

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 08 December 2015

Africa

South Sudan complex emergency – GLIDE number: OT-2014-000001-SSD

It is estimated that two million individuals have been displaced since an outbreak of violence in South Sudan during the month of December 2013. UNITAR-UNOSAT continues to monitor the progression of this situation and recently released a map of satellite-detected shelters and other buildings at the Delthoma IDP camp in Upper Nile state, South Sudan. Located approximately five kilometers east of Melut, Delthoma is split into five individual camps and occupies a total area of 114.9 hectares. Using satellite imagery acquired 20 and 29 November 2015, UNITAR-UNOSAT identified a total of 3,993 IDP structures as well as 118 administrative structures. Of the IDP structures, 3,172 were tent shelters, 239 improvised shelters, and 582 tukuls. An inset image within the map provides a close-up view of tent shelters, improvised shelters, and tukuls in a portion of the camp. This map product is available for download as a PDF on the UNITAR-UNOSAT website. Accompanying data in ESRI shapefile and geodatabase format is also accessible on this website.

Source: UNITAR-UNOSAT

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

Asia

China haze – GLIDE number: TBD

Thick haze enveloped a large area of northeastern China during the month of November 2015. China has recently experienced its most severe air pollution of the year. On 08 December 2015 a red alert was issued for the city of Beijing as air pollution was ten times higher than the World Health Organization's recommended levels. The NASA Earth Observatory acquired 30 November 2015 satellite imagery of haze over northeastern China and produced an overview map. As of this date, vast amounts of haze were visible extending over the region, including the city of Beijing. Clouds and fog with hints of grey or yellow color due to the air pollution could also be seen. The haze continued moving hundreds of kilometers from Beijing in a southwest direction and was especially dense in low-lying parts of the Guanzhong Plain. Haze is comprised of many sulfate aerosols produced from coal burning, which accounts for roughly two-thirds of China's energy. This map product is 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=87071&eocn=home&eoci=nh>

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India tropical cyclone – GLIDE number: TC-2015-000163-IND

Heavy rainfall from a tropical cyclone in November 2015 and ongoing precipitation in early December 2015 led to widespread flooding in the southern Indian state of Tamil Nadu. In response to this event, the International Charter on Space and Major Disasters was activated on 02 December 2015 by ISRO. UNITAR-UNOSAT published a new map of flood waters over the Chennai area of Tamil Nadu state using satellite imagery acquired 12 and 24 November 2015, as well as 14 October 2015 and 01 September 2015. An expansion of flood waters in this area by approximately 10 percent was observed between 12 November 2015 and 24 November 2015. According to news reports, Tamil Nadu recently experienced its heaviest rainfalls in more than 100 years. As of 08 December 2015 flood waters were receding in most parts of the state and relief efforts were underway. This map product is available for download as a PDF on the UNITAR-UNOSAT website. Accompanying data in ESRI shapefile and geodatabase format is also accessible on this website.

Source: UNITAR-UNOSAT

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

Europe

Italy volcanic eruption – GLIDE number: TBD

On 03 December 2015, Sicily's Mount Etna volcano erupted after a two year hiatus. According to scientists, the eruption was the most violent from Mount Etna in the last two decades. Ash was spewed 10,000 feet into the sky and lava reached heights nearing one mile. The NASA Earth Observatory acquired satellite imagery of the eruption on 03 December 2015 and produced an overview map. As of this date, a large plume of ash and gas was visible emanating from the volcano and moving in a southeast direction. The plume could also be seen over the Ionian Sea near the Italian coast. Many villages neighboring the volcano were covered with ash and the nearest airport on the island was closed. Mount Etna is the tallest active volcano in Europe at 3,329 meters high and is estimated to have erupted for the past 2.5 million years. This map product is available for online viewing or download in GeoTIFF, KML, and JPEG format on the NASA Earth Observatory website.

Source: NASA Earth Observatory

Link: <http://earthobservatory.nasa.gov/NaturalHazards/view.php?id=87097&eocn=home&eoci=nh>

United Kingdom floods – GLIDE number: EMSR147*

In early December 2015, heavy rainfall from severe weather caused flooding in the northwest counties of Cumbria and Lancashire, England. In response to this event, the Copernicus Emergency Management Service produced delineation maps of some affected towns in Cumbria. A total of approximately 3,998 hectares of flooded area, 10.3 hectares of affected settlements, and 6.8 kilometers of impacted transportation networks were identified in the towns of Carlisle, Appleby,

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Kendal, and Cockermouth. The largest amount of flooded area (2,283.4 ha) as well as affected local and primary roads (3.9 km) were found in the town of Kendal. The town of Cockermouth had the most bridges (10), settlements (7.1 ha), and inhabitants (39) impacted by the floods. As of 07 December 2015 thousands of people had been evacuated from their homes or left without power. By 08 December 2015, two new severe weather warnings were issued by the Met Office for 09 December 2015. Map products are available for download in TIFF, PDF, and JPEG formats on the Copernicus Emergency Management Service website. Accompanying zipped vectors packages are also provided on the website.

