



An Integrated Approach for Maximizing Multi-platform data for Enhancing Water Related Disaster Early Warnings in Developing Countries

keywords: *Real-time data collecting, archiving and integration system, Decision Making Tools, Data and information Dissimilation*

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Background

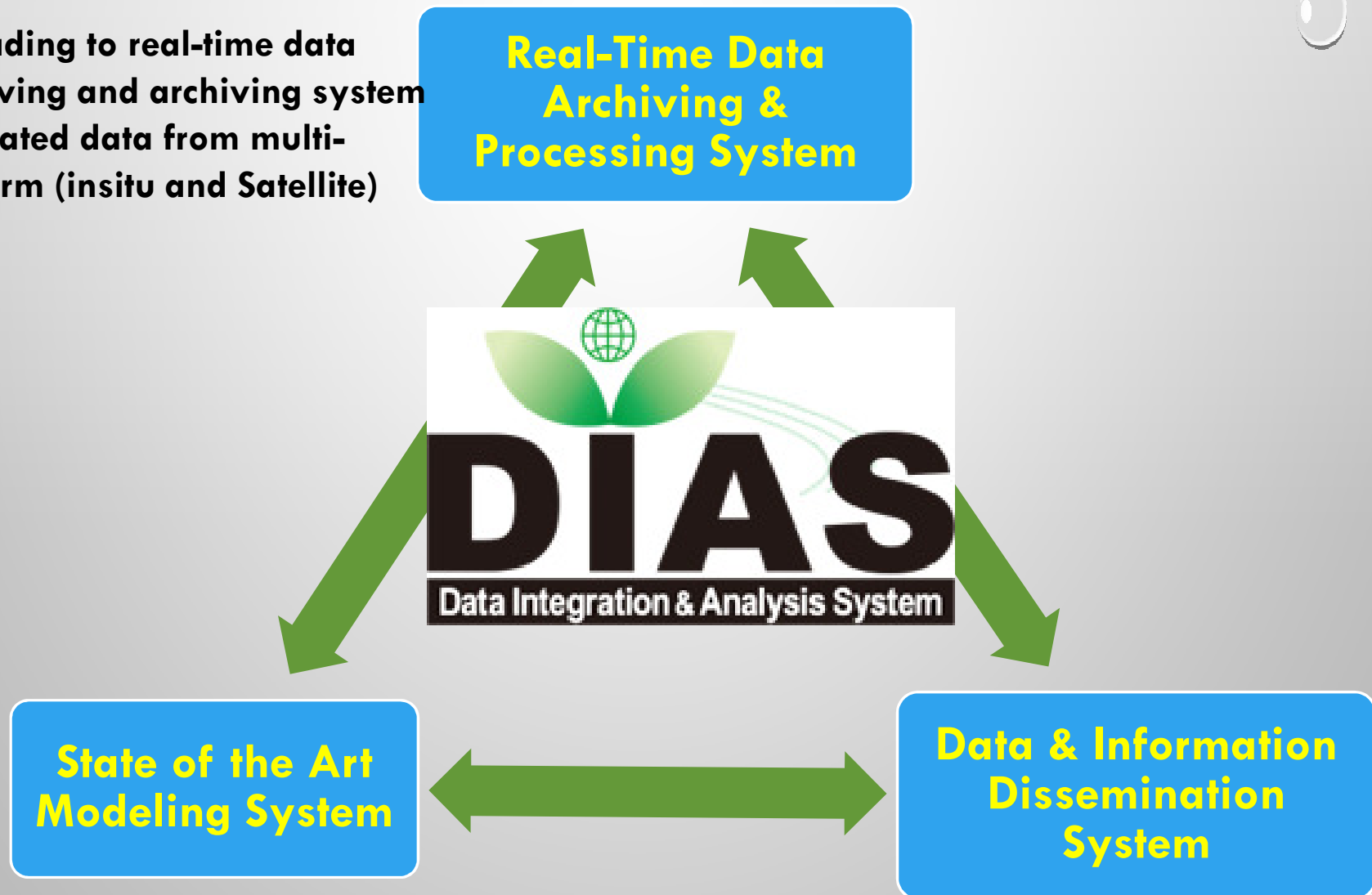
- 🌐 **Reliable and timely information** on water cycle is crucial to enhance early warnings capabilities, decision making, reduce the associated risk and damages.
- 🌐 Developing countries have **inadequate knowledge & technologies** to obtain **reliable & timely information** which is the greatest challenges for improving disaster early warning & risk reduction.



- 🌐 Greater need for **developing data archiving and Integration technology & their applications** to disaster risk reduction.

3 Aspects on Monitoring & Early Warning System

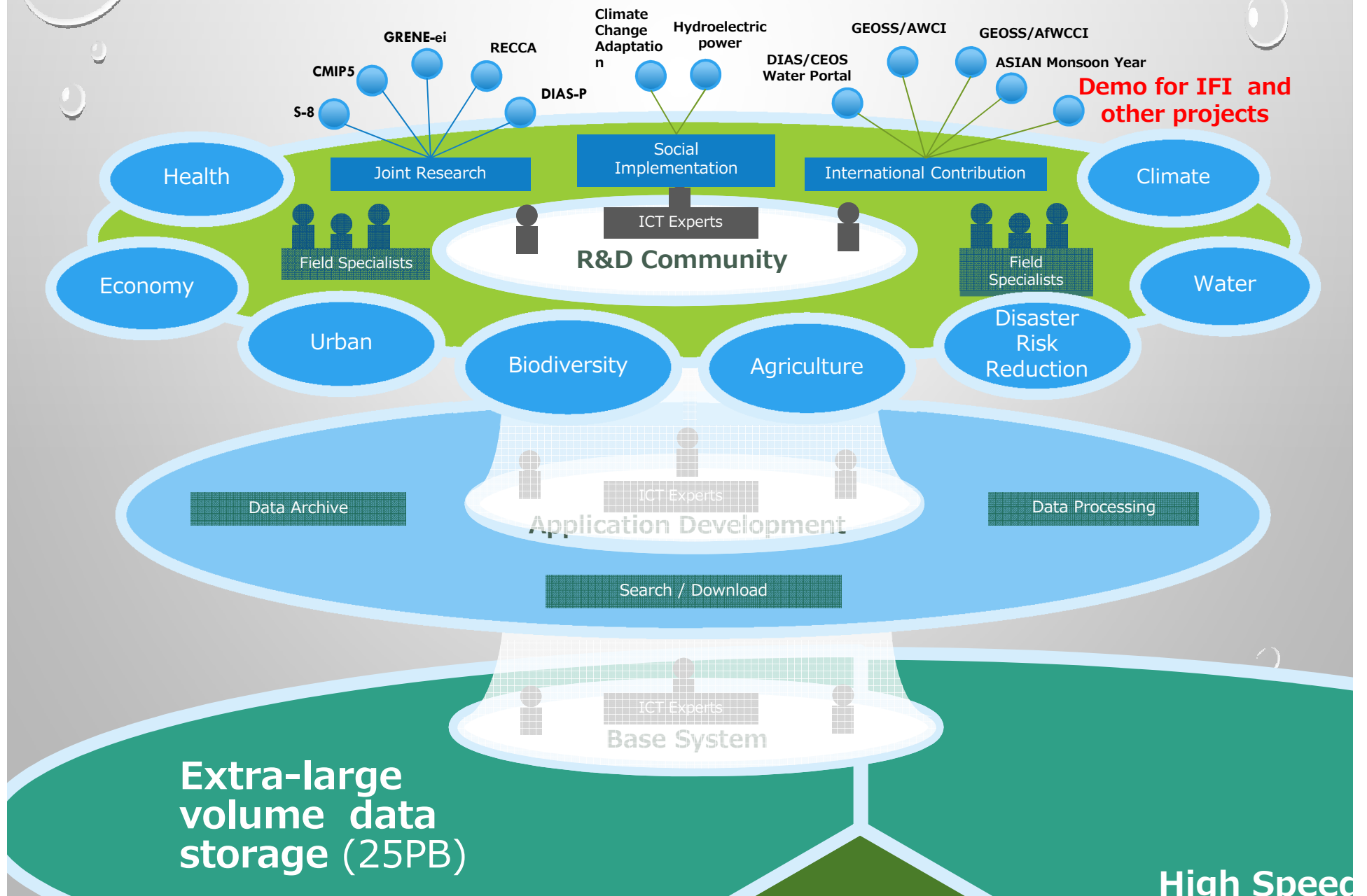
- Upgrading to real-time data observing and archiving system
- Integrated data from multi-platform (insitu and Satellite)



