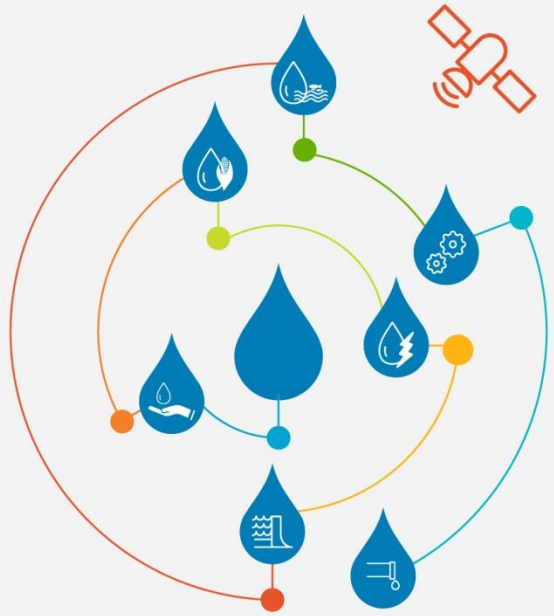
Satellite-based applications for water resources management in Asia and Pacific region



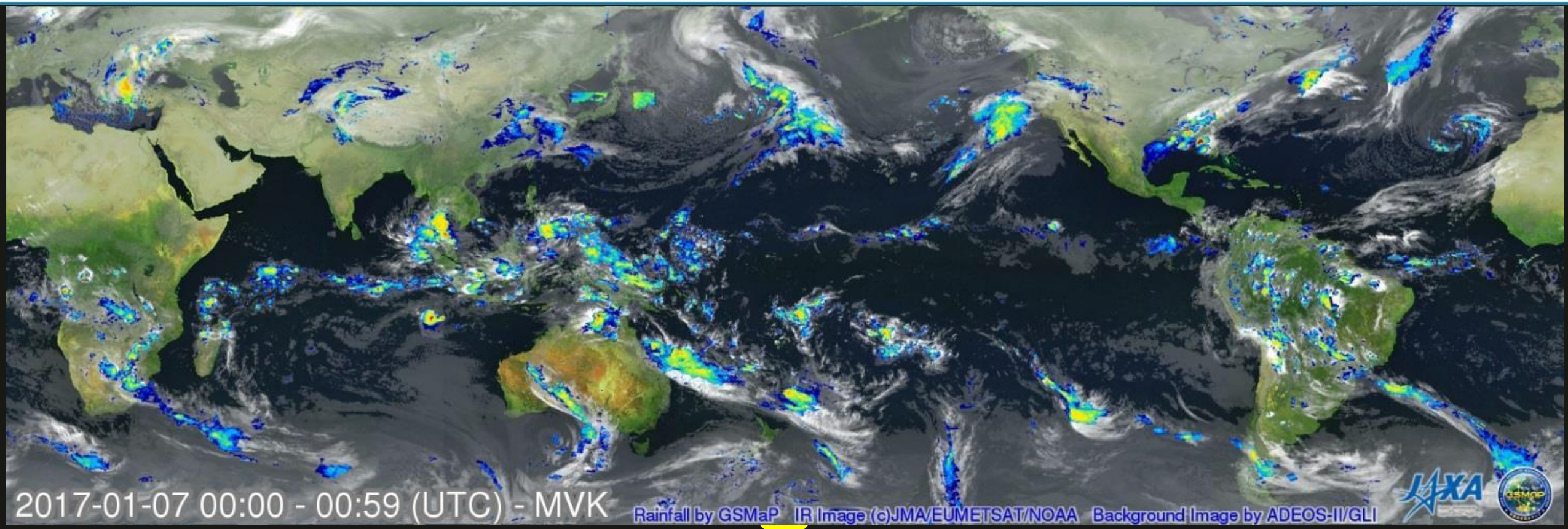
Ko Hamamoto

Japan Aerospace Exploration Agency

Japan Aerospace Exploration Agency (JAXA)

