CEDIM Forensic Disaster Analysis Group

in conjunction with wettergefahren-fruehwarnung.de and CATDAT/Earthquake-report.com

Super Typhoon Haiyan / Yolanda – Report

10.11.2013 – Situation Report No. 1 – 12.00pm GMT

An official FDA (Forensic Disaster Analysis) has been called - an updated report will be released in the coming days

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Official Disaster Name	Date	Landfall UTC	Local	Duration (PHL)
Yolanda (International: Haiyan)	**From 4-11**	**7.11. 20:40**	**+8**	**30 hours**

Preferred Hazard Information:

Path	Speed	Definition	Width (km)	Gust (Peak)	Landfall	Sustained
280W (PH) then 325W (VN)	**30-40kph**	**Category 5**	**Max: 150**	**379kph**	**312kph**	**250kph**
				JTWC		JTWC

Location Information:

Country	ISO	Provinces/Regions	Most Impact	Economic Exposure	HDI (2012)	Urbanity	Pop. affected
Philippines	**PH**	**IV, V, VI, VII, VIII, X, XI, XIII**	**Leyte, Samar, Tacloban**	**Ca. $104b**	**0.654**	**55%**	**Ca. 17 million**
Vietnam, China	**VN**	**North of Da Nang**	**Coastal regions**	**Waiting**	**0.617**	**Wait**	**600,000 evac.**

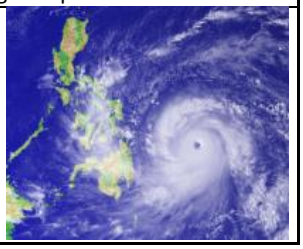
**predicted path at this point – China will also be affected.*

Preferred Hazard Information:

Philippines	Vietnam	China	**Key Hazard Metrics**
Typhoon (Cat. 5)	Category 4	Unk.	Leyte, Dinagat, Samar, Aklan, Capiz, Guimares, Cebu, with wind speeds exceeding 185kph

Hazard Description (Wind speed etc.)

The category 5 typhoon made landfall near Guiuan on Eastern Samar at 07.11 at 20:40 UTC and hit with the strongest landfall wind speeds ever observed. Previously, the typhoon had hit the small nation of Palau causing some damage. Wind gust speeds reached a predicted 380kph shortly before impact.The warm sea water and low wind shear has contributed to the maximum intensity of this typhoon before landfall. The central pressure was estimated 885 hPa (according Joint Typhoon Warning Center), which makes it only the 5th in 25 years in the Western Pacific to do so (Megi 2010, Flo 1990, Ruth 1991, Yuri 1991). The wind speeds have dropped significantly to around 150kph approaching Vietnam and Southern China (Hainan).



Additional hazard information on Haiyan/Yolanda: http://www.wettergefahren-fruehwarnung.de/Artikel/20131108info.pdf

Vulnerability and Exposure Metrics (Population, Infrastructure, Economic)

The capital stock of the affected locations is around $104b with the GDP being around $31b with approximately 17 million inhabitants. Leyte was the first hit with destructive force (1.5 million inhabitants) with Tacloban City worst affected (220,000 inhabitants). Most houses will not withstand winds of over 200kph, thus destruction in the eye of the typhoon will be close to 70-80% as confirmed by police officials in the affected regions.

What have been the 2 largest comparable damaging events in the past?

Date - Name	Impact Size (1 min sustained)	Location	Social % or Insured %	Economic Loss in Philippines
2012 Bopha	Typhoon (280kph)	Southern PH	1146 deaths, 834 missing	$1.04b USD (42b PHP)
1990 Mike	Typhoon (280kph)	Central PH	748 dead	$879m USD (2013 adj.)