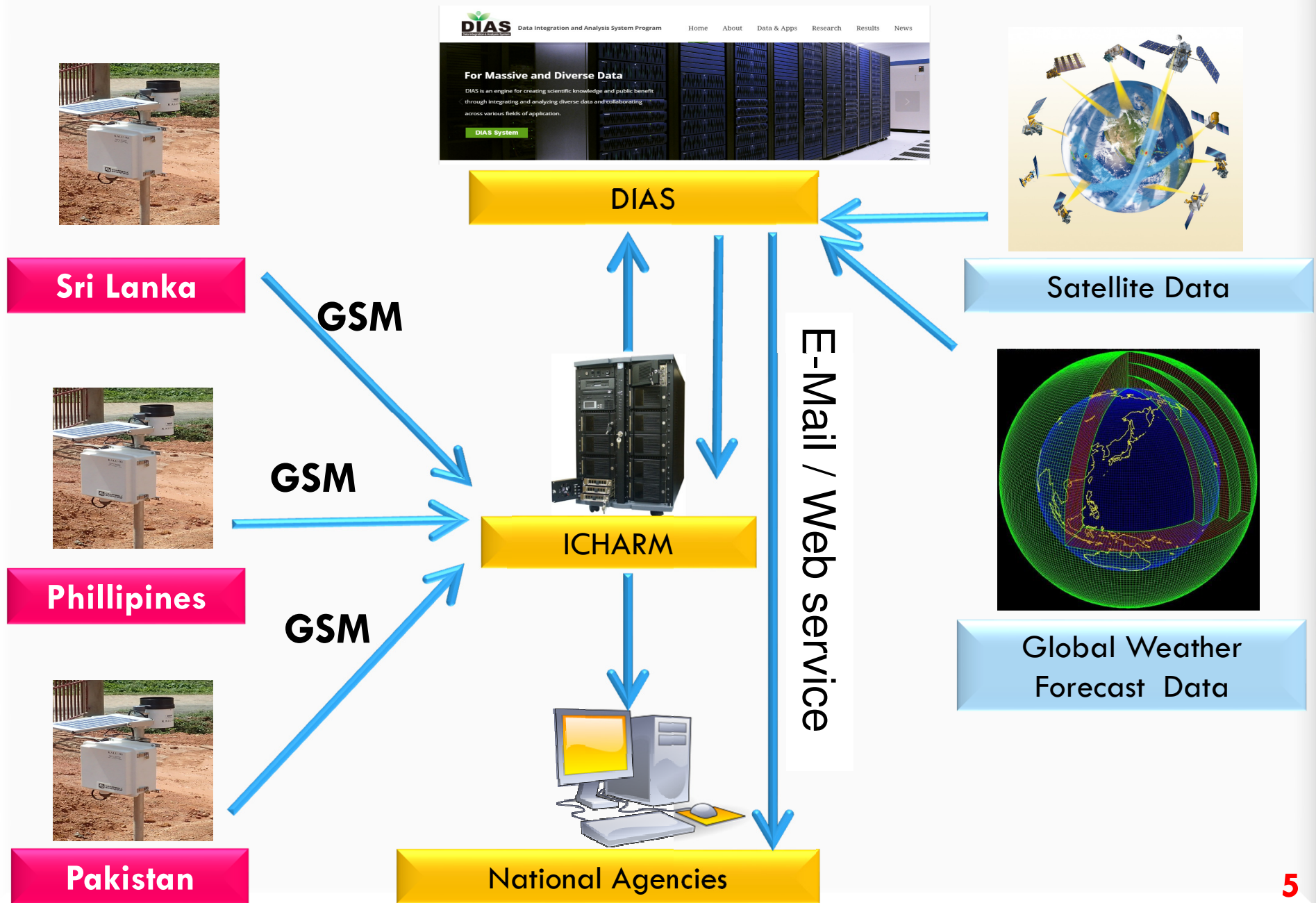
- Simulating and forecasting water related disasters

- Automated alerts & Online- data Transfer
- Dissemination from models and satellite

DIAS: legacy for Japan contribution



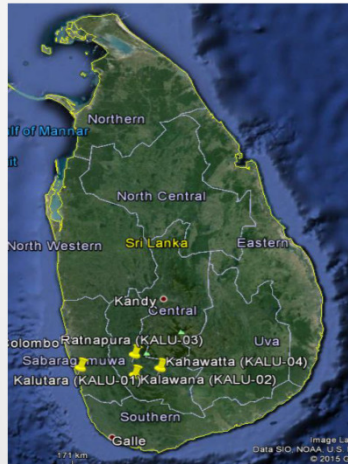
Data Collection, Processing & Sharing



Overview of Activities

RT
Gauge
Data

✓ Faster way to
get rainfall data

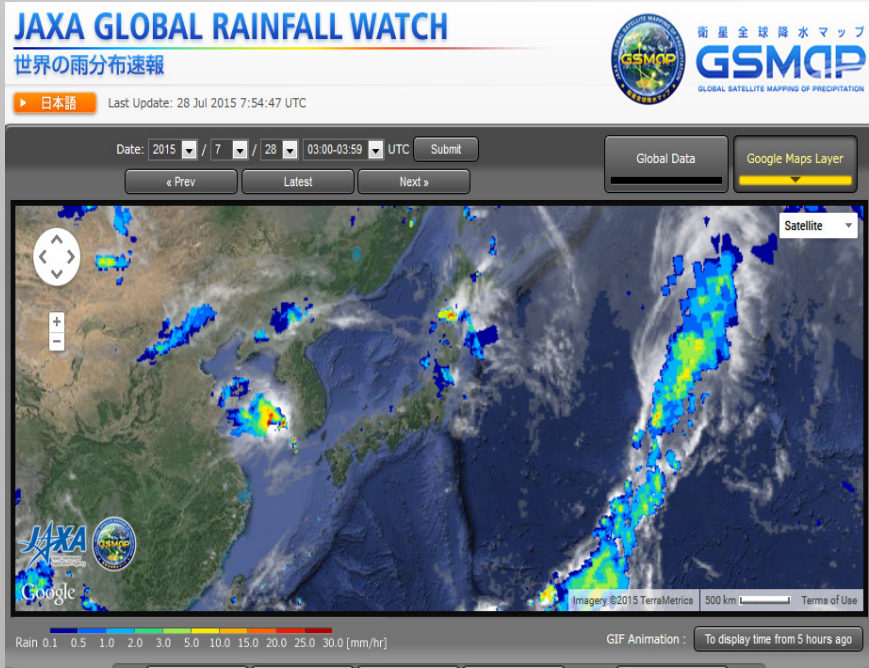
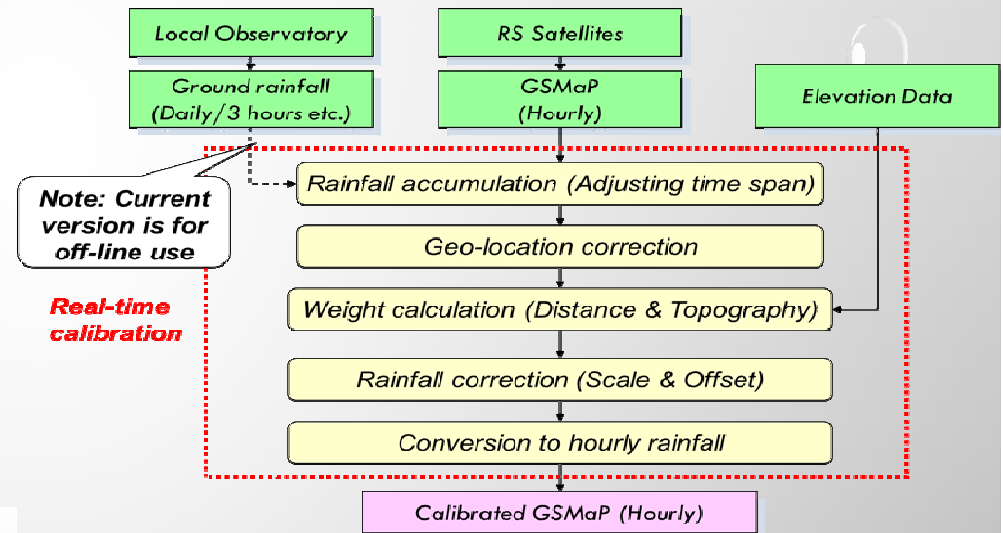
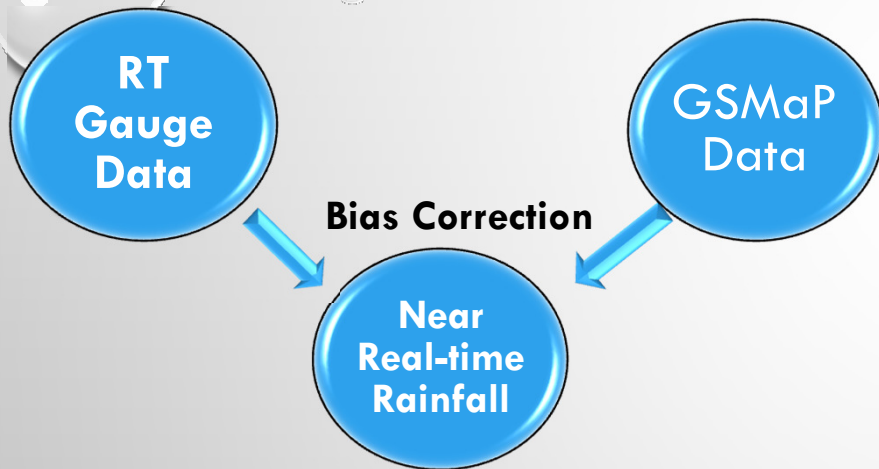


✓ Kalu River basin
as a pilot region



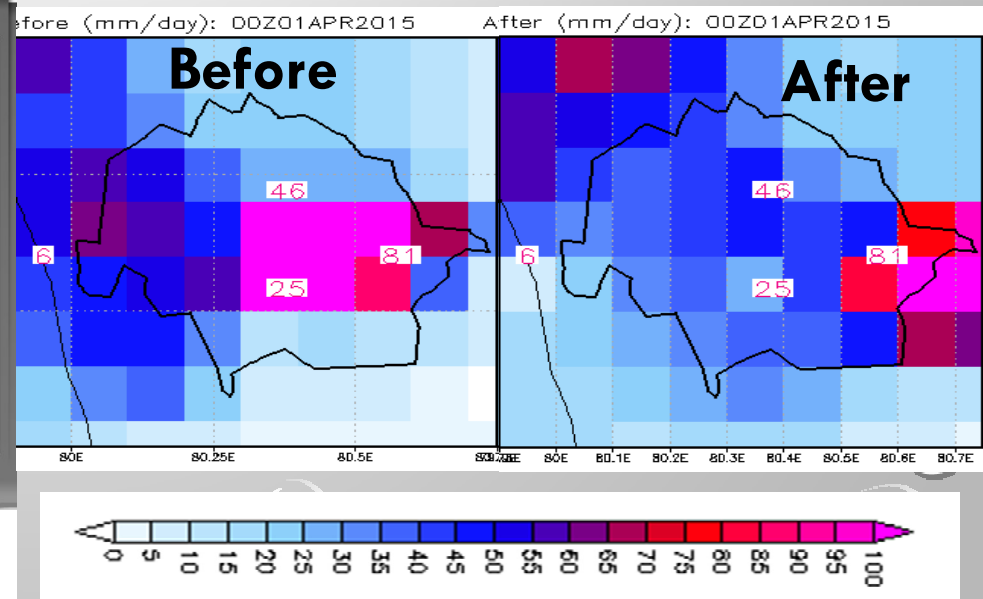
Upgrading to real time rainfall data observing system

