



Philippine Space Agency

Space Data Usage and Applications for Disaster Risk Reduction and Management (DRRM) in the Philippines

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Space Information Infrastructure Bureau (SIIB)

The Philippine Space Agency

Building an integrated and sustainable national space program



08 August 2019

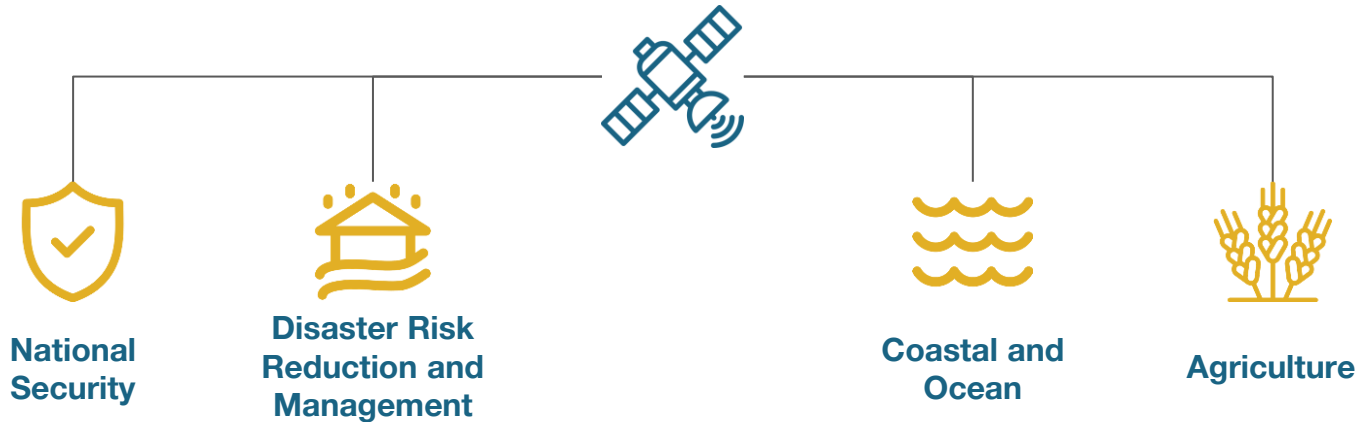
Signed by the President

03 September 2019

Effectivity of Philippine Space Act
R.A. 11363

Data Analytics Technologies and Operations Systems for Space Data (DATOS)

The PhilSA aims to further the development and application of remote sensing, artificial intelligence (AI), machine learning (ML), data science and other methodologies in producing space-enabled information to support the operations of various government agencies.



Enabling Timely Disaster Response

Rapid disaster response in Naga, Cebu
landslide (21 September 2018)

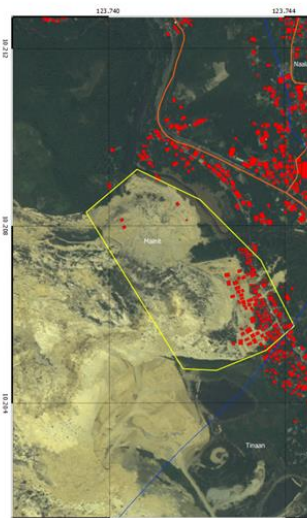
The images show the areas before and after the landslide event in Naga, Cebu. The map layout was immediately sent a team on the ground. The ability to generate this [map] information in a timely manner was crucial.

It enabled rescuers to prioritize areas for search and rescue.

NAGA CEBU LANDSLIDE - SEPT 21, 2018
NAGA, CEBU

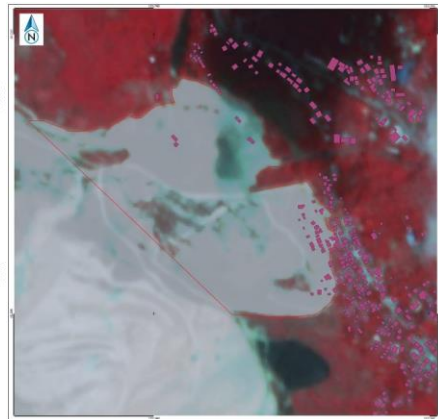


ESRI BASEMAP
PRE-LANDSLIDE



KOMPSAT 3 - SEPT 21, 2018
POST-LANDSLIDE

Satellite: KOMPSAT-3
Accessed via: DOST-ASTI PEDRO
Center
Capture date: September 21, 2018
Payload: Optical
Resolution: 0.5 m
Basemap: ESRI (Pre-landslide)

