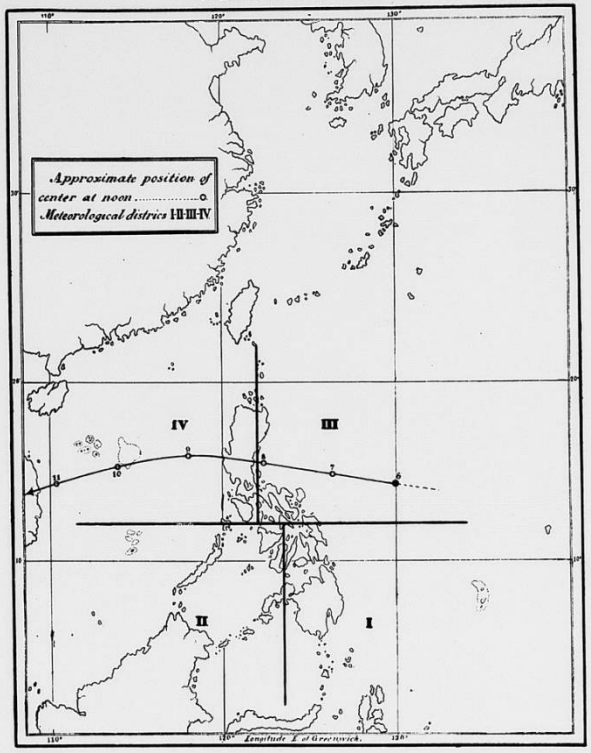
Source of data: "EM-DAT: The OFDA/CRED International Disaster Database, Universit catholique de Louvain, Brussels, Bel."
Data version: v11.08

Data displayed does not imply national endorsement


@JT.



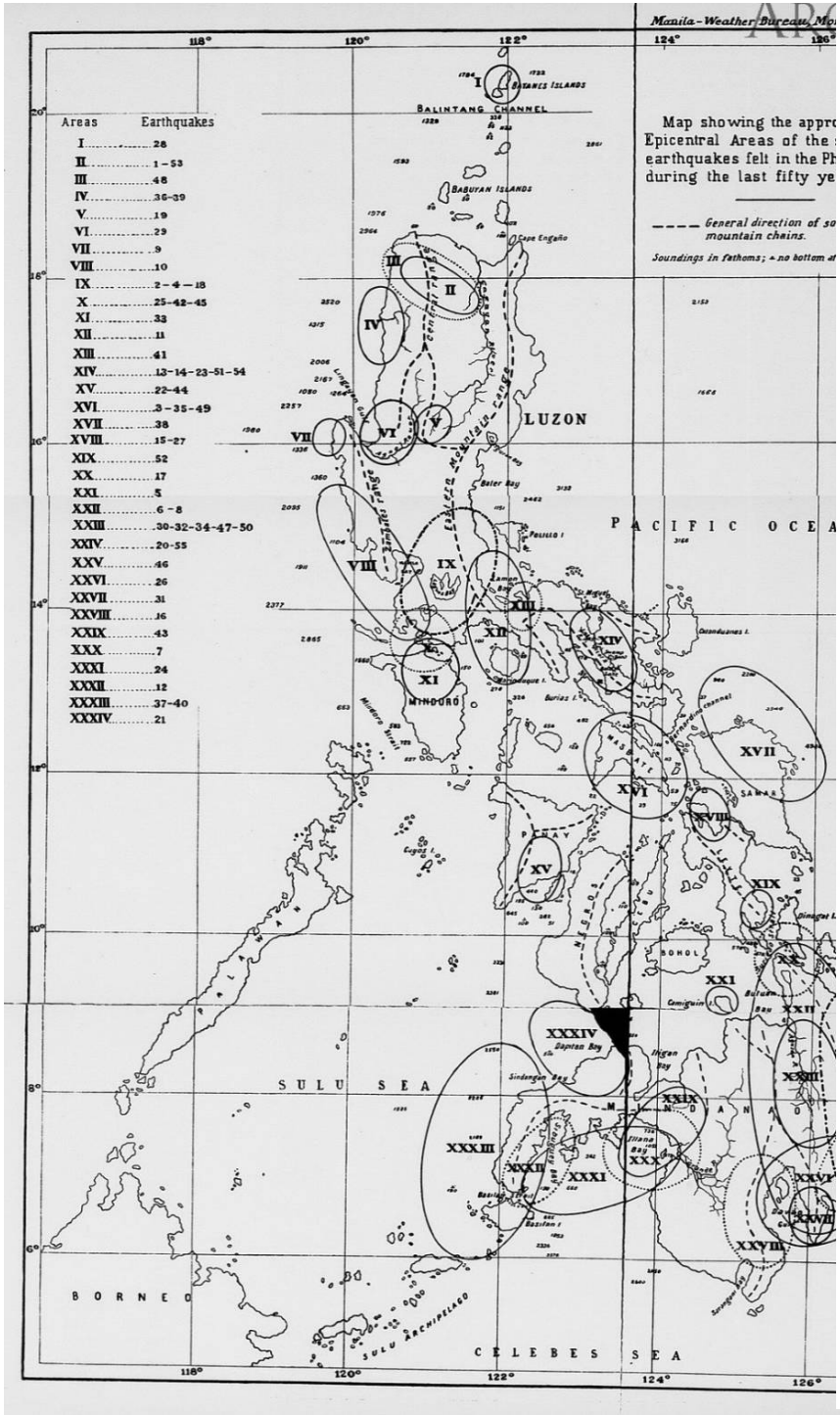
TRACK OF THE TYPHOON
OF NOVEMBER 6 TO 12, 1902



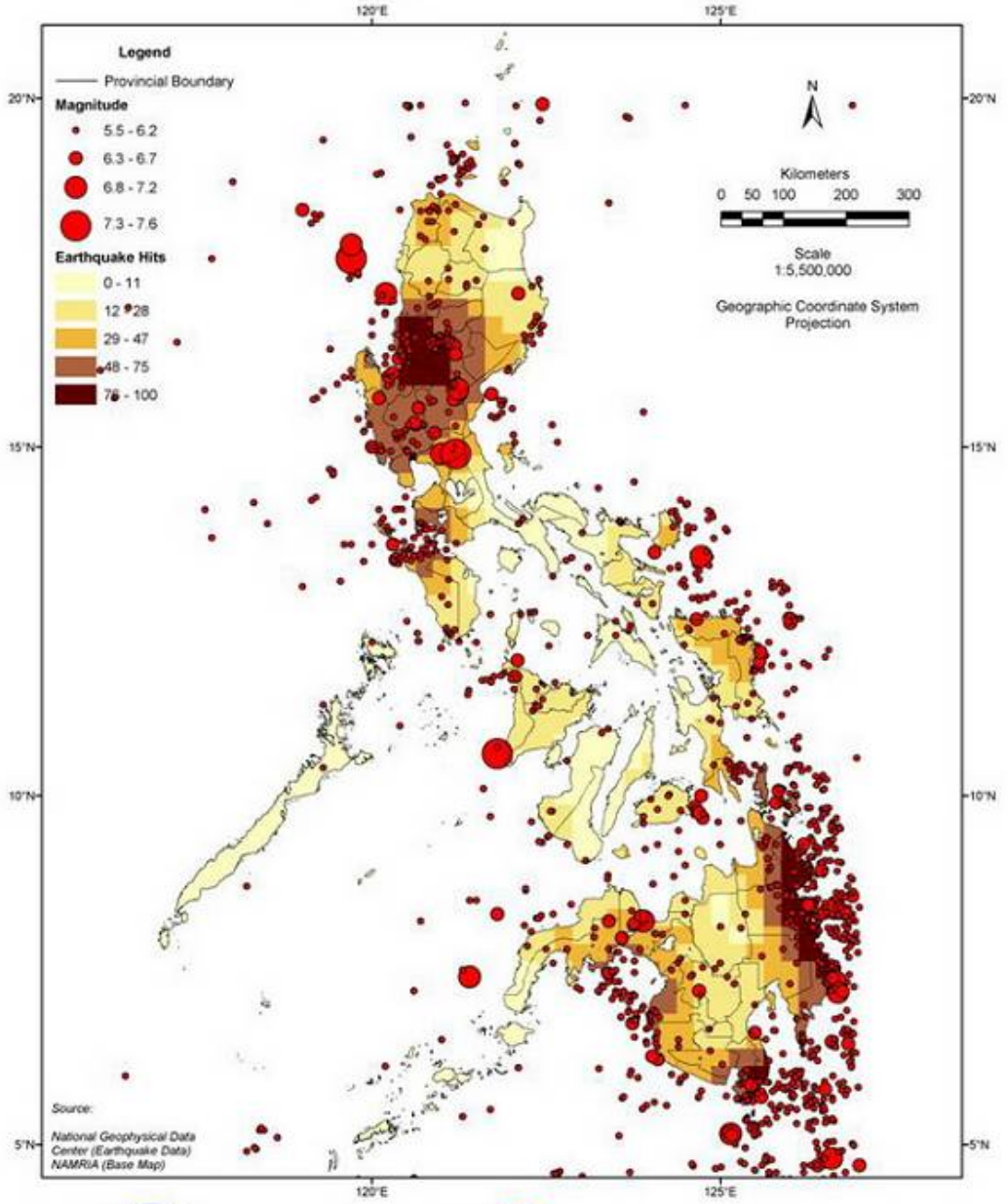
MAPS

Below are the lists of maps taken from the Manila Observatory Annual Reports and Monthly Bulletins. Click each thumbnail to view a larger version of each map.