Overview of Activities

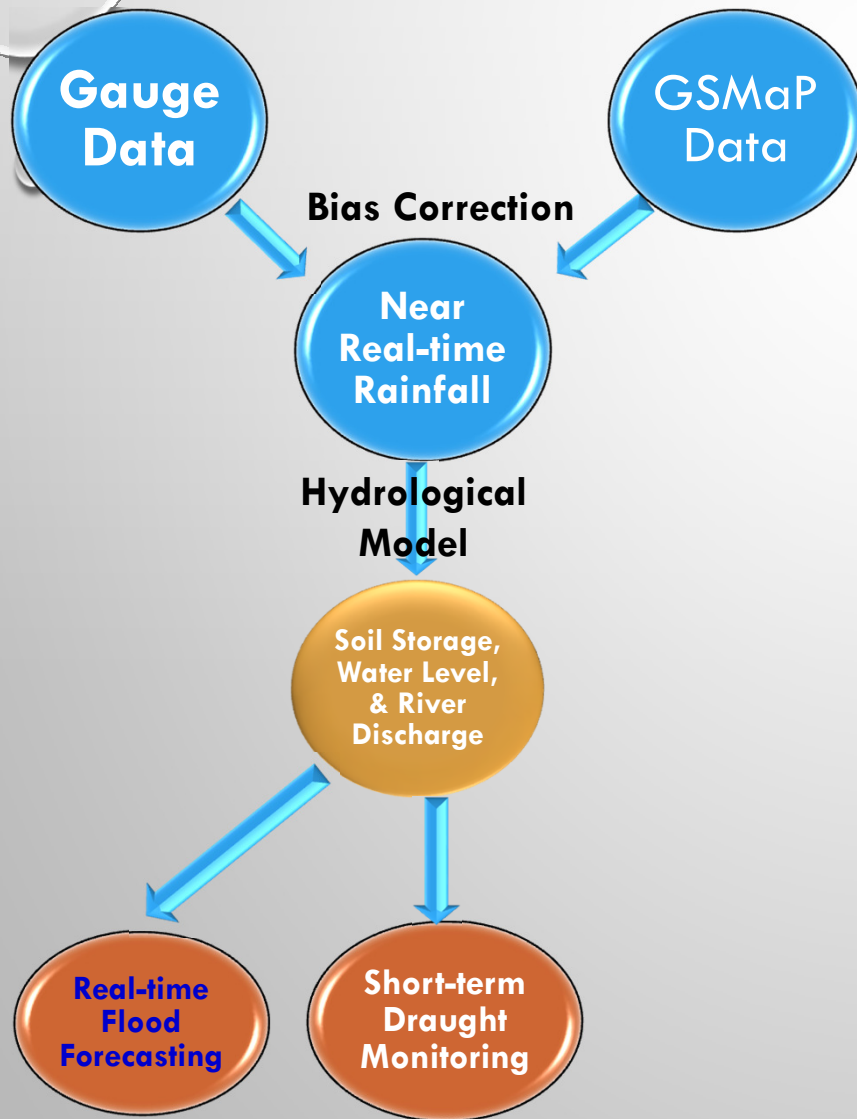


0.1-deg and hourly global rainfall product after 30min and 4-hour

1. ICHARM JAXA-NTT data bias correction algorithm (GSMaP-IF2)

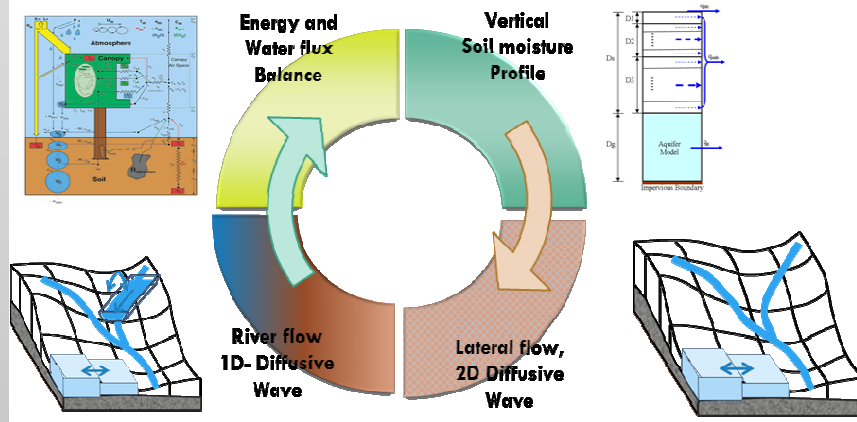


Overview of Modeling Activities



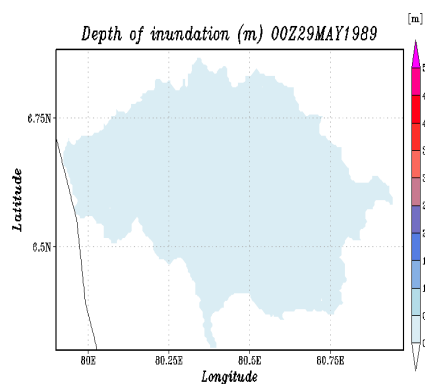
Hydrological Modeling for Water Resource Management

Water and Energy Balance based Rainfall-Runoff-Inundation Modeling (WEB-RRI)

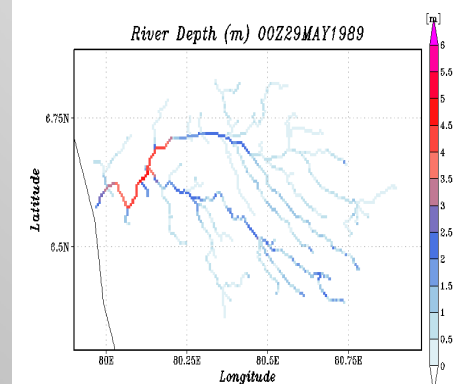


Discharge & Inundation Simulation

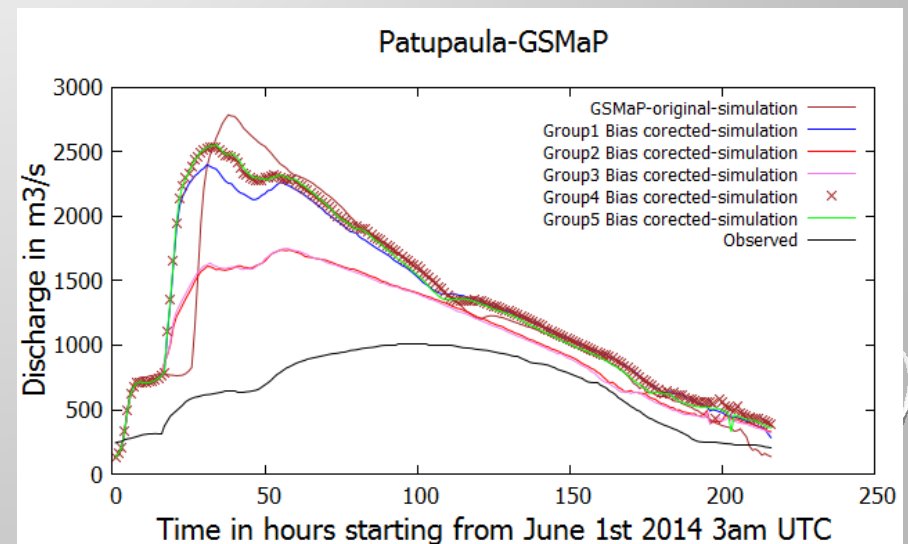
1. Improved initial condition
2. Improved Forecasting
3. Self calibrating system for long-term (climate) simulation



Inundation

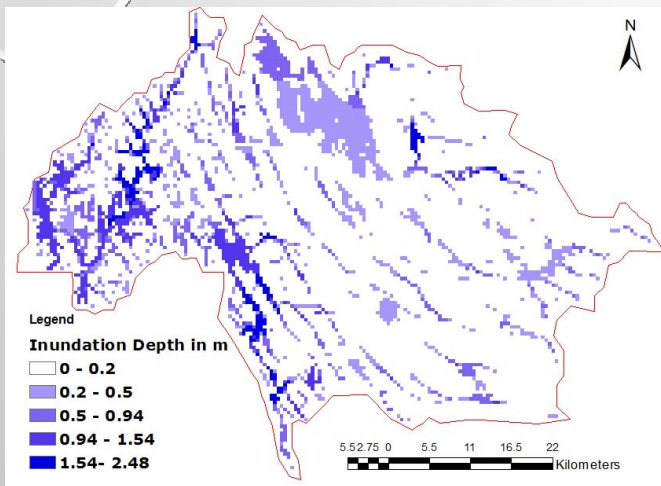


Water Depth

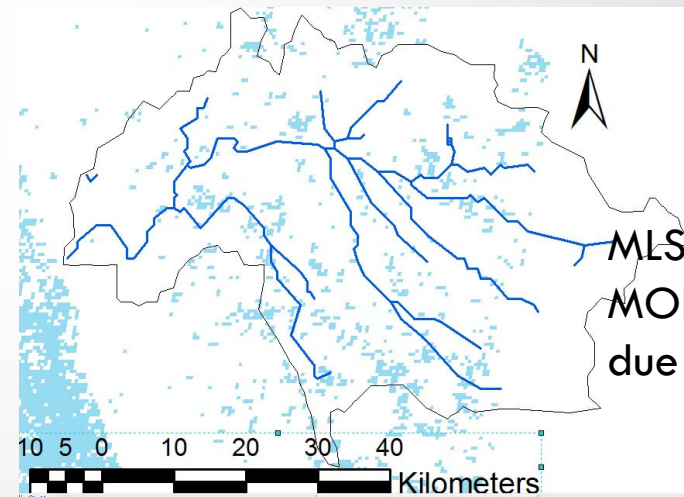


Discharge

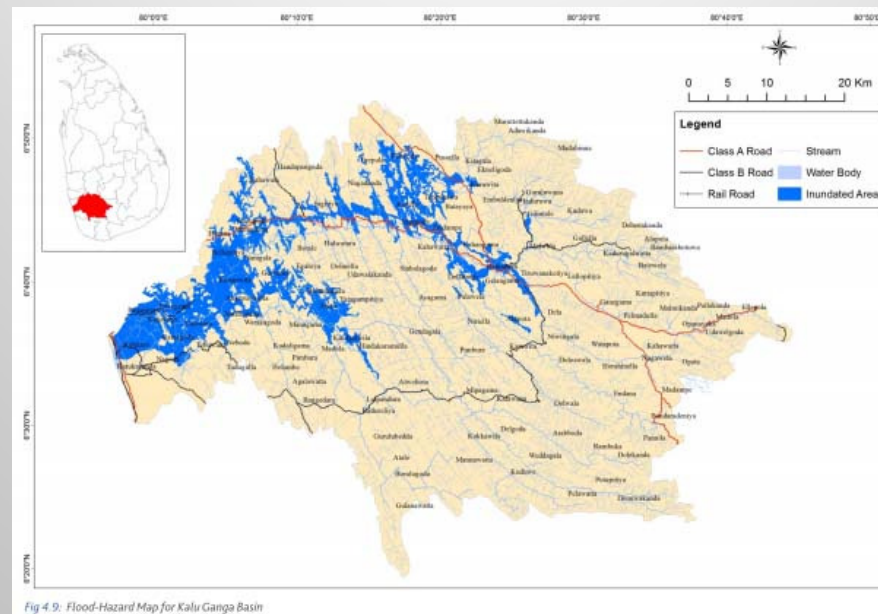
Inundation map and comparison with satellite data



