Global Flood Partnership
Annual Conference, Guanzhou, China

11-13 June 2019

Risk financing against floods: an application leveraging on global models and EO data

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Joost Beckers, Deltares
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The Application

- Immediate support and relief to population in SEA
- Risk financing options: Parametric insurance

The Application

Risk Profile

- Hydrologic/hydraulic scenarios modelling
- EO based Validation
- Impact scenarios modelling

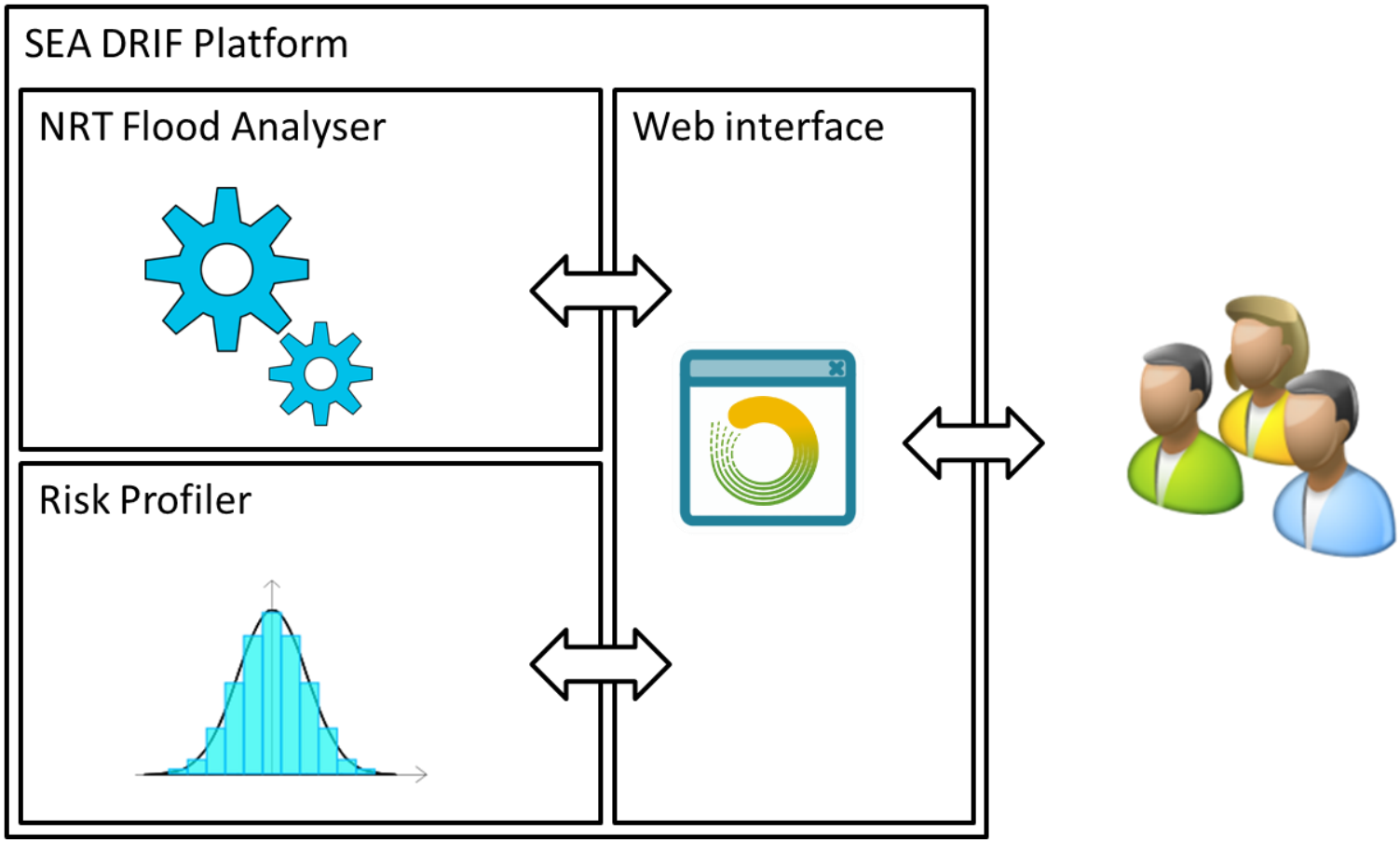
NRT Trigger

- Model Based estimates
- EO based estimates
- Merged estimates

Access to Information

