Satellite-based applications for water resources management in Asia and Pacific region

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Japan Aerospace Exploration Agency (JAXA)

- JAXA has developed various satellite earth observation products and applications in cooperation with research institutes and development aid agencies.
- In 2010, JAXA started the collaboration with ADB to utilize space-based technology for ADB’s technical assistant, grant and loan projects in below sectors:
  - Disaster Risk Management
  - Climate Change Mitigation and Adaptation
  - Forest Monitoring
  - Water Resources Management
  - Agriculture
  - Urban Management
Global Satellite Mapping of Precipitation

Multi-satellite Rainfall Product: GSMaP

- Hourly global rainfall data
- 0.1x0.1deg. lat/lon (≒10km)
- In near real time

Applications:
- Rainfall / Agro-met monitoring
- Landslide warning
- Flood forecasting
Satellite-based Rainfall Monitoring

• GSMaP (or satellite-based rainfall data) is a useful tool to monitor rainfall distributions in the areas where do not have enough ground-based rainfall observation infrastructures (ex. rain gauge, radar).
• GSMaP can be used for various usages with free of charge as a supplement for exiting observation infrastructures.

<table>
<thead>
<tr>
<th>User type</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public</td>
<td>- Weather information for tourist</td>
</tr>
<tr>
<td></td>
<td>- Awareness of disasters (heavy rain or typhoon)</td>
</tr>
<tr>
<td>Private sector</td>
<td>- Weather information for agriculture and tourism</td>
</tr>
<tr>
<td>Government</td>
<td>- Disaster risk management</td>
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Rainfall Monitoring in Pacific

- JAXA developed a localized “GSMaP NOW (real time)” for each island.
- Pacific meteorological agencies are using the GSMaP for real-time rainfall monitoring around their island in terms of disaster risk management without hardware/software installation and operation & maintenance cost.

Meteorological agencies using GSMaP:

http://www.met.gov.fj/

GSMaP for Fiji

Met. agencies using GSMaP in official web site: Fiji met., Kosrae Micronesia resource management, Solomon met. and Tonga met.

GSMaP image in FB post by Palau met.
GSMaP-based Landslide Warning System (GLOWS) in the Philippines

- JAXA and PHIVOLCS* demonstrated the GLOWS under the Sentinel Asia** framework.
- JMA*** is operating landslides alert system with this methodology.
- This system can provide spatial information of landslides risk.

*PHIVOLCS: Philippine Institute of Volcanology and Seismology
**Sentinel Asia: https://sentinel.tksc.jaxa.jp/sentinel2/topControl.jsp
***JMA: Japan Meteorological Agency
GLAWS issued an alert when the devastating landslide occurred.

Barangay Tanauan, Quezon (13:30 pm, Dec. 19)

Evacuation level

Warning level

https://www.eorc.jaxa.jp/SAFE/

Local Provincial DRR Office reported that landslide occurred at about 1:30 p.m. on 19 December 2015
Flood Inundation Forecasting in Sri Lanka

JAXA, ICHARM and ID* demonstrated flood inundation forecasting system in Kelani river basin in Sri Lanka under the SAFE** framework.

*ID: Irrigation Department  **SAFE (Space Applications for Environment) : https://www.eorc.jaxa.jp/SAFE/
Inundation Model Result, 15th May 2016 in Kelani Basin
Key Factors for adopting Satellite Rainfall Data

• Rainfall (global map) data is available in almost all of the earth.

• Combination usage with ground observation data considering application’s targets and required resolution.

• Local customization/calibration of satellite-based applications considering local disaster characteristics and disaster management regulations/policies.
Toward Future Upscaling

To scale-up of the satellite rainfall applications (GSMaP) in the Asia and Pacific region, followings are needed;

• To build capacity to operate the applications and customize the applications’ configurations

• To establish a network for knowledge sharing between stakeholders, including local governments, local research institutes and space agencies
  – Asia Pacific Regional Space Agency Forum (APRSAF)*

*APRSAF: https://www.aprsaf.org
Thank you for your attention