MAP MB 1891 001 *Carta seismica del archipelago Filipino del mes de Marzo de 1891.*
MAP MB 1891 002 *Carta seismica del archipelago Filipino del mes de Mayo de 1891.*
MAP MB 1894 001 *Distribucion normal de lluvias en el archipielago [Enero].*
MAP MB 1894 002 *Carta seismica del archipelago Filipino del mes de Febrero de 1894.*
MAP MB 1894 003 *Distribucion normal de lluvias en el archipielago [Febrero].*
MAP MB 1894 004 *Distribucion normal de isobars e isotermas.*
MAP MB 1894 005 *Distribucion normal de lluvias en el archipielago [Marzo].*
MAP MB 1894 006 *Distribucion normal de lluvias en el archipielago [Abril].*
MAP MB 1894 007 *Carta seismica del archipelago Filipino del mes de Abril 1894.*
MAP MB 1897 001 *Carta seismica del archipelago Filipino del mes de Mayo de 1897.*
MAP MB 1902 001 *Tracks of typhoons during July 1902.*
MAP MB 1902 002 *Approximate isogonic lines Mindanao I. June 20th 1902.*
MAP MB 1902 003 *Track of the typhoon of November 6 to 12, 1902.*
MAP MB 1902 004 *Map showing relative intensity of the Manila earthquake (December 15, 1901) in different parts of the Archipelago.*
MAP MB 1903 001 *Track of the typhoon of June 2 to 7, 1903.*
MAP MB 1903 002 *Annular eclipse of March 17, 1904.*
MAP MB 1903 003 *Chart showing atmospheric pressure direction and force of the wind on November 7, 8, and 9 1903.*
MAP MB 1904 001 *Chart of Central Luzon showing total rainfall (in MM) from July 12th to 15th 1904.*
MAP MB 1904 002 *Tracks of cyclone during August 1904.*
MAP MB 1904 003 *Position of U.S.A.T. "Sherman" with reference to cyclone center on the barocyclometer disc. 6 am Aug. 20, 1904 .*
MAP MB 1905 001 *Track of remarkable cyclone April 20-30, 1905.*
MAP MB 1905 002 *Area of rain and path of typhoon on April 20.*
MAP MB 1905 003 *Area of rain and path of typhoon on April 29.*
MAP MB 1905 004 *Area of rain and path of typhoon on April 30.*
MAP MB 1905 005 *Isobars for 16th and 19th July 1905.*

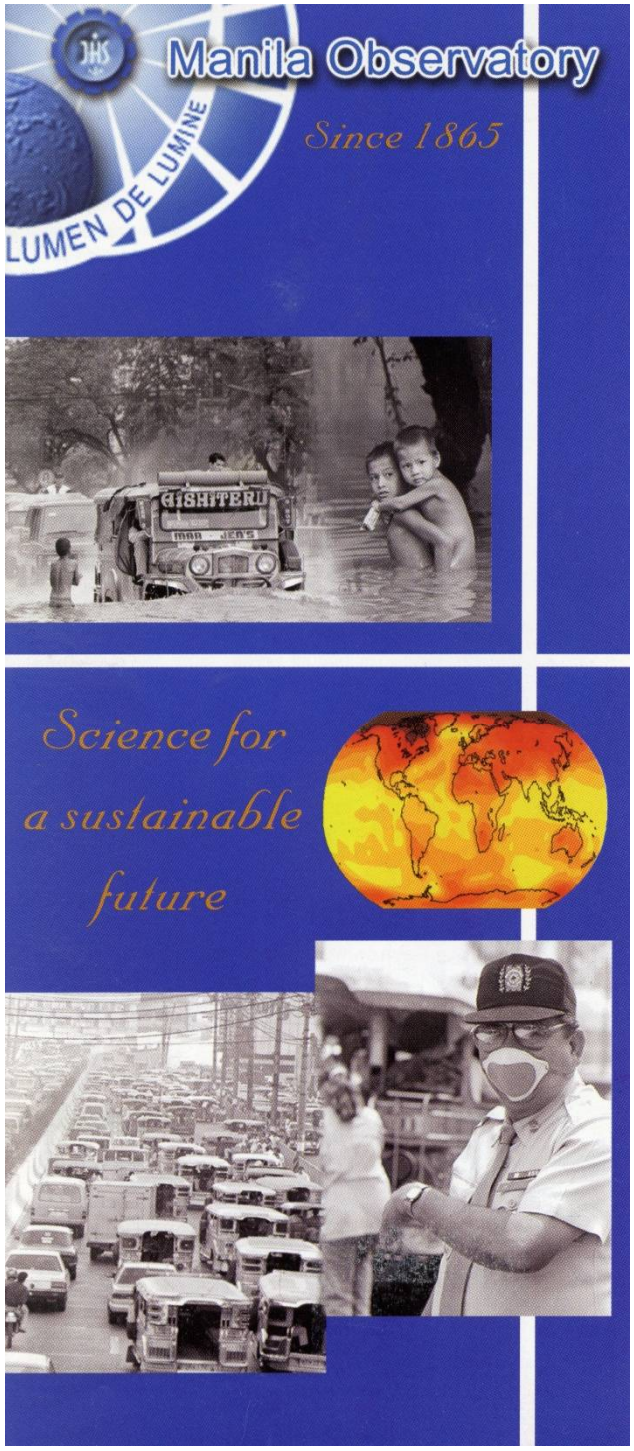


Earthquake-Prone Areas



MANILA OBSERVATORY

DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES



The Manila Observatory's Mission and Research Programs

Urban Air Quality

Regional Climate Systems

Climate Change Assistance

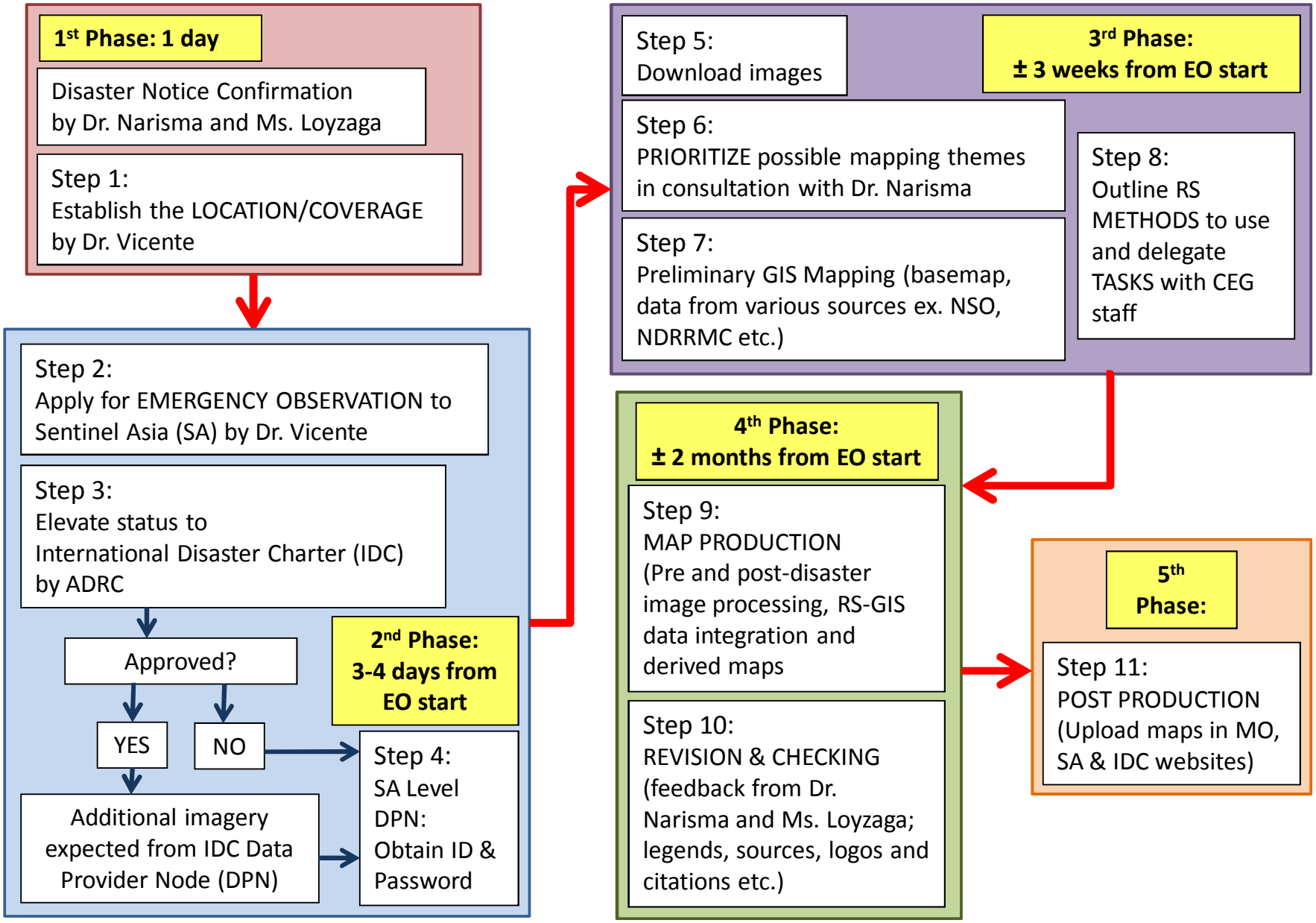
Geomatics for Environment and Development