- Platform implementation
- Operations maintenance

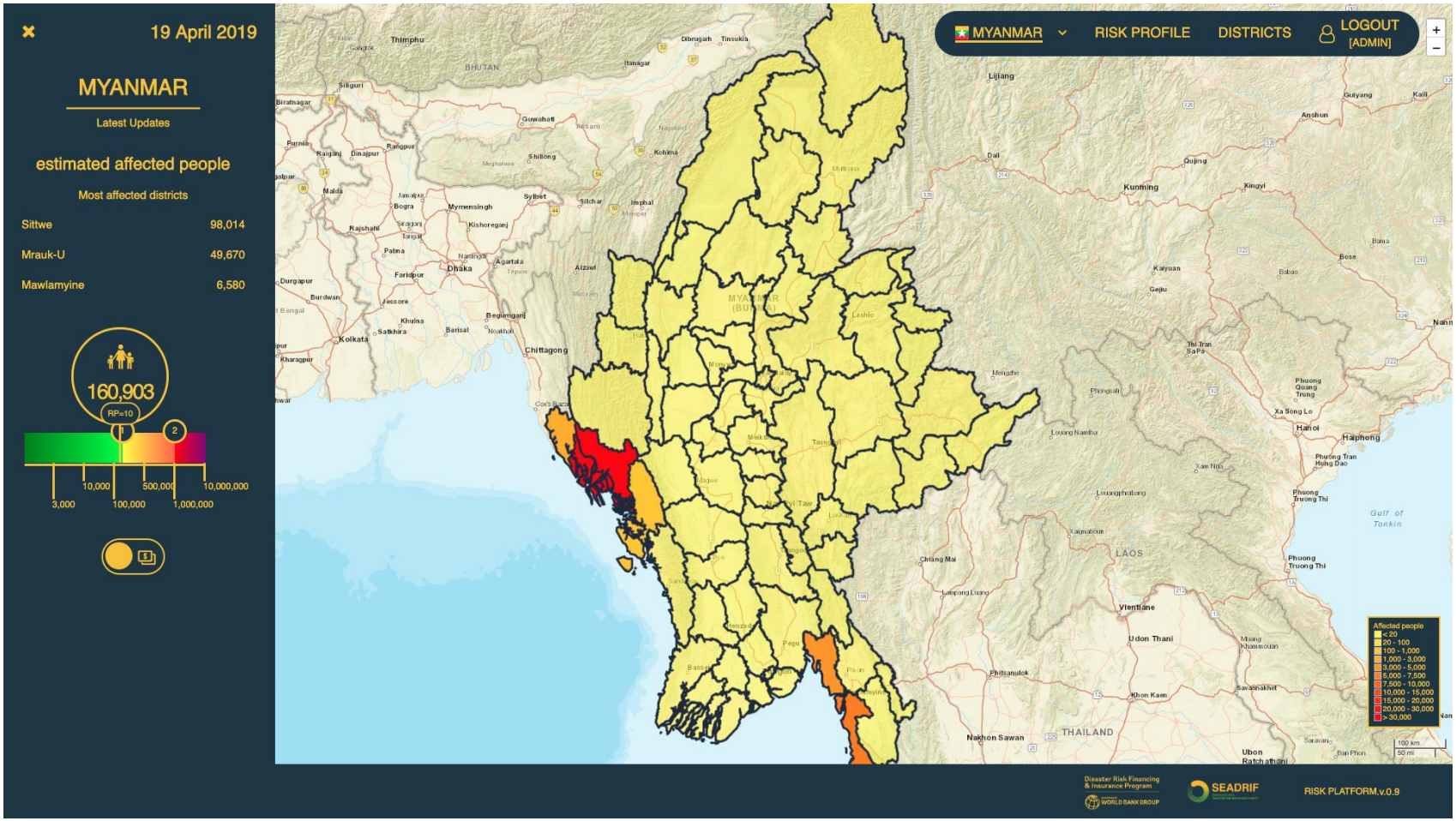
The Application



SEADRIF
SOUTHEAST ASIA
DISASTER RISK INSURANCE FACILITY

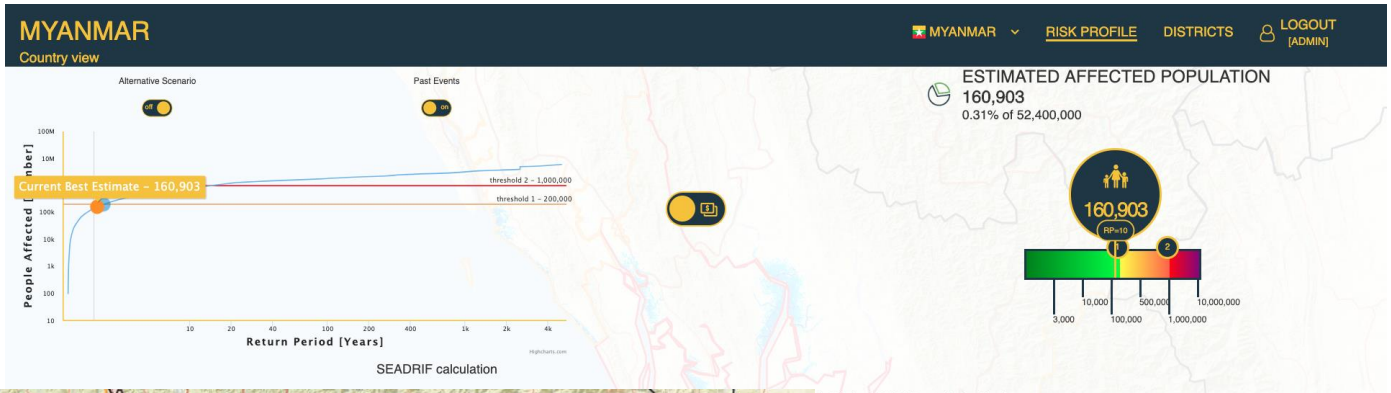
The Interface

Disaster Risk Financing
& Insurance Program
SUPPORTED BY
WORLD BANK GROUP



The Interface

SEADRIF
SOUTHEAST ASIA
DISASTER RISK INSURANCE FACILITY



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Risk Profile

Hazard maps and scenarios

GLOFFIS
for riverine flood hazard

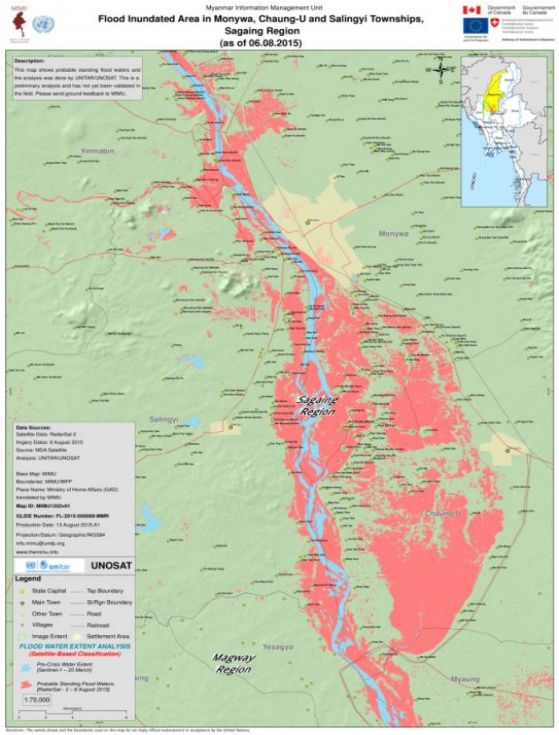
GLOSSIS
for coastal flood hazard

Risk Profile

Unosat image 2015

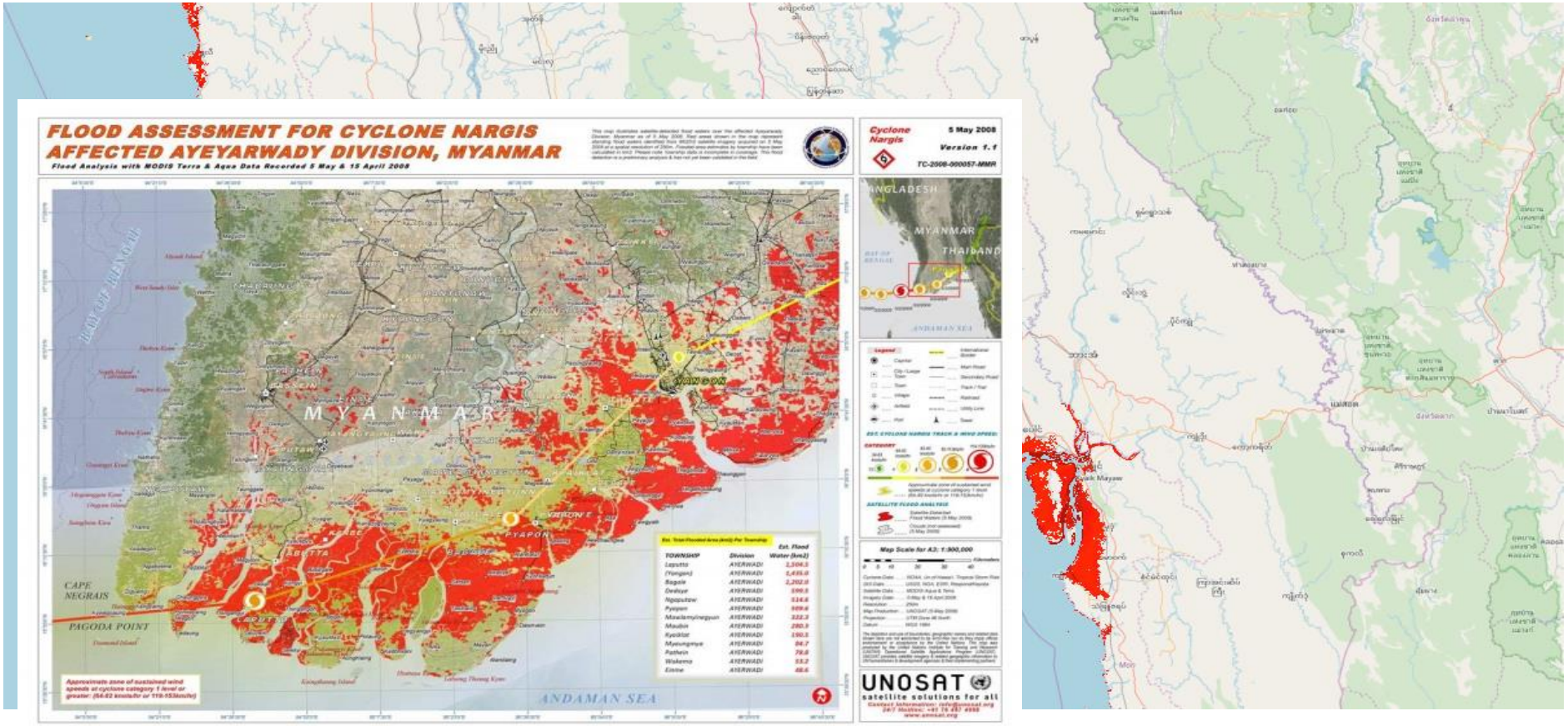
50 yr flood map

100 yr flood map