Mike was close to the path of this storm in 1990 – destroyed 117,000 homes and damaged 295,000 others

Preferred Building Damage Information: *(Damage states will be filled in later when more info available)*

Leyte: The destruction has been canvassed at 70-80% of homes destroyed. All communication systems affected. Tacloban City. Aklan: 9248 destroyed, 18387 partially destroyed (10/17 counted) Samar: 15% destroyed, with worst locations like Guiuan in Eastern Samar unknown at this point. 10390 schools destroyed according to ministry of education in the affected region.

*total destruction will not be known for weeks. Over 3.5 million houses exposed

UN Rapid Response (Tacloban City)

Secondary Effect Information:

Type	Impact	Damage %	Social %	Economic %
Storm Surge	Wave heights of 5-6m were seen	Major	Unk.	Unk.
Flooding	River flooding and flash flooding	Major	Unk.	Unk.
Landslides	Due to rain, many are expected	Minor	Unk.	Unk.

Disaggregation will occur during the course of the FDA

Preferred Social Impact Information:

Type	Median	Accepted Range	Description	Source
Deaths	**12300***	Official: 151 but many more	Leyte:10000 (Tacloban:1000), Samar: 300 and 2000 missing, Palawan: 6, VI: 8	Officials from Police agencies
	***NB: 6000 people are currently missing on Person Finder (Google)*			
Injuries	23	Will increase	Uncounted	NDRRMC
Long term Homeless	**2,100,000**	**estimated**	Based on housing destruction	Daniell, CATDAT
Short term homeless	**6,000,000**	**estimated**	Based on locations without power and damaged houses	Daniell, CATDAT
Affected	**17,000,000**	4.2m	**IV, V, VI, VII, VIII, X, XI, XIII**	Estimates, NDRRMC

Preferred Current Economic Impact Information: $million int. event-day dollars

Type	Median	Accepted Range	Description	Source
Total Cost	$13.3b	$8b-19b	Total estimate (using rapid loss model combined with damage for range)	CATDAT/James Daniell
Insured Losses	$2b	Up to $2b	According to Bloomberg Analyst citing	Kinetic Analysis Corp.
Aid Impact	Unknown			

Direct Economic Cost (Total) - Summary

- Given the capital stock of the disaster path and the destruction seen in locations of Leyte – a quick estimate can be made. Using the 70-80% destroyed rate for Tacloban and other locations, the MDR (mean damage ratio) comes to around 30% for Leyte. In other locations like Aklan, and MDR of 15% is likely based on the initial estimates of house destruction. MDRs of 15% in Samar. In less affected regions, MDRs of 1-5% are likely.
- Reconstruction costs in the order of $4.02b (174b PHP) from the 3 provinces, and around $9b total cost for all affected regions from the first estimate (CATDAT-James Daniell)
- Plantations and crop losses (sugar cane and rice) will be huge, and industry losses of the affected region will probably be at least 40% of GDP – thus around $2b from the 3 provinces and around $4.3b from other locations.
- This is in the order of 14 times larger than Typhoon Bopha.

Links

www.wettergefahren-fruehwarnung.de
(Updated storm track)
http://www.micromappers.com/
(Twitter crowdsourcing)
http://google.org/personfinder/2013-yolanda
(Google Person Finder for Yolanda)
http://www.ndrrmc.gov.ph/
(official updates from NDRRMC)
www.earthquake-report.com
(CATDAT data and statistics)
http://www.ssd.noaa.gov
(track and intensity data)
http://www.digital-typhoon.org
(Storm info and satellite images)

Insured Loss Estimates:

Public infrastructure damage has occurred, as well as total destruction of many industries. Sugar cane and rice production losses will be nearly total through this region – accounting for 50% and 33% respectively of the Philippines. Bloomberg currently estimates around 14% insurance losses as a percentage of total.