Solid Earth Dynamics

Iono-Geomagnetics

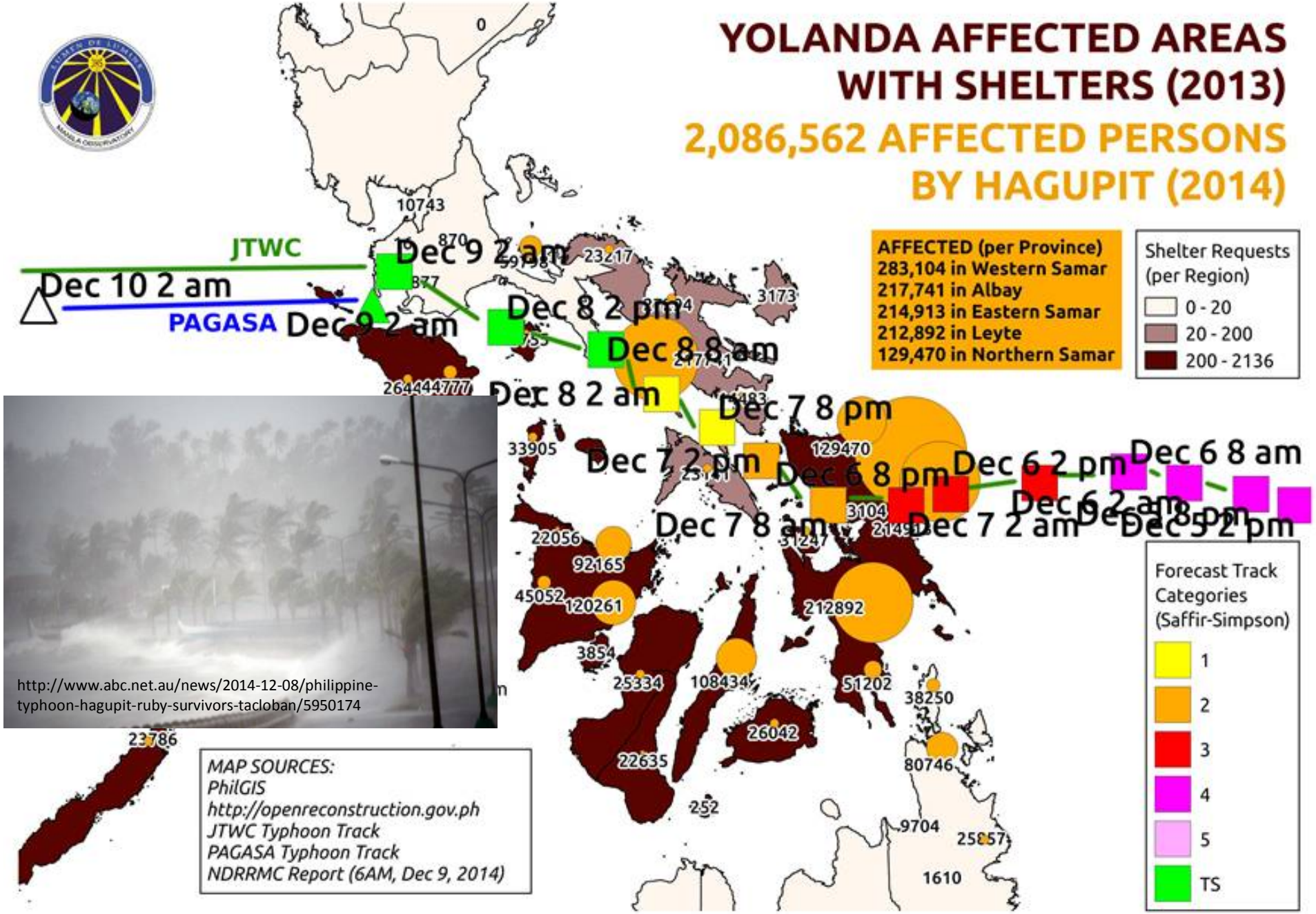
Instrumentation and Technology Development

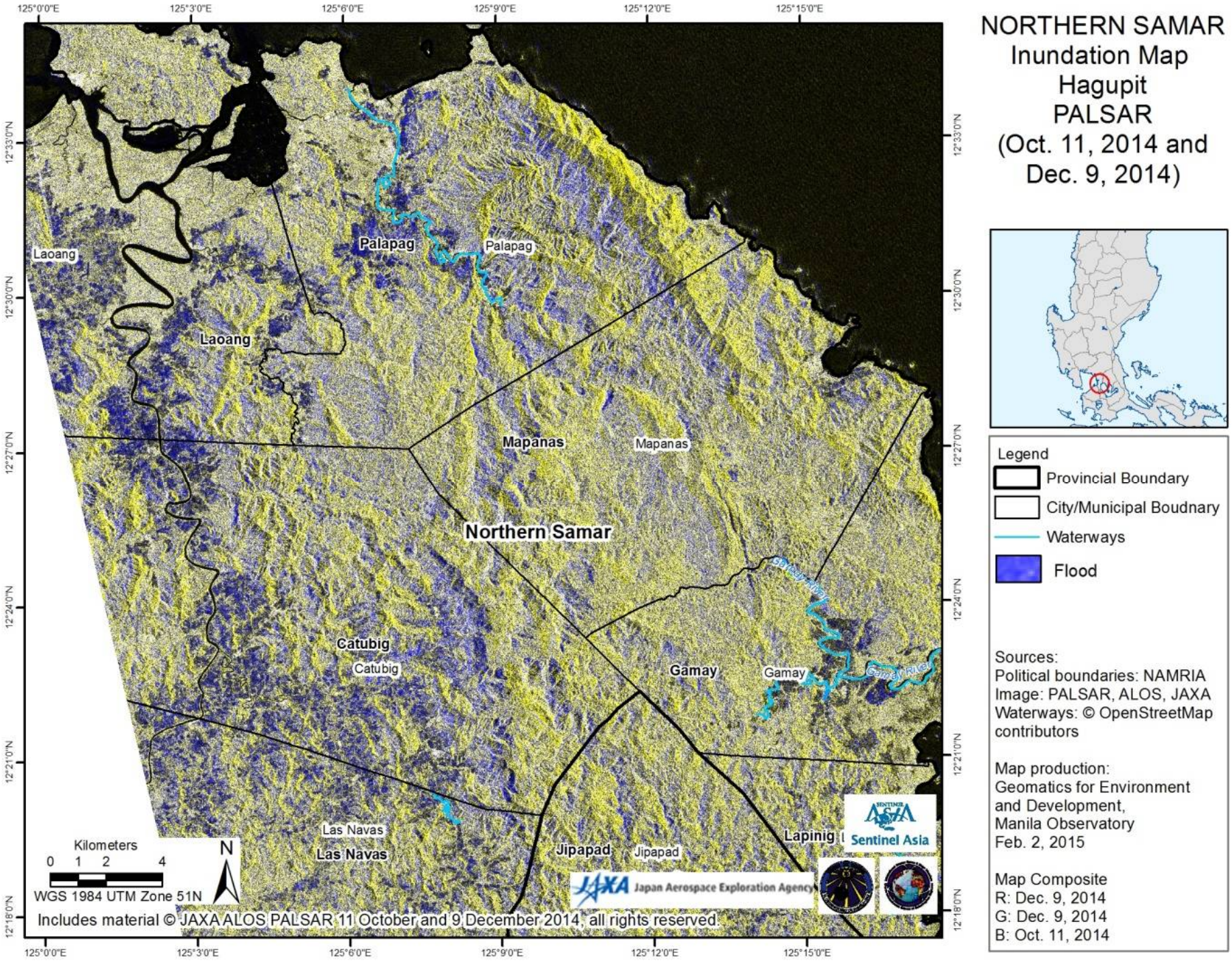
Proposed Emergency Observation (EO) and Mapping Protocol, 15 January 2013



YOLANDA AFFECTED AREAS WITH SHELTERS (2013)

2,086,562 AFFECTED PERSONS BY HAGUPIT (2014)





NORTHERN SAMAR
Inundation Map
Hagupit
PALSAR
(Oct. 11, 2014 and Dec. 9, 2014)

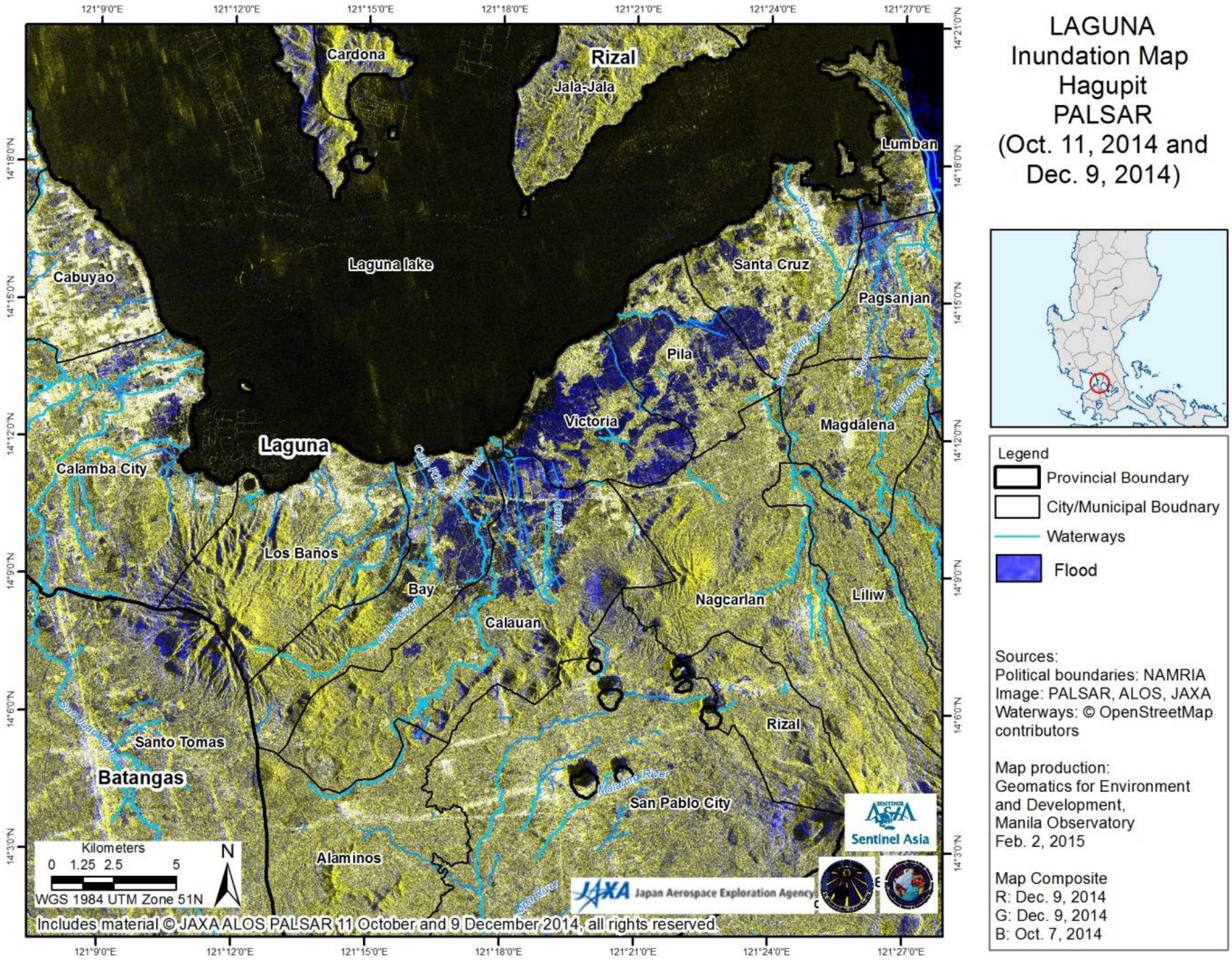
Legend

- Provincial Boundary
- City/Municipal Boudnary
- Waterways
- Flood

Sources:
Political boundaries: NAMRIA
Image: PALSAR, ALOS, JAXA
Waterways: © OpenStreetMap contributors