Hazard maps Validation

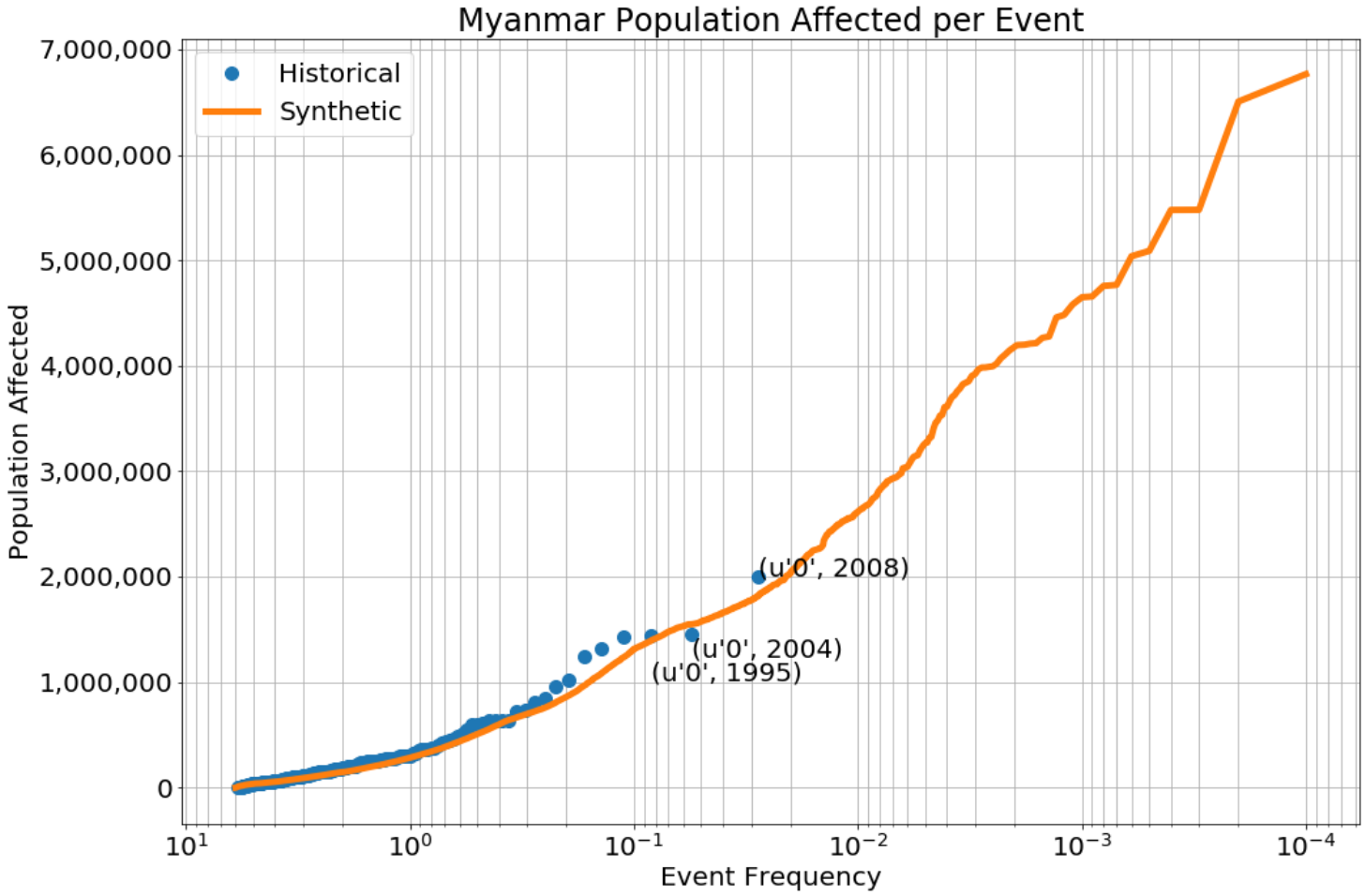
Risk Profile



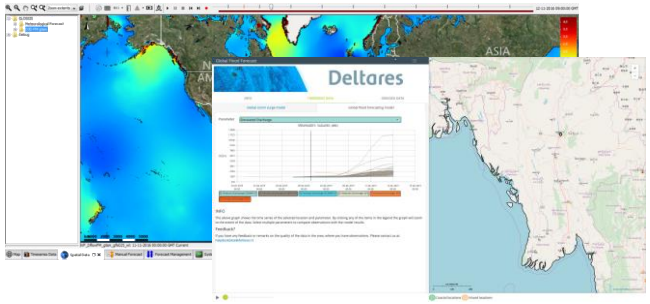
Event maps validation

Risk Profile

Impact Scenarios validation

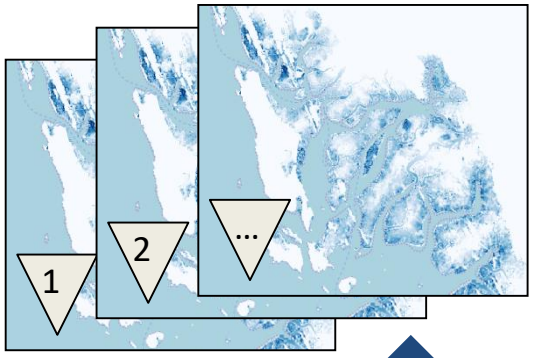


NRT Flood Analyzer

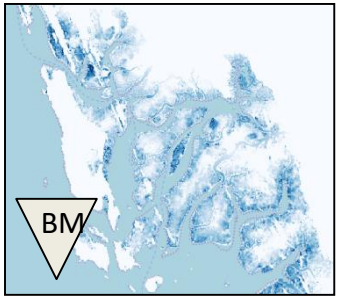


Global models

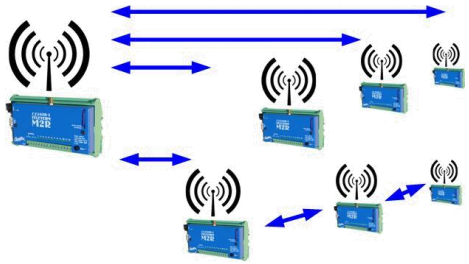
Best Match Algorithm



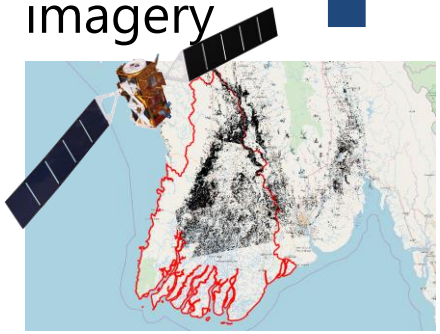
Best Flood Map



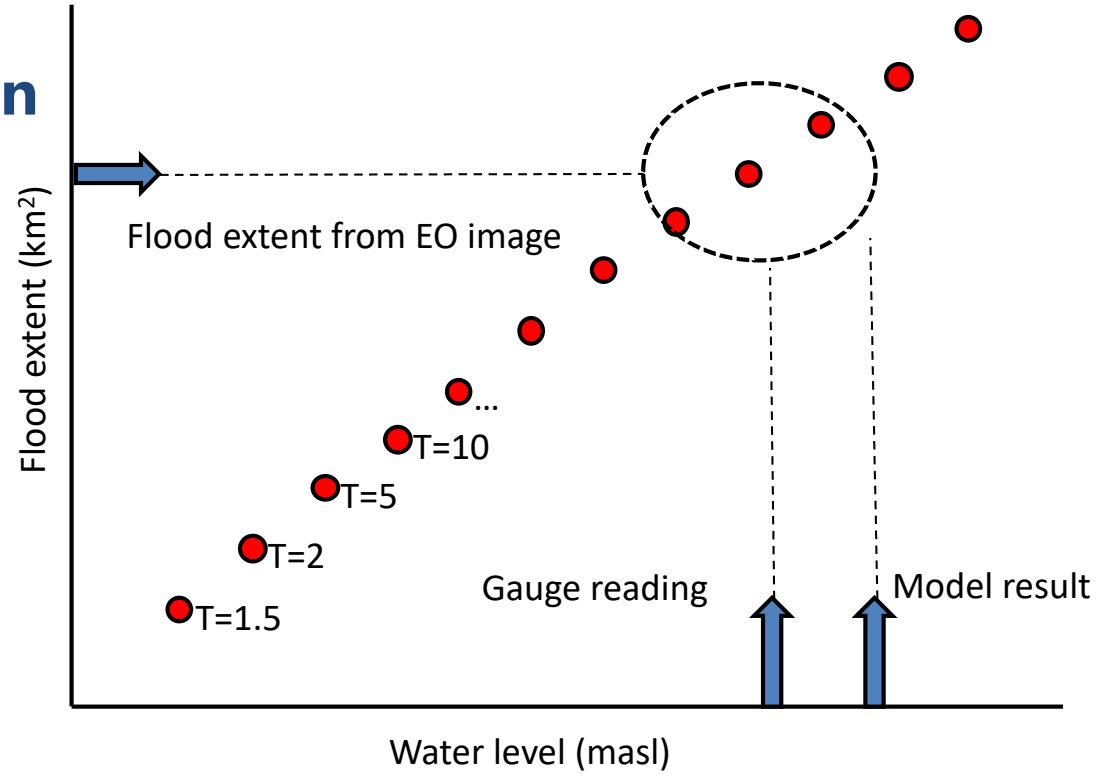
Telemetry



Satellite imagery



Best Match: Map selection



Gauge level similarity: $S2_{GA} = (h_{floodmap} - h_{gauge} - h_{bias})^2/stdev(h_{floodmap})^2$

GLOFFIS level similarity: $S2_{GL} = (h_{floodmap} - h_{GLOFFIS} - h_{bias})^2/stdev(h_{floodmap})^2$