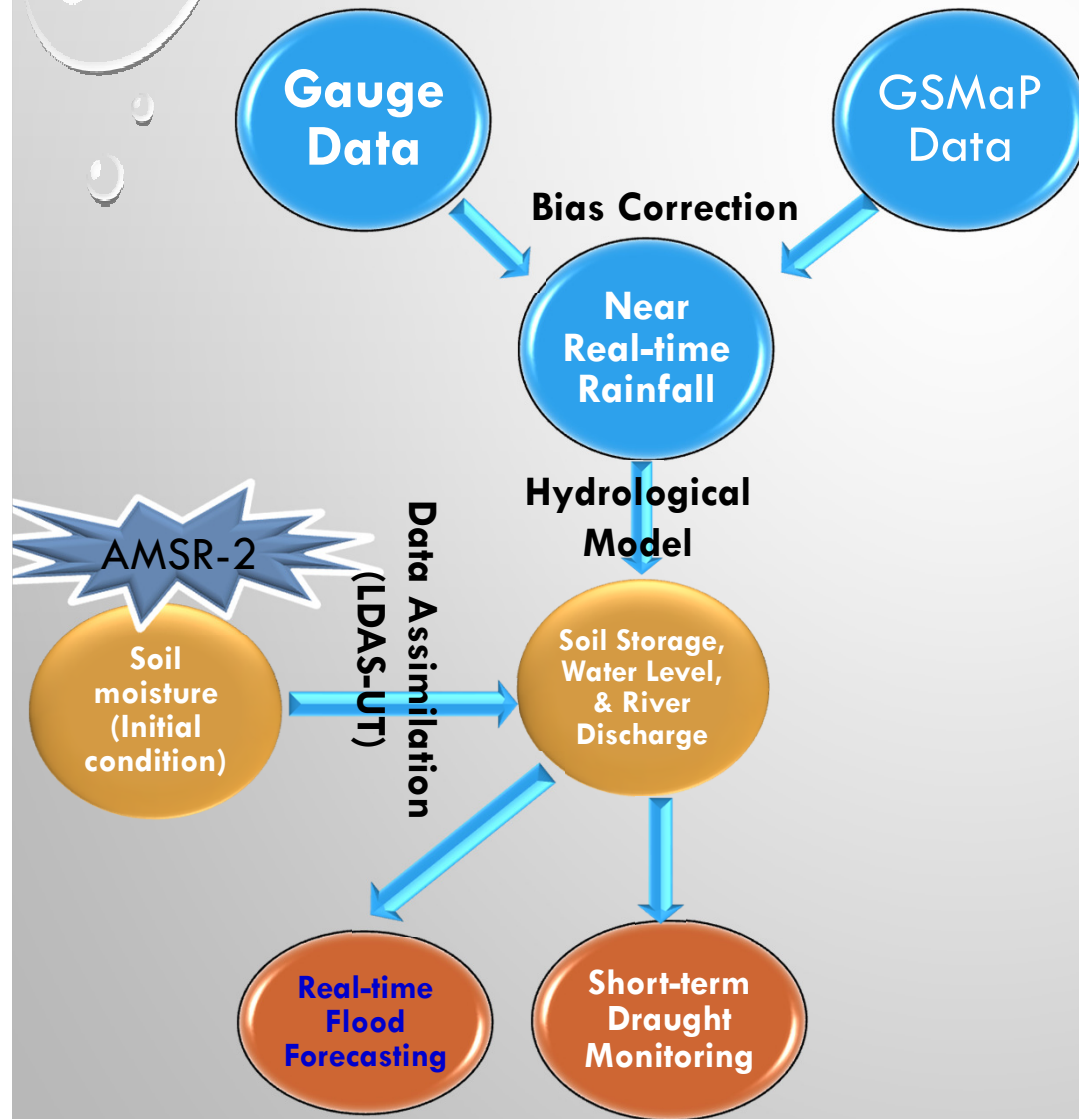
Inundation from Model



MLSWI map from MODIS – Has errors due to cloud coverage

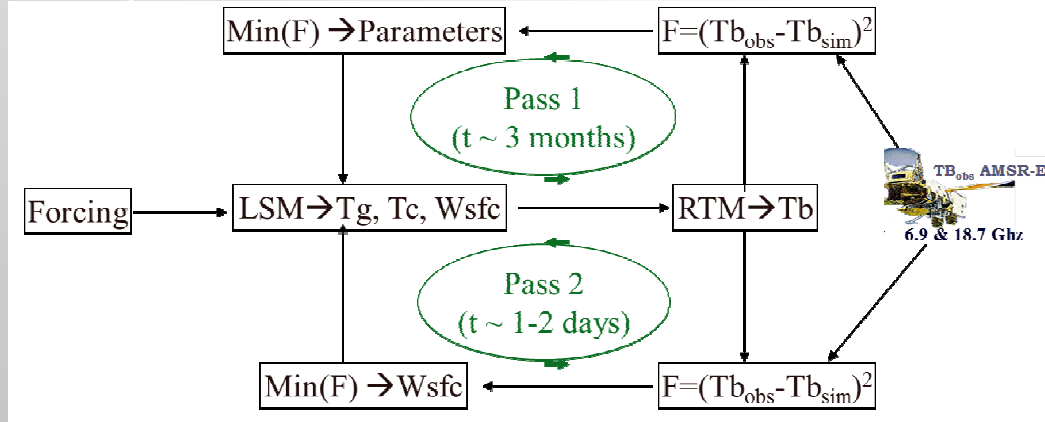


Overview of Activities

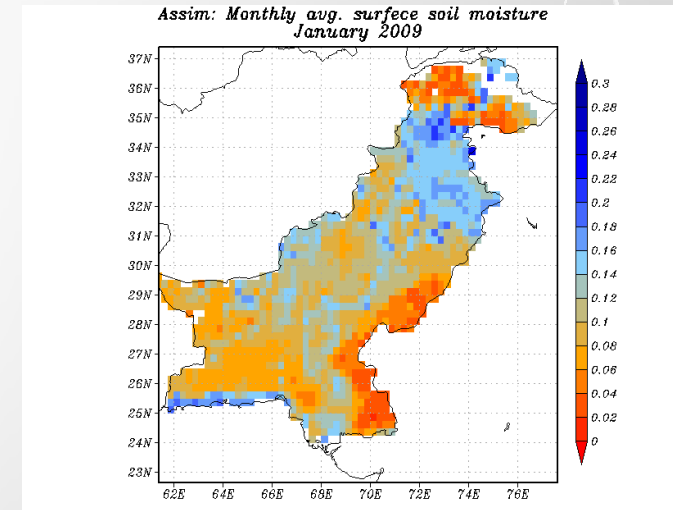


Regional Drought Monitoring & Damage Assessments

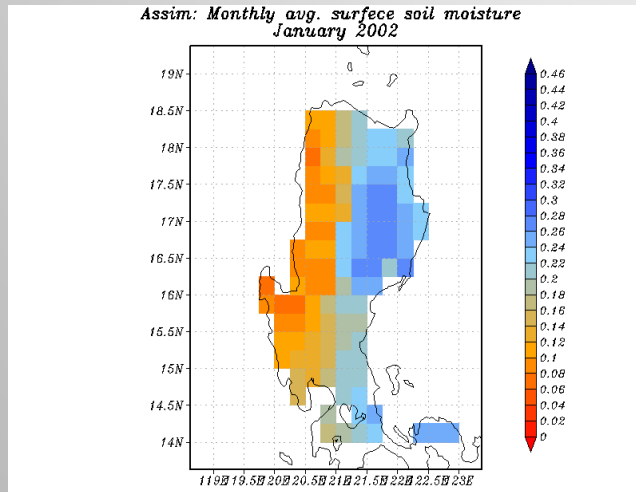
LDAS-UT dual-pass algorithm



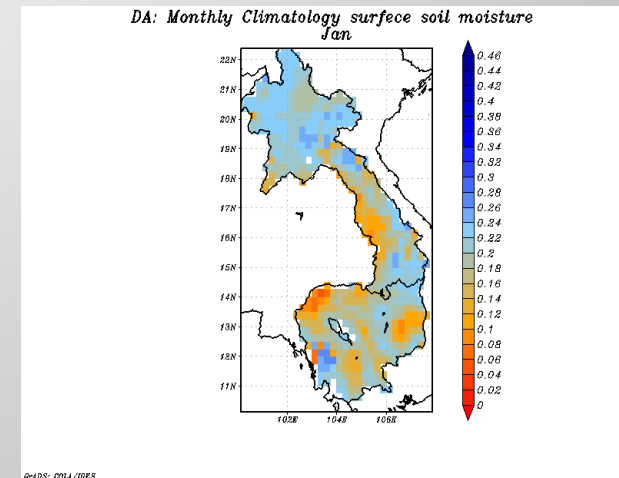
High spatial & temporal water and energy flux data.