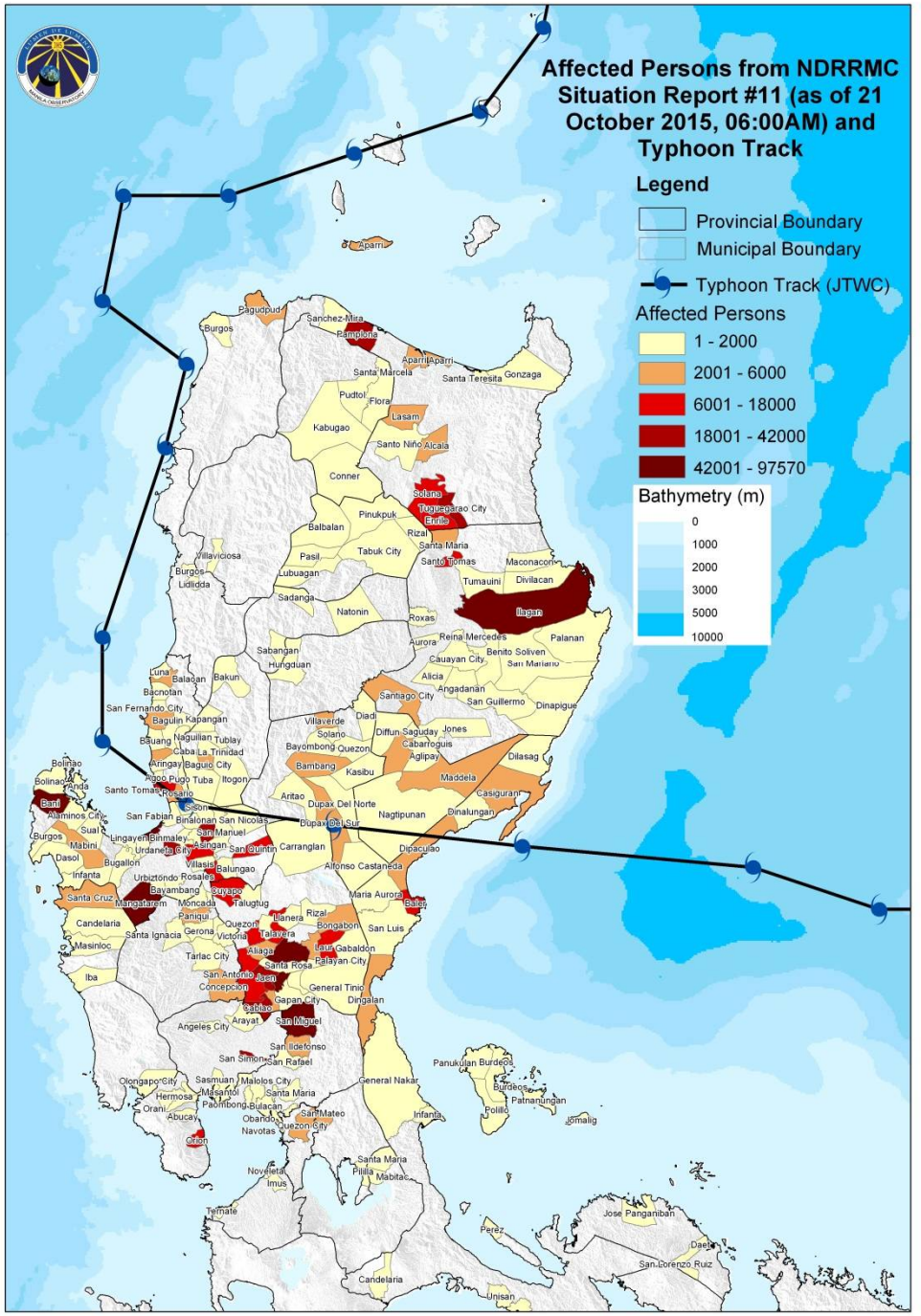
Map production:
Geomatics for Environment and Development,
Manila Observatory
Feb. 2, 2015

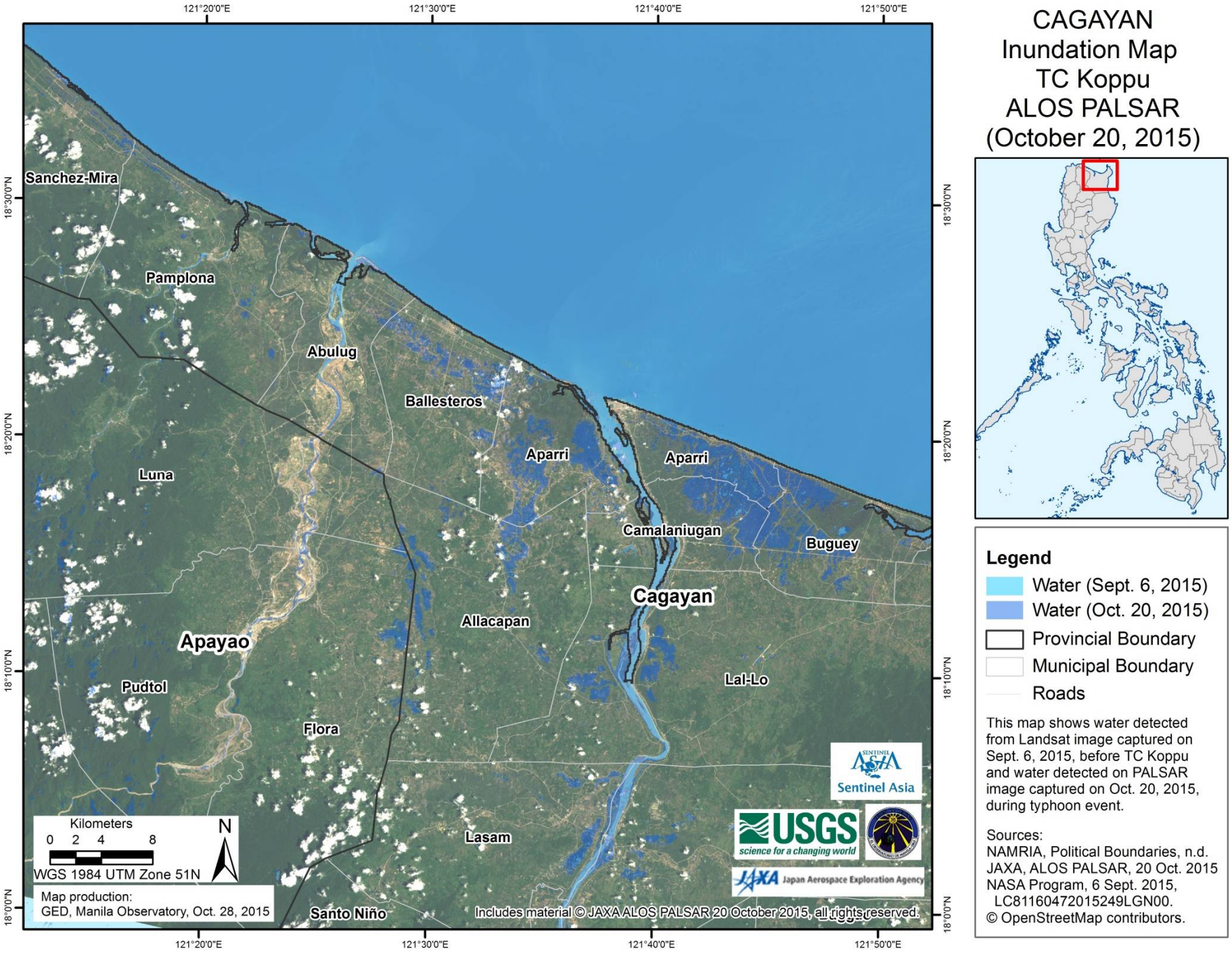
Map Composite
R: Dec. 9, 2014
G: Dec. 9, 2014
B: Oct. 11, 2014


LAGUNA
Inundation Map
Hagupit
PALSAR
(Oct. 11, 2014 and
Dec. 9, 2014)
Cardona
Rizal
Jala-Jala
Lumban
Laguna lake
Cabuyao
Santa Cruz
Pagsanjan
Pila
Victoria
Magdalena
Laguna
Calamba City
Los Baños
Bay
Nagcarlan
Liliw
Calauan
Rizal
Santo Tomas
Batangas
San Pablo City
Alaminos
Kilometers
0 1.25 2.5 5
WGS 1984 UTM Zone 51N
N
Includes material © JAXA ALOS PALSAR 11 October and 9 December 2014, all rights reserved
Legend
Provincial Boundary
City/Municipal Boudnary
Waterways
Flood
Sources:
Political boundaries: NAMRIA
Image: PALSAR, ALOS, JAXA
Waterways: © OpenStreetMap contributors
Map production:
Geomatics for Environment and Development,
Manila Observatory
Feb. 2, 2015
Map Composite
R: Dec. 9, 2014
G: Dec. 9, 2014
B: Oct. 7, 2014
Sentinel Asia
JAXA Japan Aerospace Exploration Agency

Typhoon Koppu (October 20, 2015)

http://news.abs-cbn.com/nation/regions/10/19/15/drone-video-shows-massive-flooding-tuguegarao