EO map similarity: $S_{EO} = (N_{pospos}+N_{negneg}) / N_{total}$

$N_{total} = N_{pospos}+N_{negneg}+N_{posneg}+N_{negpos}$

Total similarity = $S2_{GA} + S2_{GL} + (1-S_{EO})^2$

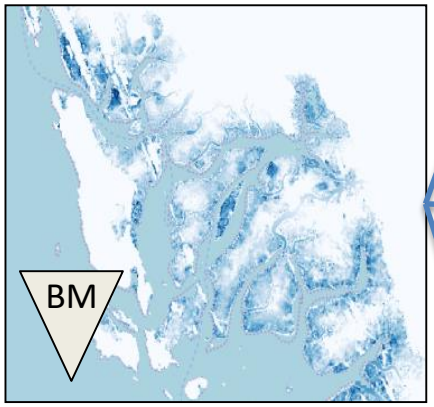
Weights can be added (but not used so far):

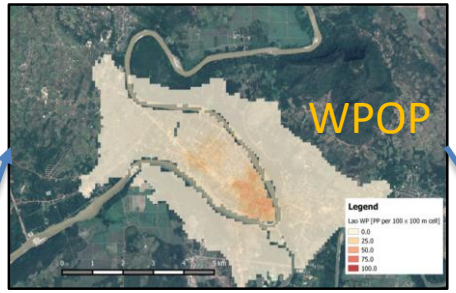
Total similarity = $W_{GA}S2_{GA} + W_{GL}S2_{GL} + W_{EO}(1-S_{EO})^2$

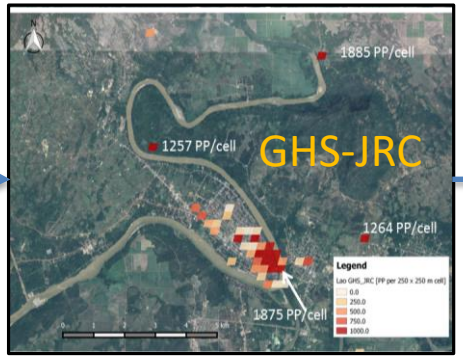
NRT Flood Analyzer

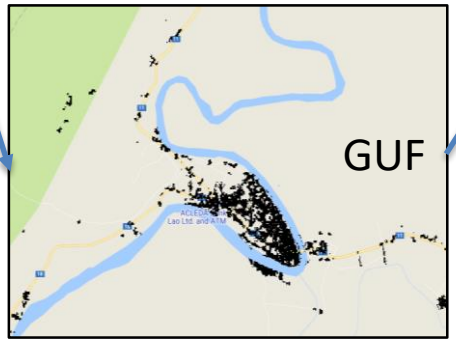
Population Layers

Best Flood Map









NRT Affected People Estimates

The need

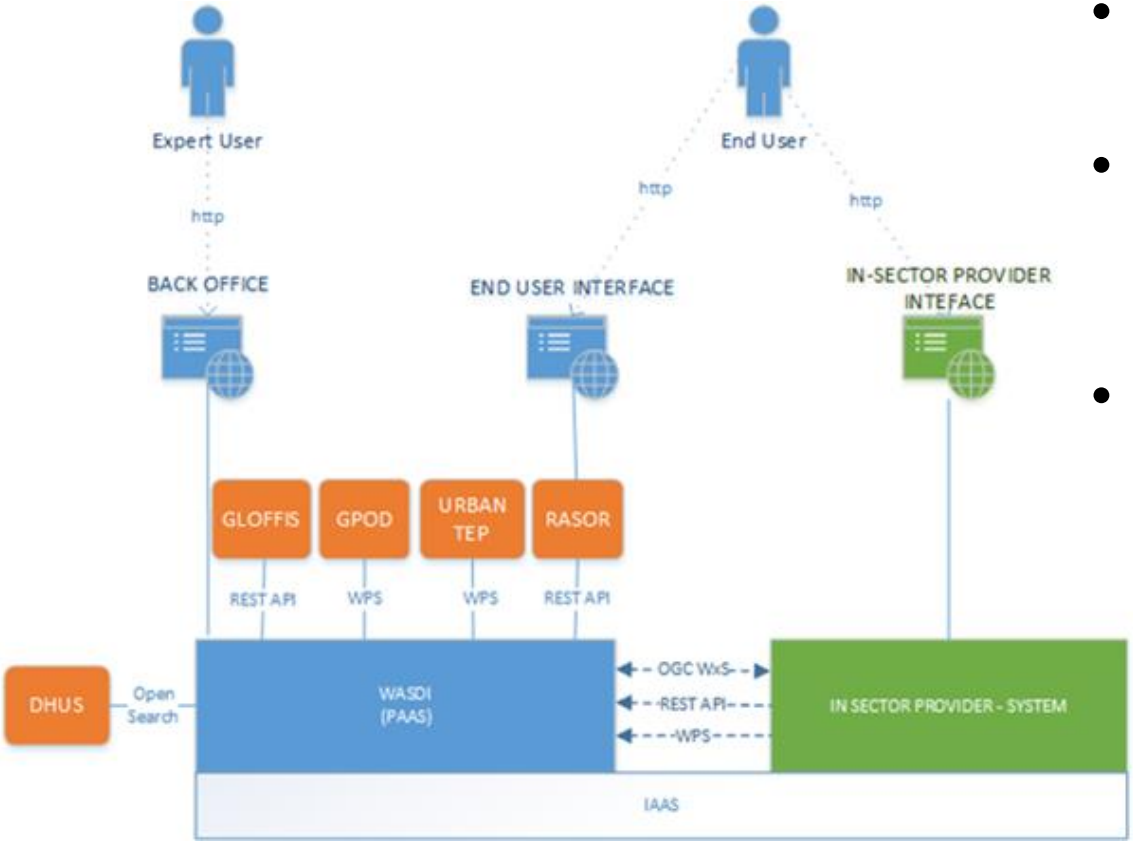
After 1 year of pre-operation:

- Strengthen the EO component
- Concentrating on SAR data processing

Challenges:

- Operation in NRT
- Geographical scope (full country coverage)
- Reliability (compared with the 7-day window)
- Urban areas

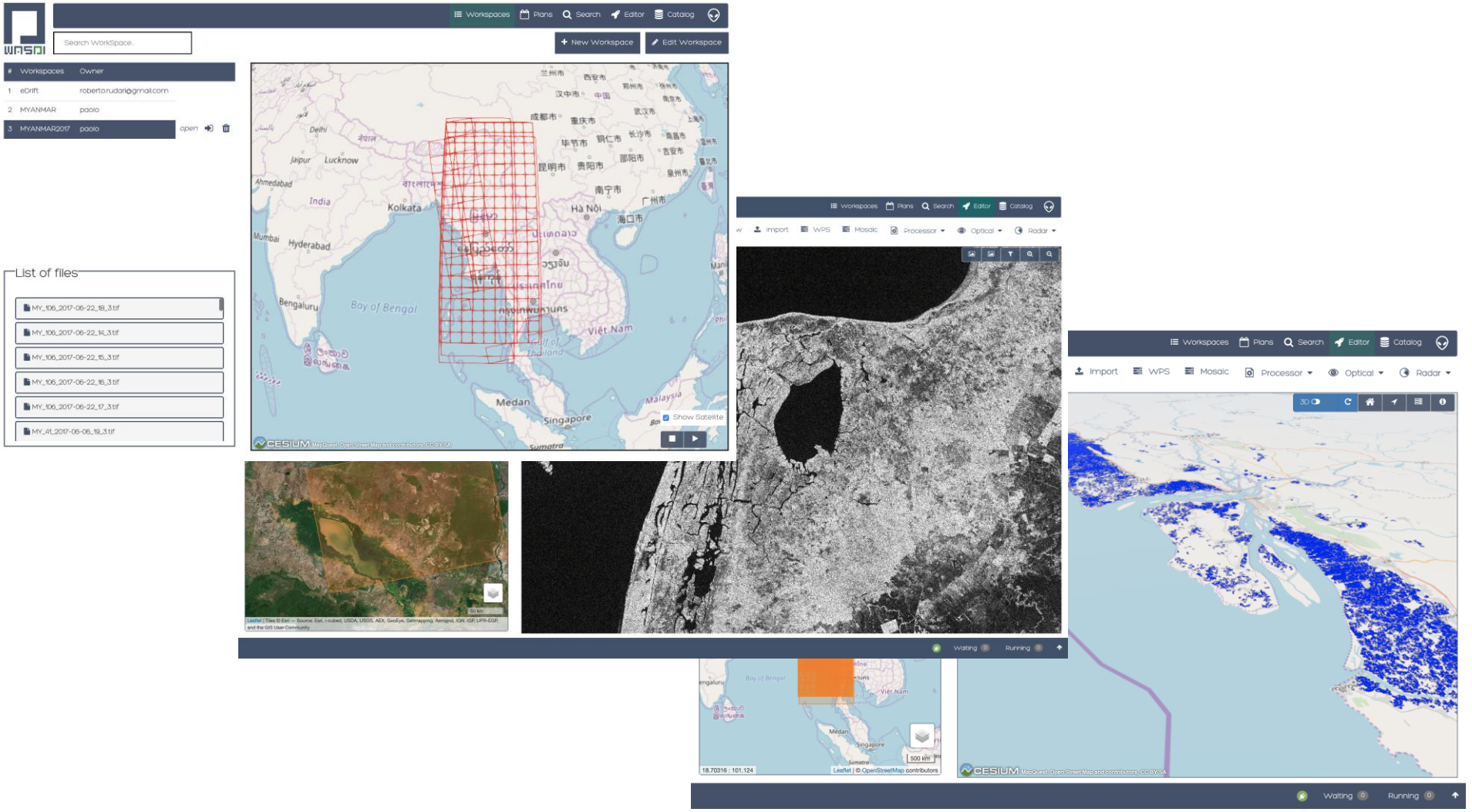
e-DRIFT



Virtual Platform:

- Directly based on the DIAS
- Accessible through Machine-to-machine protocols
- Providing added value EO services