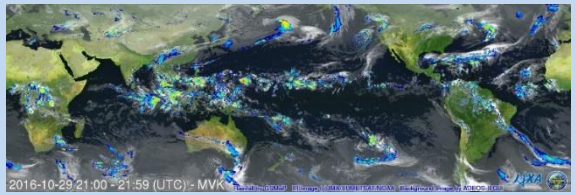
- JAXA has developed various satellite earth observation products and applications in cooperation with research institutes and development aid agencies.
- In 2010, JAXA started the collaboration with ADB to utilize of space-based technology for ADB's technical assistant, grant and loan projects in below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

GSMaP :Global Satellite Mapping of Precipitation



Multi-satellite Rainfall Product: GSMaP

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



distribution

Applications:

- Rainfall / Agro-met monitoring
- Landslide warning
- Flood forecasting

Users

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.

User type	Usage
Public	- Weather information for tourist - Awareness of disasters (heavy rain or typhoon)
Private sector	- Weather information for agriculture and tourism
Government	- Disaster risk management

Rainfall Monitoring in Pacific

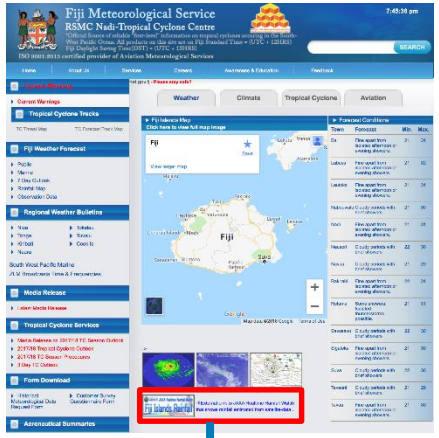
- JAXA developed a localized “GSMaP NOW (real time)” for each island.
- Pacific meteorological agencies are using the GSMaP for real-time rainfall monitoring around their island in terms of disaster risk management without hardware/software installation and operation & maintenance cost.

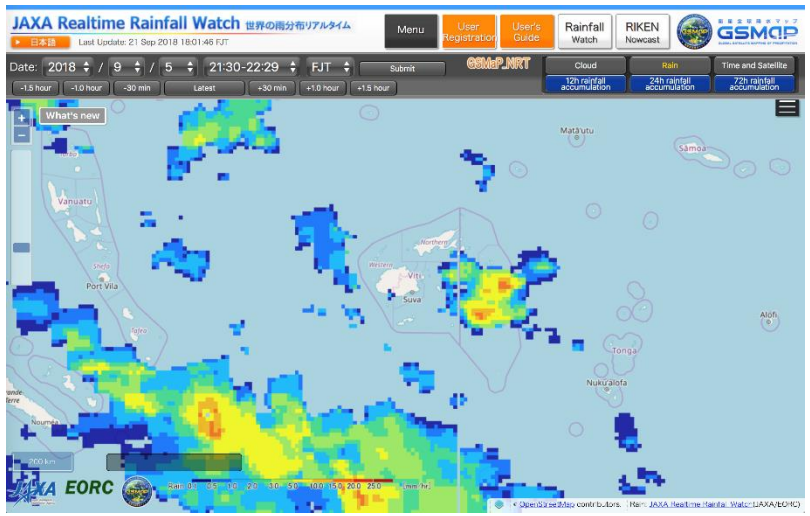
Solomon met.

Meteorological agencies using GSMaP:
Chuuk Micronesia met., Fiji met., Kosrae Micronesia resource management, Marshall met., Palau met. Solomon met., Tonga met. and Vanuatu met.