Abridged Summary Description:

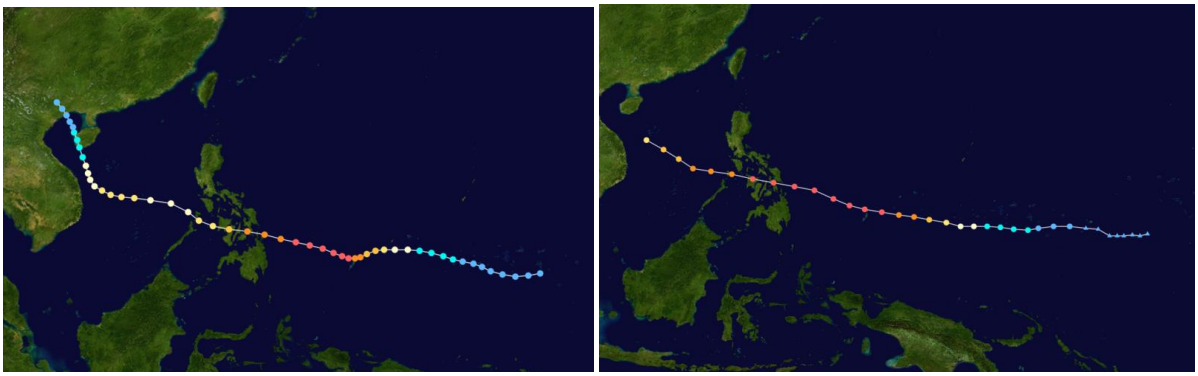
A catastrophic typhoon has hit Philippines, Palau, and will continue on to Vietnam and China. Over 12300 are presumed dead in Philippines adding together estimates from police forces. The economic cost will be the largest ever in terms of Philippines typhoon losses with around $13.3b USD or 574.3 billion PHP expected losses (which would be 13 times larger than historic typhoon losses).

CATDAT Economic Storm Rank	10: Catastrophic	**CATDAT Social Storm Rank:**	10: Catastrophic

This report was produced in conjunction with the CATDAT database, earthquake-report.com, wettergefahren-fruehwarnung.de, NDRRMC and JTWC data. As shown below is full size documentation of the diagrams shown in the summary above. The data is current as of 10th November 2013 6:00am European Standard Time.

Maps of the affected region signalling some of the destruction and photos of affected infrastructure.

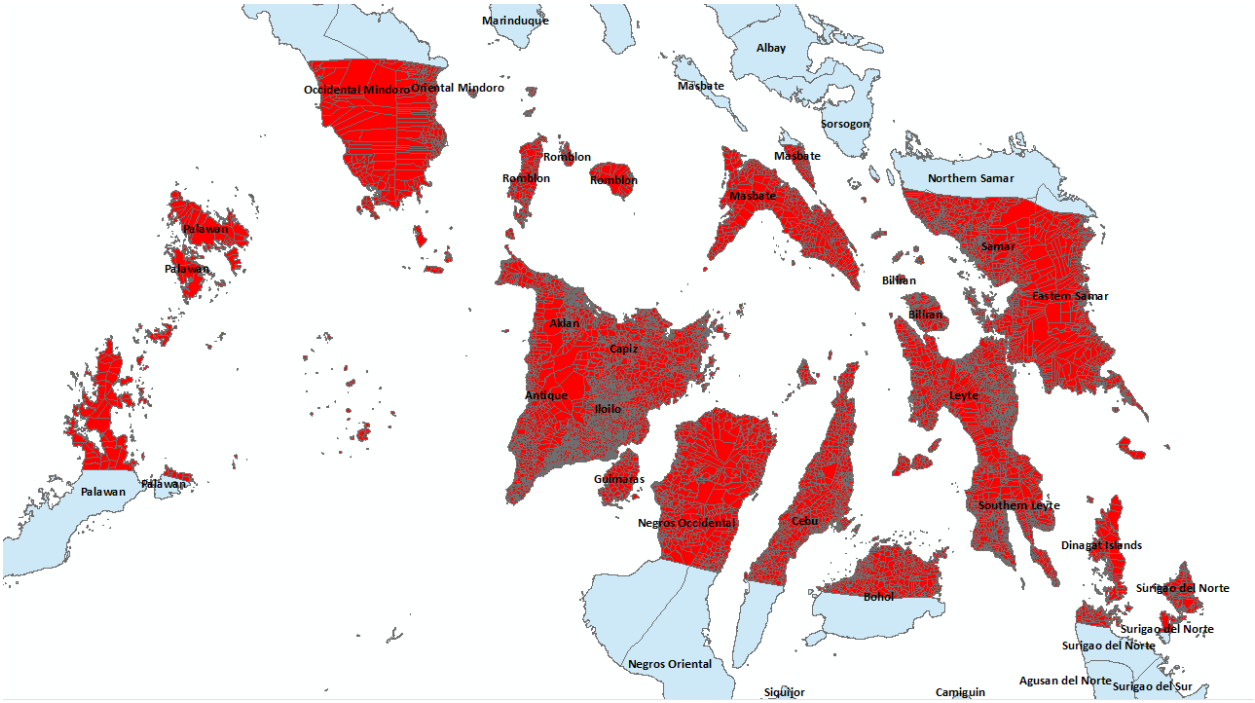
Source: JTWC imported into Google Earth – Path of Haiyan/Yolanda and forecasted track (as from 10 November 2013, 06 UTC)



