Flood Foresight: A framework for transnational flood forecasting

Understanding Risk Balkans

18 September 2018

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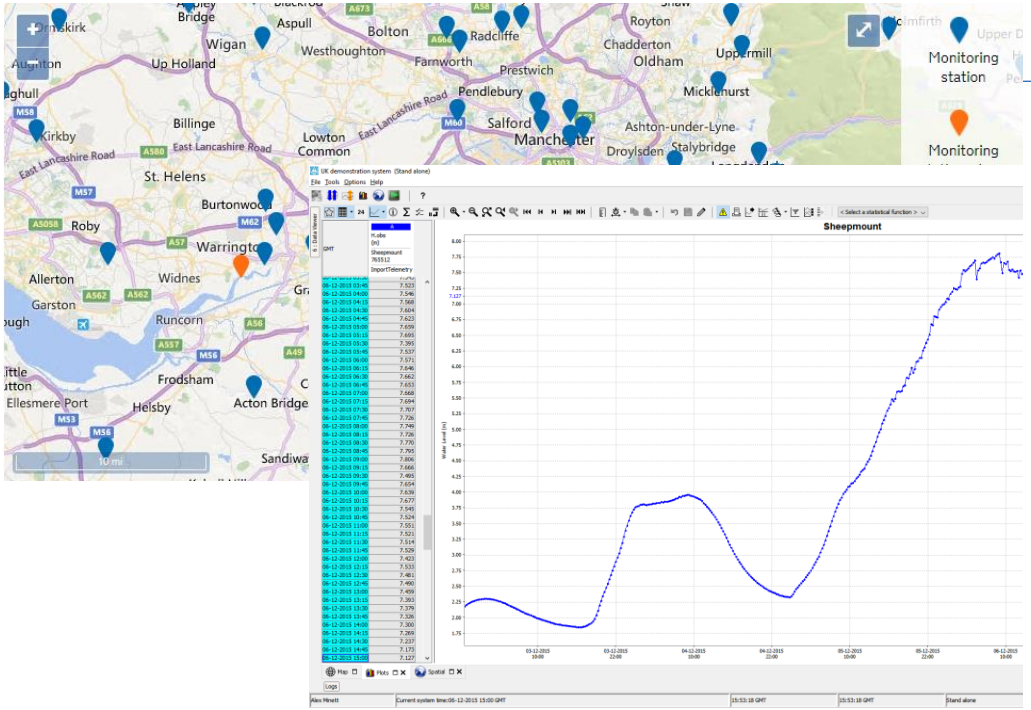
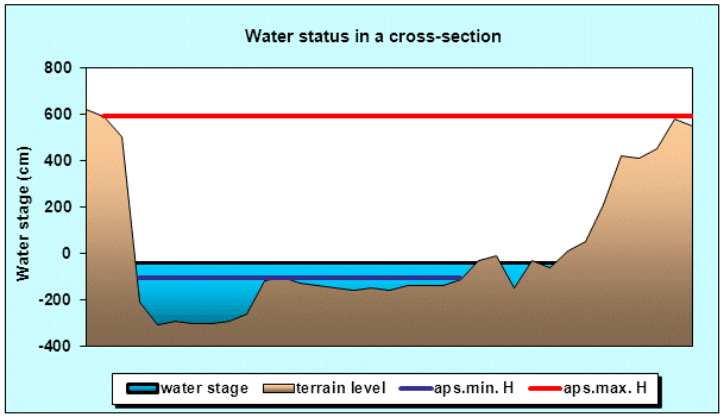
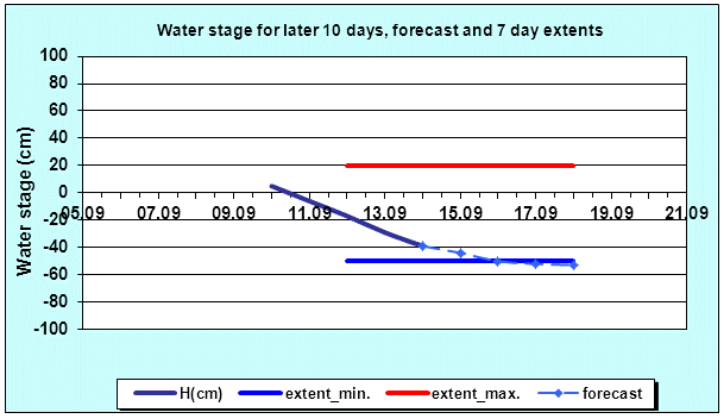
Background

Operational flood forecasting



Republic of Serbia
Republic Hydrometeorological Service of Serbia
Kneza Višeslava 66, 11000 Belgrade
office@hidmet.gov.rs