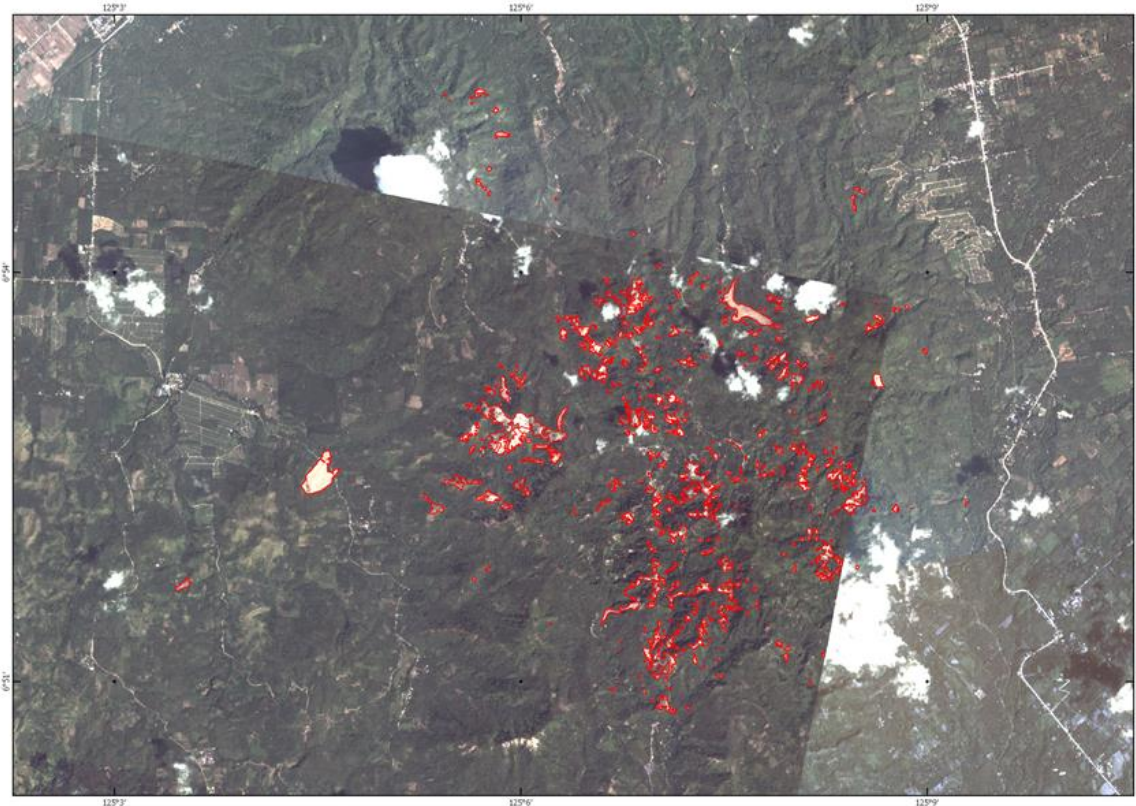


Assessing Earthquake Damage

Rapid detection and mapping of earthquake-induced landslides in Makilala, Cotabato

The image shows the areas potentially affected by earthquake-induced landslides in Makilala, Cotabato. Artificial Intelligence (AI) models were used to predict the bare soil and vegetation cover from PlanetScope satellite images.

Areas with changes from vegetation to bare soil are interpreted as the potential landslide areas. **The hazard event was triggered by multiple quakes that hit large parts of Mindanao in 29-31 October 2019.**



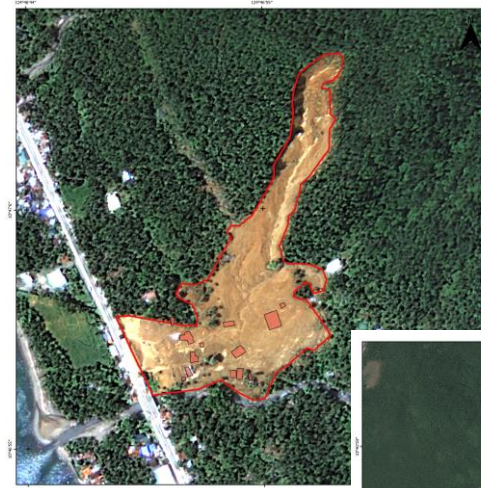
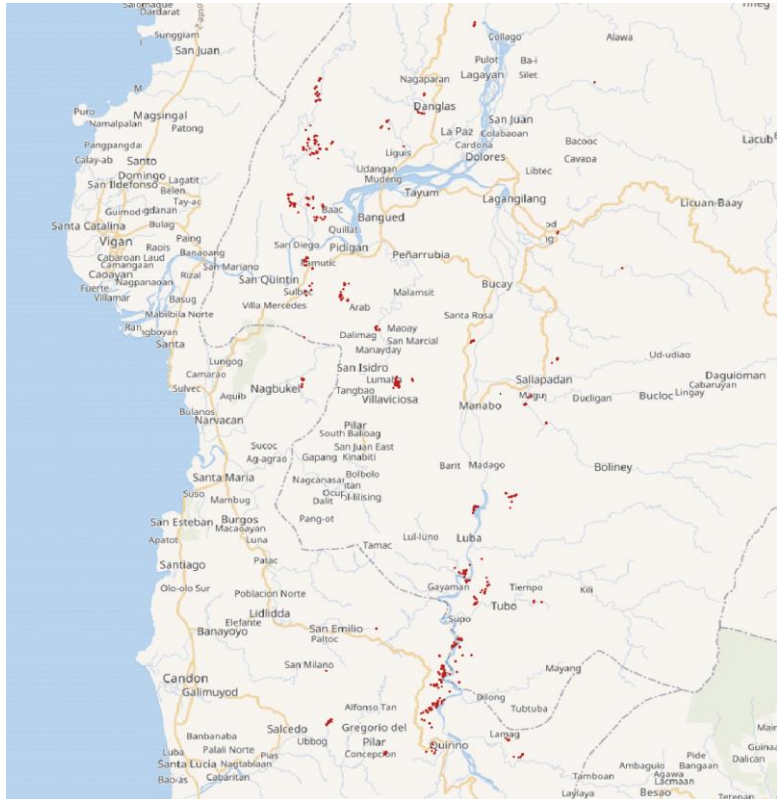
This image was shared with Philippine Institute of Volcanology and Seismology (PHIVOLCS) and the Cotabato LGU.