Pakistan

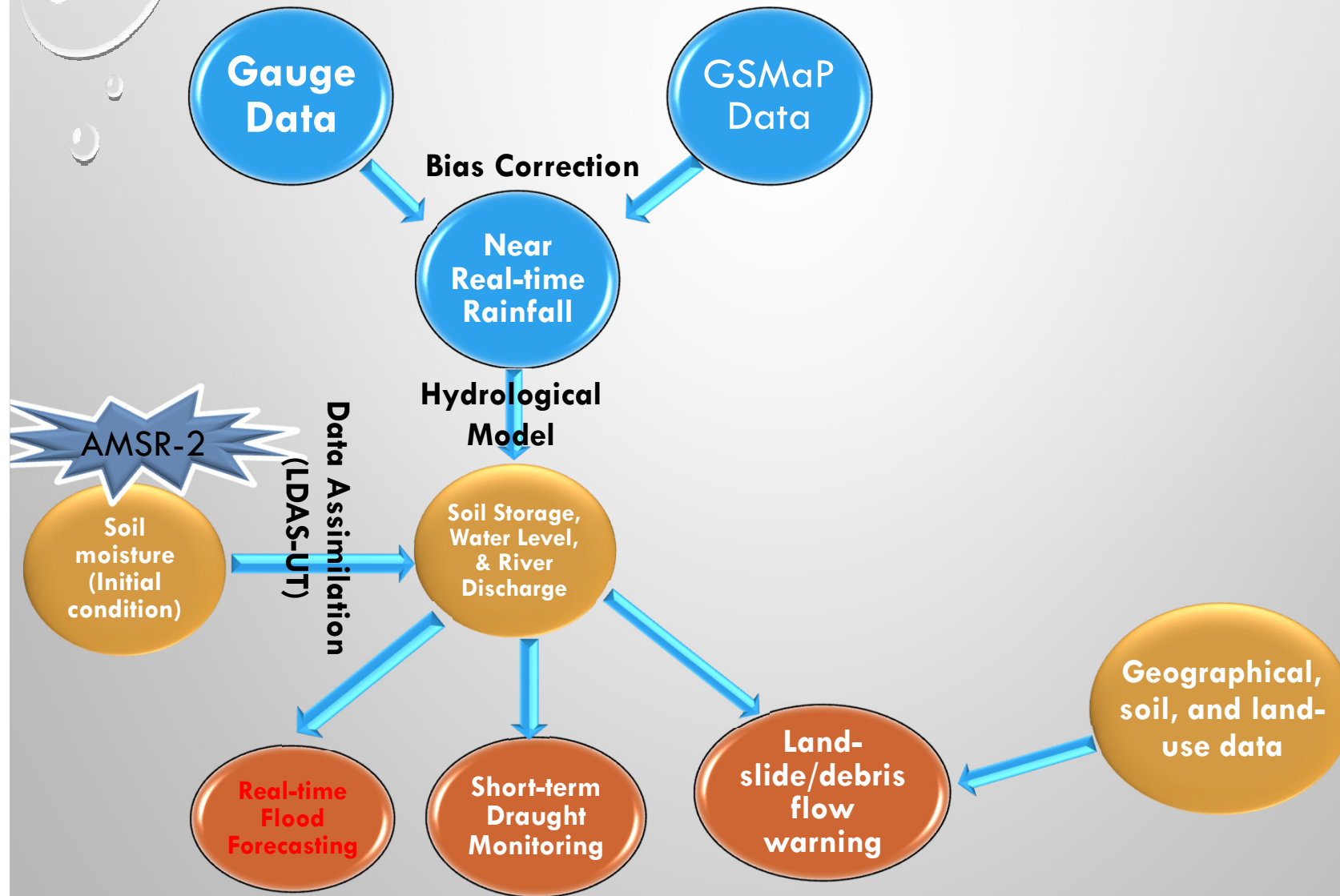


Philippines



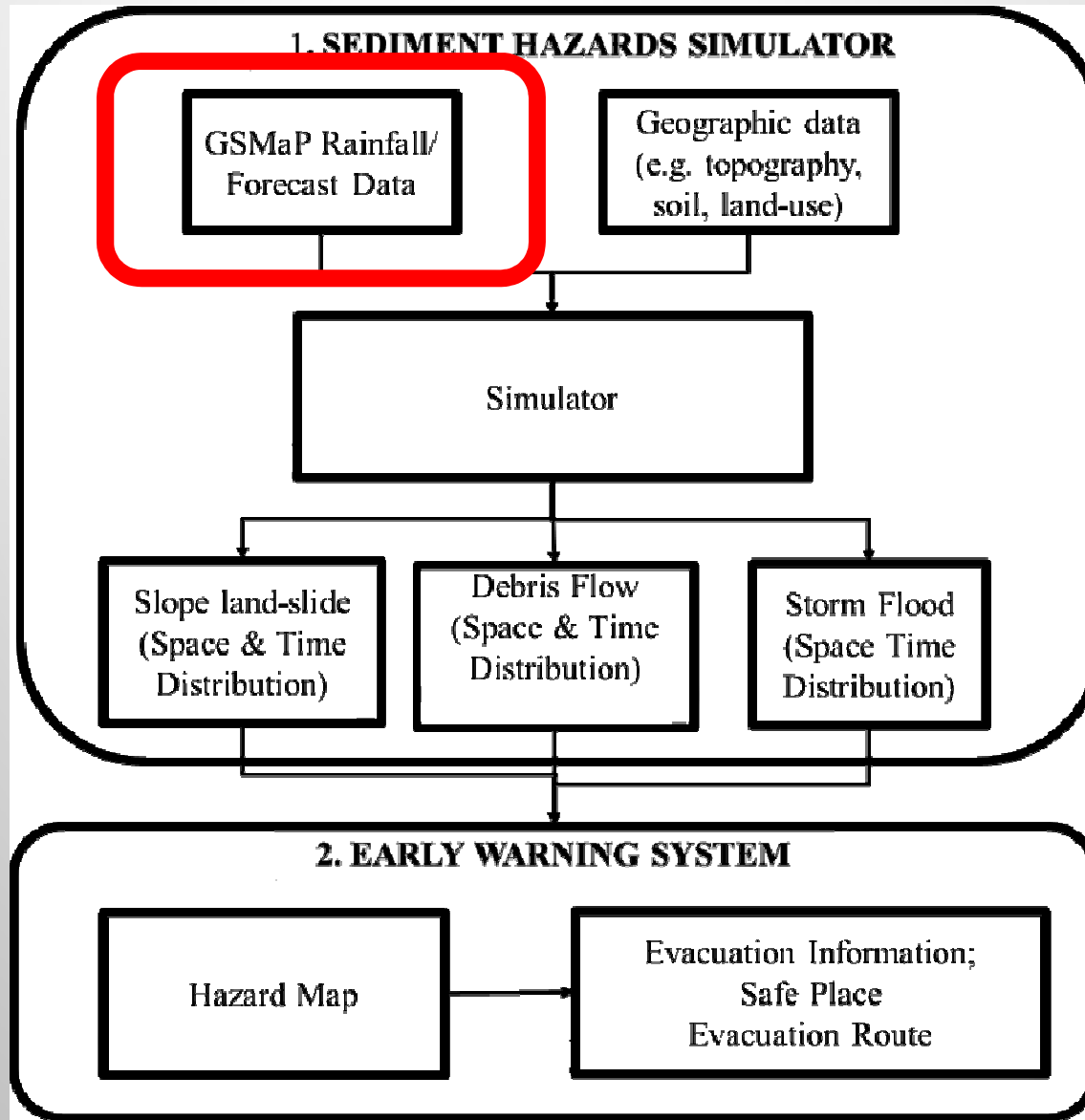
Mekong-River

Overview of Activities



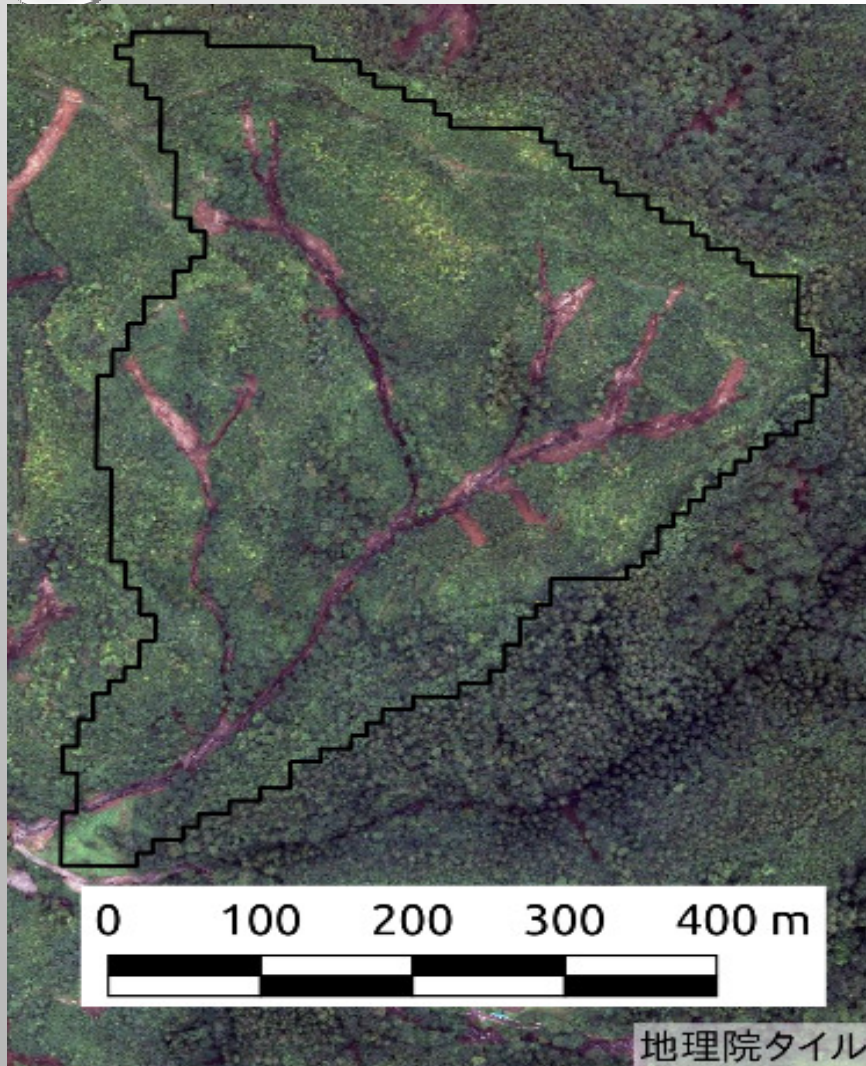
Real-Time Sediment Hazards Simulator

Ground +
Bias Corrected
GSMaP

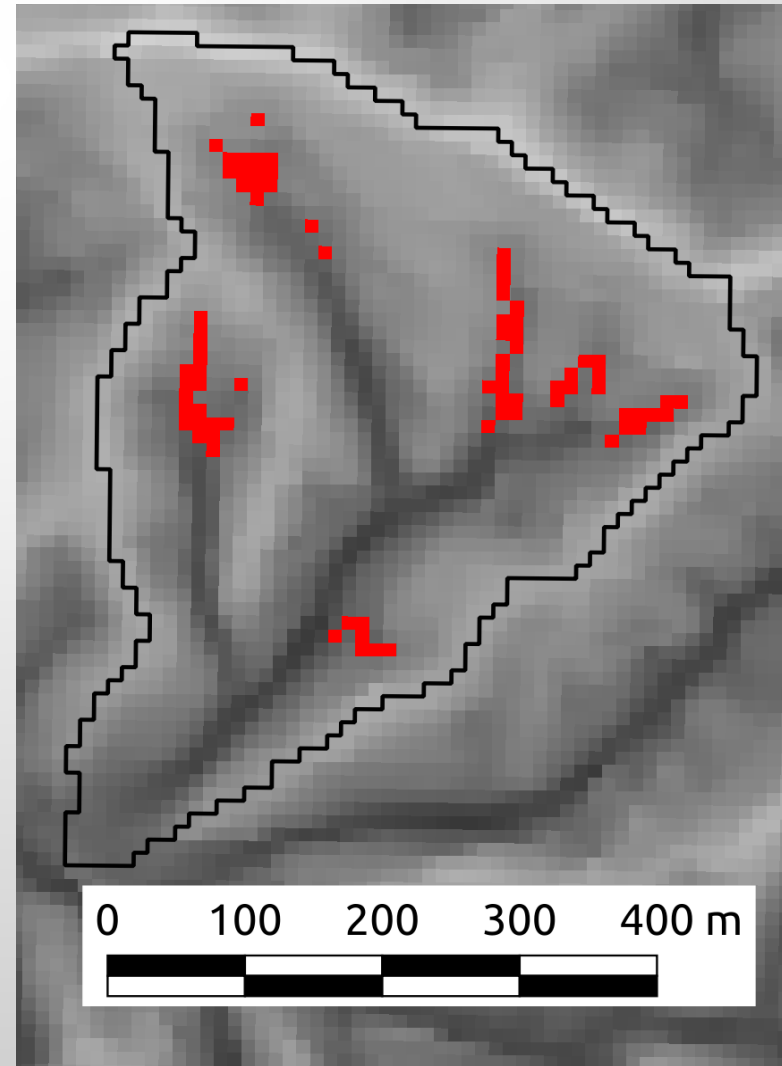


Sediment hazard simulation and early-warning system

Real-Time Sediment Hazards Simulator

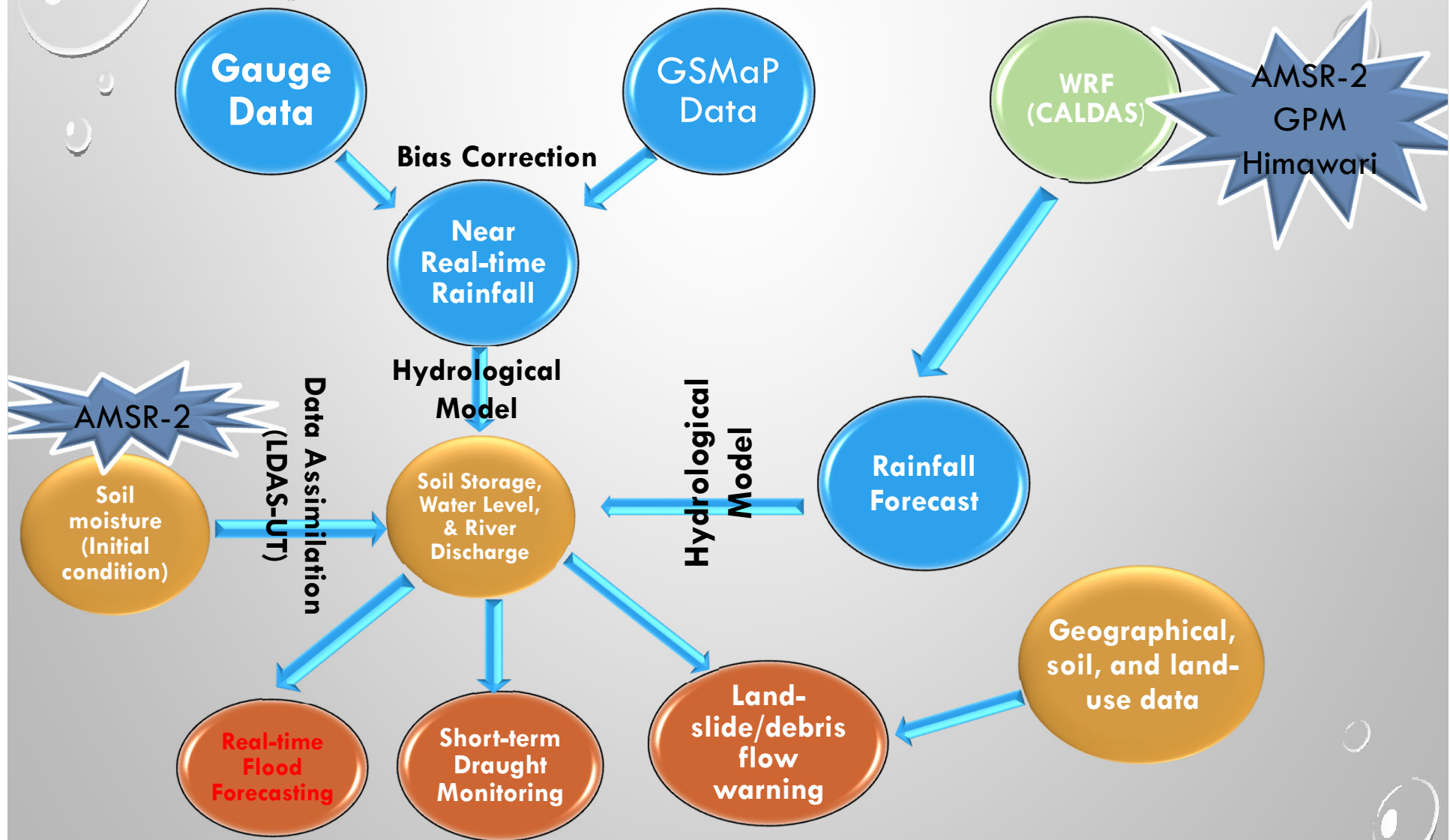


Observation from Geospatial Information
