

Mapping the Impacts of Typhoon Kalmaegi (Tino) in Cebu

Geomatics for Environment and Development (GED) Laboratory

MANILA OBSERVATORY

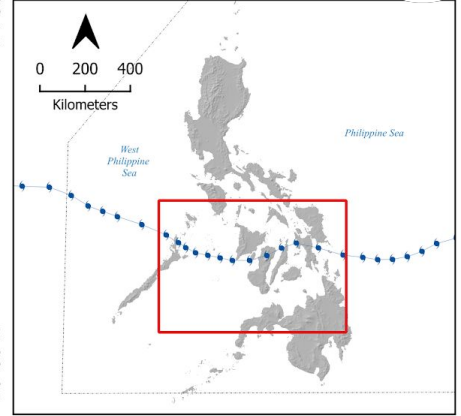
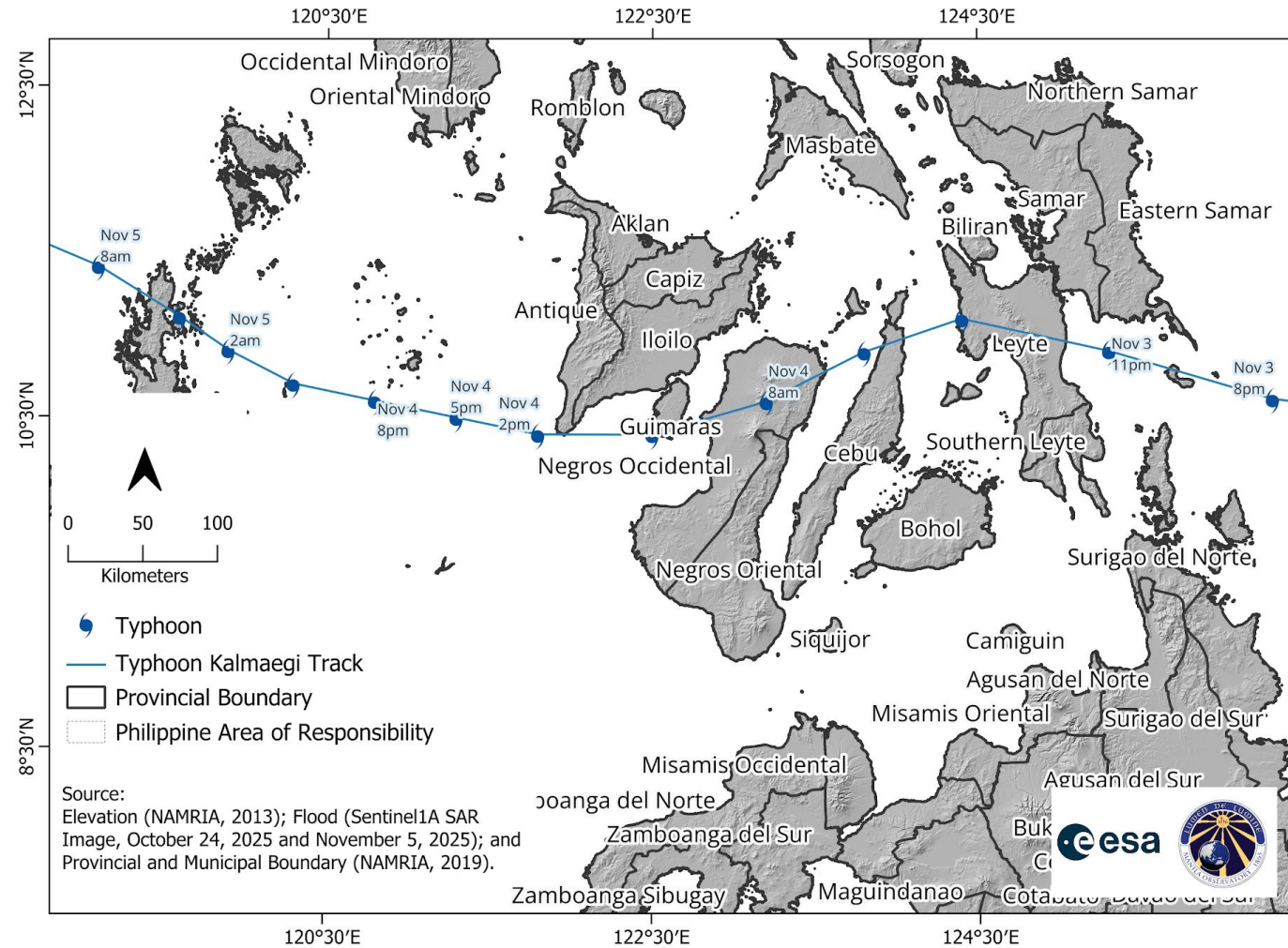
March 9, 2026

Summary

- Several areas in Visayas experienced accumulated 24-hour rainfall exceeding 200 mm during onslaught of Typhoon Kalmaegi (Tino) on November 3 to 4, 2025
- Multi-temporal Synthetic Aperture Radar images detected flooding in the Provinces of Leyte, Cebu, Negros Occidental, Capiz, and Iloilo.
- Generated map shows population density overlaid with detected flood caused by Typhoon Tino, affected population, loss and damage to agriculture, and flooded road.



Typhoon 'Tino' Track over the Philippines



Kalmaegi or 'Tino' entered the Philippine Area of responsibility (PAR) at 11:00 am Nov. 2, 2025 as Tropical Storm. It made landfall on Nov. 4, 2025 over the Province of Leyte.

