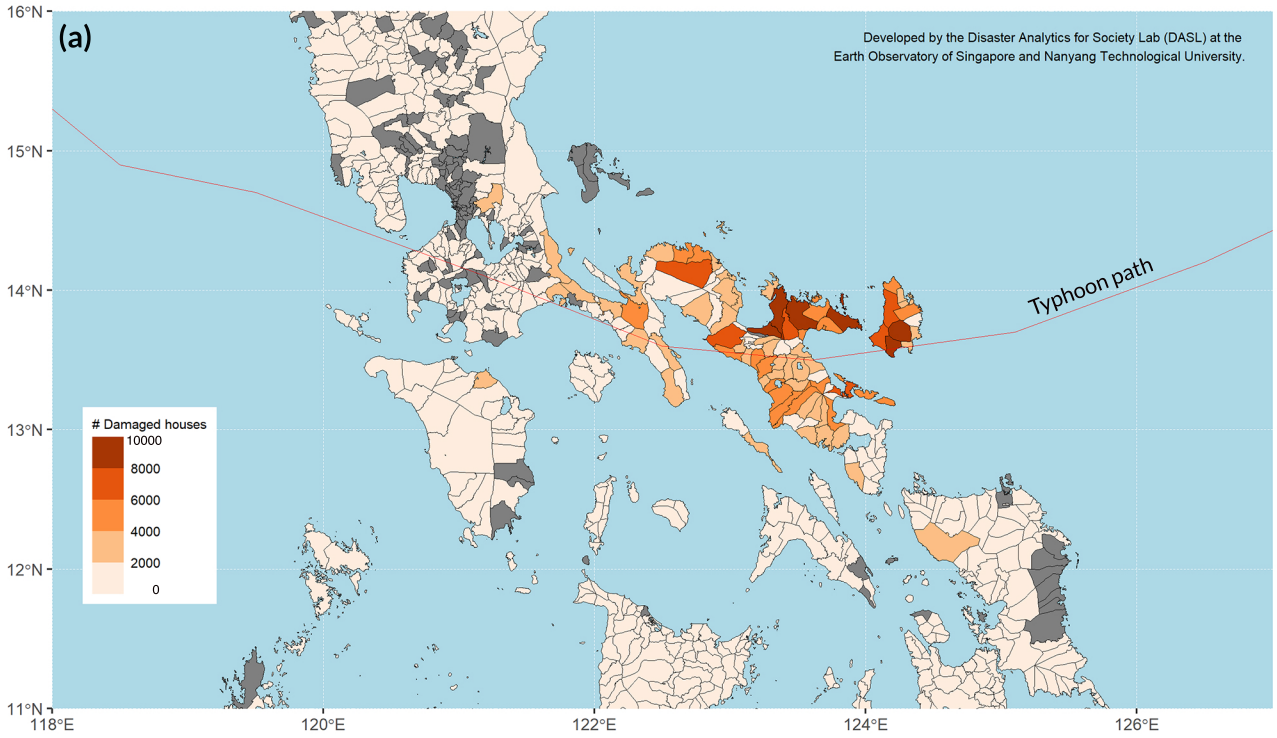

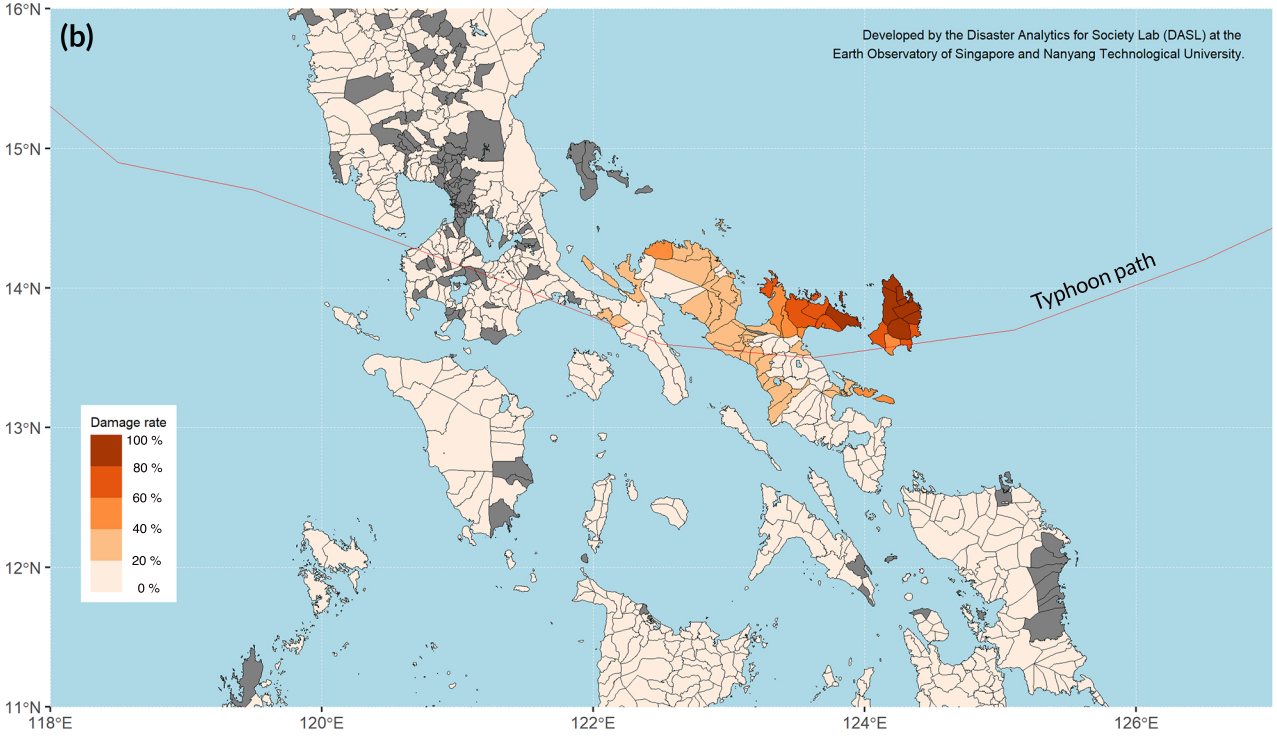

Damage Prediction Model: Philippines, Typhoon Goni, v1.0

Overview:

This preliminary map shows municipality-level estimates of the (a) number of damaged houses and (b) proportion of damage (equal to the number of damaged houses divided by total number of houses) in the Philippines due to Typhoon Goni which made landfall on UTC 31 Oct 2020. Damaged houses include partly and completely damaged houses.

Municipalities with damage estimates are colour-filled from white to red, with red having the maximum damage estimate. Municipalities coloured in gray have no damage estimates due to the lack of data.

This model is a data-driven damage prediction model based on characteristics of the typhoon (e.g. wind speed, distance to first impact) and vulnerability characteristics of municipalities (e.g. building quality, experience with past typhoons, etc.). It has been calibrated with data from 12 past typhoons in the Philippines using multivariate logit regression.

Top 10 municipalities in terms of estimated number of damaged buildings:

1. Tinambac	10000	6. Calabanga	8200	**Point estimates rounded*
2. Caramoan	10000	7. Libmanan	7300	*to the nearest 100.*
3. Virac (Capital)	10000	8. San Andres (Calolbon)	7100	
4. Lagonoy	8700	9. Goa	6600	
5. San Miguel	8300	10. Caramoran	6600	

Model limitations:

It is not an observational estimate and has not been validated against damage observations from Typhoon Goni, and is purely predictive based on data on the typhoon and the municipalities affected. Based on the limited data available for the statistical model, the damage model cannot predict damage from landslides, lahars or coastal surge. While the predicted values should be taken with caution due to the large expected uncertainty in different sources (e.g. wind speed estimation, data-scarcity in some regions, etc.), they