GSMaP for Fiji

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



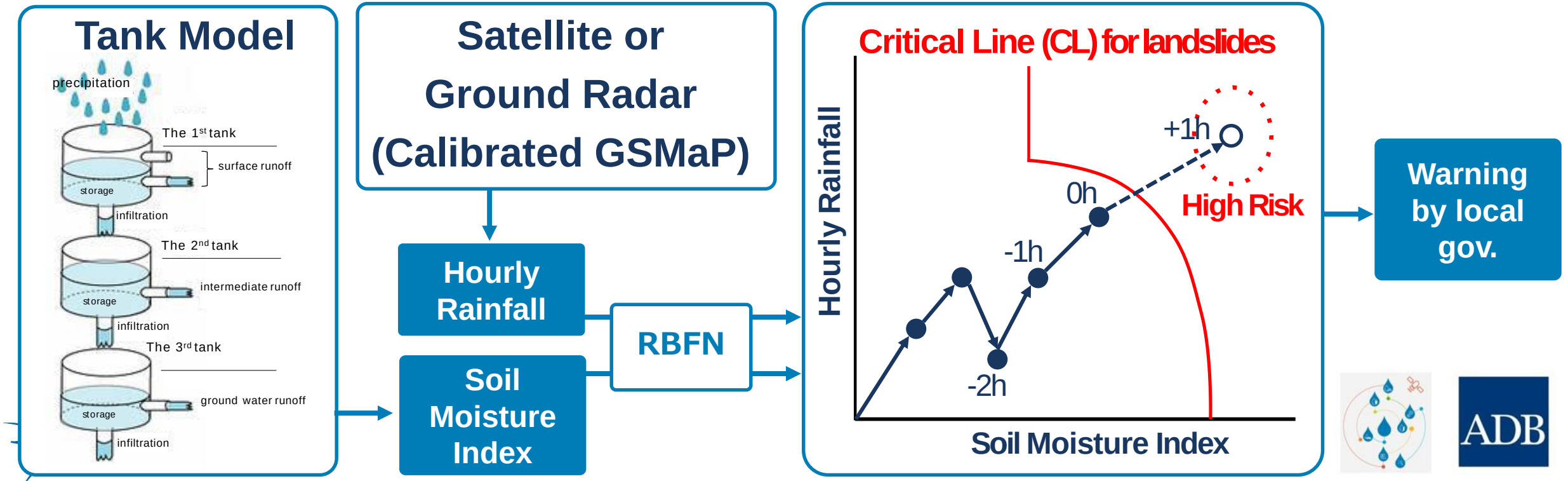


Met. agencies using GSMaP in official web site: Fiji met., Kosrae Micronesia resource management, Solomon met. and Tonga met.

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.