Back Office


Workspaces
Plans
Search
Editor
Catalog
Search WorkSpace..
+ New Workspace
Edit Workspace
Workspaces Owner
1 eDrift roberto.rudari@gmail.com
2 MYANMAR paolo
3 MYANMAR2017 paolo open
List of files
MY_106_2017-06-22_18_3.tif
MY_106_2017-06-22_14_3.tif
MY_106_2017-06-22_15_3.tif
MY_106_2017-06-22_16_3.tif
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Mosaic
Processor
Optical
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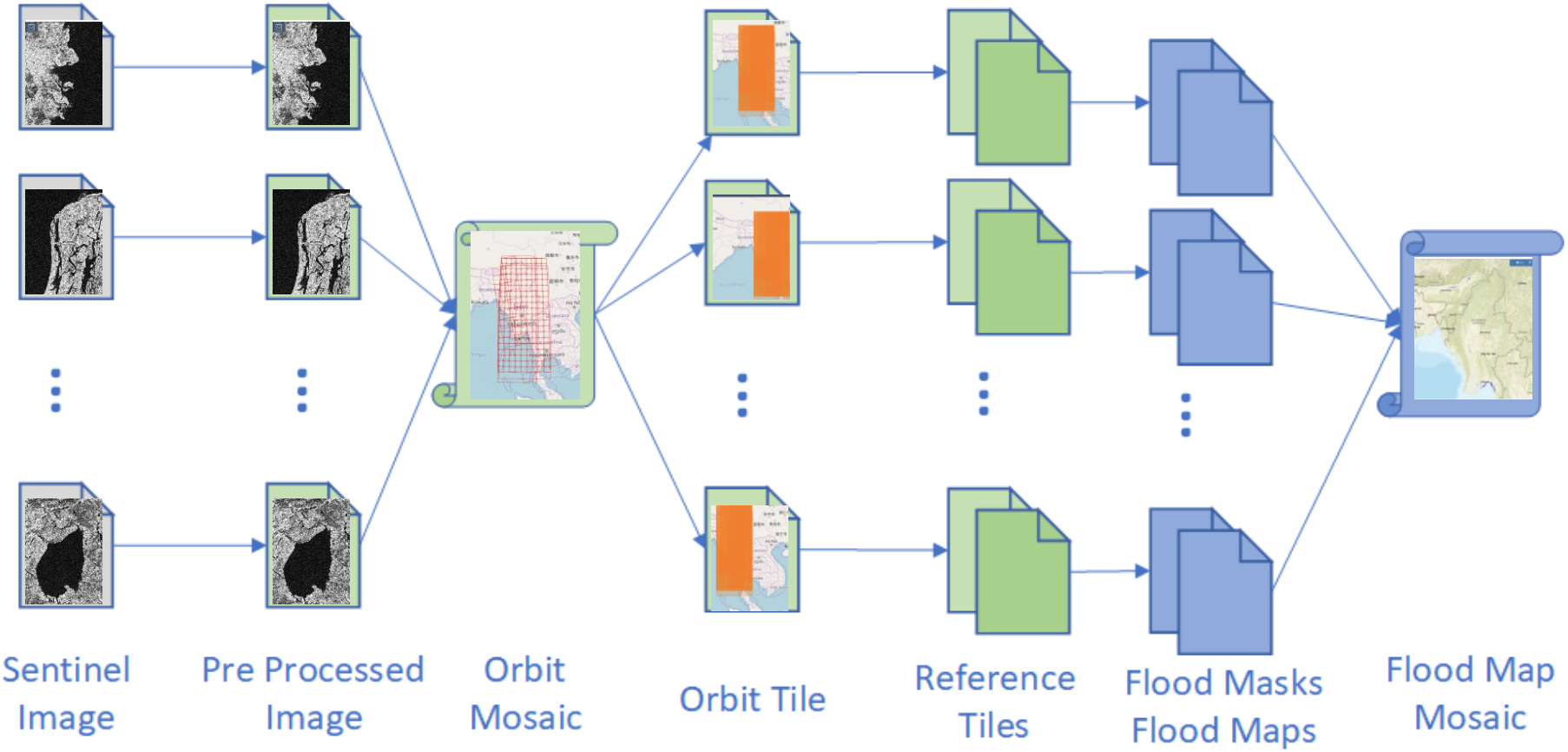
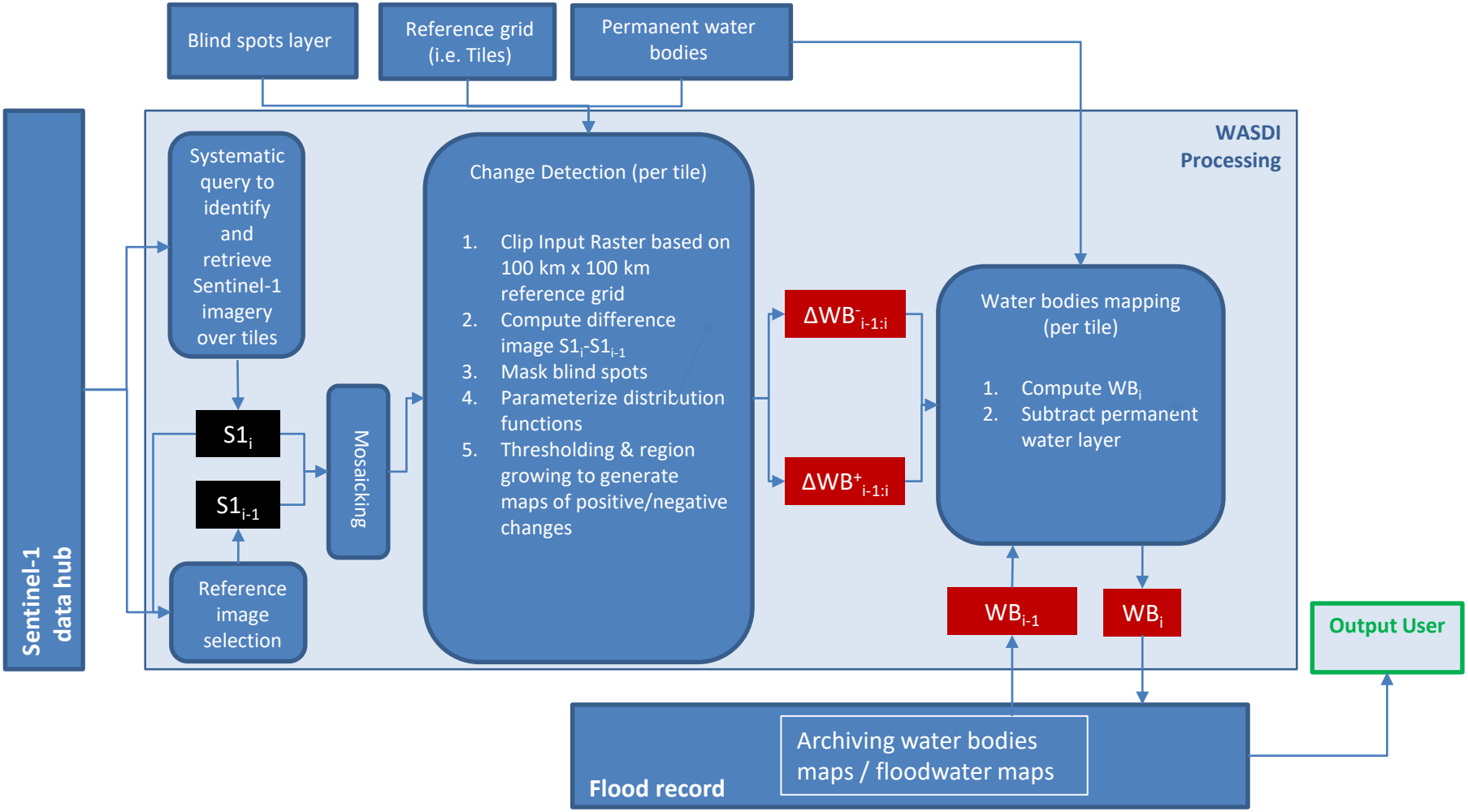
Running
Bay of Bengal
Viet Nam
Medan
Singapore
Kolkata
Hyderabad
Bengaluru
Mumbai
Delhi
Jaipur
Lucknow
Ahmedabad
India
Hà Nội
Malaysia
Sumatra
CESIUM