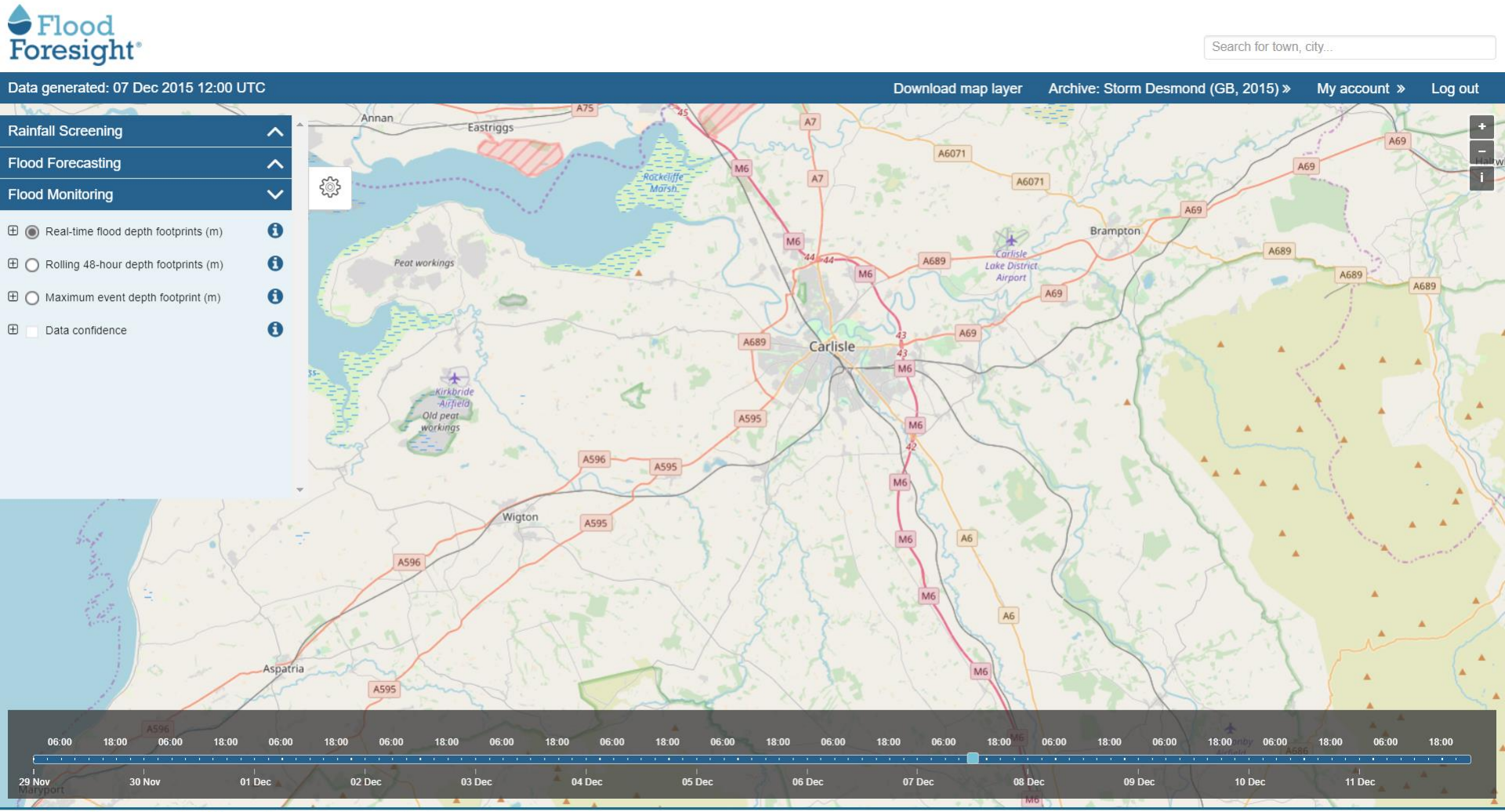


Decision maker:
"Where is the water?"