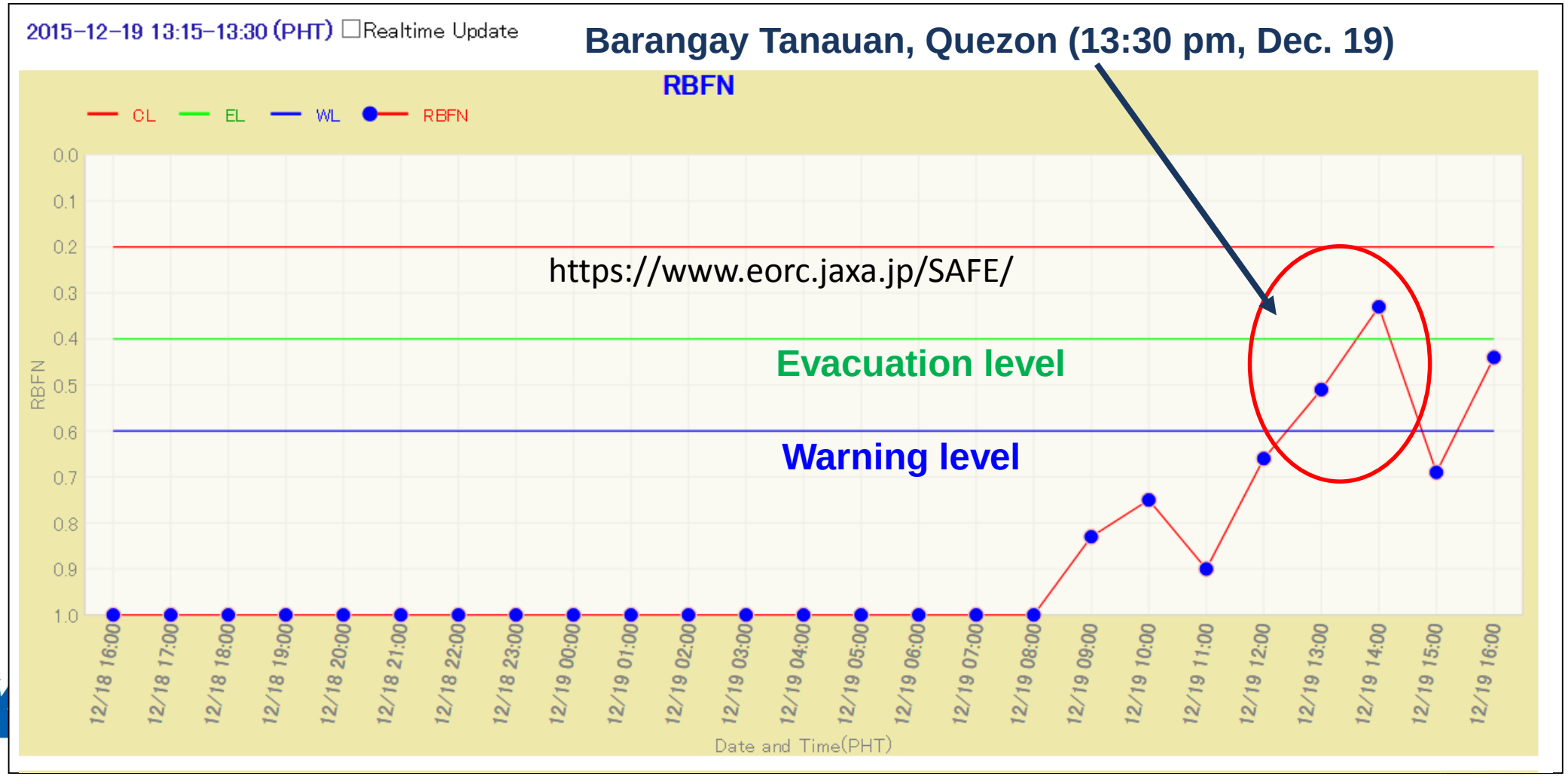
*PHIVOLCS : Philippine Institute of Volcanology and Seismology