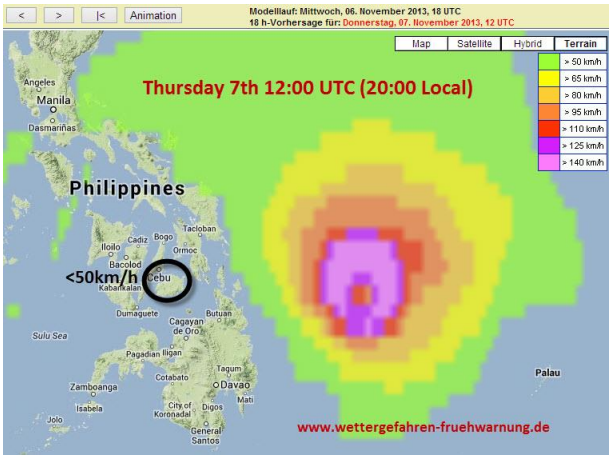
Source: 1990 Typhoon Mike (Left) vs. 2013 Typhoon Yolanda/Haiyan (Right)

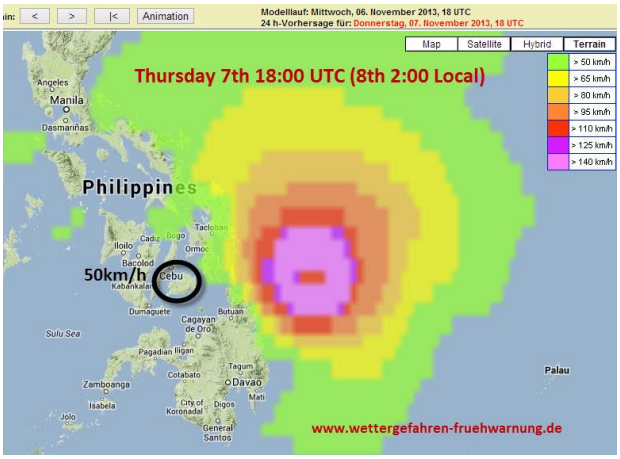
Source: Destruction as seen from above Tacloban City (estimated 70%-80% destruction rate) – UN Rapid Response Team