Landslide areas

Satellite: PlanetScope
Accessed via: DOST-ASTI PEDRO Center
Capture date: November 8, 2019
Resolution: 3m

Assessing Landslide Damage



Assessing Landslide Damage

Itogon Benguet

Dataset:

Planet (Dove Constellation)

Processing Time

~ 2 minutes

Released to:

- Office of Civil Defense
- DOST Regional Offices
- Social Media
- Others



*Natural Color of Planet Image (RGB:
321)
As of June 4, 2018*

Assessing Landslide Damage

Itogon Benguet

Dataset:

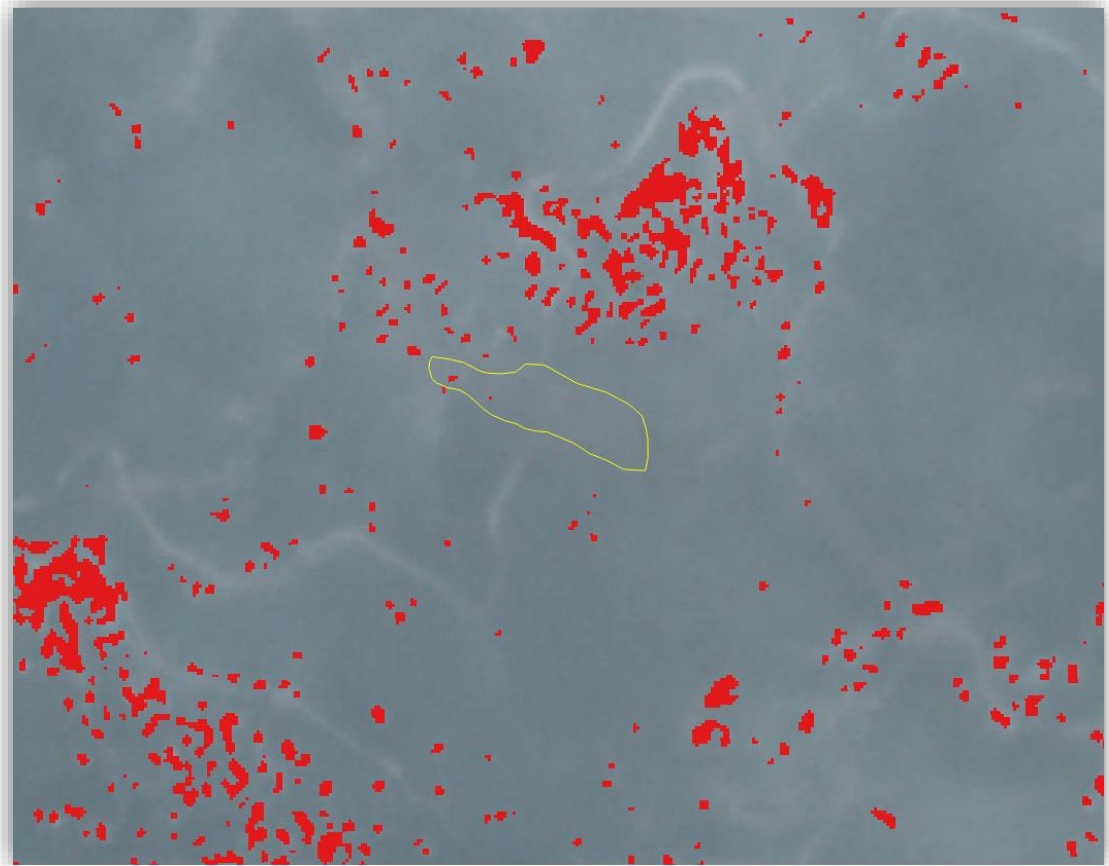
Planet (Dove Constellation)

Processing Time

~ 2 minutes

Released to:

- Office of Civil Defense
- DOST Regional Offices
- Social Media
- Others



*Natural Color of Planet Image (RGB: 321)
Red areas are Artificial Intelligence (AI)-predicted built-up areas.
Red areas are inside the landslide areas
September 18, 2018*

Detecting Damages

Tagging Typhoon-damaged Buildings using Disaster Charter Imagery

Damage tagging using satellite imagery is important in assessing the damages caused by disasters. In this example, damaged buildings caused by Super Typhoon Rai (Odette) in Carcar City, Cebu were tagged through. This shows the expanse and devastation the Super Typhoon left in its wake.

The red dots shows buildings with evident damages as seen from the optical image, as orange dots represents buildings with uncertain damages which needs to be confirmed on the ground.

