Developing Collaborative Mechanism and Tool for Near-Real-Time Flood Monitoring in Southeast Asia

Peeranan Towashiraporn and Prof. Farrukh Chishtie

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GEO-DARMA: a framework for developing use of satellite data for risk management

- Concept phase completed for two of three regions: Asia and Africa. ADPC’s SERVIR Mekong project is first GEO-DARMA Pilot to go forward.

- Iterative process means new projects welcome at any time, but must fit within identified DRR priorities.
SERVIR Mekong GEO-DARMA Pilot

Background

- Championed by ADPC;
- Leverages existing NASA/USAID-funded Mekong SERVIR project; fully-funded for five years;
- Part of larger international SERVIR network;
- Incorporates new data types, faster service delivery, higher resolution flood maps, capacity building;
- Financing for project in place, but some partners still to be confirmed (e.g. on-going discussion with CEOS Flood Demonstrator Team);
- Vision to extend to larger SE Asia area if successful.
SCO NASA

SERVIR - Eastern and Southern Africa

SERVIR - Hindu Kush and Himalayas

SERVIR - Mekong

SERVIR - West Africa

SERVIR - Amazonia?

SERVIR - Eastern and Southern Africa

SERVIR GLOBAL

CONNECTING SPACE TO VILLAGE
Why Flood Mapping for Myanmar?

Provide information to users on:
• The extent of flooded areas
• Possible severity of flood (e.g., depth, duration, size)

Is a visualization tool to assist planning for emergency response and relief
• Pillar 4: Enhancing disaster preparedness for effective response and resilient rehabilitation and Construction
  ➢ 4.2 Improved disaster response system in Myanmar
Functions of Department of Disaster Management (DDM) in response phase:

- Provision of relief aids (with General Administration Department)
- Social protection to vulnerable groups affected by disasters
- Coordination and cooperation with UN Country Team
- Mobilizing the humanitarian assistance & emergency relief from international communities
- Reporting and technical advices to National Disaster Management Committee and ASEAN Coordinating Centre for Humanitarian Assistance
- Early warning dissemination (with Department of Meteorology and Hydrology and General Administration Department)

Flood maps are useful in all of these functions.
Satellite-based Flood Mapping

Advantages

✓ Capability to acquire data everywhere in the world
✓ Capability to acquire data in any conditions (even through clouds – SAR)
✓ Capability to monitor flood progress and retreat over time

Limitations

✓ Possibility of not being in the right place at the right time
✓ Compared to ground survey, the flood depth information is harder to get and is less accurate from satellites
Satellite-based Flood Mapping

Source: JAXA, Sentinel Asia
Proposed Support to Emergency Flood Mapping of Myanmar

- Developing an online platform that is user-friendly and allow users access to flood maps on a (near) real-time basis
- Developing capacity of Myanmar government and other stakeholders
- Supporting DDM in integrating the satellite-based flood mapping into existing policy framework and guideline for emergency response
- Collaborating with international and national partners to improve the satellite-based emergency mapping overall
An Online Flood Mapping Platform

✓ Utilize multiple satellites to increase temporal resolution
✓ Target daily updates on flood extents
✓ User-friendly
✓ Interface to be co-designed with national stakeholders such as DDM
✓ Modular design allowing future integration of additional satellite data to improve accuracy
✓ Promote collaboration
✓ Built-in capacity building into the development and implementation
ADPC began discussion with GEO-DARMA in 2017, as part of regional assessment of DRR priorities.

ADPC proposed SERVIR-MEKONG as a GEO-DARMA pilot project at January 2018 GEO-DARMA Steering Committee meeting.

Improved access to satellite data through CEOS/GEO-DARMA will increase temporal revisit and improve resolution and accuracy of flood products, as well as supporting archive of past flood events for better risk assessment.

SERVIR MEKONG proposes to use imagery for validation of proposed NRT service in Myanmar starting in the 2018 flood season – July till September 2018.

SAR data will be processed and integrated into system by SERVIR partner Deltares (discussions underway for further support from NASA as pre-cursor to Flood demonstrator)

This data can be further utilized in later versions of this product which will enhance spatio-temporal coverage.
For the 2018 flood season, the project plans to use the following sensors:

District level – high resolution optical data and high resolution SAR data
- SPOT 10m resolution and higher
- Sentinel-2 30m resolution
- Sentinel-1 20m resolution (systematic extraction each pass)
- RADARSAT Scan SAR Narrow and Scan SAR Wide 50m and 100m resolution in 350-500km swath

Urban Flooding (very high resolution optical data and very high resolution SAR data)
- SPOT 1.5m
- Pleiades 70cm
- Cosmo-SKYMED 1m

Analysis of results will be conducted after the flood season and a new request will be made for 2019-2020
Additional Data Sources

- Inundated areas from multiple sensors
  - RiverWatch - streamflow estimates derived from passive microwave
  - Updated daily - Global Flood Monitoring System
- Contextual information from other Lower Mekong systems
  - Updated daily - MODIS-based NASA Project Mekong
- Inundation depth
  - TIN Based Approaches
- Precipitation conditions
  - SERVIR-Mekong Virtual Rain and Stream Gauge
Suggested Area of Interest for urban flooding, Myanmar
Mandalay – areas prone to floods based on surface water occurrence maps
(based on 2000-2015 Landsat imagery)
Suggested Area of Interest for Wide Area flooding, Myanmar

Irrawaddy Delta – areas prone to floods based on surface water occurrence maps (based on 2000-2015 Landsat imagery)
# GEO-DARMA data request - data volumes

For 2018:

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