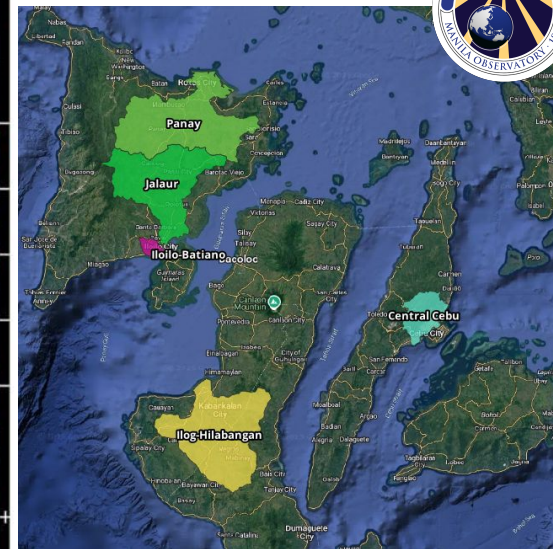
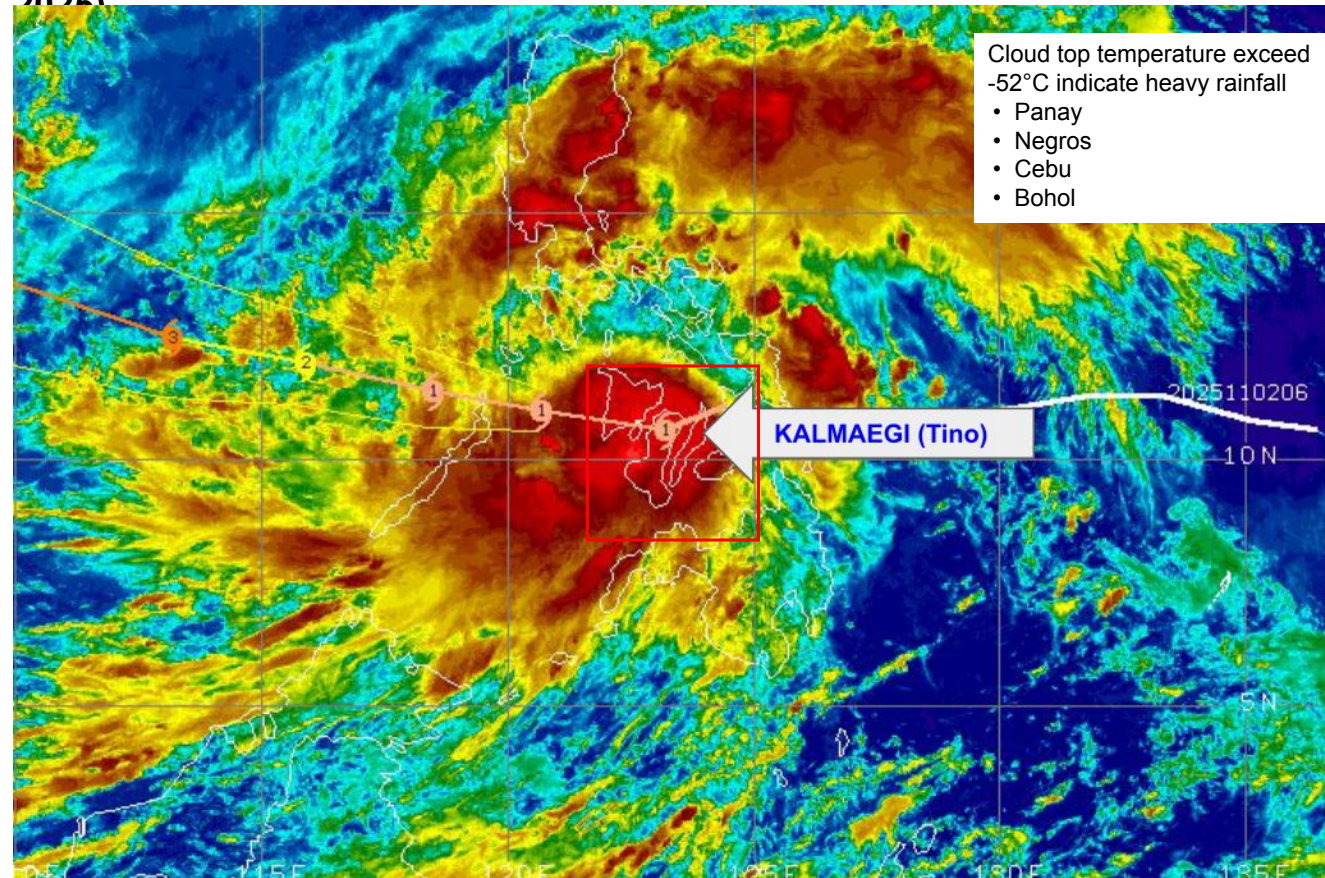
Typhoon 'Tino' (NDRRMC Situation Report No. 30)

- It made multiple landfall over Leyte, Cebu, Negros Occidental, Guimaras, Iloilo, and Palawan
- Tino exited PAR on Nov. 6, 2025, it moved past Kalayaan Islands to Vietnam.

Source: Elevation (NAMRIA, 2013); Flood (Sentinel1A SAR Image, October 24, 2025 and November 5, 2025); and Provincial and Municipal Boundary (NAMRIA, 2019).

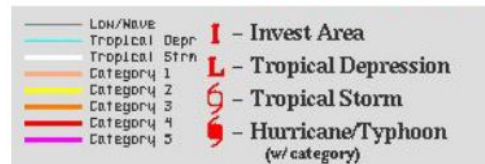


Typhoon Tino Rainfall over Visayas (November 4, 2025)