1

Optical Image

Satellite: Pleiades-1

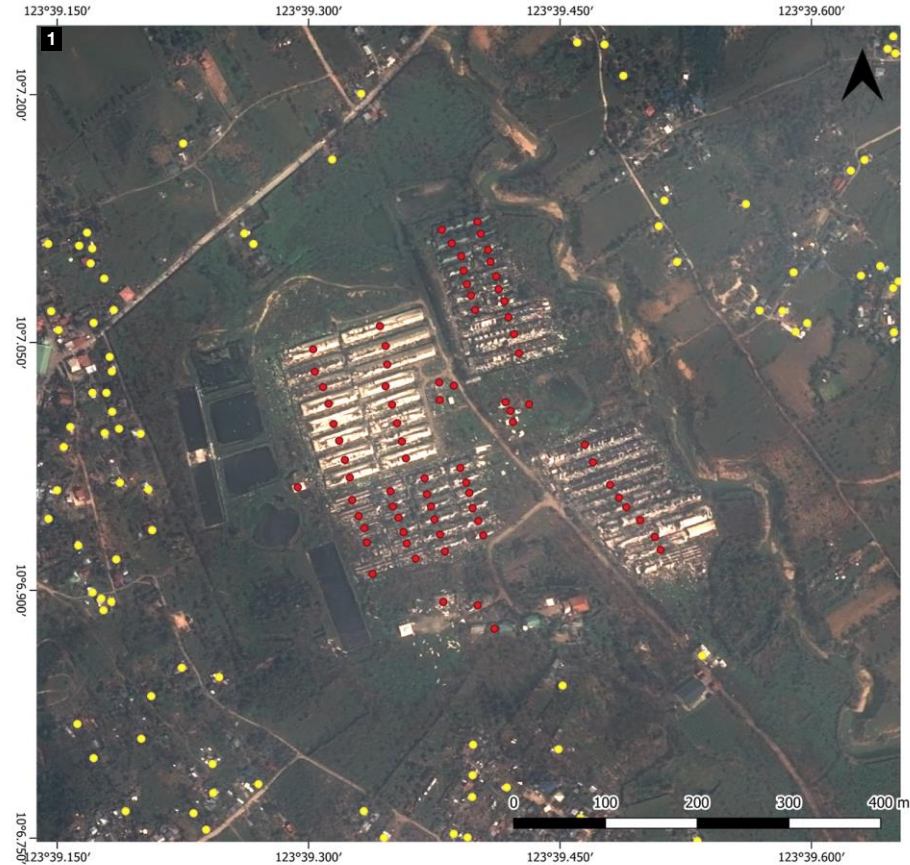
Accessed via: Disaster Charter

Capture date: 22 December 2021

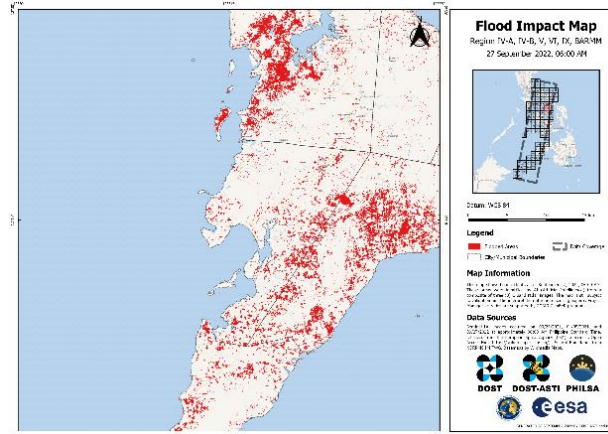
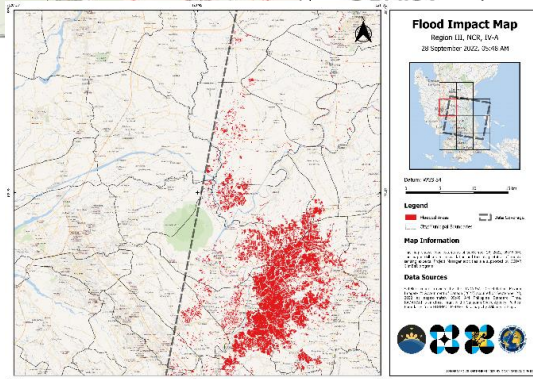
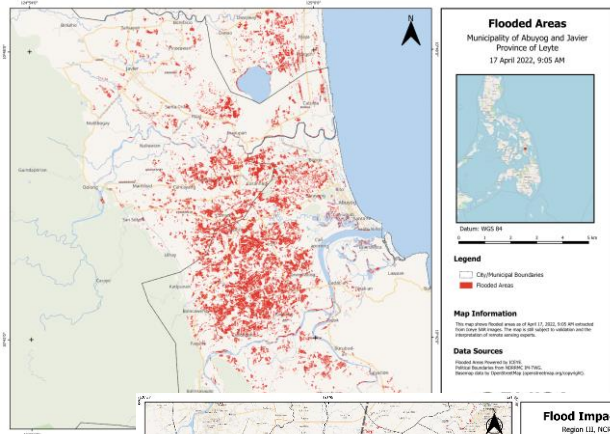
Resolution: 0.5m

Legend:

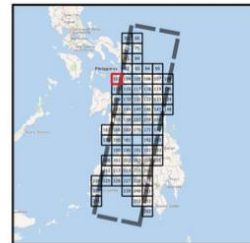
- Damaged Buildings
- Potentially Damaged Buildings



Assessing Flood Impacts



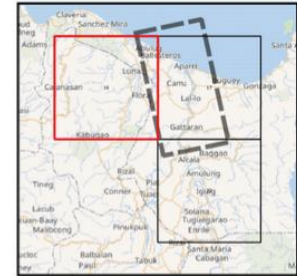
Flood Impact Map
Region V, VII, VIII, IX, X, XII, BARM
28 October 2022, 06:00 AM



Flood Impact Map

Province of Cagayan

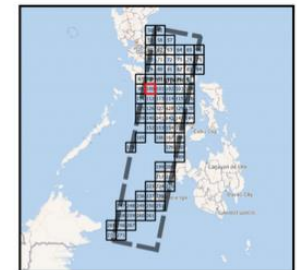
01 November 2022, 01:49 AM



Flood Impact Map

Region IV-A, IV-B, V, VI, IX, BARM

02 November 2022, 06:00 AM

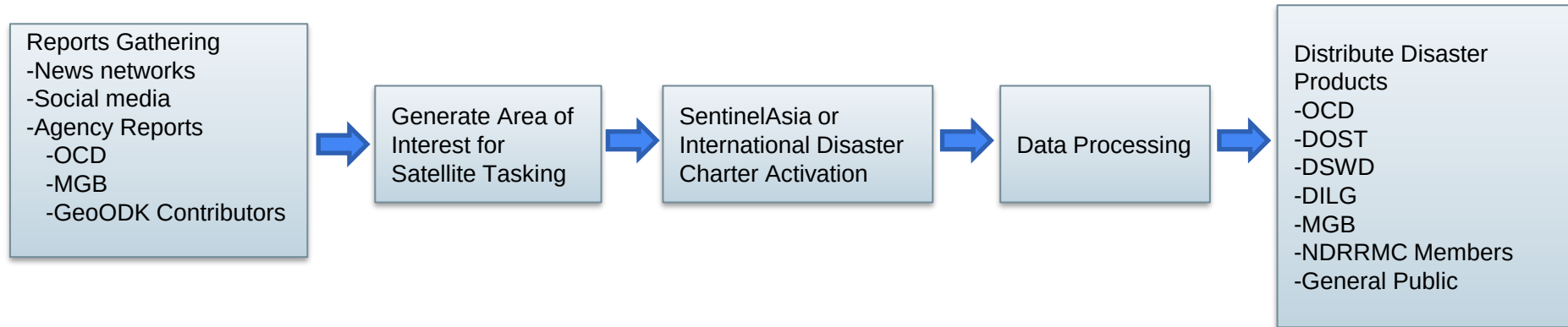


Common Satellite Data Sources in the Philippines



Different satellite data and products are **being mobilized and shared to different stakeholders** for several environmental applications, i.e. utilization of images for disaster response and risk assessment

Disaster Information Flow



Disaster Incidence ODK



Disaster Incidence

Event Name
(Typhoon name, Disaster location, etc.)

Disaster Incidence

*** Type of Incident**
Select the incident classification of the event.

☐ Flood

☐ Landslide

☐ Earthquake

☐ Damages

☐ Others

Disaster Incidence

Remarks
Additional information about the incident.

Disaster Incidence

*** Location**
Click start GeoPoint and wait for your device to detect your gps location.

Start GeoPoint

Add "Add a photo."?

Do not add Add

Disaster Incidence

Add a photo. > 1

*** Photo**
Take a picture of the incident.

Take Picture

Choose Image

You are at the end of Disaster Incidence.