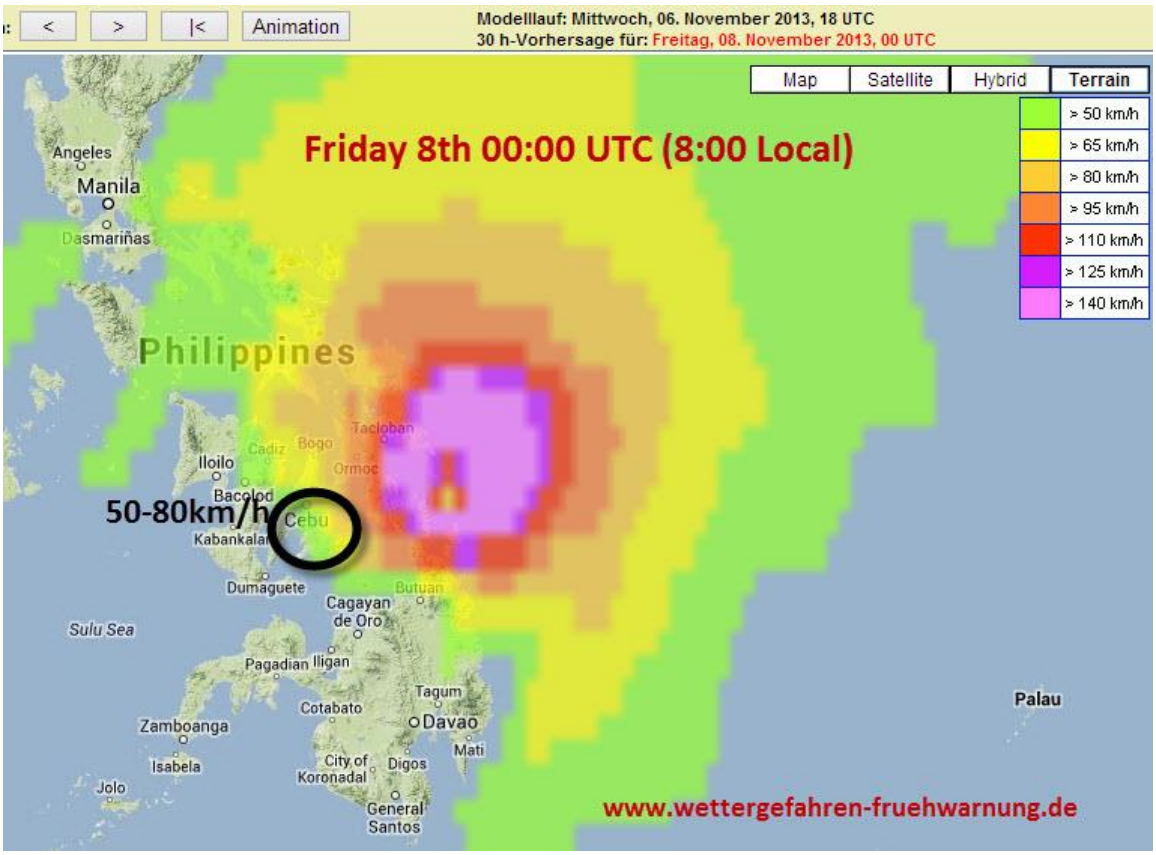
Affected locations

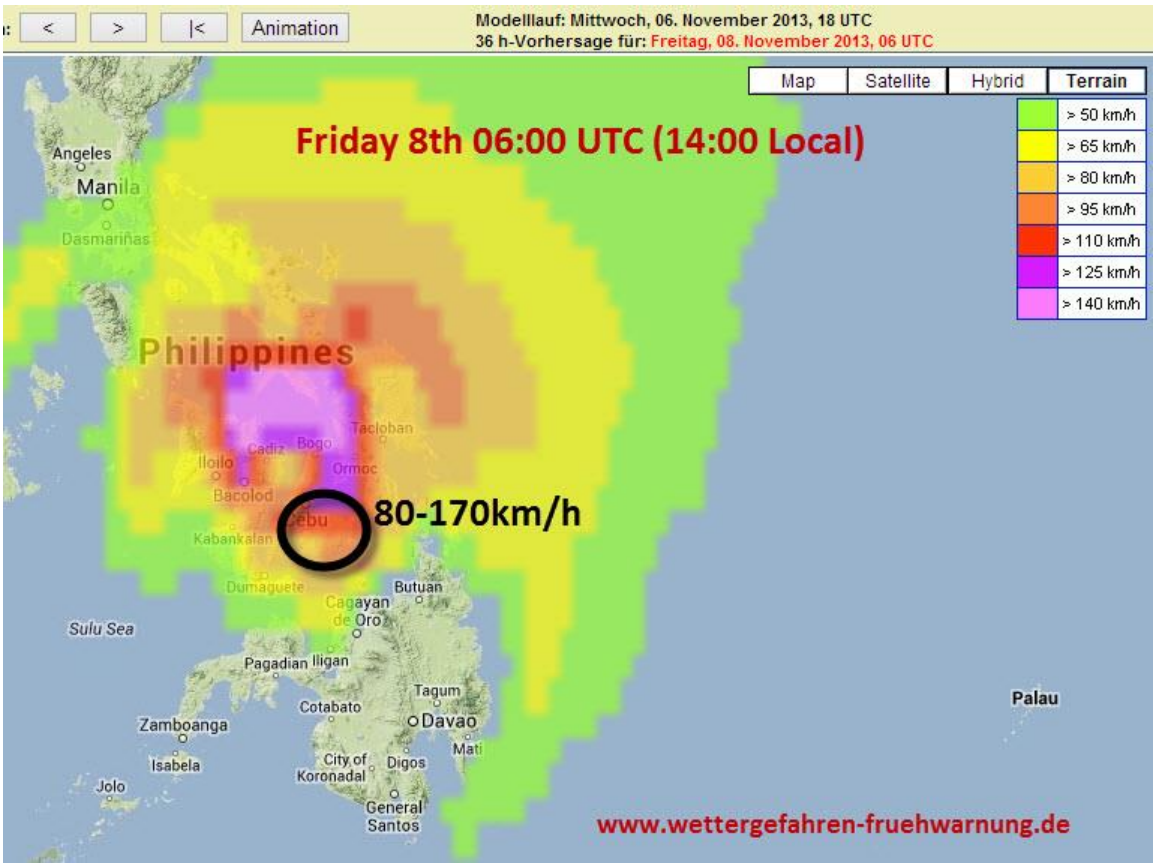


Timeline of event: (circled is Bohol – location of the recent earthquake as a reference)
Colours indicate average wind speed (GFS forecasts)