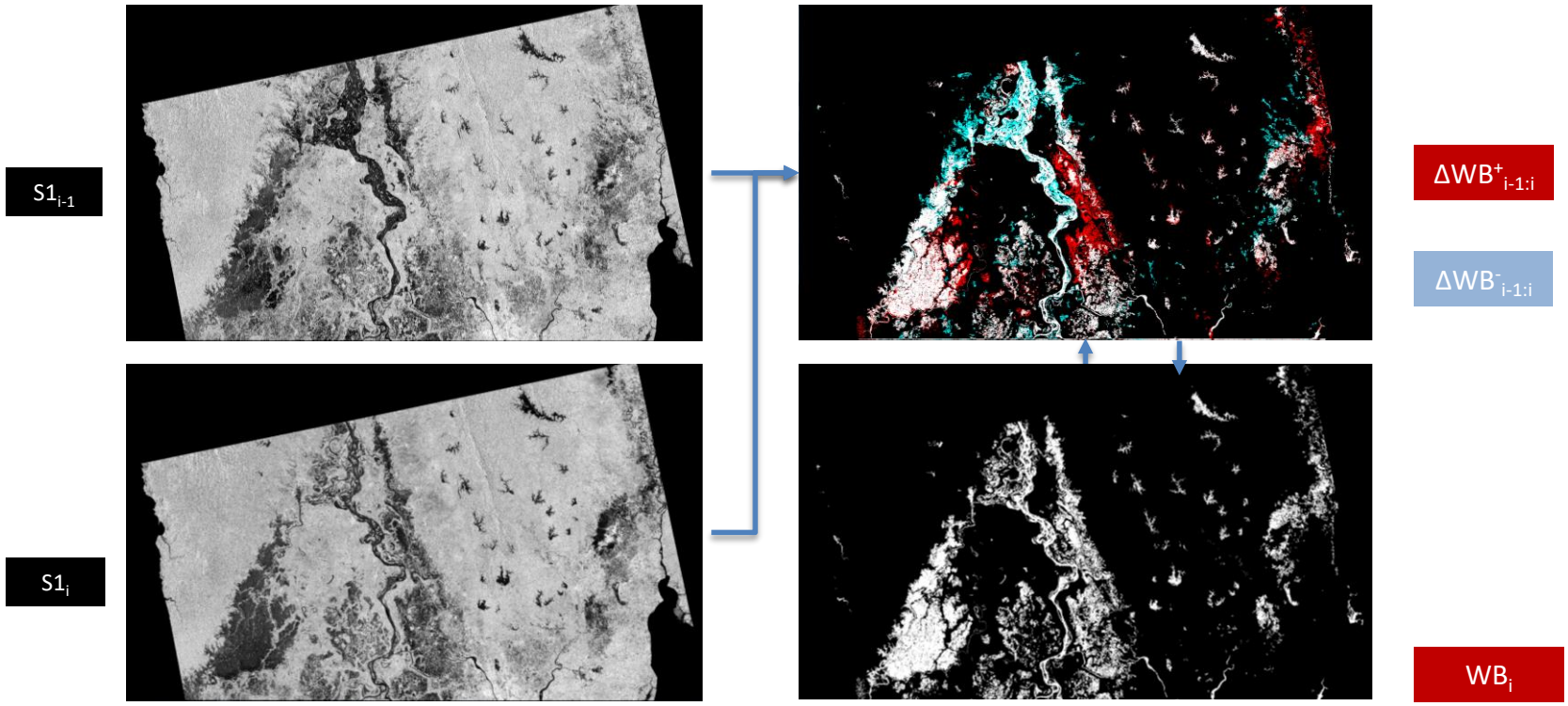
The flood Archive Algorithm



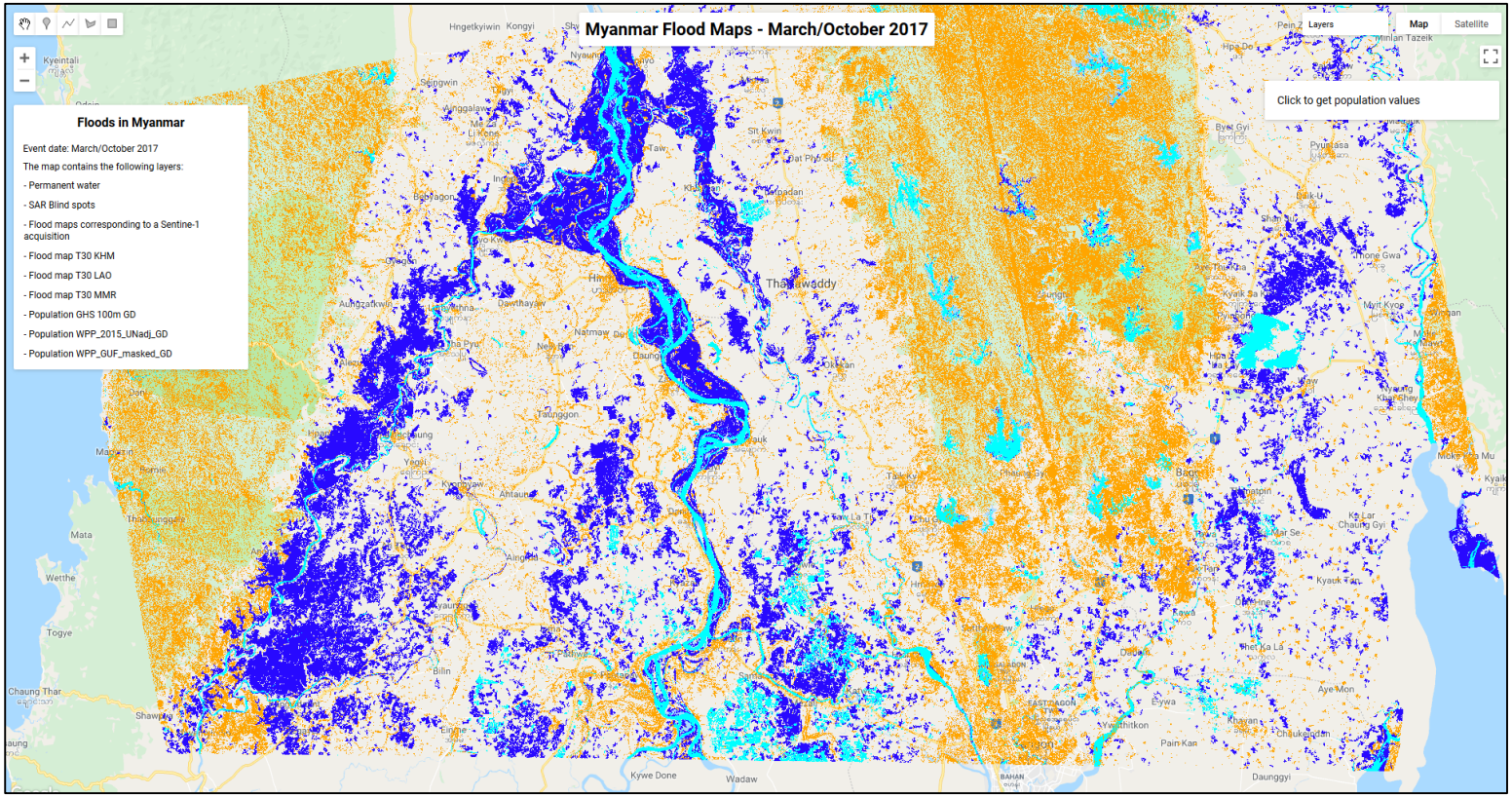
The flood Archive Algorithm



Methodology: flood mapping in Myanmar



Methodology: flood mapping in Myanmar

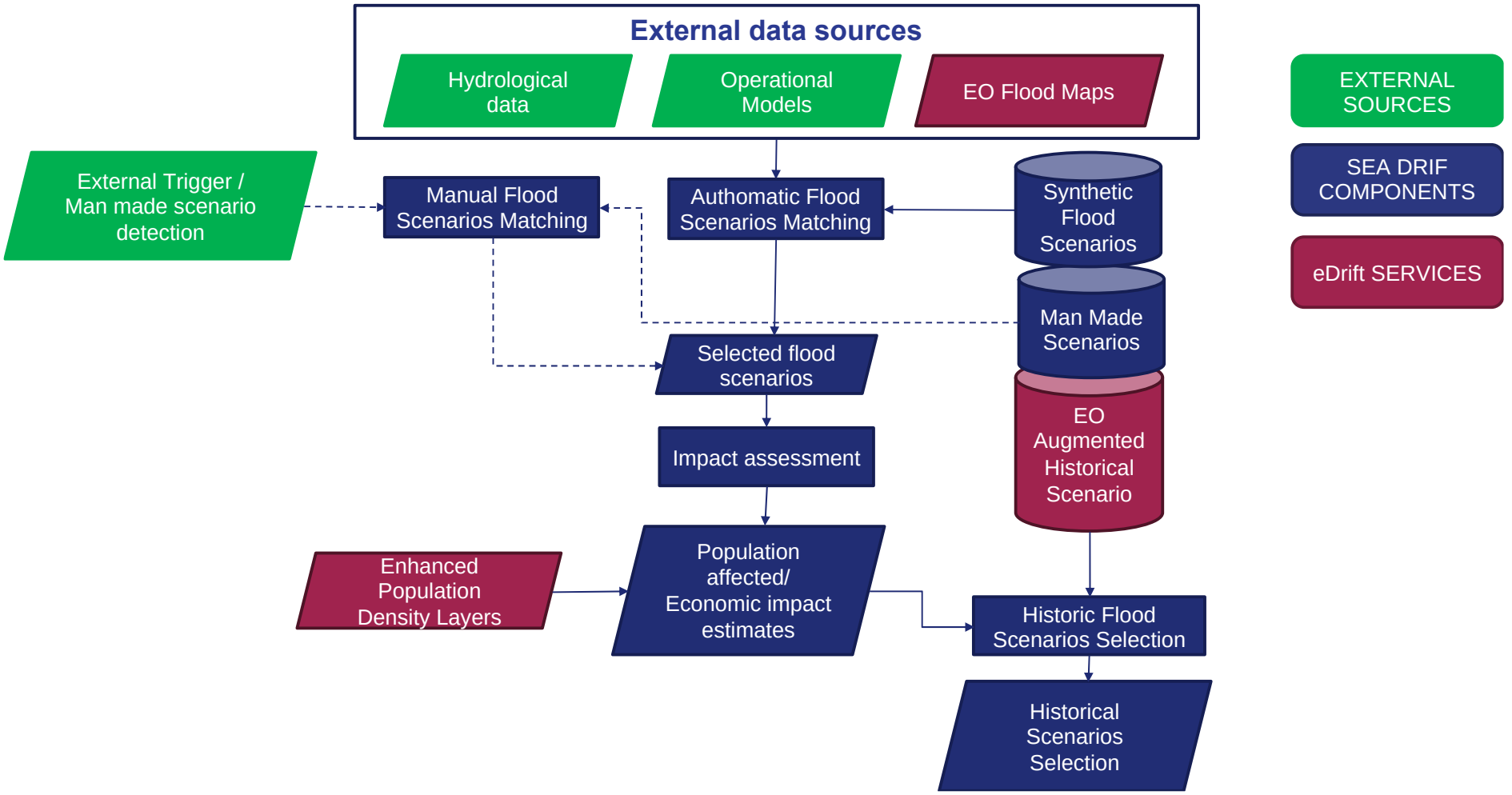


«Blind spots»

Permanent Water

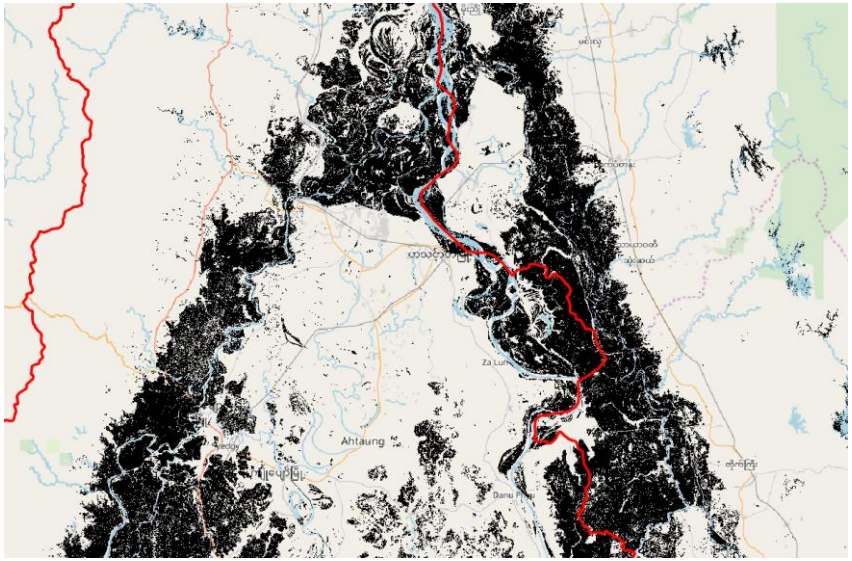
Floodwater

The SEA DRIF eDRIFT Integration

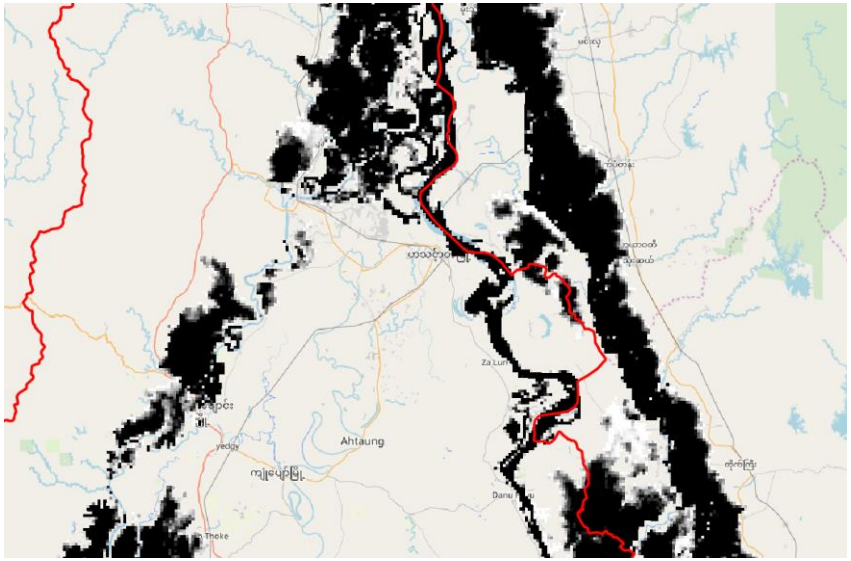


Combined use of Model and EO data