Name this form
Disaster Incidence

☒ Mark form as finalized

Save Form and Exit

Date	Time	Location	Description	Lat	Long	News Link	screenshot	Damage Type	COMMENTS
25/09/2022	2:00PM	Pulillo Islands	Extreme winds and heavy rains in Pulillo Islands (Signal No. 5)	14.756095	121.942134	https://twitter.com/Cafos_Ronson/status/1517290111801141248 https://twitter.com/BeckyBibbey/status/1517290210778117244 https://twitter.com/BeckyBibbey/status/1517290314299057458 https://twitter.com/transportation/status/15172903664877310414 https://twitter.com/transportation/status/15172903664877310414		Possible Infra Damage and Flooding	Location not exact
25/09/2022	2:00PM	Palayan City	Flooding	15.530102	121.089745	https://www.facebook.com/natw/15172903664877310414 https://www.facebook.com/natw/15172903664877310414 https://www.facebook.com/natw/15172903664877310414		Flooding	Unverified, No Photos/Videos, Hearsay, Location not exact
25/09/2022	6:30PM	Infanta Quezon	Torrential rainfall	14.722517	121.657634	https://twitter.com/MexicoM11/status/15172903664877310414 https://twitter.com/MexicoM11/status/15172903664877310414 https://twitter.com/MexicoM11/status/15172903664877310414		Possible Infra Damage and Flooding	General Location in Infanta, video not geotagged
25/09/2022	4:30PM	Panukulan, Pulillo Islands	Extreme winds and heavy rains in Pulillo Islands (Signal No. 5)	14.9756019	121.9304017	https://www.youtube.com/watch?v=15172903664877310414 https://www.youtube.com/watch?v=15172903664877310414 https://www.youtube.com/watch?v=15172903664877310414		Possible Crop and Infra damage	
25/09/2022		National Highway to Kabanukulan, Negros Occidental	Flooding	9.958683	122.8301996	https://www.facebook.com/natw/15172903664877310414 https://www.facebook.com/natw/15172903664877310414 https://www.facebook.com/natw/15172903664877310414		Flooding, crop damage, fallen trees	
25/09/2022		Patnanungan Island	Torrential rainfall	14.709509	122.1808621	https://www.facebook.com/natw/15172903664877310414 https://www.facebook.com/natw/15172903664877310414 https://www.facebook.com/natw/15172903664877310414		Possible Infra Damage and Flooding	General Location, video not geotagged
25/09/2022		Biga, Bonghin, Panukulan, Quezon	Extreme winds and heavy rains in Pulillo Islands (Signal No. 5)	14.9629111	121.8829517	https://www.facebook.com/natw/15172903664877310414 https://www.facebook.com/natw/15172903664877310414 https://www.facebook.com/natw/15172903664877310414		Possible Crop and Infra damage	Possibly taken from school which was used as an evacuation site
25/09/2022		Pulillo Islands	Extreme winds and heavy rains in Pulillo Islands (Signal No. 5)	14.756095	121.942134	https://www.facebook.com/natw/15172903664877310414 https://www.facebook.com/natw/15172903664877310414 https://www.facebook.com/natw/15172903664877310414		Crop Damage	Location not exact
25/09/2022		Silo Campus, Inayawan campus, Negros Occidental	Flooding	9.9078192	122.4594552	https://www.facebook.com/natw/15172903664877310414 https://www.facebook.com/natw/15172903664877310414 https://www.facebook.com/natw/15172903664877310414		Flooding, Possible crop damage	
25/09/2022	5:50PM	Jomalig, Quezon	Fallen trees	14.6873449	122.3301551	https://www.facebook.com/natw/15172903664877310414 https://www.facebook.com/natw/15172903664877310414 https://www.facebook.com/natw/15172903664877310414		Fallen trees	
25/09/2022			Extreme winds and			https://www.facebook.com/natw/15172903664877310414 https://www.facebook.com/natw/15172903664877310414 https://www.facebook.com/natw/15172903664877310414		Possible Infra Damage, Flooding	Location not exact



BAGYONG KARDING
Like Comment Share
Translate Tweet



1:04 PM · Sep 25, 2022 · Twitter for Android

448 Retweets 222 Quote Tweets 1,037 Likes

Took these photos along the National Highway going to Kabanukulan para dul-on ng si Doc. Karding is now being classified as Super Typhoon and monsoon rains continue to elevate water levels in the south. Praying for the safety of those who are affected.

To all those traveling to far south, stay safe gidi!
#KardingPH #AmbotSaKardingNgMayBans



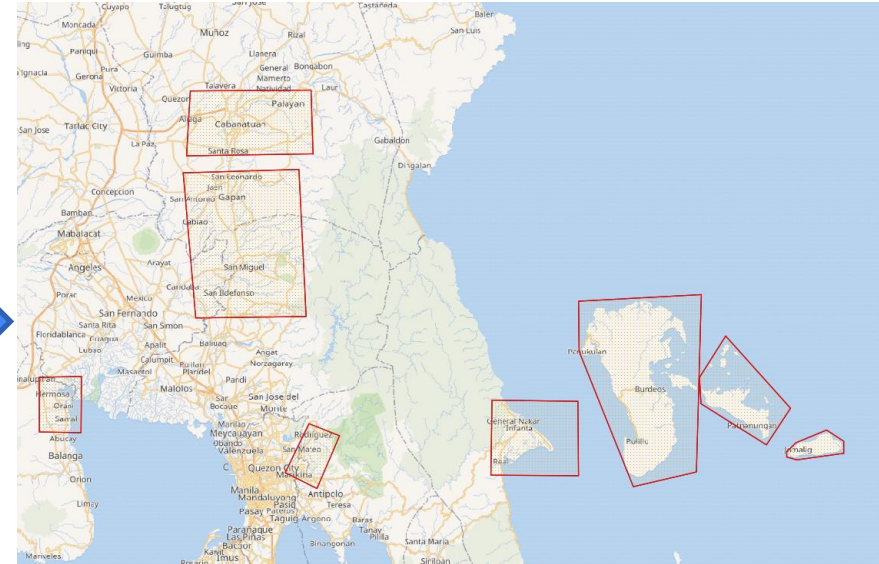
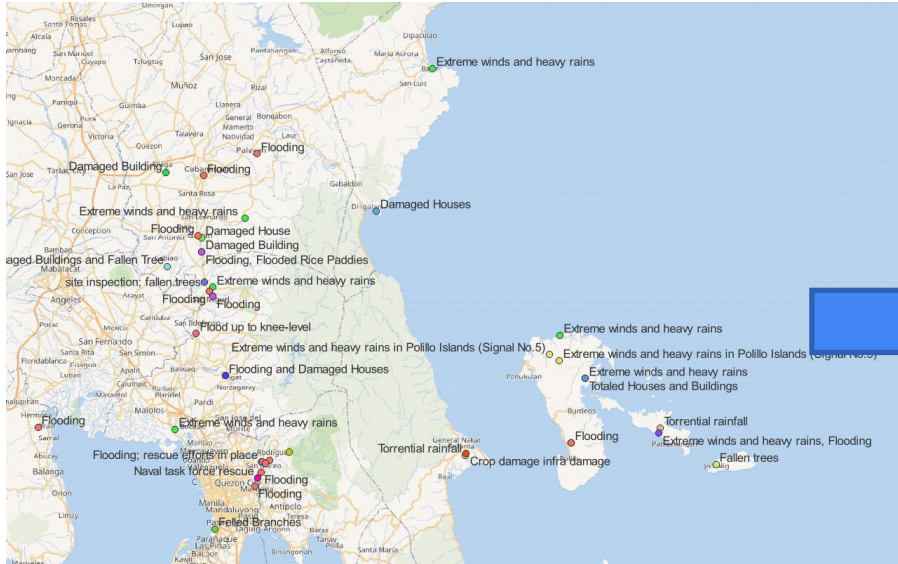
874