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Modelllauf: Mittwoch, 06. November 2013, 18 UTC
36 h-Vorhersage für: Freitag, 08. November 2013, 06 UTC
Map Satellite Hybrid Terrain
> 50 km/h
> 65 km/h
> 80 km/h
> 95 km/h
> 110 km/h
> 125 km/h
> 140 km/h
Friday 8th 06:00 UTC (14:00 Local)
Angeles
Manila
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Cebu
80-170km/h
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Dumaguete
Butuan
Cagayan de Oro
Sulu Sea
Pagadian
Iligan
Tagum
Cotabato
Davao
Zamboanga
Mati
Isabela
City of Koronadal
Digos
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General Santos
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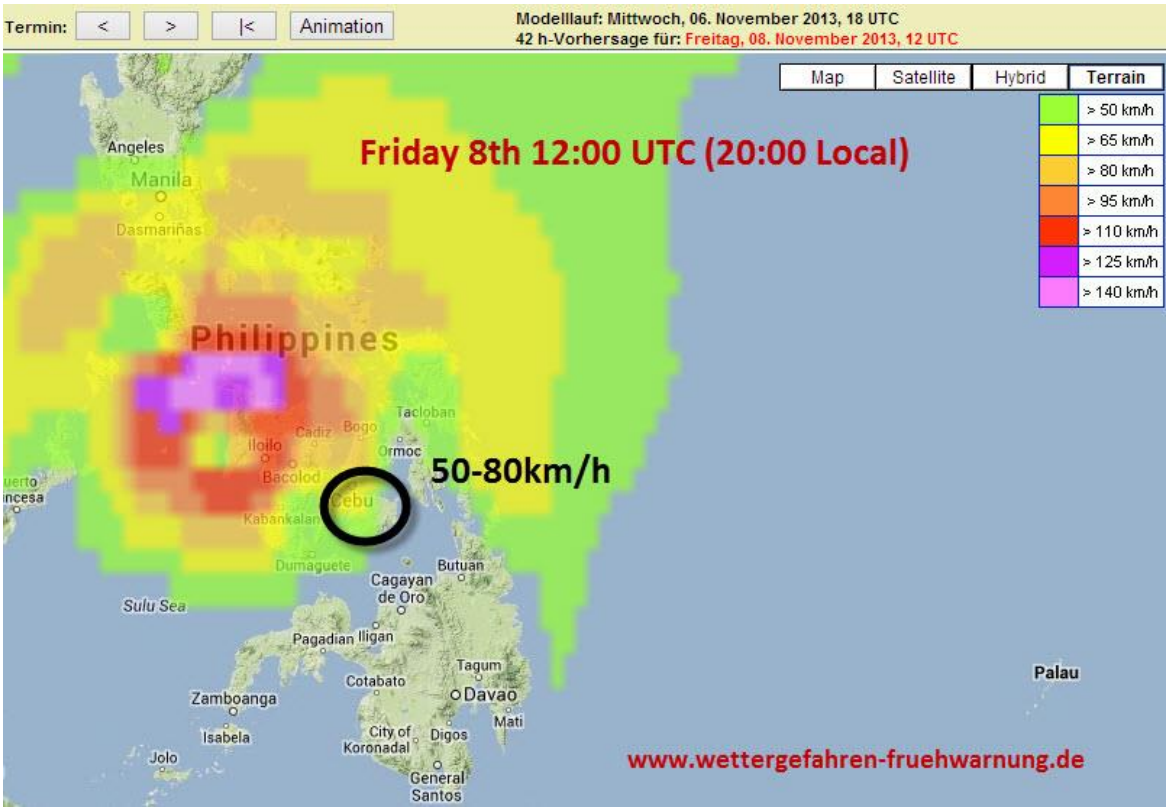
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Modelllauf: Mittwoch, 06. November 2013, 18 UTC