Authority of Japan

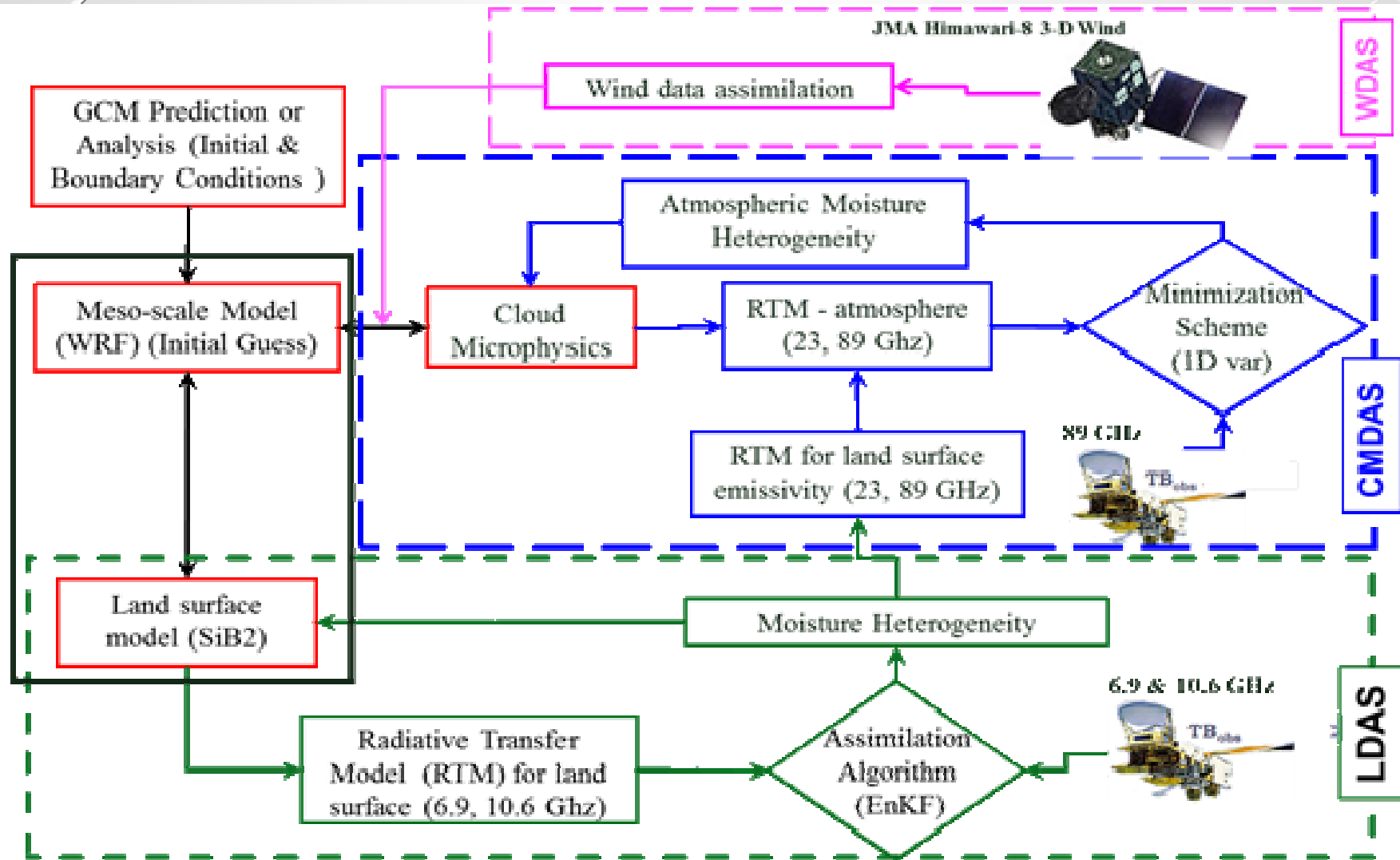


Results from model simulation

Overview of Modeling Activities



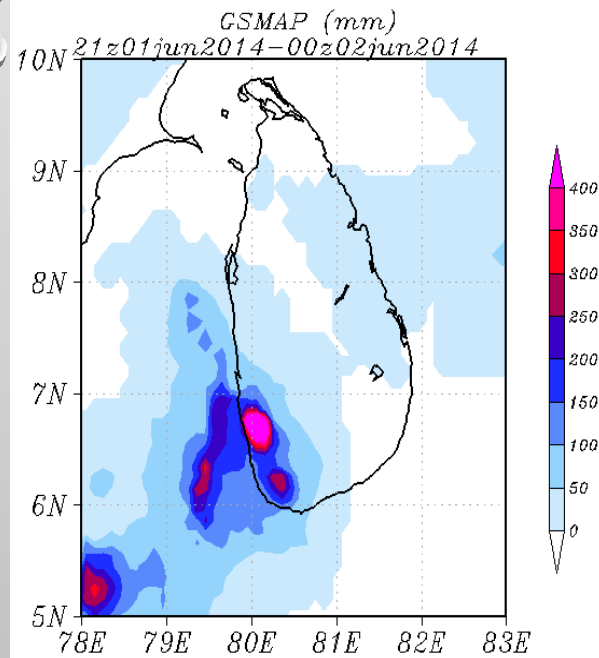
Weather Forecasting for improved Early Warning: CALDAS



Meso-scale model
 Land data assimilation system (LDAS)
 Cloud Microphysics Data assimilation System (CMDAS)
 Proposed Wind Data Assimilation System (WDAS)

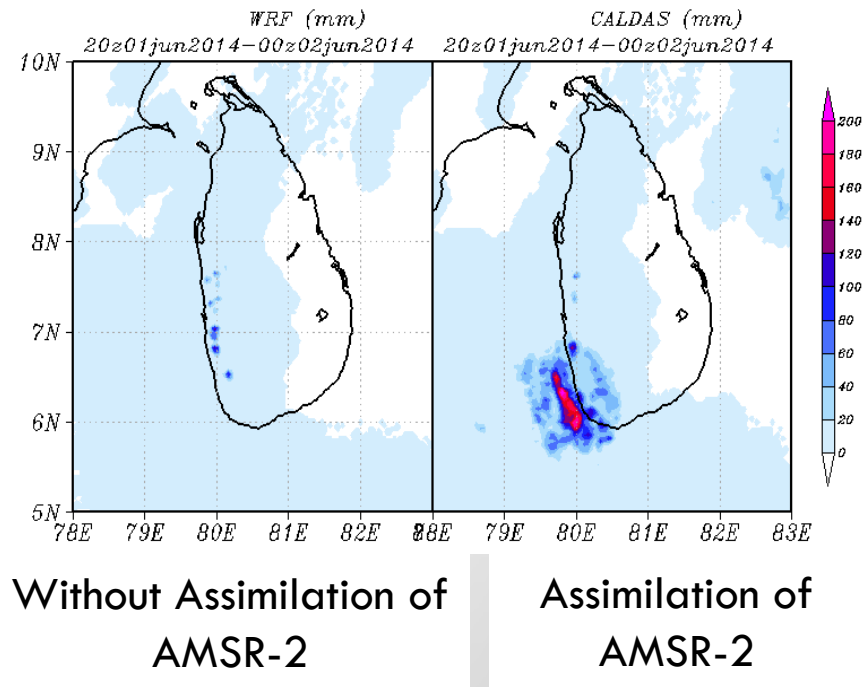
CALDAS-Sri Lanka

Quantitative Precipitation Forecast