Rapid assessment by matching of EO and model simulation
E.g. 2015 monsoon floods, Myanmar



Sentinel-1, August 11, 2015



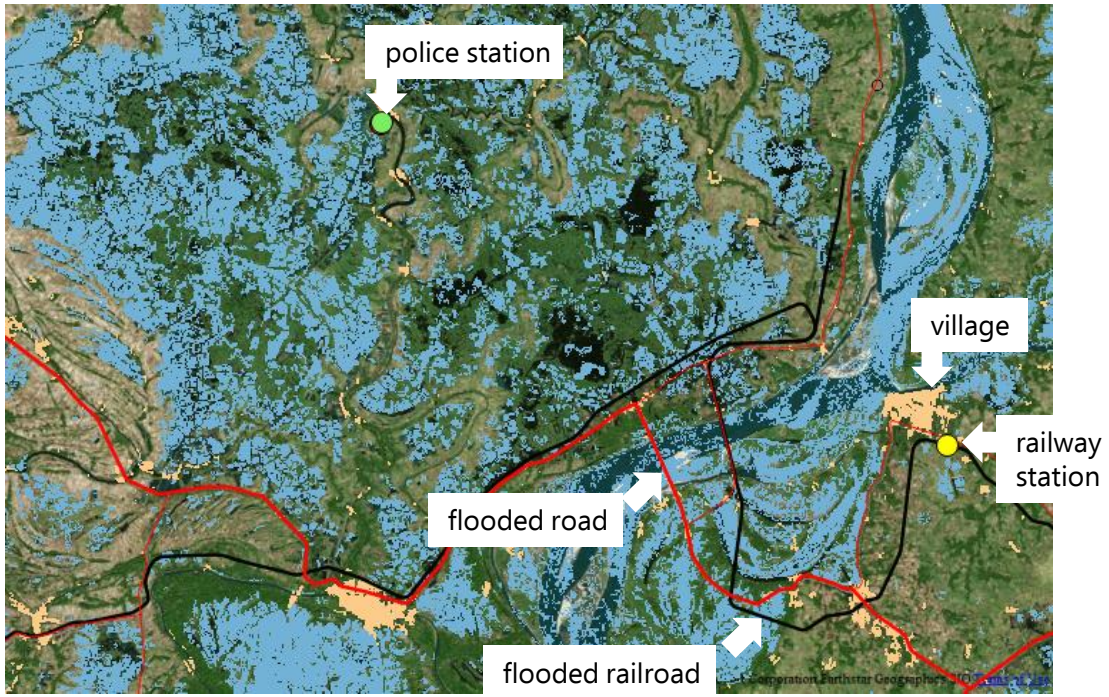
T=20 modelled flood map

Flood impact NRT estimation

Built-up area: World Settlement Footprint based on Landsat and Sentinel1

Critical infrastructure from various sources:

- Airports
- Seaports
- Railways
- Roads
- Hospitals
- Fire stations
- Police stations
- Schools
- Government buildings



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