can be interpreted as average order-of-magnitude estimates with the best available **data** openly available at the moment. Although an objective model selection criteria was used, the model and hence predictions have also been guided by the modeller's (i.e. DASL) best interpretation of the damaging process and the exploratory data analysis of the available dataset. For that reason, the dataset and the model are made available for the user to test alternative criteria.

Full disclaimer and limitations can be found at the following GitHub repository:
https://github.com/ntu-dasl-sg/storm-goni
The entire modeling process is up on DASL's website:
https://disaster-analytics.com/wp-content/uploads/2020/11/PHDamageModel.html
The code is made available for further re-use, but we ask that you contact us if you intend to do so.

Data sources:

The model is based on data from 12 past typhoons obtained from the Netherlands Red Cross and wind data from the NOAA/NCEP Global Forecast System (GFS) Atmospheric Model. The municipality level data adopted from Netherlands Red Cross includes the following:

[1] Number of damaged houses from past typhoons: Department of Social Welfare and Development (DSWD) and the National Disaster Risk Reduction and Management Council (NDRRMC)
[2] Population: Philippine Statistics Authority; received from UN OCHA (HDX)
[3] Administrative boundaries: Philippines Government; Published by GADM and UN OCHA (HDX)
[4] Poverty: Pantawid Pamilyang Pilipino Program
[5] Geographical features (slope, elevation. ruggedness): Netherlands Red Cross
[6] Building quality (roof and wall materials): Netherlands Red Cross.
[7] Proportion of skilled agriculture/forestry/fishermen: Netherlands Red Cross.

Developed by the Disaster Analytics for Society Lab (DASL) at the
Earth Observatory of Singapore and Nanyang Technological University.
More about DASL at https://disaster-analytics.com.