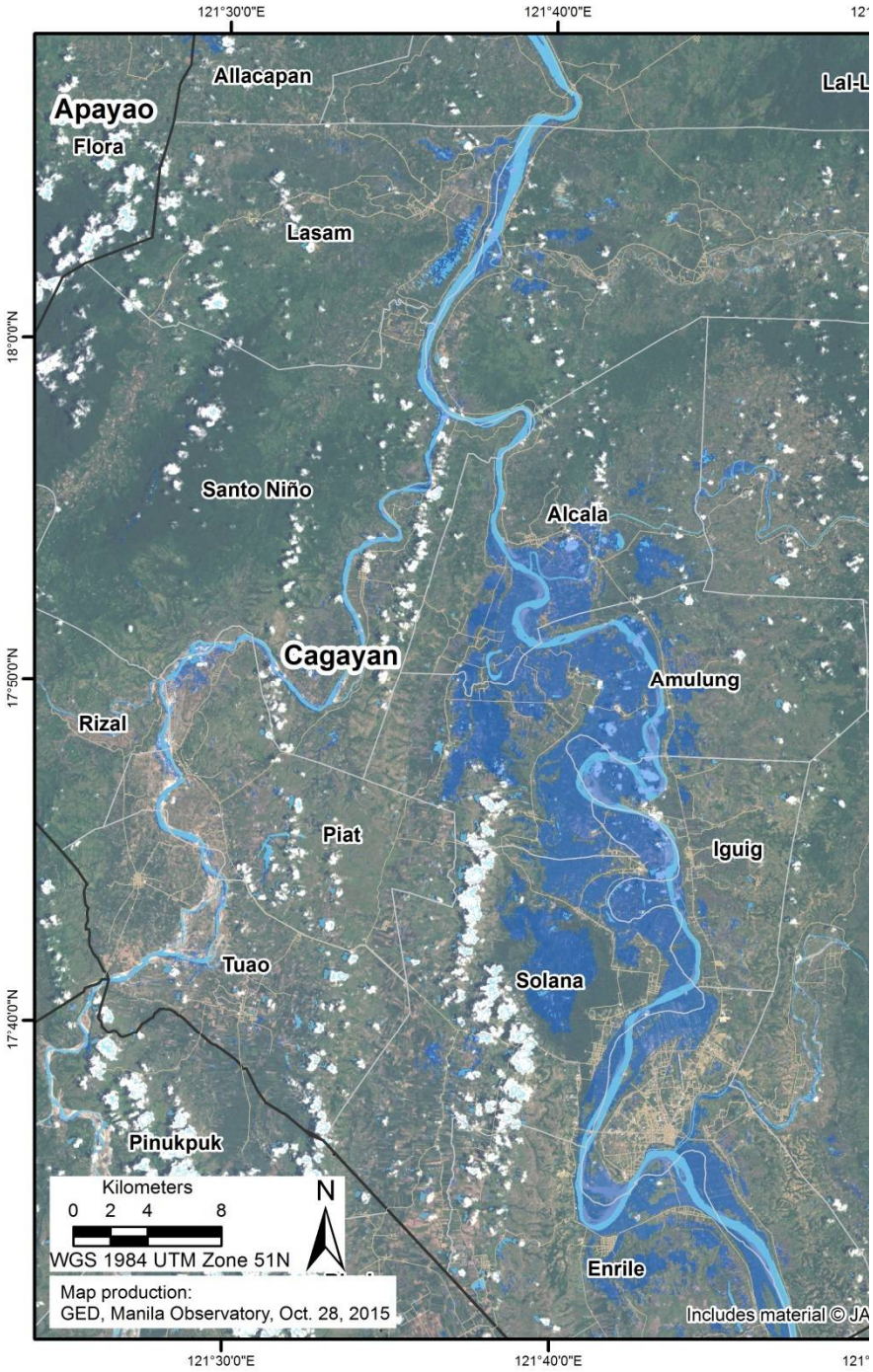
CAGAYAN
Inundation Map
TC Koppu
ALOS PALSAR
(October 20, 2015)

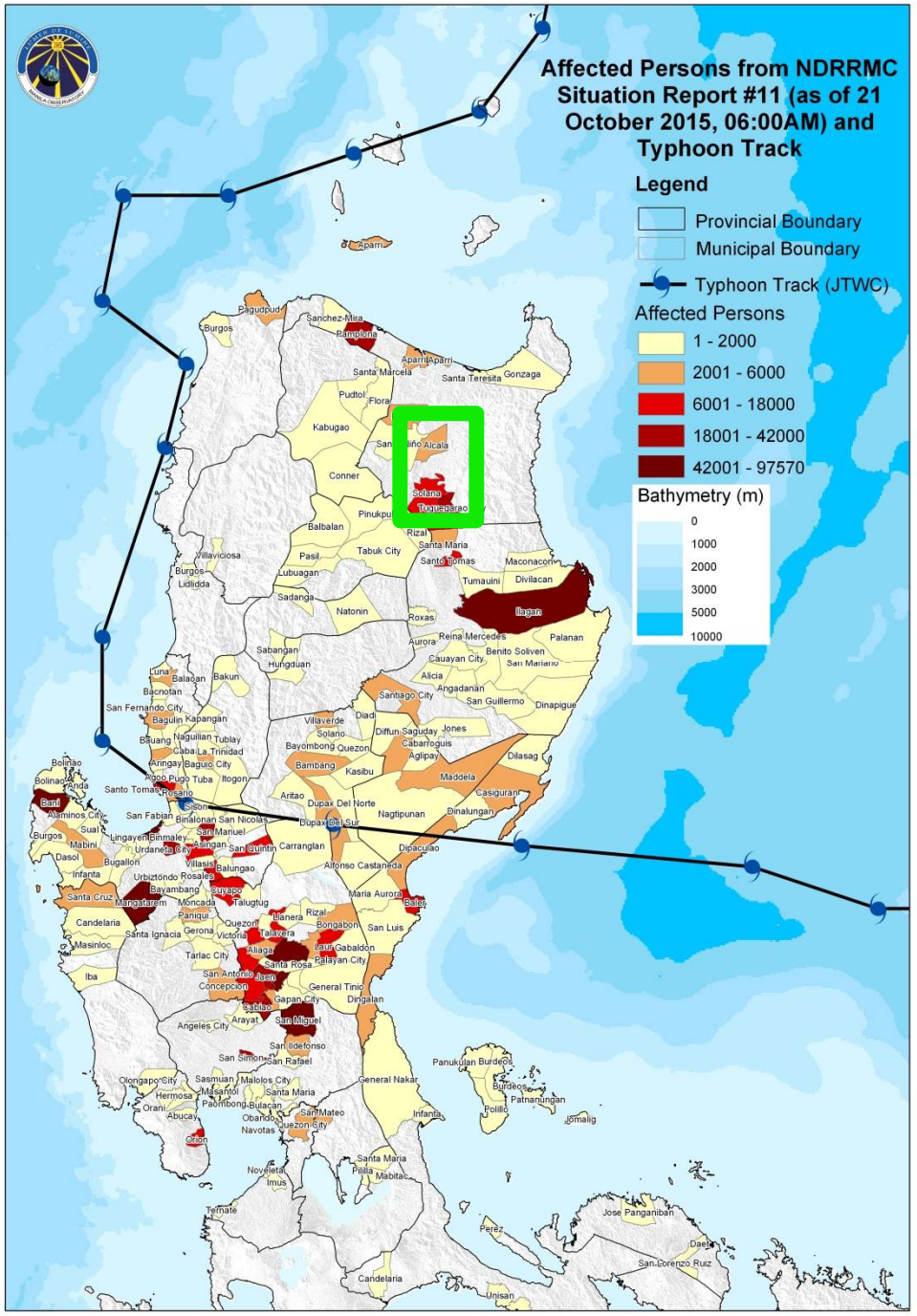
Legend

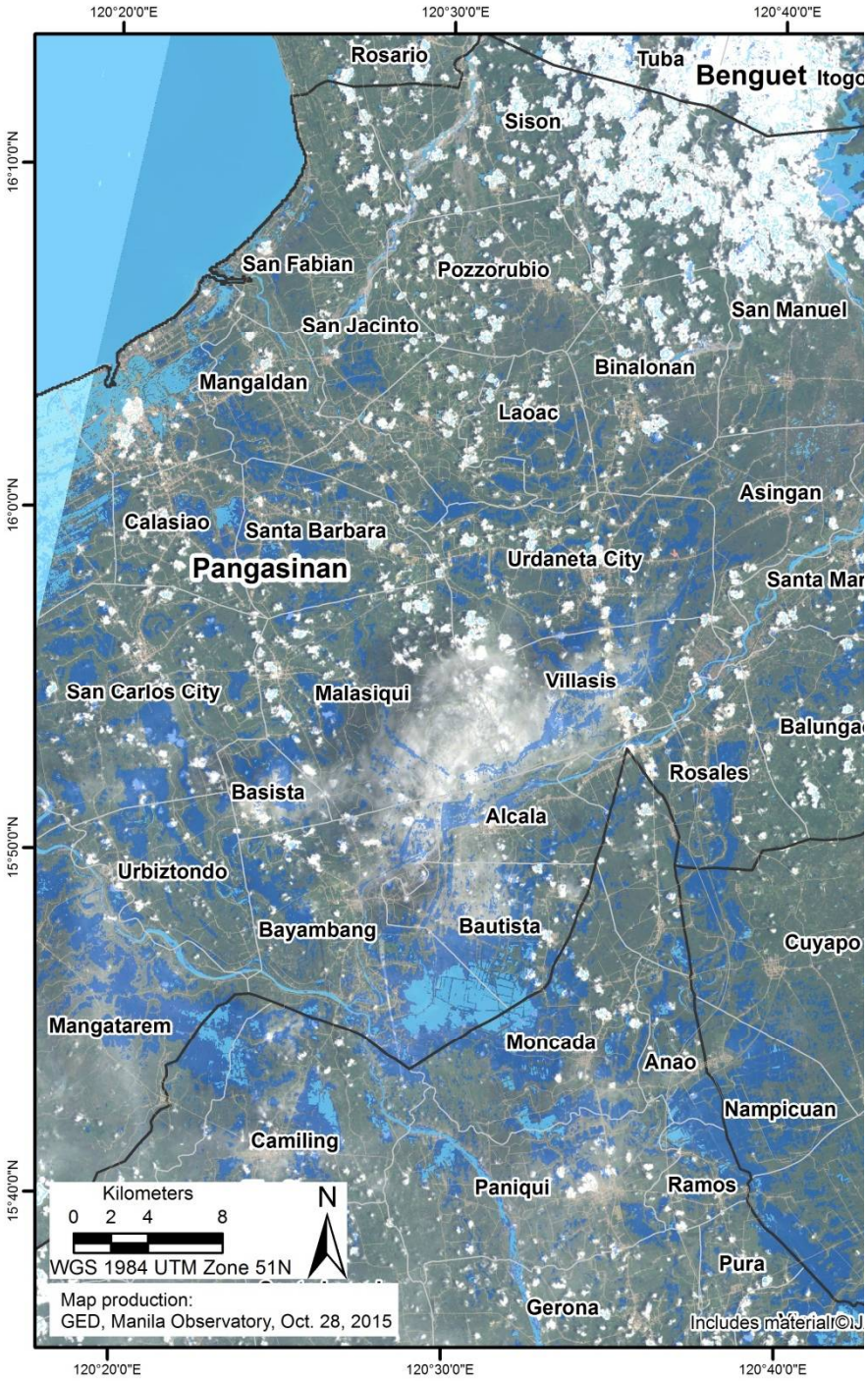
- Water (Sept. 6, 2015)
- Water (Oct. 20, 2015)
- Provincial Boundary
- Municipal Boundary
- Roads