**Sentinel Asia: https://sentinel.tksc.jaxa.jp/sentinel2/topControl.jsp

***JMA: Japan Meteorological Agency

Case Study of Typhoon NONA, December 2015

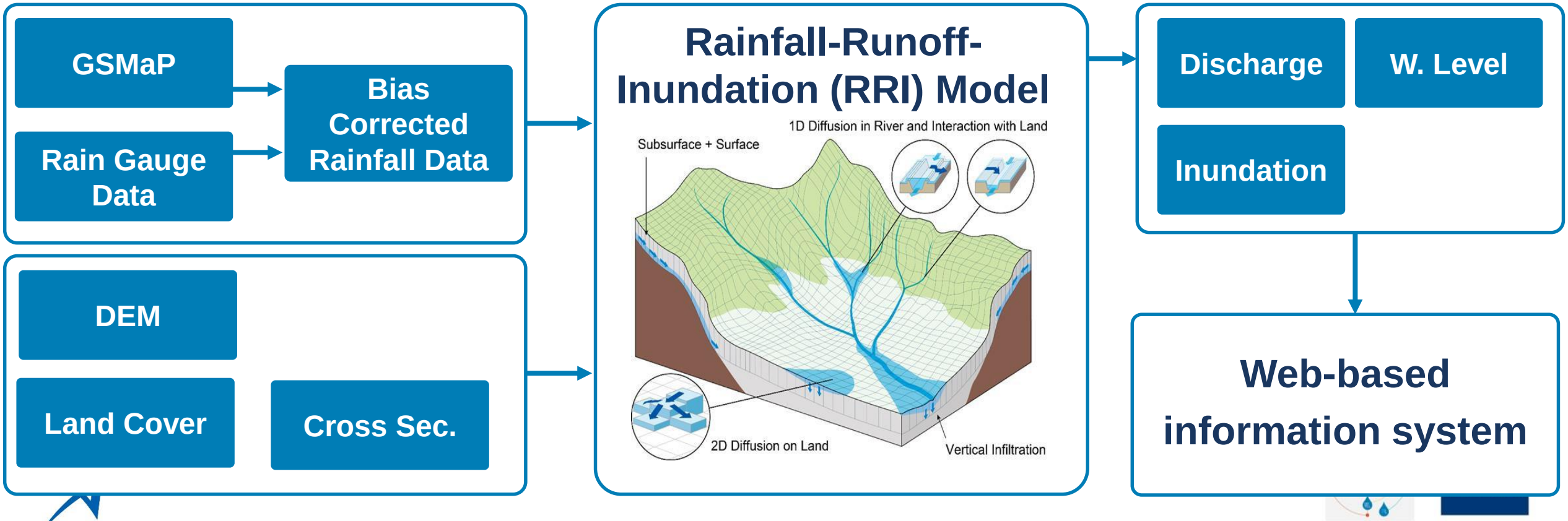
GLAWS issued an alert when the devastating landslide occurred.



Local Provincial DRR Office reported that landslide occurred at about 1:30 p.m. on 19 December 2015

Flood Inundation Forecasting in Sri Lanka

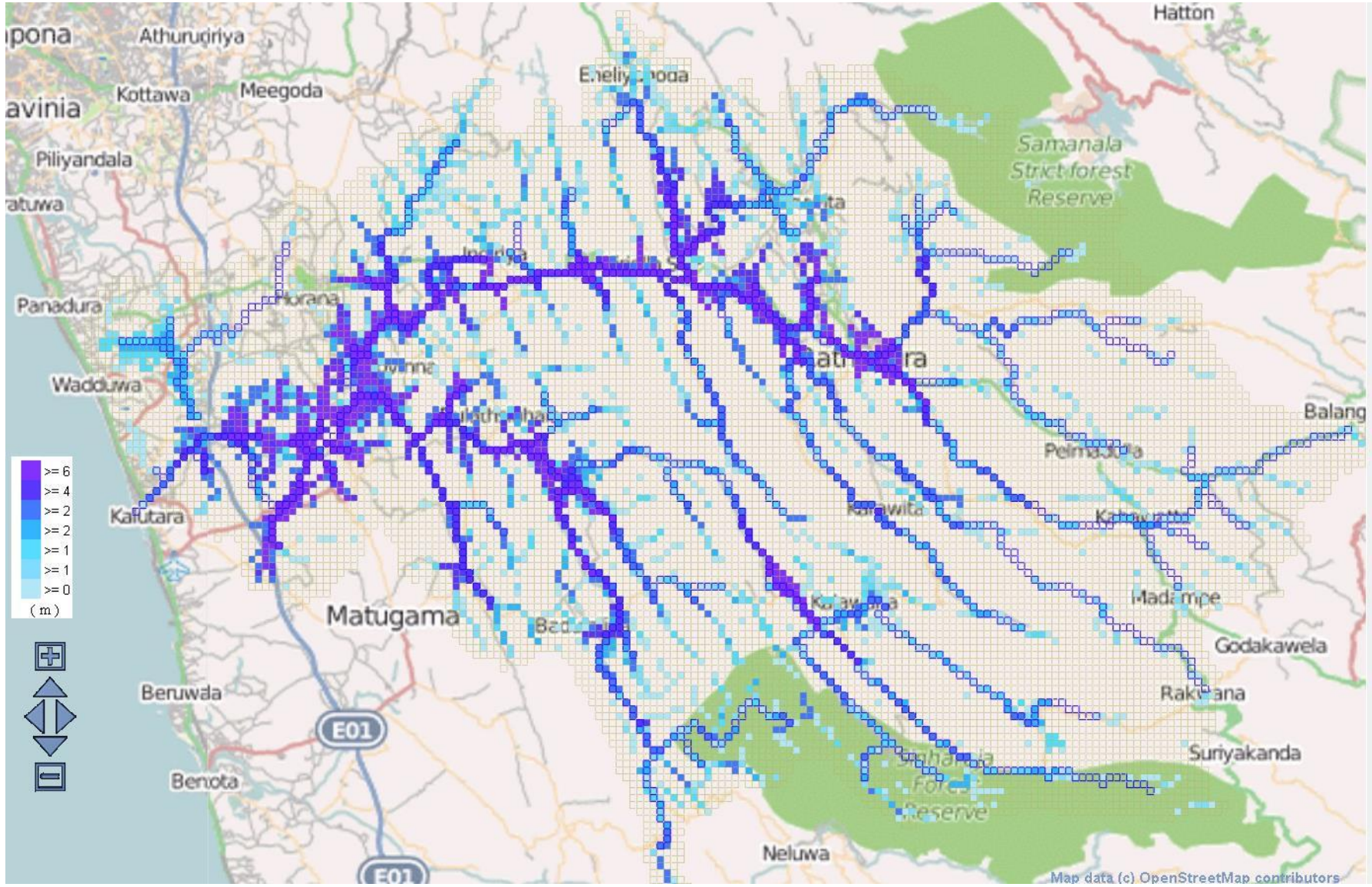
JAXA, ICHARM and ID* demonstrated flood inundation forecasting system in Kelani river basin in Sri Lanka under the SAFE** framework.