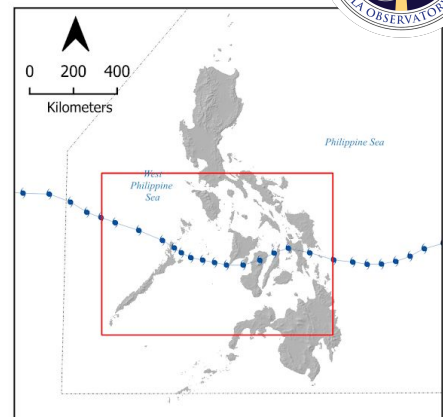
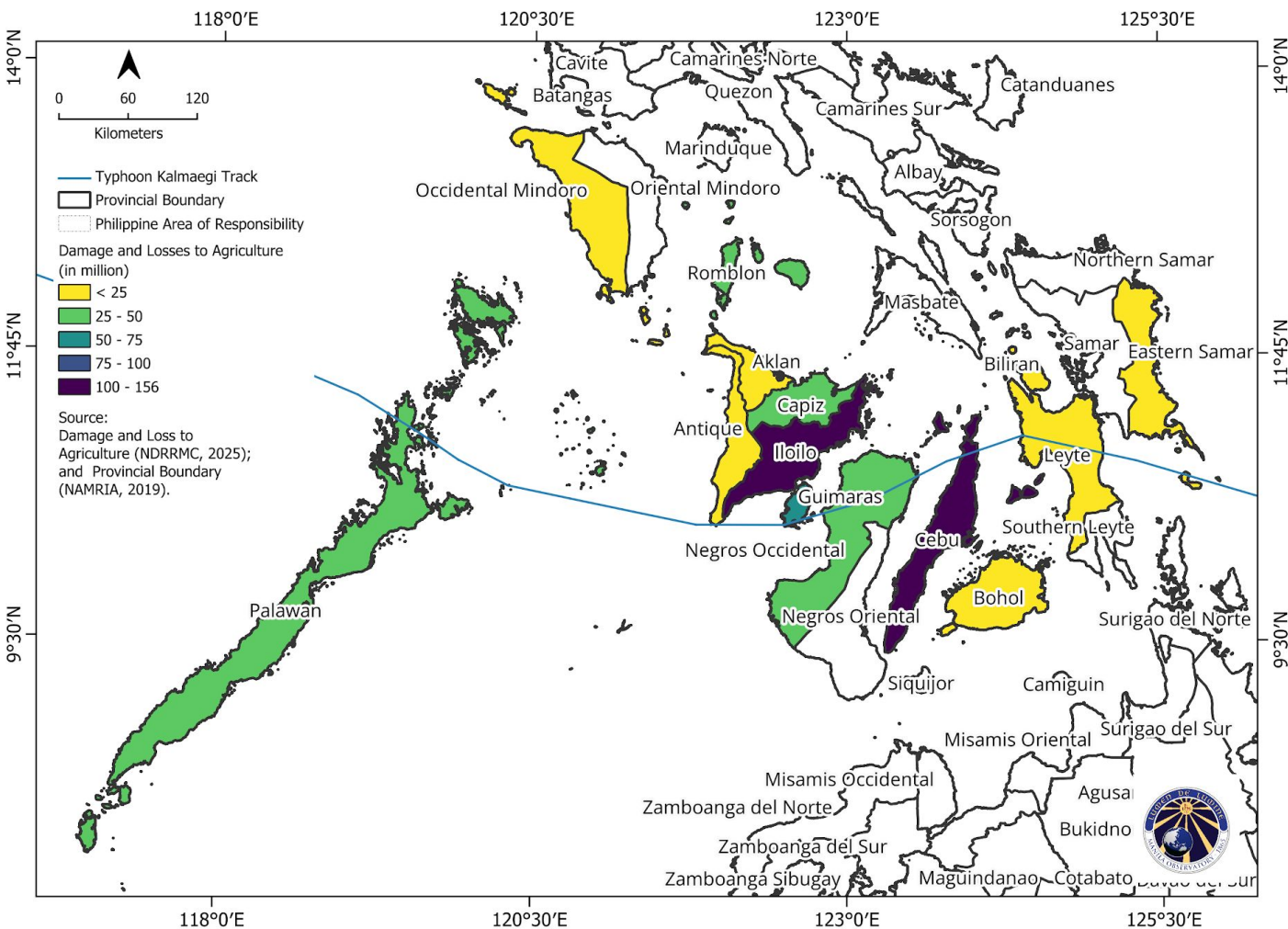
Affected Major River Basin:

- Panay
- Jalaur
- Iloilo-Batiano
- Ilog-Hilabangan
- Central Cebu



INFRARED SATELLITE IMAGE

Damage and Loss to Agriculture

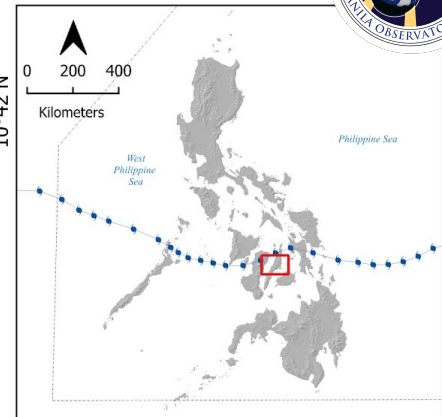
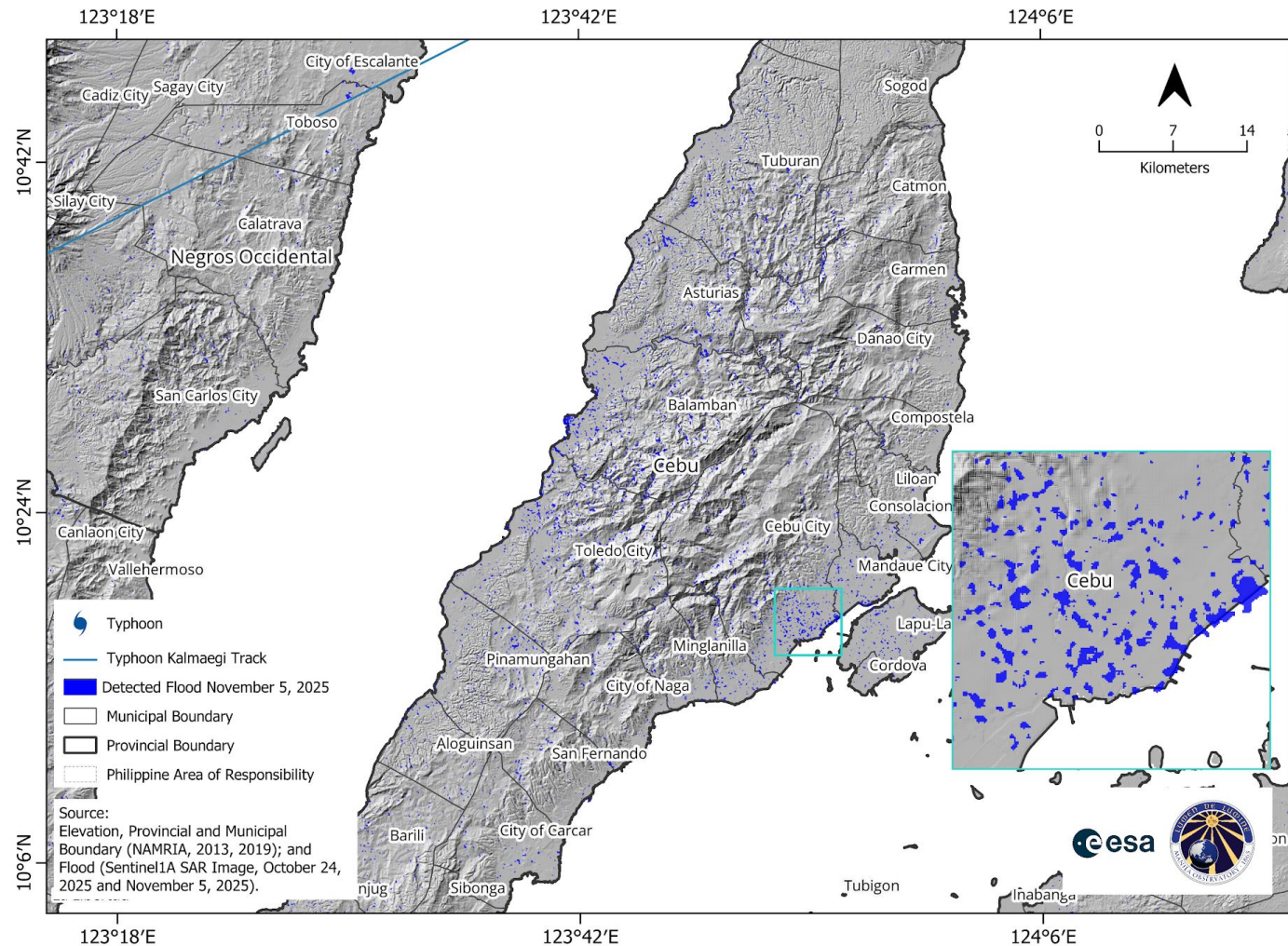


Province with Damage and Loss in Agriculture (More than 25 million)

- Cebu
- Iloilo
- Guimaras
- Romblon
- Negros Occidental
- Capiz
- Palawan



Detected Flood in Province of Cebu (Sentinel 1A Images, October 24, 2025 and November 5, 2025)



Highlighted in blue are the observed flooded areas in Cebu Island after >200 mm of rain due to Typhoon 'Tino' on Nov 4, 2025.