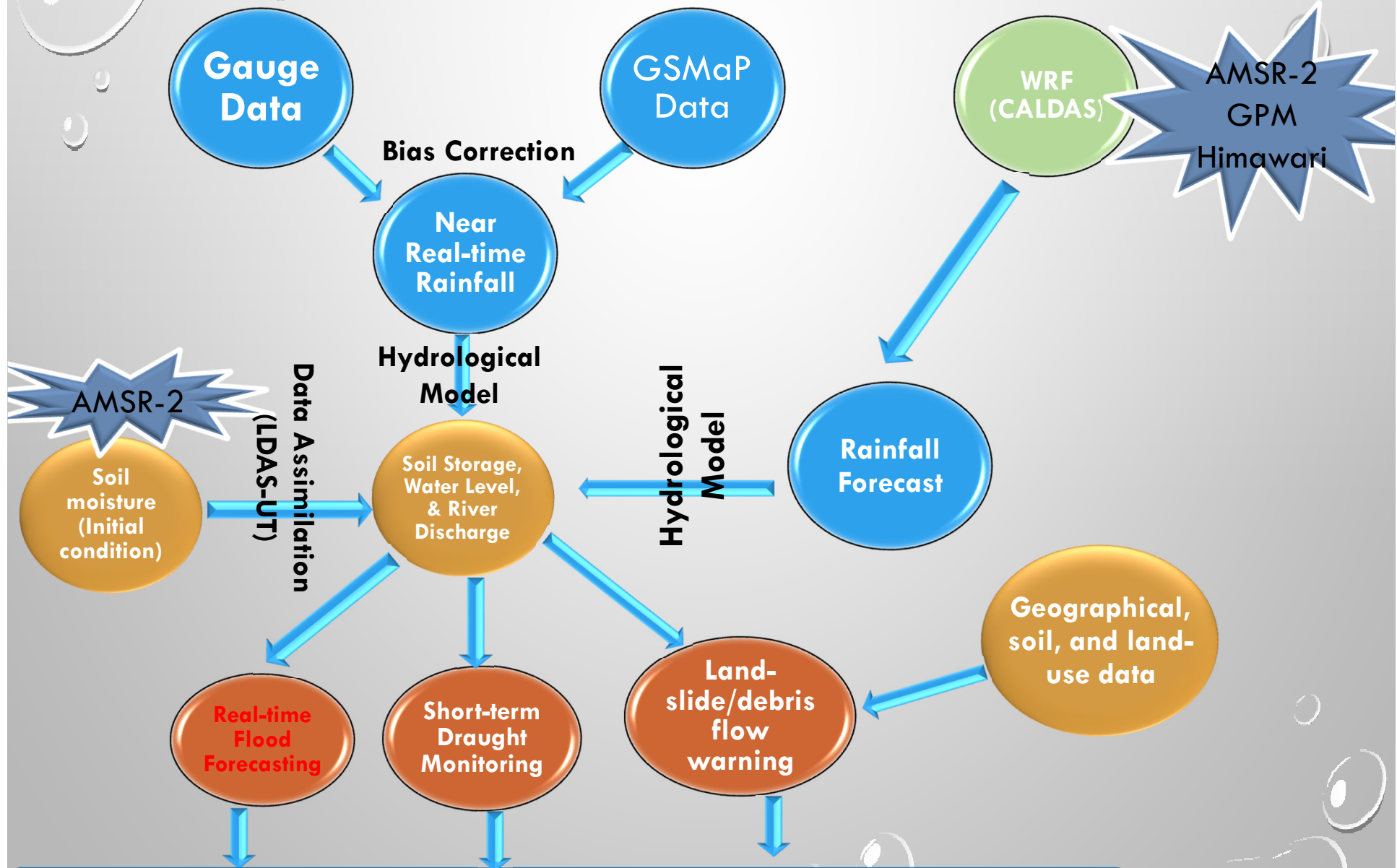
303mm

from 31 May – 4th June 2014



Forecast will be improved by assimilating real-time Himawari 3D-Wind fields

Overview of Activities



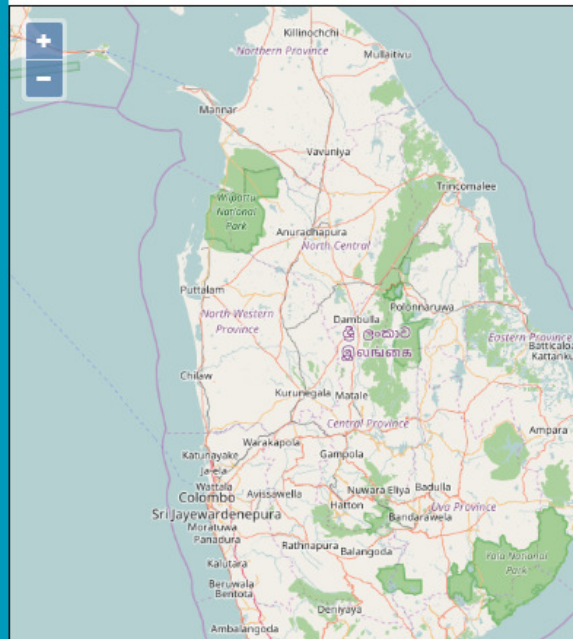
Socio-economic Benefits:


Hazard Maps & Disaster Early Warning, Assessment of Risk and Damages


Data & Information Dissemination


Overview	Kalu River	Kelani R
New features	Map Centre	Partner
About this site	Flash Flood Products	Weather Info