Source: Copernicus Emergency Management Service

Link: <http://emergency.copernicus.eu/mapping/list-of-components/EMSR147>

Middle East

Iraq complex emergency – GLIDE number: OT-2014-000074-IRQ

Ongoing conflict in Iraq has caused significant structural damage and destruction to some of the country's towns and cities. UNITAR-UNOSAT recently published an updated damage assessment of the Sinjar area in Nineveh Province, Iraq. Analysis of satellite imagery acquired 18 and 28 November 2015, as well as 30 December 2014 and 07 August 2014, revealed a total of 1,780 potentially affected structures. Approximately 544 of these were destroyed, 473 severely damaged, 457 moderately damaged, and 306 possibly damaged. Before and after inset images within the map illustrate the extent of damage and destruction sustained by multiple structures in Gundy Hamy village, located southwest of the town of Sinjar. Due to less than ideal characteristics of the imagery used the margin of error for this analysis is likely higher than usual, and due to terrain distortion the spatial accuracy is +/- 15 meters. This damage assessment is available for download as a PDF on the UNITAR-UNOSAT website. Accompanying data in ESRI shapefile and geodatabase format is also accessible on this website.

Source: UNITAR-UNOSAT

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

Iraq floods – GLIDE number: FL-2015-000153-IRQ

Eastern Iraq experienced flooding as a result of torrential rainfall from 28 to 30 October 2015. On 01 November 2015 a state of emergency was declared by the Iraqi Prime Minister. The International Charter on Space and Major Disasters was activated by the USGS on behalf of the Ministry of Science and Technology on 05 November 2015, and project management was assumed by Integração. The Brazilian National Risk and Disaster Management Center (CENAD) recently produced a new map depicting the city of Kut in Iraq's Wasit province before and after the floods. Satellite imagery acquired 14 November 2014 was analyzed and CENAD identified flooded areas, including a

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temporary lake to the north of the city. It is estimated that at least 84,000 people residing mainly in the Baghdad and Anbar governorates were displaced by this event. This map product is available for online viewing and download in JPEG format on the International Charter on Space and Major Disasters website.

Sources: International Charter on Space and Major Disasters, CENAD

Link: <https://www.disasterscharter.org/web/guest/-/flood-in-iraq>

Syria complex emergency – GLIDE number: CE20130604SYR

As a result of violence in Syria, citizens continue to flee the country in search of refuge. UNITAR-UNOSAT recently published an updated map of the refugee situation in Jordan's Al Zaatari camp. Using satellite imagery acquired 12 October 2015, UNITAR-UNOSAT identified a total of 26,963 shelters as well as 2,130 infrastructure and support buildings within the 534.4 hectares of the camp. Between 26 April 2015 and 12 October 2015, a total of 4,310 shelters were closed or moved, and a total of 2,268 shelters were constructed. The number of shelters thus decreased by about 2,268 since the previous UNITAR-UNOSAT assessment. This indicates an approximate decrease by 7.76 percent in the number of shelters between 26 April 2015 and 12 October 2015. Structure locations are subject to a spatial error margin of +/- three meters. Shelters grouped under plastic sheeting were estimated by average household size and may be a source of error. This map product is available for download as a PDF on the UNITAR-UNOSAT website. Accompanying data in ESRI shapefile and geodatabase format is also accessible on this website.

Source: UNITAR-UNOSAT

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

South America

Brazil dam collapse – GLIDE number: TBD

On 05 November 2015, two iron ore tailing dams storing waste materials collapsed in the Minas Gerais State of Brazil. As a result of this incident, approximately 60 million cubic meters of liquid waste was released into some neighboring areas. The International Charter on Space and Major Disasters was activated on 05 November 2015 and project management assumed by Integração. The Brazilian National Risk and Disaster Management Center (CENAD) and the NASA Earth Observatory recently published overview maps. Using satellite imagery acquired 12 November 2015, CENAD identified several locations affected by contaminated waters including Mariana city in the districts of Bento Rodrigues, Camargos, and Paracatu de Baixo, as well as Barra Longa city in Gesteira district. Impacted areas were situated along or in close proximity the Gualaxo, Santarém, and Do Carmo Rivers. The NASA Earth Observatory captured a 30 November 2015 satellite image and created a map of affected areas farther downstream. As of this date, muddy waters were visible along part of

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the Doce River and a contaminated plume spread several kilometers into the Atlantic Ocean. Polluted waters first reached the Atlantic Ocean seventeen days after the dam failure. Concerns about the health of affected ecosystems have arisen due to the high levels of mercury, arsenic, chromium, and manganese in the tainted water. Map products are available for download in JPEG format on the International Charter on Space and Major Disasters and NASA Earth Observatory websites.

Sources: International Charter on Space and Major Disasters, CENAD, NASA Earth Observatory

Links: <https://www.disasterscharter.org/web/guest/-/other-in-brazil>

<http://earthobservatory.nasa.gov/NaturalHazards/view.php?id=87083&eocn=home&eoci=nh>

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: maps@gdacs.org

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.*