- Flood extent was detected by thresholding the difference of pixel values of Sentinel-1 SAR image taken on Oct 24, 2025 and Nov 5, 2025.
- Please note that flood extent could be underestimated in urban areas due to complex backscattering over built surface.
- Note also that **no ground validation** was

- Flooded municipalities in Cebu**
- Liloan
 - Consolacion
 - Mandaue City
 - Cebu City
 - City of Talisay
 - Lapu-Lapu City
 - Tuburan
 - Asturias
 - Balamban
 - Toledo City
 - Pinagmunganhan

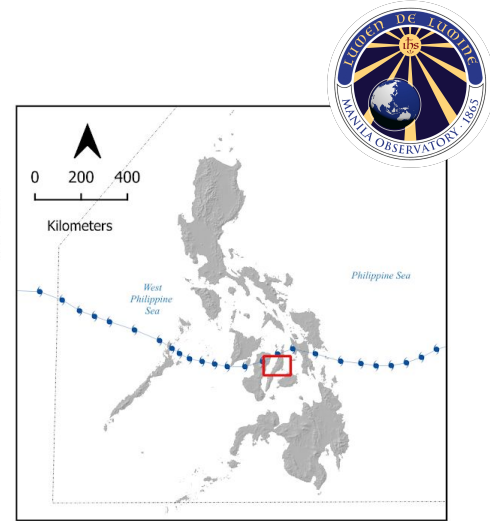
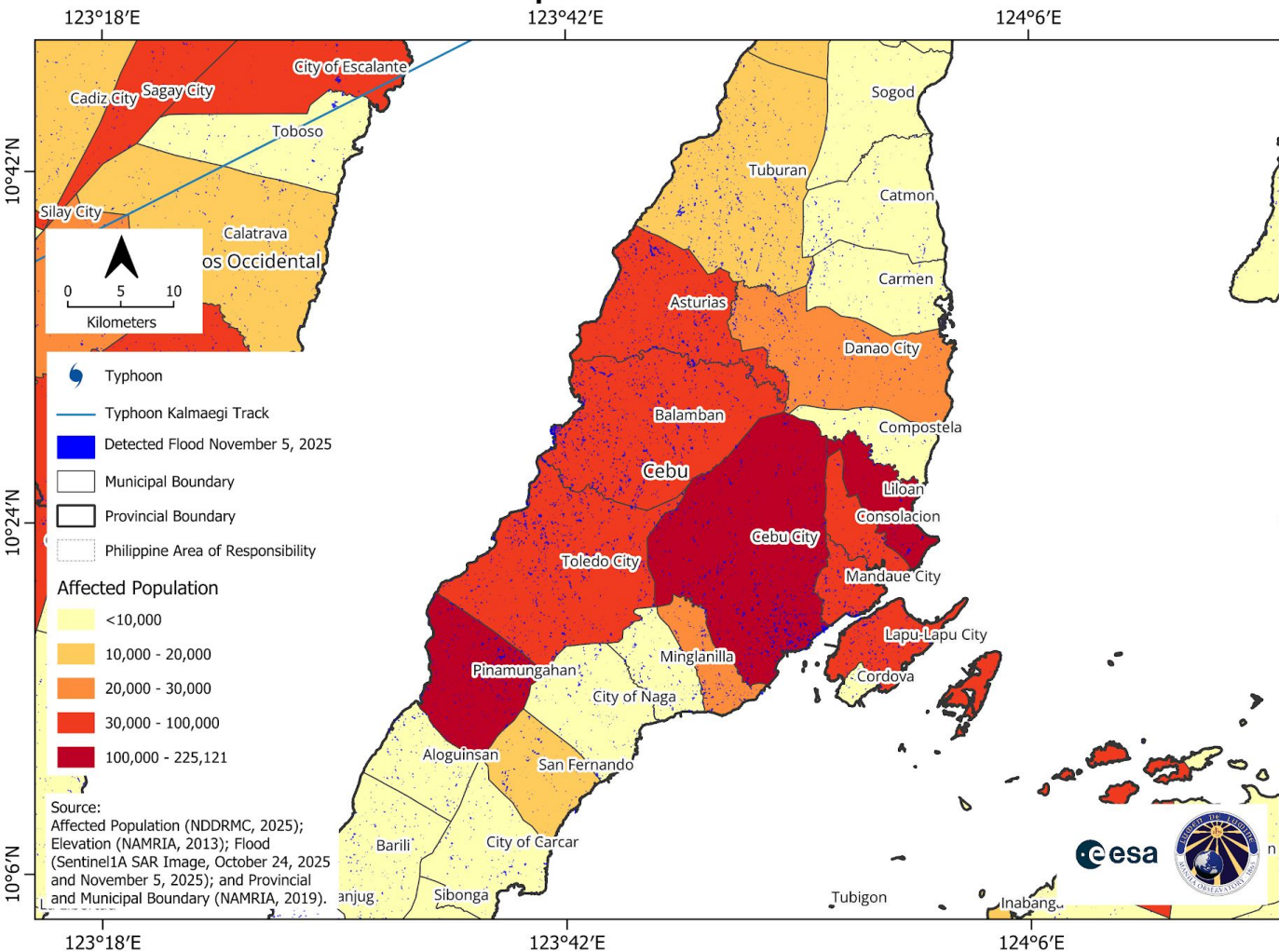
- Typhoon
- Typhoon Kalmaegi Track
- Detected Flood November 5, 2025
- Municipal Boundary
- Provincial Boundary
- Philippine Area of Responsibility

Source: Elevation, Provincial and Municipal Boundary (NAMRIA, 2013, 2019); and Flood (Sentinel1A SAR Image, October 24, 2025 and November 5, 2025).



Includes material © Sentinel 1 SAR Image, October 24, 2025 and November 5, 2025. All rights reserved.

