

*This service summarizes current satellite mapping activities of interest to GDACS stakeholders. It is issued weekly and based on contributions from map-producing entities and GDACS partners.*

## Satellite mapping overview

As of 28 November 2016

### Africa

#### **Nigeria complex emergency – GLIDE number: CE20140617NGA**

Ongoing conflict in Nigeria has led to a significant internal displacement of the country's population. UNITAR-UNOSAT released a new map of shelters for internally displaced persons in the Muna settlement near Dalakaleri in Borno state. Analysis of satellite imagery from 05 September 2016 revealed a total of 2,597 shelters and 22 infrastructure and support buildings within the Muna compound. Of these shelters, 120 were newly constructed and located in the northern part of the compound. An additional 203 shelters were detected grouped together across the road. This map product is available for download as a PDF on the UNITAR-UNOSAT website. Accompanying data in shapefile and ESRI geodatabase format is also accessible on this website.

Source: UNITAR-UNOSAT

Link: <https://www.unitar.org/unosat/maps/NGA>

#### **South Sudan complex emergency – GLIDE number: CE20131218SSD**

Renewed violence in South Sudan recently caused a mass exodus from the country. As of 17 November 2016, more than 2,900 South Sudanese refugees were reportedly fleeing over the border into Uganda each day. The Bidi Bidi refugee camp opened in August 2016 and has become one of the world's largest centers for refugees with more than 221,000 people. UNITAR-UNOSAT published a land cover classification map for zone 2 of the camp with satellite imagery acquired 30 August 2016. It identified areas of agriculture (4%), urban or bare soil (14.6%), canopy vegetation (14.8%), and light vegetation (66.6%). This map product is available for download as a PDF on the UNITAR-UNOSAT website.

Source: UNITAR-UNOSAT

Link: <https://www.unitar.org/unosat/maps/SSD>

### Asia

#### **Philippines tropical cyclone – GLIDE number: TC-2016-000108-PHL**

Tropical cyclone Haima hit the Philippines on 19 October 2016, impacting more than 60,000 people. The storm arrived only four days after tropical cyclone Sarika made landfall over the country. In an effort to evaluate the aftermath, UNITAR-UNOSAT released maps of damage in parts of Cagayan

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province. Using satellite imagery acquired 25 October 2016, UNITAR-UNOSAT identified a total of 303 potentially damaged structures in the village of Alibago. Additionally, it found 661 structures with possible damage in the town of Enrile and its surroundings. Map products are available for download as PDFs on the UNITAR-UNOSAT website. Accompanying data in shapefile and ESRI geodatabase format is also accessible on the UNITAR-UNOSAT website.

Source: UNITAR-UNOSAT

Link: <http://www.unitar.org/unosat/maps/PHL>

### **Viet Nam floods – GLIDE number: FL20161109VNM**

In mid-October 2016, severe floods in central Viet Nam left tens of thousands of homes submerged. UNITAR-UNOSAT produced three maps of the extent and evolution of satellite-detected surface waters in parts of the Binh Dinh, Quang Binh, and Ha Tinh provinces. It analyzed satellite imagery acquired 07 November 2016 and 12, 24 and 26 October 2016. The surface water of Dinh Binh Lake in Binh Dinh province measured roughly 9.3 square kilometers on 07 November 2016, increasing by of about 85% since 26 October 2016. In northern Quang Binh province, approximately 64 square kilometers of surface water was observed as of 24 October 2016. This represents an increase of about 45% from 12 October 2016. An expansion also occurred in Ha Tinh province, where roughly 307 square kilometers of surface water was detected on 24 October 2016. Compared with the situation on 12 October 2016, this is about a 16% increase. Map products are available for download as PDFs on the UNITAR-UNOSAT website. Accompanying data in shapefile and ESRI geodatabase format is also accessible on the UNITAR-UNOSAT website.

Source: UNITAR-UNOSAT

Link: <http://www.unitar.org/unosat/maps/VNM>

## **Caribbean**

### **Haiti tropical cyclone – GLIDE number: TC-2016-000106-HTI**

Tropical cyclone Matthew made landfall over the west coast of Haiti on 04 October 2016. The International Charter on Space and Major Disasters was activated on 03 October 2016 by the USGS on behalf of the Pacific Disaster Center. UNITAR-UNOSAT recently published an updated preliminary damage assessment report for areas in the Grand South departments of Haiti. Using satellite imagery acquired 09 November 2016 as well as 07, 09, 12 and 17 October 2016, UNITAR-UNOSAT analyzed a total area of approximately 1,200 square kilometers. It identified a total of 40,696 damaged structures, 1,497 temporary people gathering sites, and 508 road obstacles. This report is available for download as a PDF on the International Charter on Space and Major Disasters and

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UNITAR-UNOSAT websites. Accompanying data in shapefile and ESRI geodatabase format is also accessible on the UNITAR-UNOSAT website.

