

FLOOD MAPPING

Flood maps extracted from Earth observation satellites data provide valuable information to the institutions involved in flood preparedness and response. Rapid information on flood extents for large areas can be logistically challenging in partly inaccessible areas, may take too long and are expensive to obtain. The synoptic view provided by Earth Observation satellites is therefore a very suitable approach to providing near-real time information on floods and related issues. While optical sensors are limited to daylight observations and cloud free conditions, radars offer their own source of illumination and a weather independent observation capability. The high spatial resolution and its ability to discriminate land/water boundaries in all weather conditions, day and night, make Synthetic Aperture Radars (SAR) highly effective tools for mapping and monitoring of flood conditions in near real time for emergency planning and damage assessments. Historical flood mapping provides knowledge of changes in the extent of water bodies and the flood occurrence. Such information helps to assess the effects of the river flow manipulation and water management scenarios. Furthermore, the historical flood mapping can contribute to a better understanding of the relationship between river discharge and extent of flooding in floodplains/wetlands as well as the spatial identification of floodplains and flood hotspots.



Thailand flood in 2011. Creative Commons on Flickr (<https://flic.kr/p/aD7s7g>)

PRODUCT SPECIFICATIONS

CONTENT

- Historic and near-real time flood extent mapping and monitoring

GEOGRAPHIC COVERAGE

- Globally available

TEMPORAL COVERAGE

- From mid 1980s (Historic)
- On demand (near real time)

SPATIAL RESOLUTION

- 10-30 m

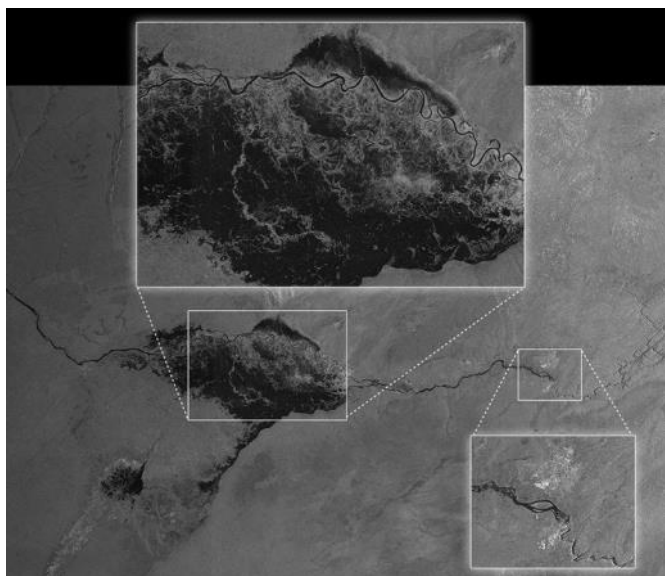
FREQUENCY

- Several observations per flood event (near real time) and subject to data availability (historic)

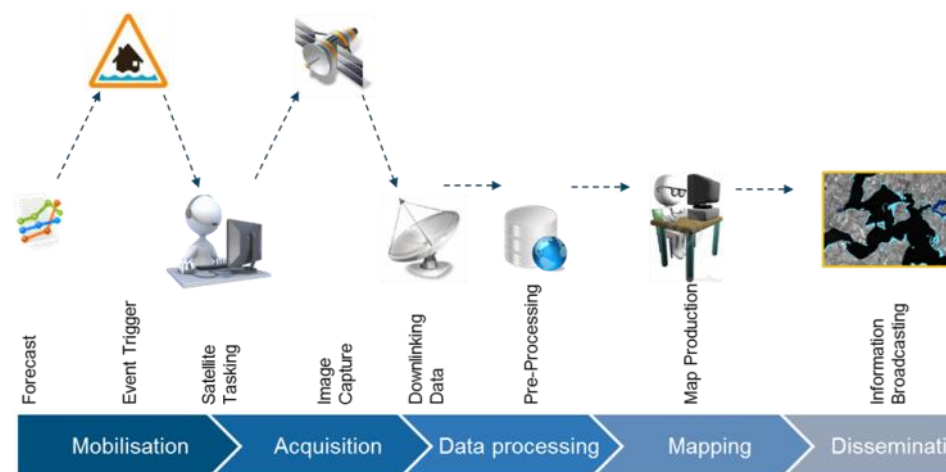
LIMITATIONS

- To ensure coverage at peak flooding or to provide day-to-day monitoring commercial SAR data may be required
- Flood inundation areas under vegetation may go undetected depending on the density of the canopy
- Historic flood mapping is subject to availability of archived satellite imagery

Historic flood mapping help decision makers and practitioners to identify and quantify areas subject to changes in the extent of water bodies and the occurrence of floods using archived satellite imagery dating back from the mid 1980s.



For near-real time monitoring the satellite based mapping need to be coupled with a forecast system, that allows forecasting flood warnings 24-48h ahead. The forecast will trigger a workflow where the operator will inform the satellite distributor about a forthcoming flood. The distributor can then install the area forecasted to be affected by the flood in the image acquisition program for the satellite, and acquire imagery as per request. The raw satellite image is typically available within hours after image acquisition, while the time needed for analysis and production maps varies from a few hours to days depending on the size of the area.



Near-real time flood mapping from forecast to information broadcasting (© DHI GRAS)

Delivery

The flood mapping services can be delivered along with

- Geodata (GeoTIFF, ASCII, or similar)
- Metadata (INSPIRE or similar)
- Cartographic presentations (PDF, PNG or similar)

The derived maps and information from the irrigation mapping service is typically made available in one or more of the following three approaches:

- An **email** can be dispatched to relevant recipients whenever new information is generated.
- Data can be made available on a dedicated password protected **ftp server** ready for the client to pull/push the data.
- Data can be viewed online through a dedicated password protected **web portal**. The system can be customized and scaled in complexity to include various online analysis options, time series plots, statistical plots as well as integration with user defined datasets .

SUMMARY

- Cost efficient mapping of large inundated areas
- Globally available in spatial resolutions from 10 m
- All weather capacity mapping through clouds and at night with Synthetic Aperture Radar (SAR) data
- Can be coupled with a forecast system for near-real time monitoring

EO4SD — Earth Observation for Sustainable Development — is an ESA initiative started in spring 2016 and focusing on top-priority international development issues including water resource management. The overall objective is to achieve a step increase in the uptake of satellite-based information in the national, regional and global programs of International Finance Institutions. Water Quality and temperature monitoring is one of the EO services being demonstrated under the EO4SD on water resource management.

For more information please contact:

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