Detected Flood and Affected Population in Province of Cebu

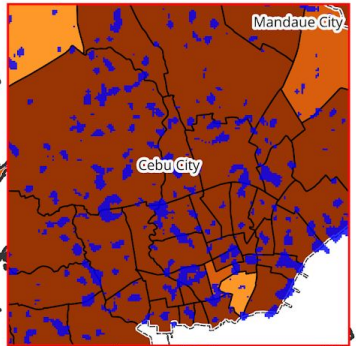
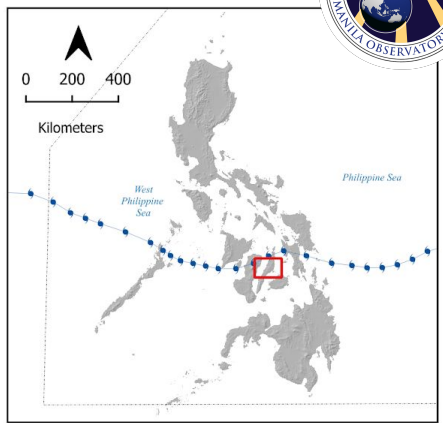
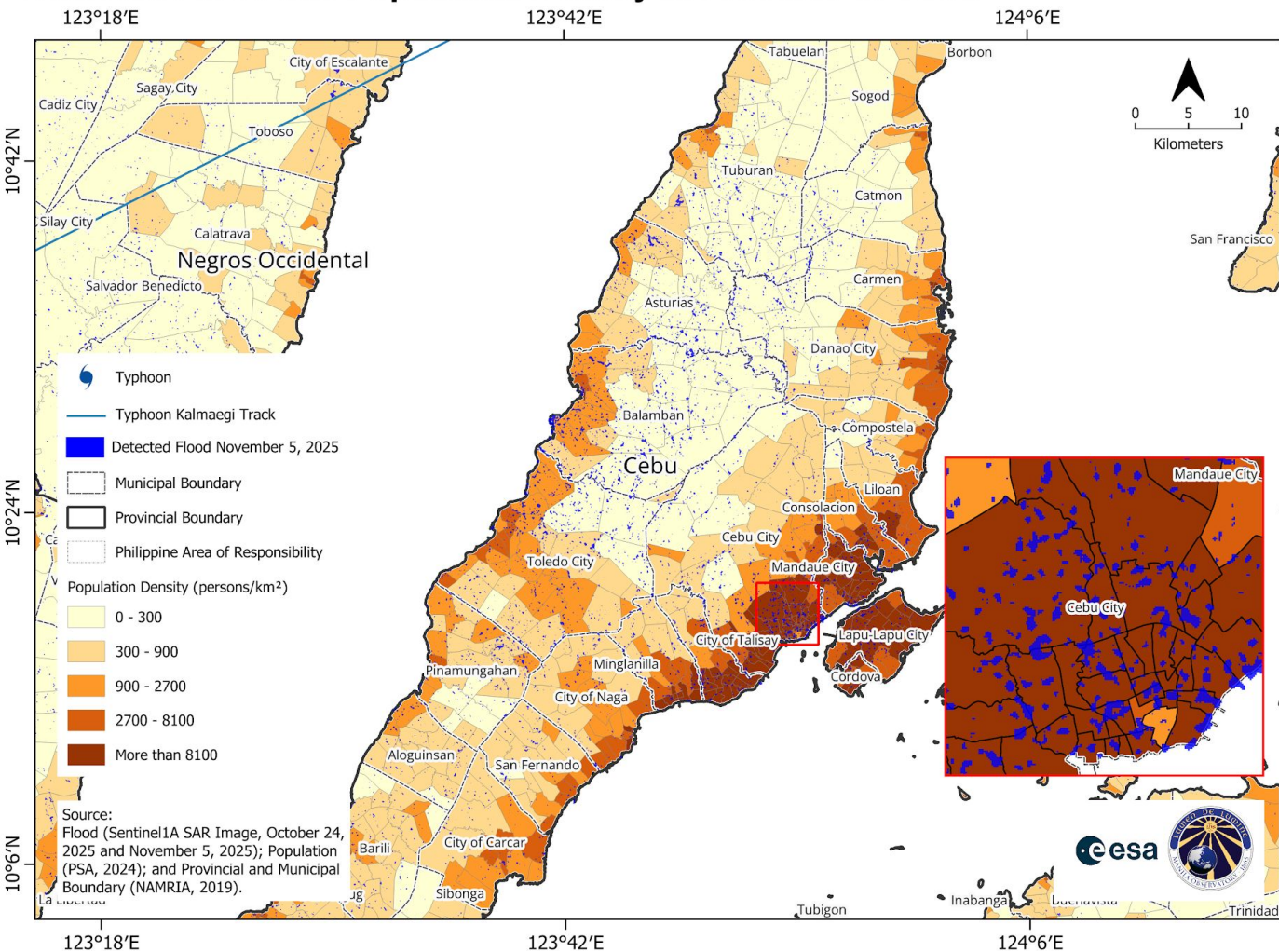


- Affected Population by City/Municipality
(More than 10,000 person)**
- Liloan
 - Cebu City
 - Pinamungahan
 - Balamban
 - Asturias
 - Consolacion
 - Mandaue City
 - Medellin
 - Toledo City
 - Badian
 - Lapu-Lapu City
 - Danao City
 - City of Talisay
 - Daanbantayan
 - Alcoy
 - San Fernando
 - Tuburan
 - Tabuelan

Includes material © Sentinel 1 SAR Image, October 24, 2025 and November 5, 2025. All rights reserved.