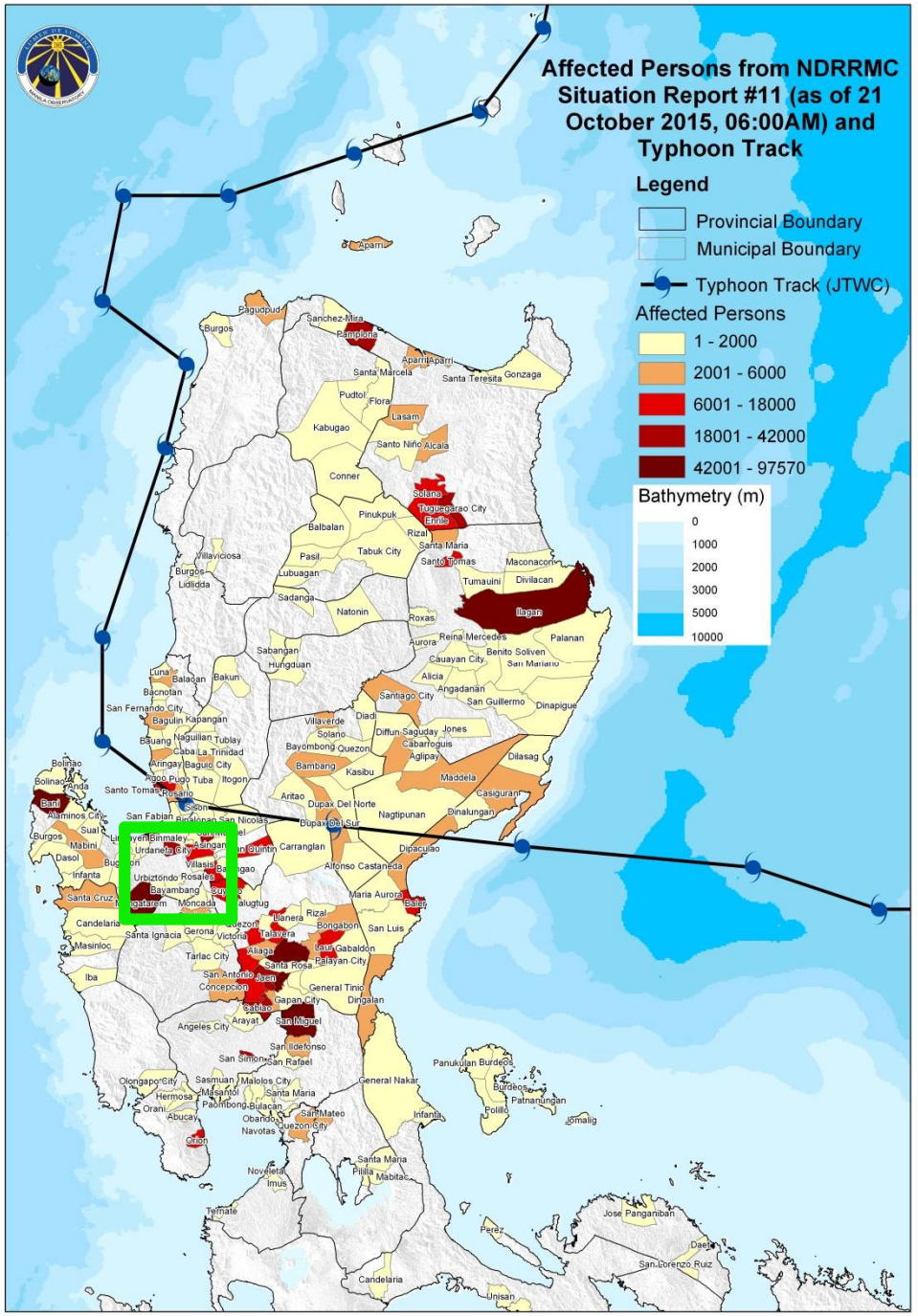
This map shows water detected from Landsat image captured on Sept. 6, 2015, before TC Koppu and water detected on PALSAR image captured on Oct. 20, 2015, during typhoon event.

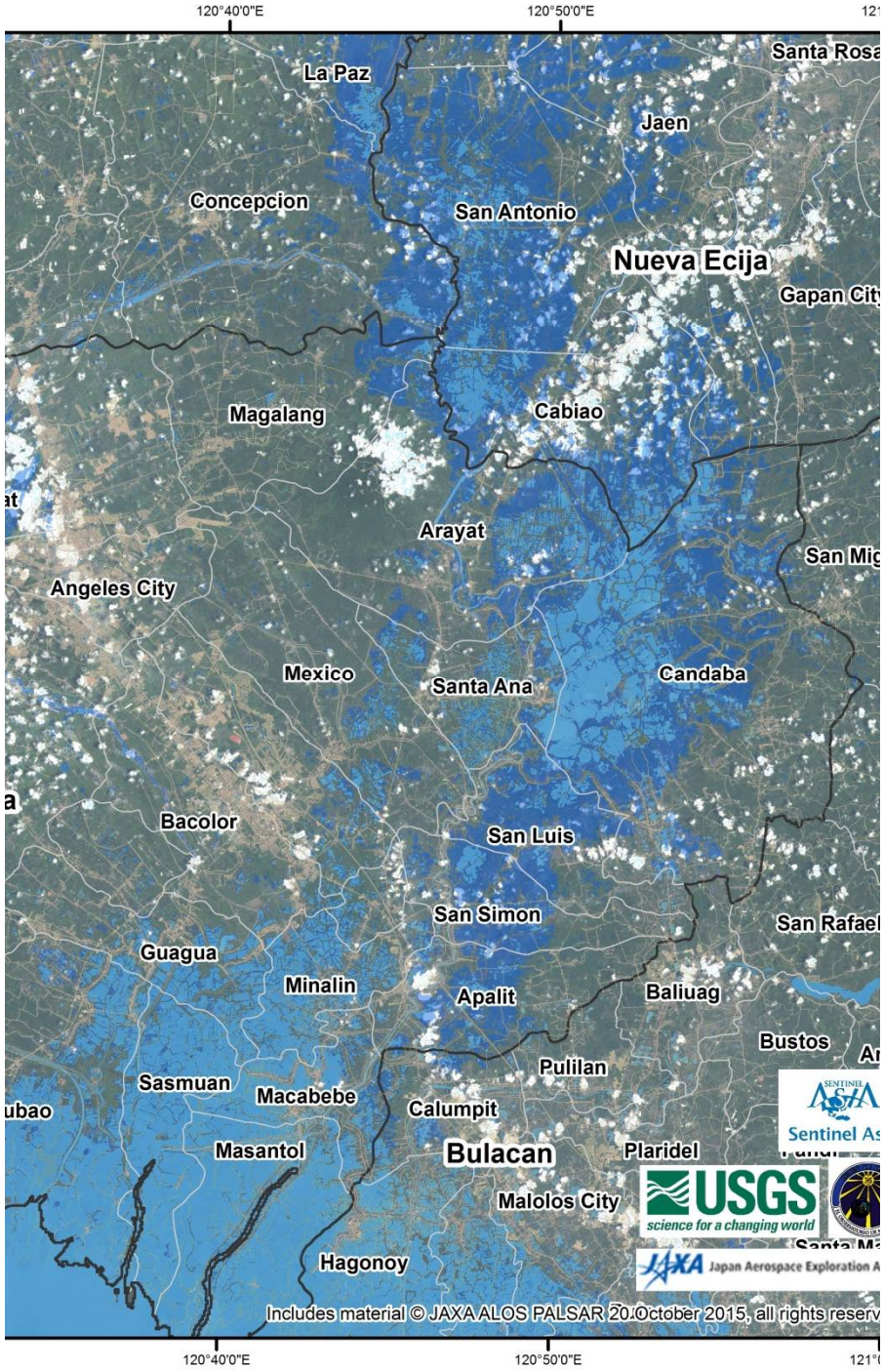
Sources:
NAMRIA, Political Boundaries, n.d.
JAXA, ALOS PALSAR, 20 Oct. 2015
NASA Program, 6 Sept. 2015,
LC81160472015249LGN00.
© OpenStreetMap contributors.