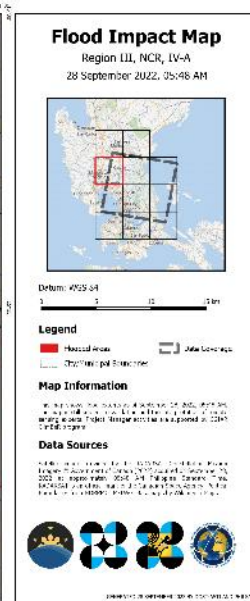
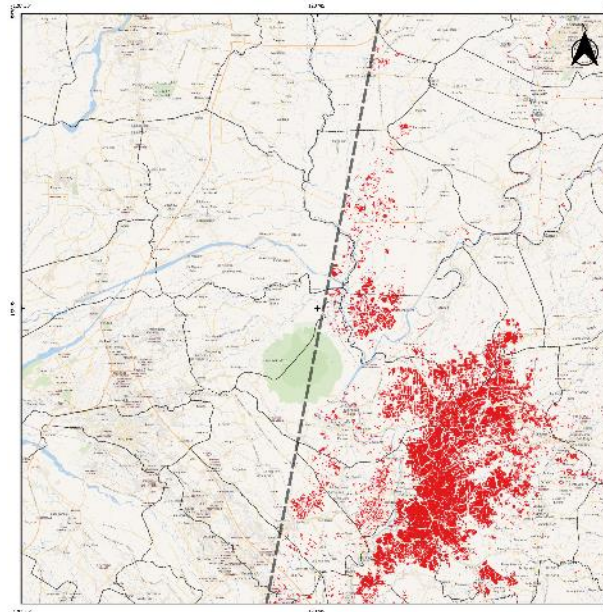
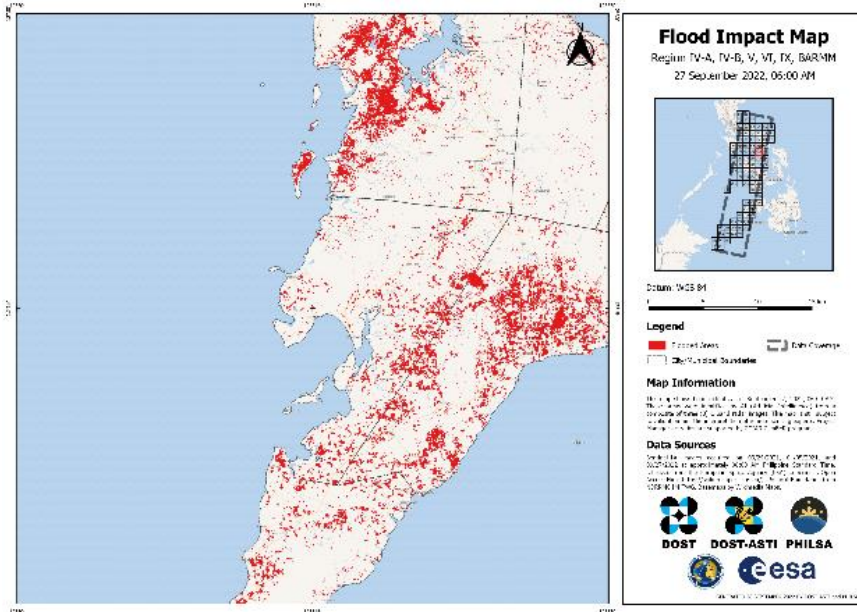
42 Comments 315 Shares

Gathered reported damage from reports from social media platforms (i.e., Facebook, Twitter, Youtube, and Instagram)

Shared to the disaster actors and volunteers, an excel file was distributed to consolidate social media reports, integrating validation links, description of the damage and/or incident, as well as map data (latitude, longitude) which was then integrated and compiled for map visualization.