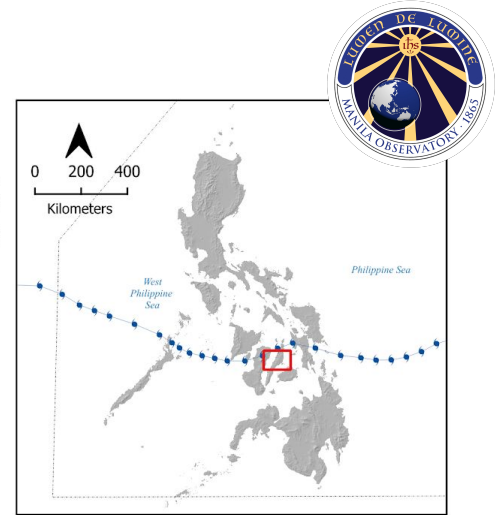
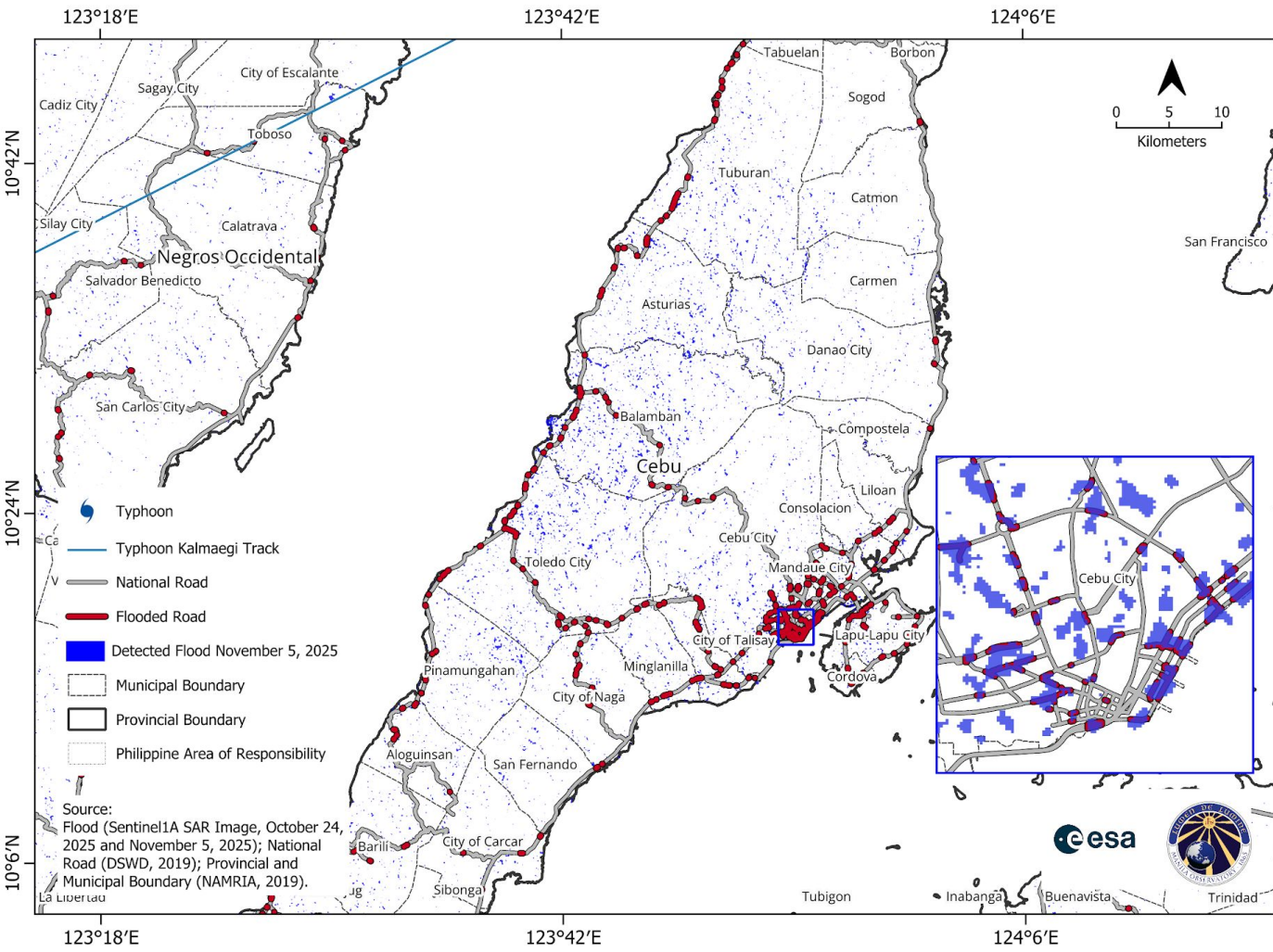
Detected Flood and Population Density in Province of Cebu



- Flooded Municipalities and Cities with Densely Populated Barangays (More than 8100 persons/km²)**
- Cebu City
 - Mandaua City
 - City of Talisay
 - Lapu-Lapu City
 - Minglanilla
 - Cordova
 - Consolacion
 - City of Naga
 - Danao City
 - City of Bogo
 - Madridejos
 - Bantayan
 - Tuburan
 - Carmen
 - Balamban
 - Dumanjug

Includes material © Sentinel 1 SAR Image, October 24, 2025 and November 5, 2025. All rights reserved.