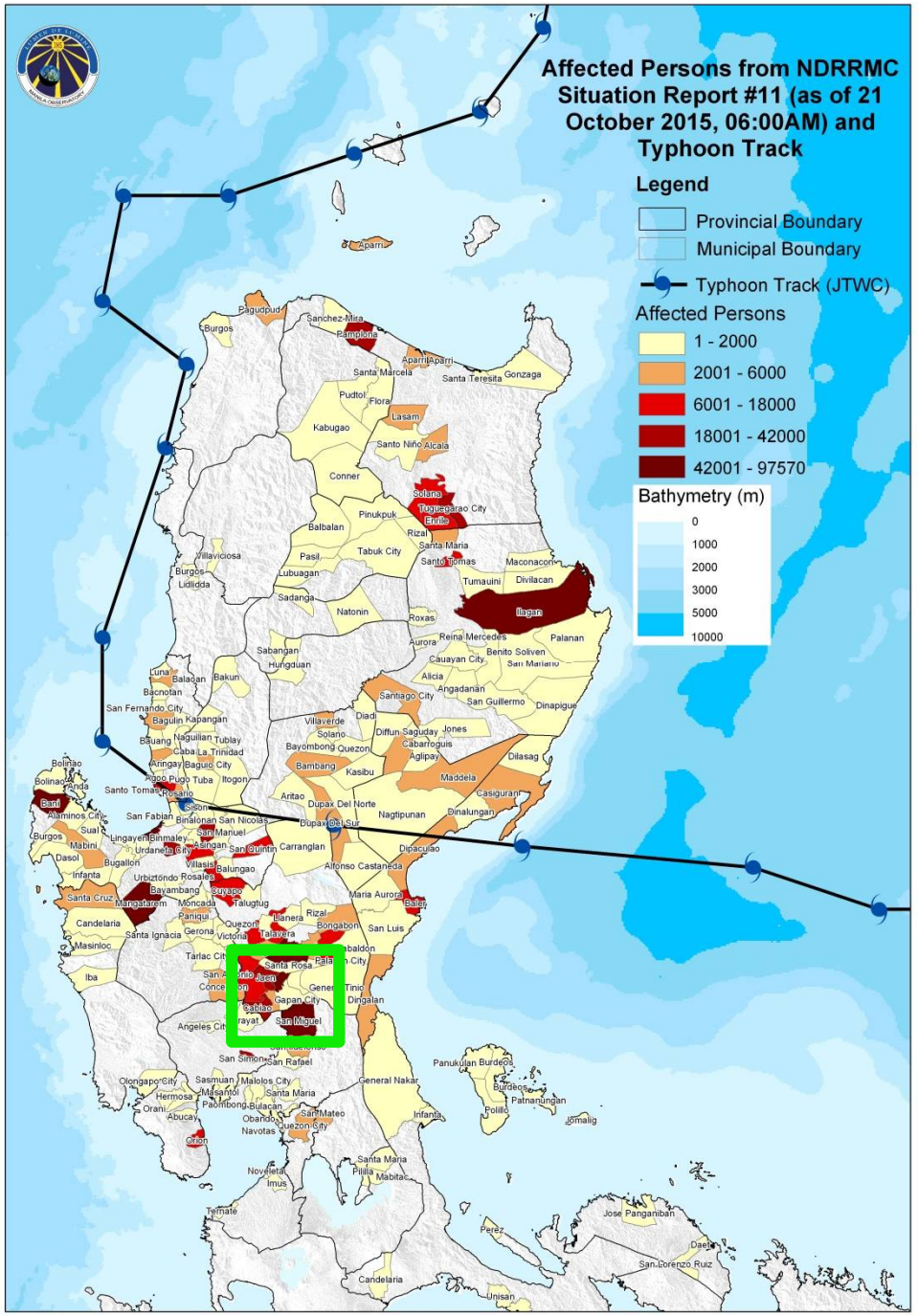

121°30'0"E
121°40'0"E
18°0'0"N
17°50'0"N
17°40'0"N
Allacapan
Apayao
Flora
Lasam
Santo Niño
Alcala
Cagayan
Amulung
Rizal
Piat
Iguig
Tuao
Solana
Pinukpuk
Enrile
Kilometers
0 2 4 8
N
WGS 1984 UTM Zone 51N
Map production:
GED, Manila Observatory, Oct. 28, 2015
Includes material © JA


Affected Persons from NDRRMC Situation Report #11 (as of 21 October 2015, 06:00AM) and Typhoon Track
Legend
Provincial Boundary
Municipal Boundary
Typhoon Track (JTWC)
Affected Persons
1 - 2000
2001 - 6000
6001 - 18000
18001 - 42000
42001 - 97570
Bathymetry (m)
0
1000
2000
3000
5000
10000


120°20'0"E
120°30'0"E
120°40'0"E
16°10'0"N
16°0'0"N
15°50'0"N
15°40'0"N
Rosario
Tuba
Benguet
Itogo
Sison
San Fabian
Pozzorubio
San Manuel
San Jacinto
Binalonan
Mangaldan
Laoac
Asingan
Calasiao
Santa Barbara
Pangasinan
Urdaneta City
Santa Mar
San Carlos City
Malasiqui
Villasis
Balunga
Rosales
Basista
Alcala
Urbiztondo
Bayambang
Bautista
Cuyapo
Mangatarem
Moncada
Anao
Nampicuan
Camiling
Paniqui
Ramos
Pura
Gerona
Kilometers
0 2 4 8
N
WGS 1984 UTM Zone 51N
Map production:
GED, Manila Observatory, Oct. 28, 2015
Includes material©J


Affected Persons from NDRRMC Situation Report #11 (as of 21 October 2015, 06:00AM) and Typhoon Track
Legend
Provincial Boundary
Municipal Boundary
Typhoon Track (JTWC)
Affected Persons
1 - 2000
2001 - 6000
6001 - 18000
18001 - 42000
42001 - 97570
Bathymetry (m)
0
1000
2000
3000
5000
10000

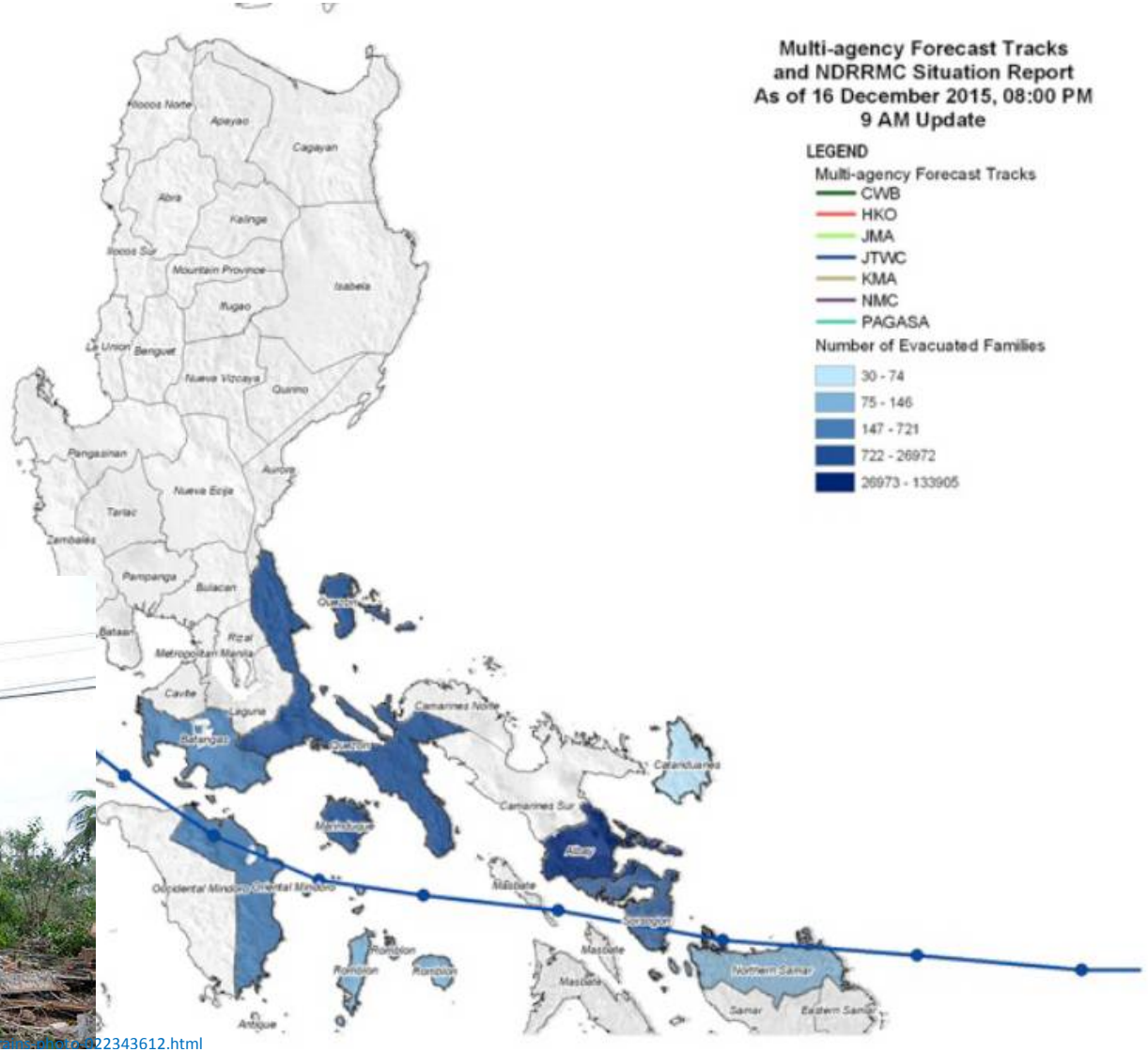

120°40'0"E
120°50'0"E
La Paz
Jaen
Concepcion
San Antonio
Nueva Ecija
Magalang
Cabiao
Arayat
Angeles City
Mexico
Santa Ana
Candaba
Bacolor
San Luis
San Simon
Guagua
Minalin
Apalit
Baliuag
Bustos
Pulilan
Sasmuan
Macabebe
Calumpit
Masantol
Bulacan
Plaridel
Malolos City
Hagonoy
Sentinel Asia
USGS
science for a changing world
JAXA Japan Aerospace Exploration A
Includes material © JAXA ALOS PALSAR 20 October 2015, all rights reserv


Affected Persons from NDRRMC Situation Report #11 (as of 21 October 2015, 06:00AM) and Typhoon Track
Legend
Provincial Boundary
Municipal Boundary
Typhoon Track (JTWC)
Affected Persons
1 - 2000
2001 - 6000
6001 - 18000
18001 - 42000
42001 - 97570
Bathymetry (m)
0
1000
2000
3000
5000
10000

Typhoon Melor (December 16, 2015)

As of 8pm Dec 16, highly affected areas include **Albay, Sorsogon, Quezon, Marinduque, Batangas and Oriental Mindoro**

http://news.yahoo.com/photos/damaged-houses-debris-seen-strong-winds-heavy-rain-photo-322343612.html