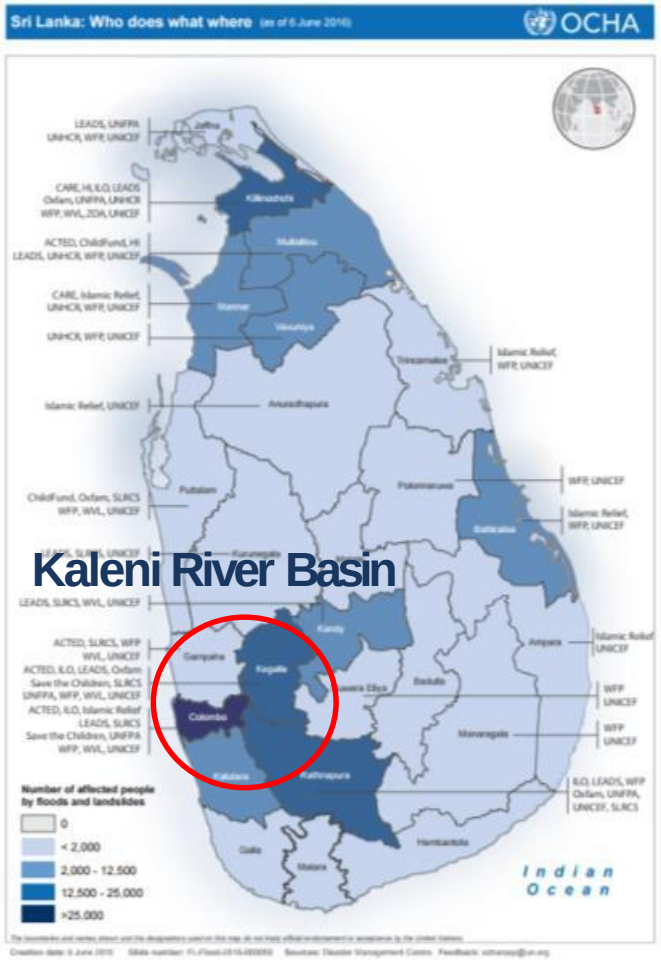


*ID: Irrigation Department

**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