Flooded Road in Province of Cebu

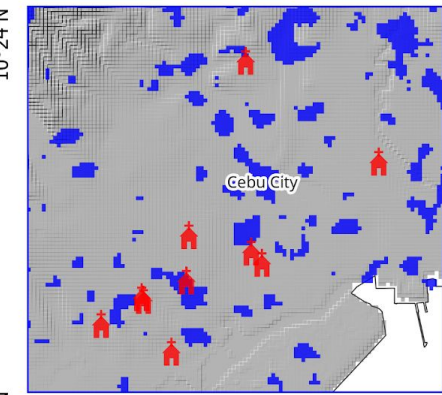
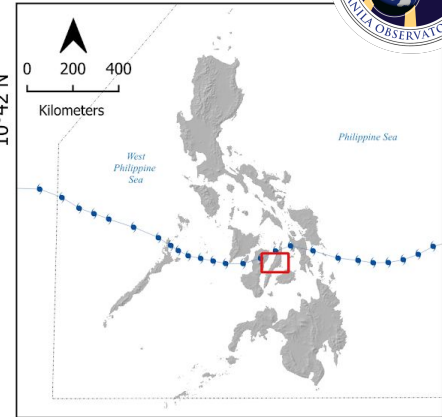
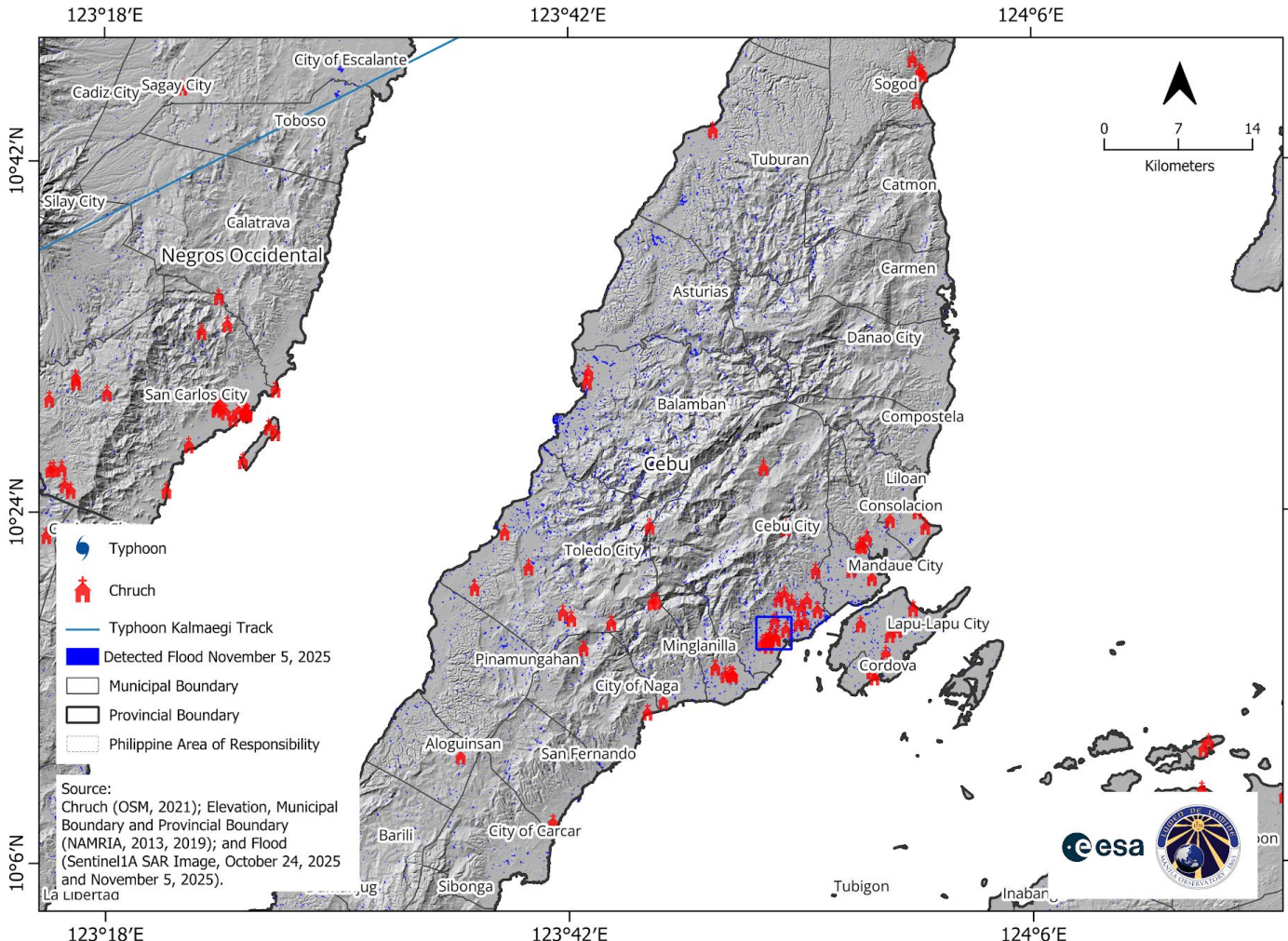


- ### Municipalities and Cities With Flooded National Road (More than 1 km)
- Cebu City
 - Toledo City
 - Balamban
 - Tuburan
 - Asturias
 - Ronda
 - Badian
 - Dumanjug
 - Malabuyoc
 - Samboan
 - Alcantara
 - Ginatilan
 - Alegria
 - Moalboal
 - City of Talisay
 - Mandaue City
 - Minglanilla
 - Lapu-Lapu City
 - City of Naga
 - San Remigio
 - City of Carcar
 - Tabuelan
 - Consolacion
 - Pinamungahan
 - Aloguinsan

Includes material © Sentinel 1 SAR Image, October 24, 2025 and November 5, 2025. All rights reserved.



Chrch (Critical Infrastructure) in Province of Cebu

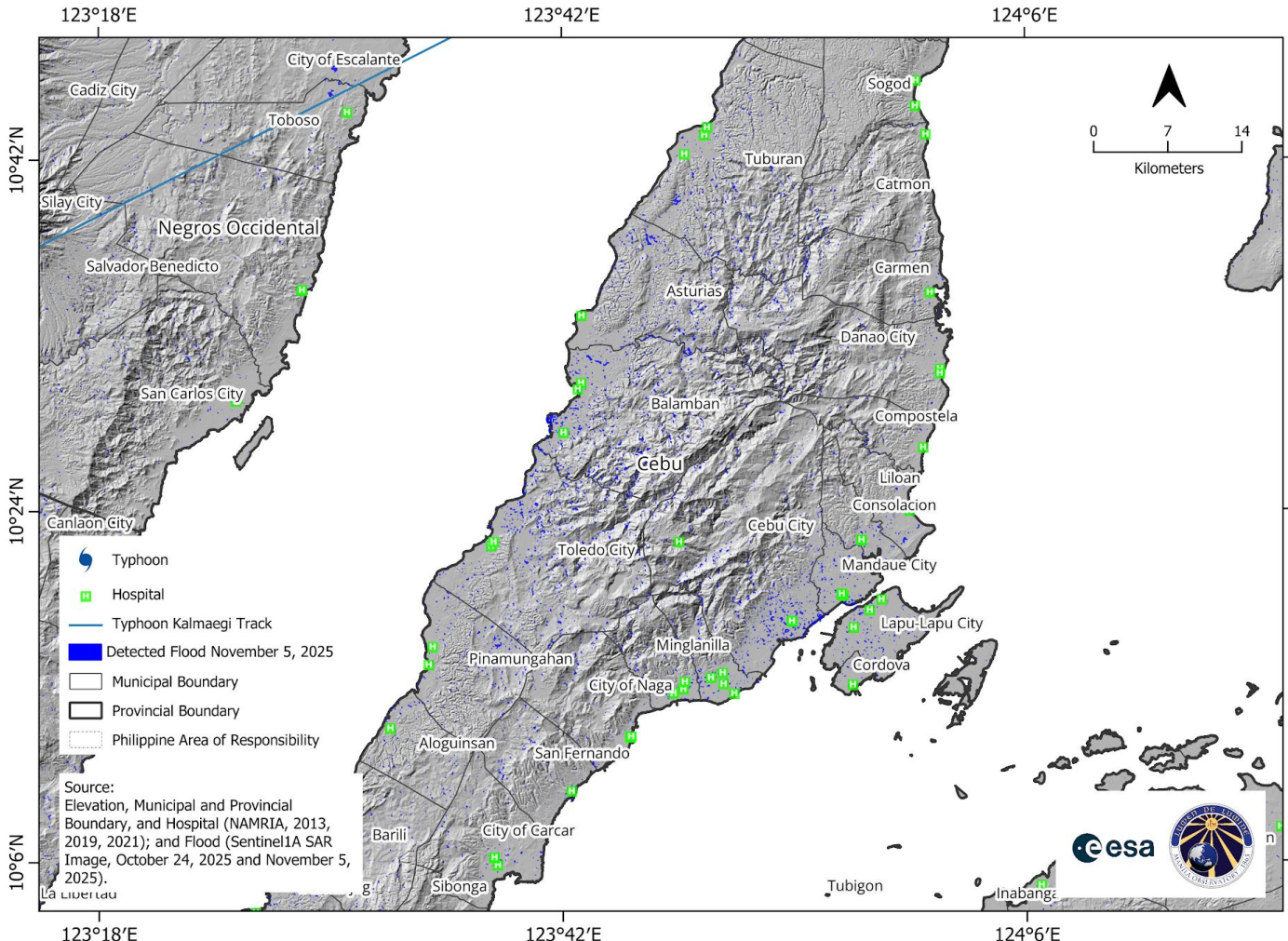


Source:
Chrch (OSM, 2021); Elevation, Municipal Boundary and Provincial Boundary (NAMRIA, 2013, 2019); and Flood (Sentinel1A SAR Image, October 24, 2025 and November 5, 2025).