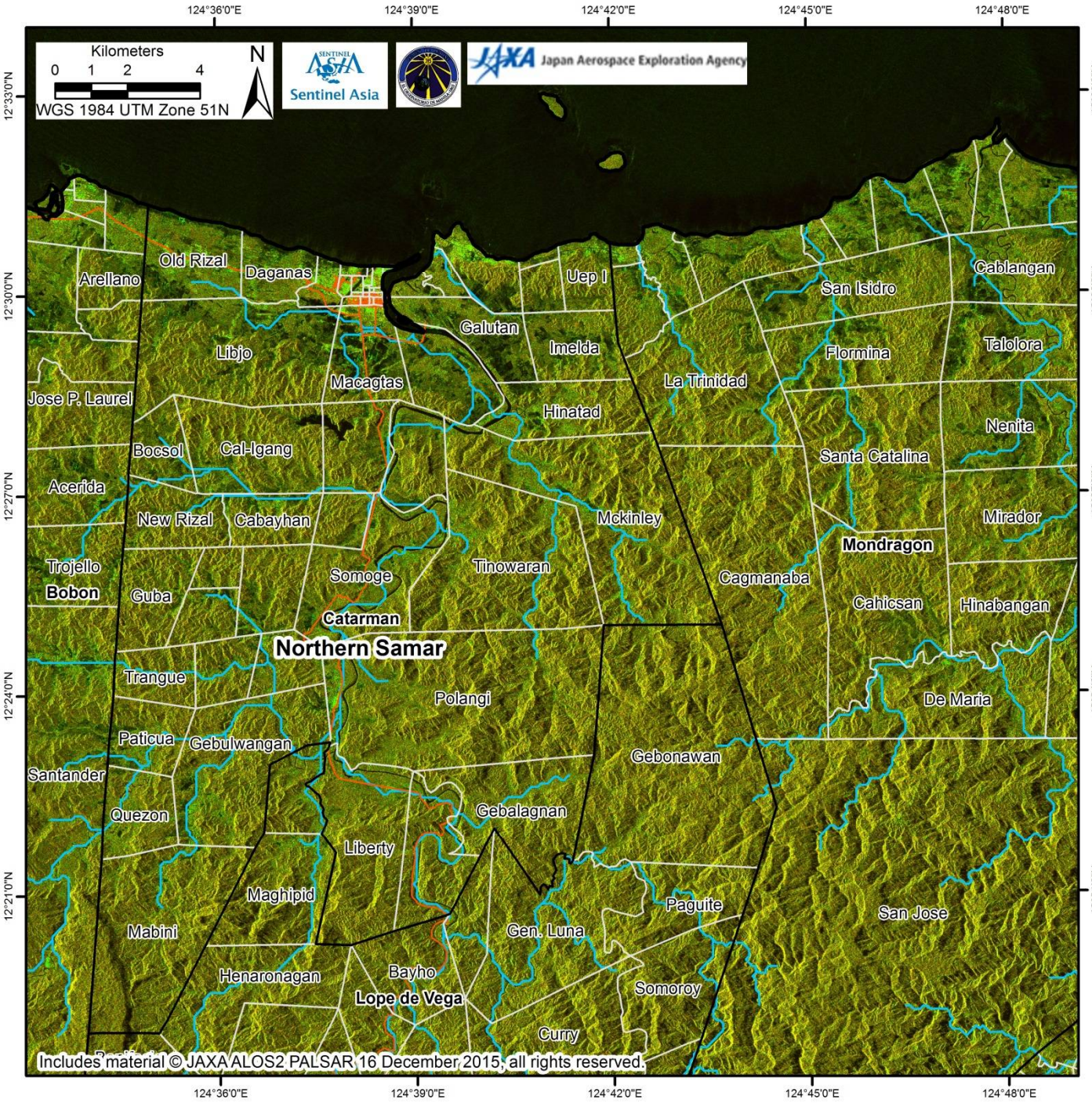
San Roque and Laoang, North Samar Inundation Map Nona ALOS 2 PALSAR (Dec. 16, 2015)

Legend

- Provincial boundary
- Municipal Boundary
- Barangay Boundary
- Roads
- Water
- Land

Sources:
Political boundaries: NAMRIA
Image: PALSAR, ALOS2, JAXA December 16, 2015
Waterways: © OpenStreetMap contributors

Map production:
Geomatics for Environment and Development,
Manila Observatory
December 17, 2015



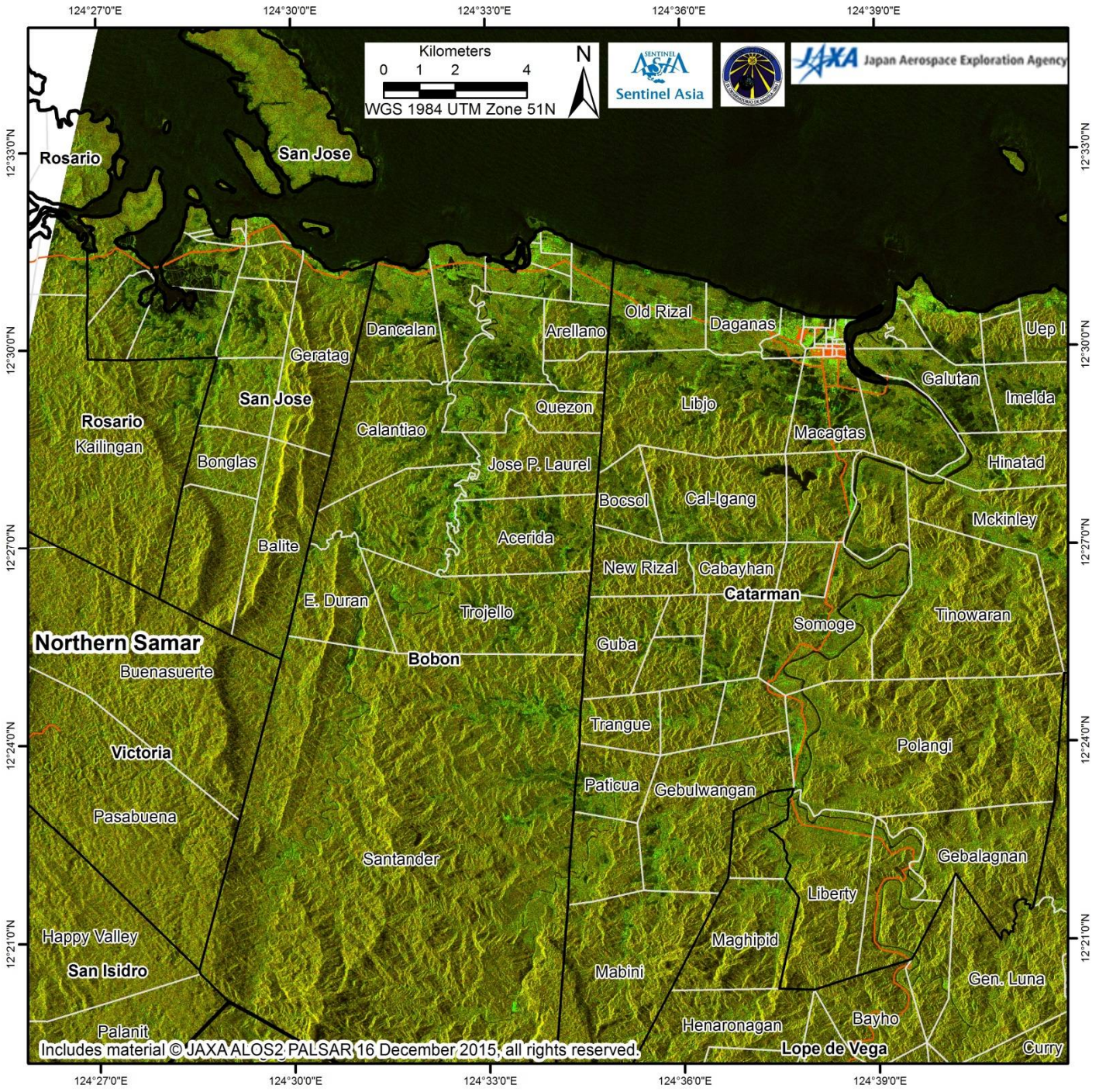
Catarman, North Samar Inundation Map Nona ALOS 2 PALSAR (Dec. 16, 2015)

Legend

- Provincial boundary
- Municipal Boundary
- Barangay Boundary
- Roads
- SRTM River
- Water
- Land

Sources:
Political boundaries: NAMRIA
Image: PALSAR, ALOS2, JAXA December 16, 2015
Waterways: © OpenStreetMap contributors

Map production:
Geomatics for Environment and Development,
Manila Observatory
December 17, 2015



Bobon and Polangi, North Samar Inundation Map Nona ALOS 2 PALSAR (Dec. 16, 2015)

Legend

- Provincial boundary
- Municipal Boundary
- Barangay Boundary
- Roads
- Water
- Land

Sources:
Political boundaries: NAMRIA
Image: PALSAR, ALOS2, JAXA December 16, 2015
Waterways: © OpenStreetMap contributors

Map production:
Geomatics for Environment and Development,
Manila Observatory
December 17, 2015

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mapsanddata.observatory.ph

Manila Observatory Geoportal

Science for a sustainable future

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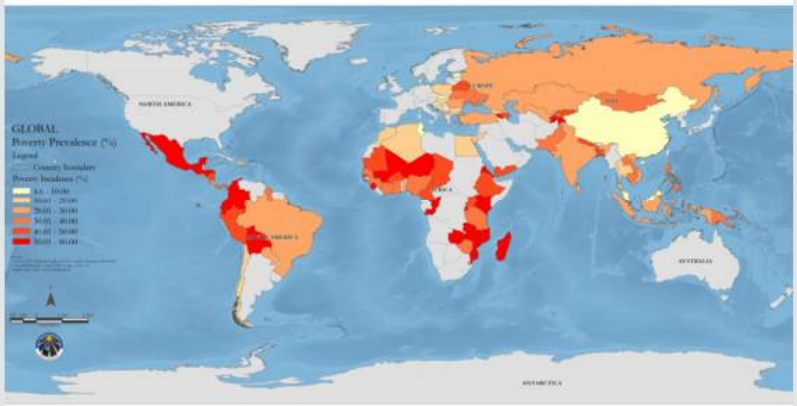
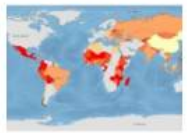
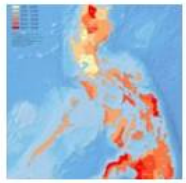
Featured Maps

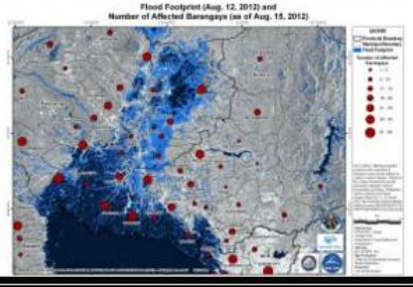


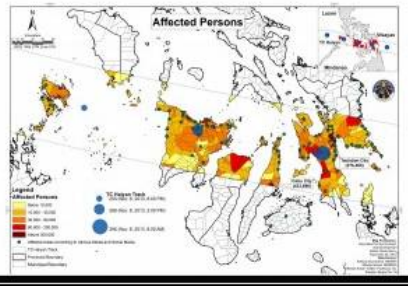
Global Poverty Prevalence (Percentage) (Produced_2015)





Featured Data Sets





The Manila Observatory's Future Plans

- Integrating Risk Policy Research:
- Mainstreaming CCA-DRM in Planning and Governance
- Upgrading and Consolidating Teaching and Research Laboratories among Academic Partners:
- Improving the Network of Rainfall Monitoring Stations
- Strengthening Networking and Linkages
- Improving Access to Satellite Imageries and Regional Climate Models/ Scenarios
- Improving the Network of Ground-Based Sensors (Rain Gauges, LIDAR)

Summary

- Philippines experiences a lot of hazards. Manila Observatory has been observing and recording them from the ground. Recently, with the help of satellite imageries, we can also observe them from space.