The reports are plotted and used to create AOIs





#KardingPh FLOOD IMPACT MAPS [Inbox x](#)



drrm@philsa.gov.ph

to Ryan, ocd, ocdadmonilla, ocd.operationsservice, ndrmoc, ncr, civildefensencr, region3, ocdregion3, region4a, jbpatalinjulig, ncr, records, dost4a, mjpablay, official, dost-ro5.ord, do

Good day, everyone!

The [Philippine Space Agency](#) and [DOST-ASTI](#)'s DRR Teams have generated flood impact maps from the recent onslaught of #KardingPh. The maps show potentially flooded areas extracted from RadarSat and Sentinel satellites captured on 27 and 28 September 2022, respectively.

Please be advised that the thematic accuracy of the flood maps might be lower in urban and forested areas due to inherent limitations of the SAR analysis technique, hence, this is still subject to the validation and interpretation of remote sensing experts.

You can download the maps and shape files on these folders:

- Sentinel: <https://bit.ly/3E2m3k8>
- RadarSat: <https://bit.ly/3RogO1n>

Please use and disseminate these maps and data as you see fit. If you have any questions, please do not hesitate to respond to this email, cc: datos@asti.dost.gov.ph.

You may also visit the Facebook pages of [DATOS](#) and [PhilSA](#) for near real time updates of our weather monitoring efforts.

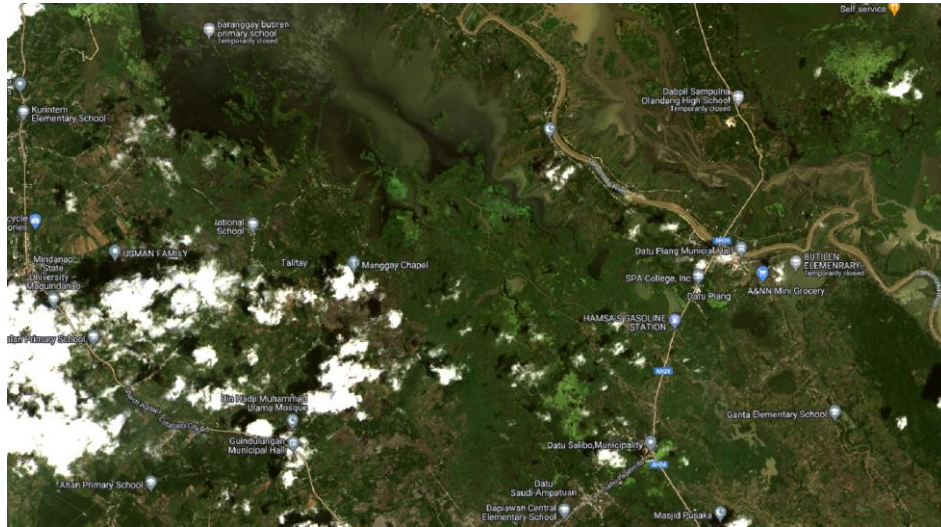
Thank you very much!

The value-added products are distributed to mandated agencies and other stakeholders **for free**, through email and social media.

Salibo-Pagati

Maguindanao Area | AOI 4

14 October 2022



30 October 2022



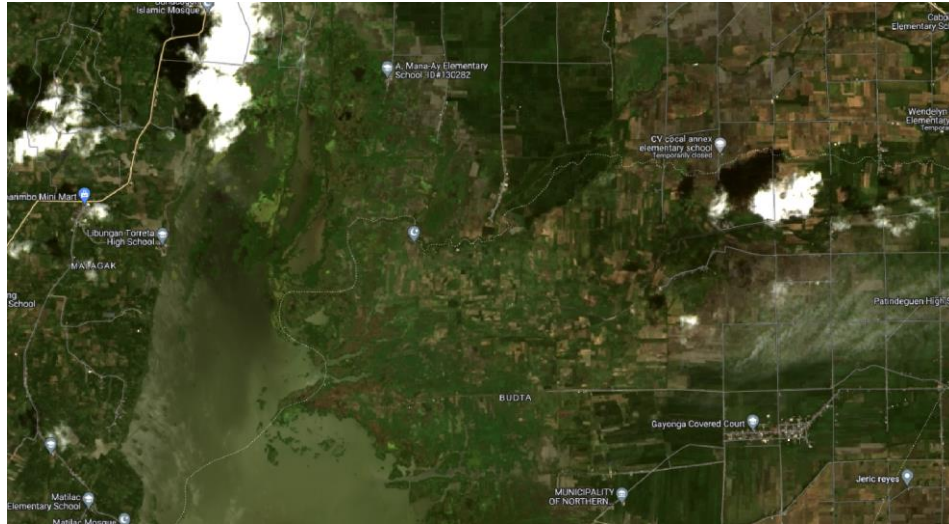
Siltation and flooding on agricultural and built-up areas as seen on Landsat 9 imagery.



Malagak – Northern Kabuntalan Maguindanao | AOI 5

14 October 2022

30 October 2022



Siltation and flooding on agricultural and built-up areas as seen on Landsat 9 imagery.



Contact the Philippine Space Agency



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<https://www.linkedin.com/company/philspaceagency/>



<https://philsa.gov.ph/>



info@philsa.gov.ph