Includes material © Sentinel 1 SAR Image, October 24, 2025 and November 5, 2025. All rights reserved.

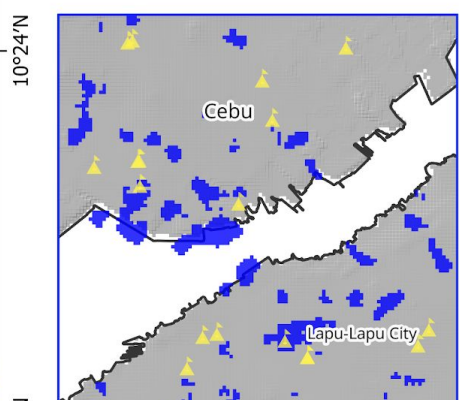
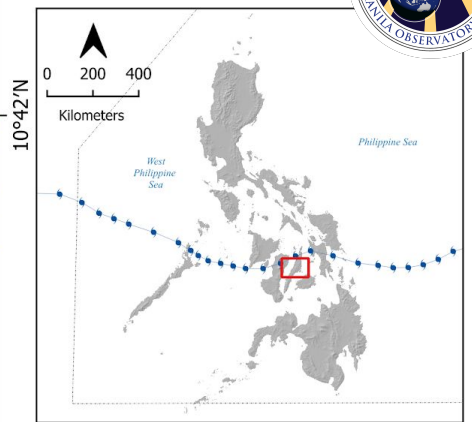
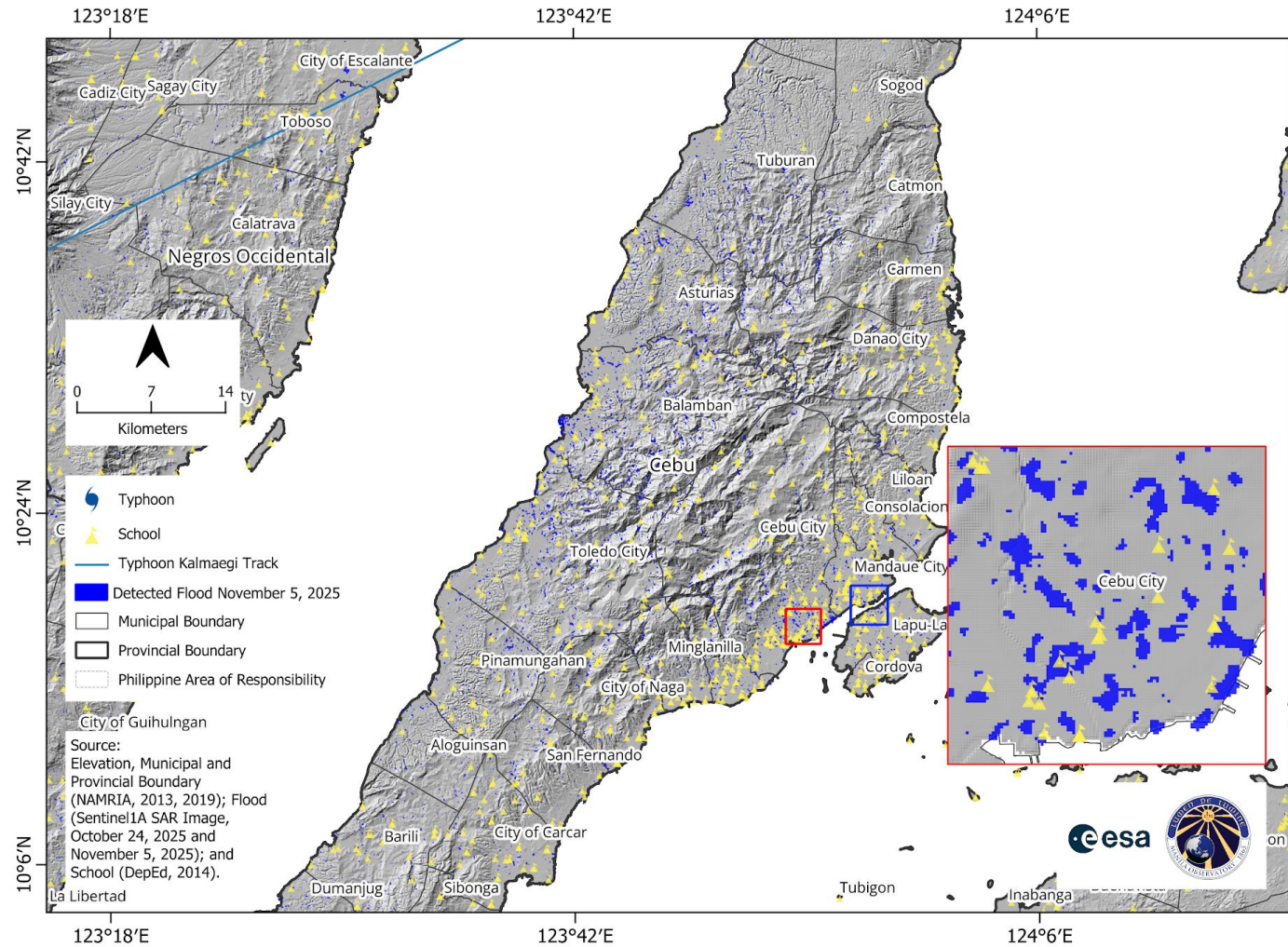
Hospital (Critical Infrastructure) in Province of Cebu



Includes material © Sentinel 1 SAR Image, October 24, 2025 and November 5, 2025. All rights reserved.



School (Critical Infrastructure) in Province of Cebu



Includes material © Sentinel 1 SAR Image, October 24, 2025 and November 5, 2025. All rights reserved.

For queries, request, comments, suggestions, please
email manila@observatory.ph