Cloud coverage



 Low Risk (Flood levels below 0.2m)

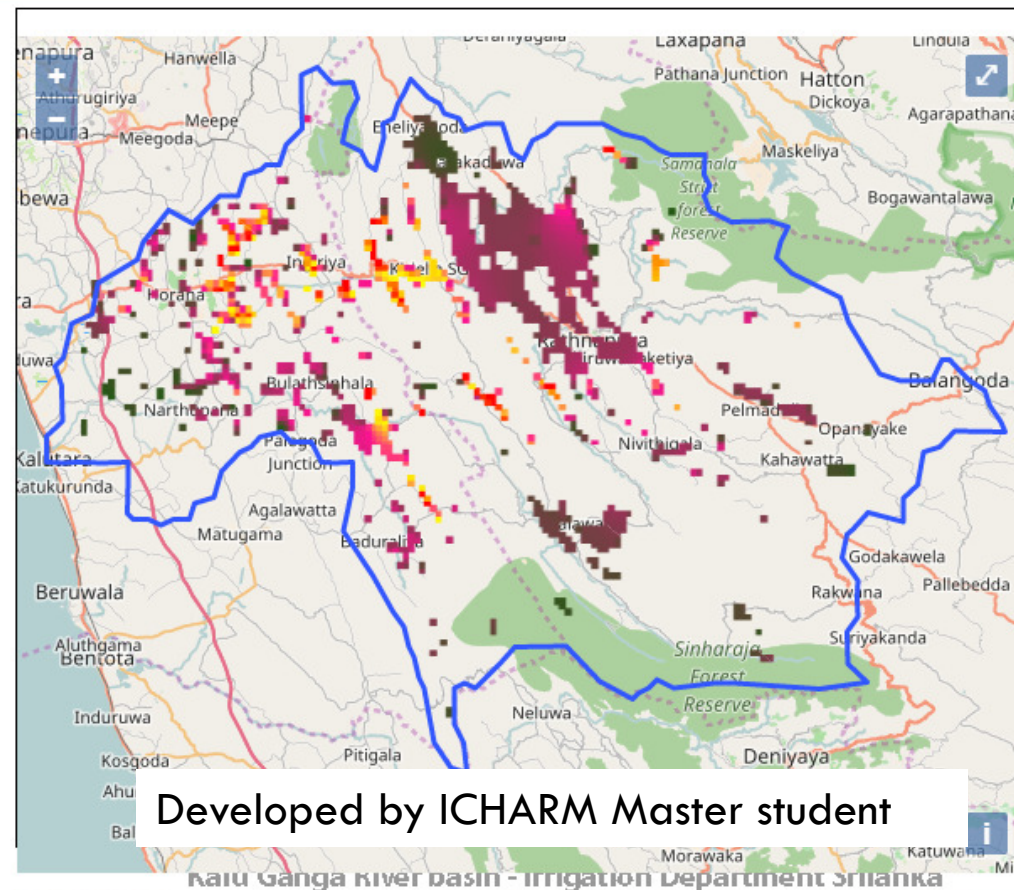
 Risk (0.2m to 0.6m)

 Medium Risk (0.6m to 1m)

 High Risk (Above 1m)

Overview	Patupaula	Ellegawa	Ratnapura	Milakanda
New features	Map Centre	Partners	Water Level Data	Rainfall data
About this site	Flash Flood Products	Weather Information	Historical Data / Reports	Links

Overview

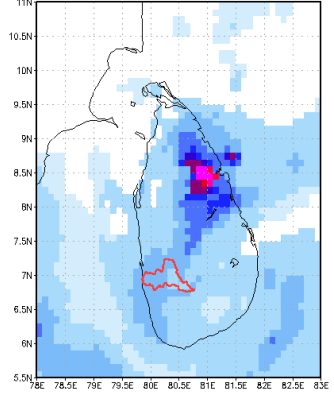


Developed by ICHARM Master student

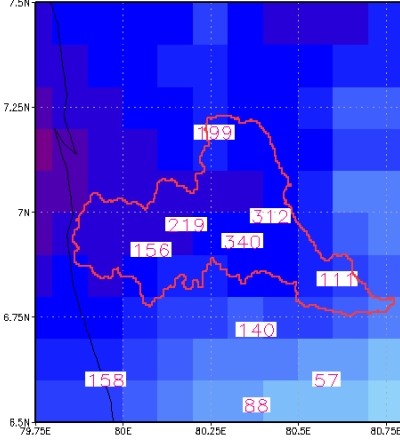
Kalu Ganga river basin - Irrigation Department Sri Lanka

Application of data & models for Kaleni Flood -2016

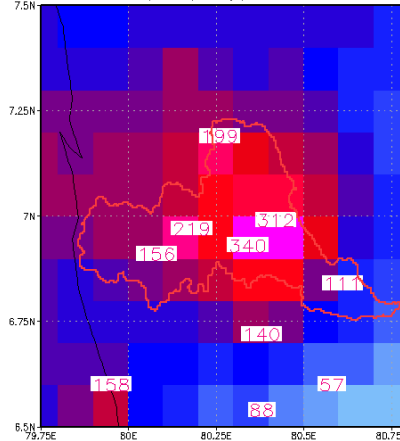
NRT-RAW (mm/day): 23Z14MAY2016



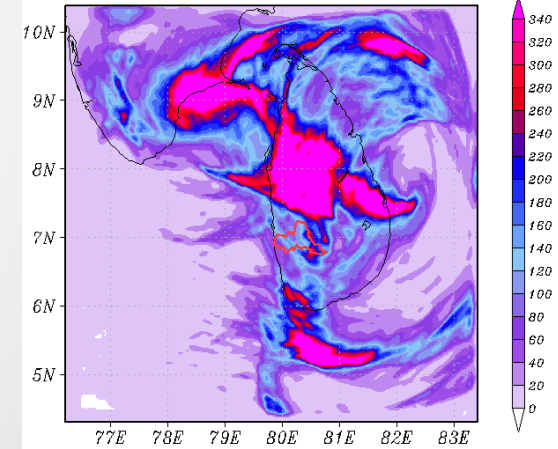
NRT-RAW (mm/day): 15MAY2016



NRT-IF2 (mm/day): 15MAY2016



(c) WRF daily accumulated rainfall (mm) 15MAY2016 UTC

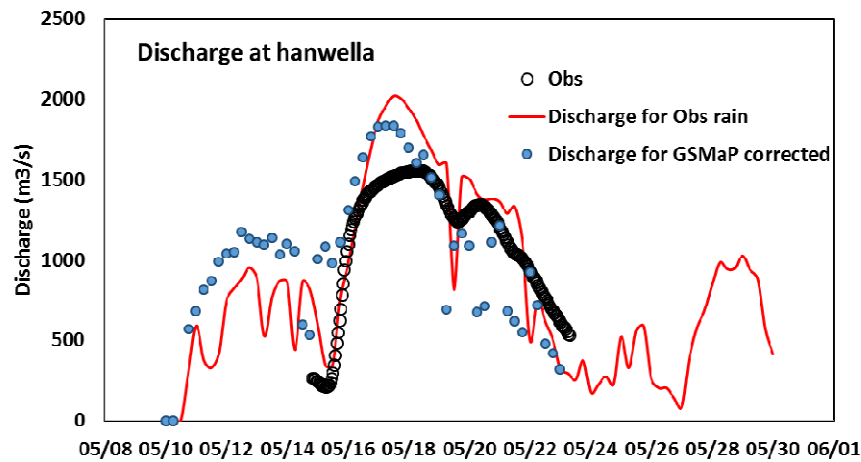


GSMAP -RAW

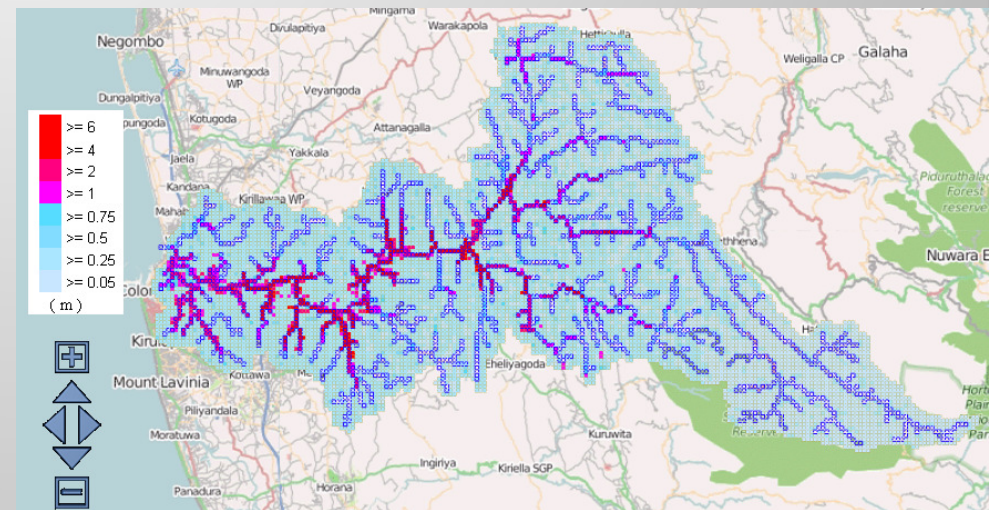
GSMAP -RAW

GSMAP - BC

WRF Forecast



Discharge



inundation Map

Summary

- 🌐 In this framework, ICHARM is developing an integrated approach for maximizing the multi-platform data to generate reliable and timely information.
 - 🌐 An advanced real-time data observing, archiving, and integration system
 - 🌐 Execute several state of the art models to generate real-time information
 - 🌐 Disseminate those useful information in real time to support pre- and post- water related disaster activities.
- 🌐 DIAS, as a demonstration platform, is used for effective data management, integration, processing, and information dissemination.
- 🌐 We will demonstrate the system by applying to three countries (i.e. Sri Lanka, Pakistan, Philippines)
- 🌐 The technology and methods developed under this projects can be transferred to other IFI member countries in the future.



Thank you for your kind attention !!!

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“We must work along a continuum – of preparedness, early response, recovery and resilience building.”

World Disasters Report 2016