42 h-Vorhersage für: Freitag, 08. November 2013, 12 UTC
Map Satellite Hybrid Terrain
> 50 km/h
> 65 km/h
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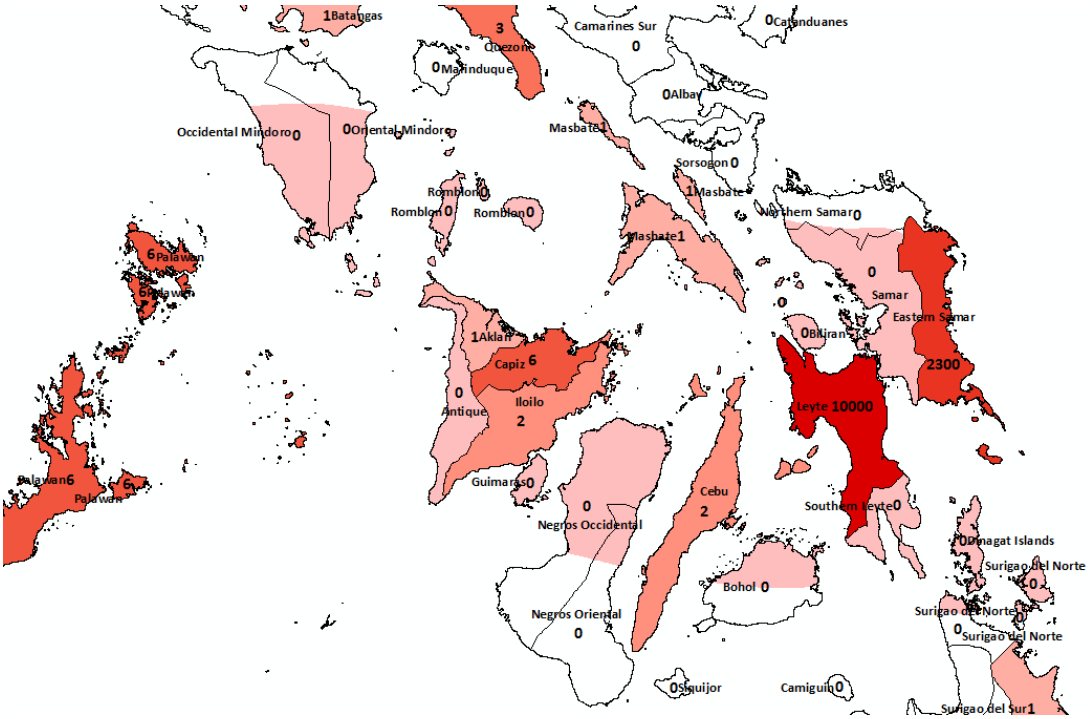
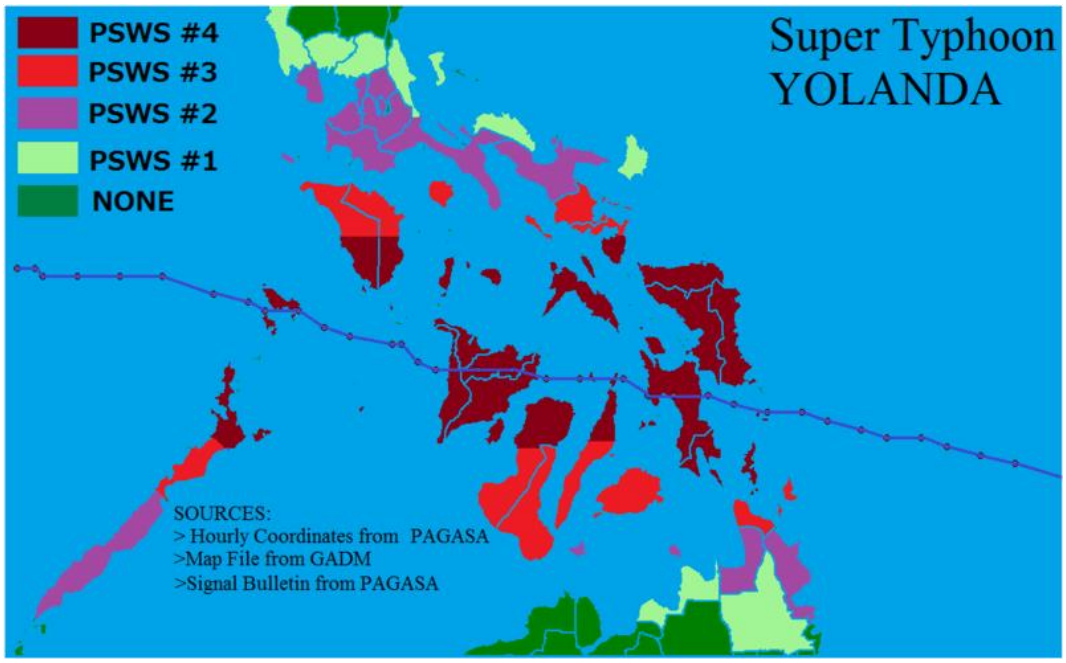
Current fatality estimates from regional sources (NDRRMC should be used for official values – currently 151 dead and 5 missing).



12300 currently presumed missing or dead via police officials combined with NDRRMC data.

Public Storm Warning Signals via PAGASA for the Typhoon Yolanda.



PSWS #1: Winds of 30-60 kph may be expected in at least 36 hours
PSWS #2: Winds of greater than 60 kph and up to 100 kph may be expected in at least 24 hours
PSWS #3: Winds of greater than 100 kph up to 185 kph may be expected in at least 18 hours.
PSWS #4: Very strong winds of more than 185 kph may be expected in at least 12 hours.