Sources: International Charter on Space and Major Disasters, UNITAR-UNOSAT

Links: <https://www.disasterscharter.org/web/guest/-/cyclone-in-haiti>

<https://www.unitar.org/unosat/maps/HTI>

## Central America

### **Panama tropical cyclone – GLIDE number: TC-2016-000119-PAN**

In late November 2016, tropical cyclone Otto traveled across Central America. The NASA Earth Observatory acquired 22 and 24 November 2016 satellite imagery of the storm and produced overview maps. On 22 November 2016, Otto had maximum sustained winds of 110 kilometers per hour and was visible hovering in the Caribbean Sea close to Panama, Costa Rica, and Nicaragua. It later grew into a Category 2 storm and impacted all three countries in the following days, reportedly resulting in several fatalities. As of 24 November 2016, the storm could be seen approaching southern Nicaragua. By 26 November 2016, Otto had weakened to a tropical storm and was situated more than 100 kilometers to the west of Costa Rica. Map products are available for online viewing or download in GeoTIFF and JPEG format on the NASA Earth Observatory website.

Source: NASA Earth Observatory

Link: <http://earthobservatory.nasa.gov/NaturalHazards/view.php?id=89164&eocn=home&eoci=nh>

## Europe

### **Italy earthquake – GLIDE number: EMSR190\***

After a devastating earthquake struck central Italy in August 2016, the region experienced more quakes on 26 and 30 October, as well as 03 November 2016. The Copernicus Emergency Management Service created an internal activation for the 26 October 2016 earthquake and produced maps for the Italian Civil Protection Department. It continued to monitor the situation in central Italy into mid-November 2016. In the most recent analysis of 16 November 2016 satellite imagery, a total of 32 affected inhabitants and 48 impacted settlements were found in the Cascia, Colfiorito, and Savelli areas. The Coretto di Spoleto and Sellano areas were also examined, however no damage was detected. Map products are available for download in TIFF, PDF, and JPEG formats on the Copernicus Emergency Management Service website. Accompanying zipped vector packages are also provided on this website.

Source: Copernicus Emergency Management Service

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Link: <http://emergency.copernicus.eu/mapping/list-of-components/EMSR190>

### **Italy floods – GLIDE number: EMSR192\***

Days of torrential rainfall in late November 2016 led to flooding in northern Italy. In response to this event, the Copernicus Emergency Management Service created an internal activation on 24 November 2016 and has since produced several maps of the aftermath in the Piemonte and Liguria regions. Analysis of satellite imagery from 25, 26 and 27 November 2016 revealed a total affected area of approximately 40.5 square kilometers and 16,399 affected inhabitants. Additionally, roughly 195.5 kilometers of roads and 34.2 square kilometers of land use were impacted. As of 27 November 2016, hundreds of people in northwest Italy had been displaced and severe weather was forecast for the region in the following days. Map products are available for download in TIFF, PDF, and JPEG formats on the Copernicus Emergency Management Service website. Accompanying zipped vector packages are also provided on this website.

Source: Copernicus Emergency Management Service

Link: <http://emergency.copernicus.eu/mapping/list-of-components/EMSR192>

## **Middle East**

### **Syria complex emergency – GLIDE number: CE20130604SYR**

As a result of ongoing conflict in Syria, the country's population has experienced significant upheaval. UNITAR-UNOSAT continues to monitor the situation along parts of the Syria-Jordan border and recently produced a new map of shelters at the Hadalat border crossing. Using satellite imagery from 12 November 2016, UNITAR-UNOSAT identified 1,358 probable shelters. This represents a 5% decrease in shelters since the previous UNITAR-UNOSAT analysis of 18 October 2016 satellite imagery. This map product is available for download as a PDF on the UNITAR-UNOSAT website. Accompanying data in shapefile and ESRI geodatabase format is also accessible on this website.

Source: UNITAR-UNOSAT

Link: <https://www.unitar.org/unosat/maps/SYR>

## **South America**

### **Peru volcanic eruption – GLIDE number: TBD**

Situated approximately 70 kilometers northwest of Arequipa city, the Sabancaya volcano in Peru has generated ash eruptions and multiple explosions since 06 November 2016. The NASA Earth Observatory collected 16 and 19 November 2016 satellite imagery of the volcano's activity and created overview maps. A voluminous ash plume could be seen emanating from Sabancaya on 16 November 2016, located northeast of a dormant volcano known as Mount Ampato. By 19 November

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2016, another ash eruption was visible and the ground had been darkened by the ash. During the month of November 2016, ash plumes reportedly rose from 2 to 4.2 kilometers above the crater rim and drifted more than 40 kilometers in different directions. Map products are available for download in JPEG format on the NASA Earth Observatory website.

Source: NASA Earth Observatory

Link: <http://earthobservatory.nasa.gov/NaturalHazards/view.php?id=89149&eocn=home&eoci=nh>

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*This summary is compiled by the GDACS mapping & satellite imagery coordination mechanism, operated by the UNITAR Operational Satellite Applications Programme (UNOSAT).*

*When referring to this summary, please credit: GDACS, UNITAR-UNOSAT.*

*For comments, questions and to submit information on satellite image derived products, please contact:*

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*Sources indicate satellite analysis production entities and imagery providers. The products referenced in this summary are based on remote satellite imagery and may not be validated in the field prior to release, in which case findings are based only on what is observed in the satellite imagery.*

*\*Not an official GLIDE number, as event has no entry in GLIDE database, but used by GDACS for seamless information integration.*