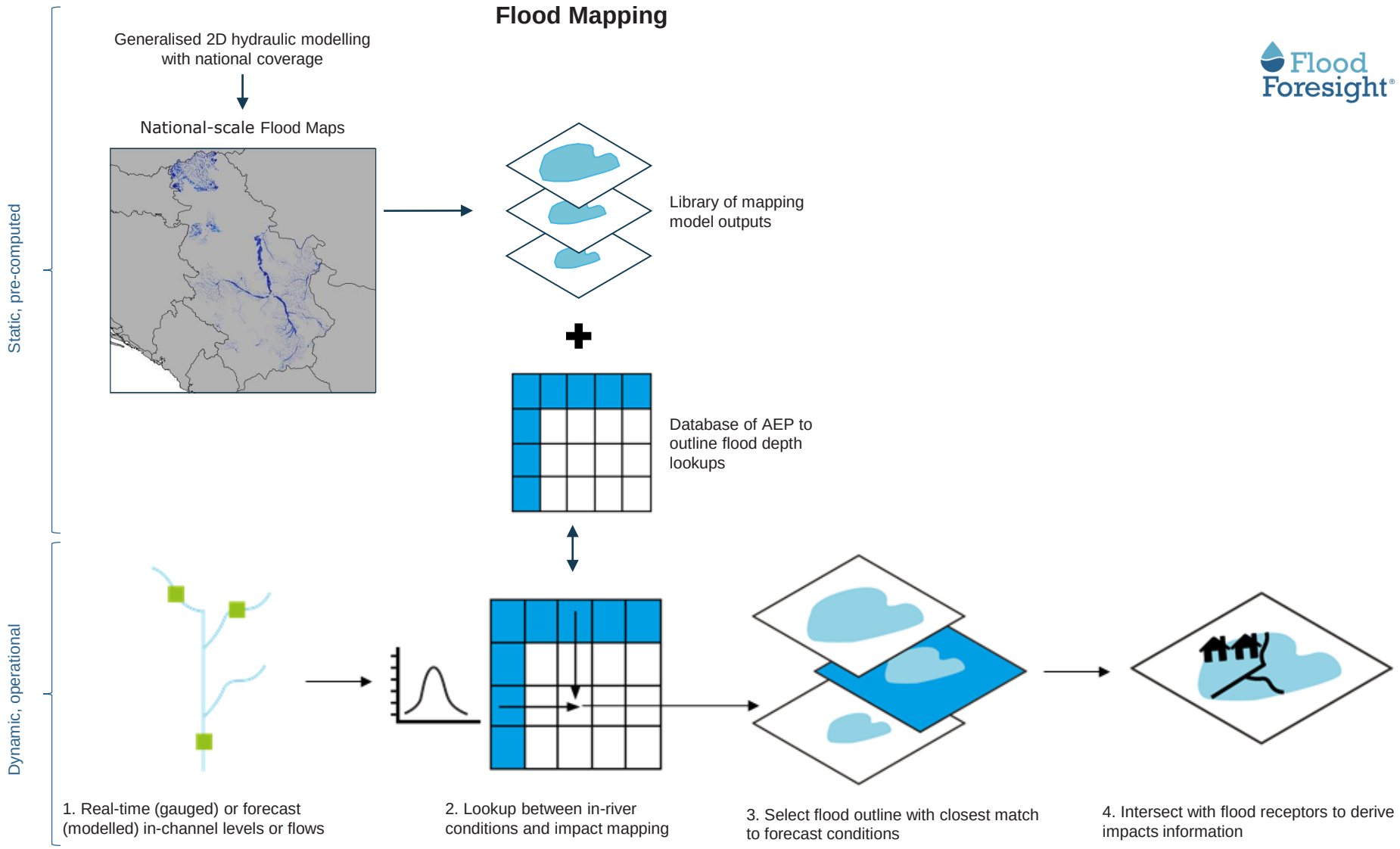
Background


Sremska Mitrovica
Šašinci
Pećinci
Hrtkovci
Nikinci
Dobanovci
Surčin
Belgrade
Jakovo
Gornja Vra
Sremčica
Mostanica
Sinoševi
Disaster Charter - Flo
www.disasterscharter.org/web/charter/activation_details?p_r_p_1415474252_assetId=ACT-490
Contact Us | English | Español | Français | 日本語 | 中文
Home page
Charter Activations
Map of Activations
Media Gallery
News
International Charter Newsletter
Conferences
About the Charter
FAQ
Text of the Charter
Activating the Charter
Members of the Charter
Charter for Schools
Charter Geographical Tool
Flood in Serbia
Back to Charter Activations
Type of Event Flood
Location of Event Obrenovac, Serbia
Date of Charter Activation 21 May 2014
Charter Requestor ROSCOSMOS / EMERCOM
Project Management ROSCOSMOS
Description of the Event
Torrential rain in the Balkans has caused the worst flooding that the area has experienced in over a century. In Serbia, it is estimated that 17 people have been killed and 25,000 people were forced to evacuate.
In just three days, during the period of 14 to 16 May 2014, three months worth of rain fell on the Balkans. The rain caused water levels in rivers to rise, and burst their banks, inundating nearby inhabited areas. There were concerns that the River Sava would flood the Nikola Tesla power plant, in Obrenovac, southwest of Belgrade, and emergency workers quickly acted to protect the plant and try to keep the waters out. Despite their efforts, the continuing rainfall has caused flooding to parts of the plant. The plant is key to providing power for half of Serbia.
Flooding situation in the Balkans as of May 25, 2014
Flooded area extension near Šabac city at the Sava river
USGS
Flooding situation in Serbia on 22 of May 2014
Area location
cnes

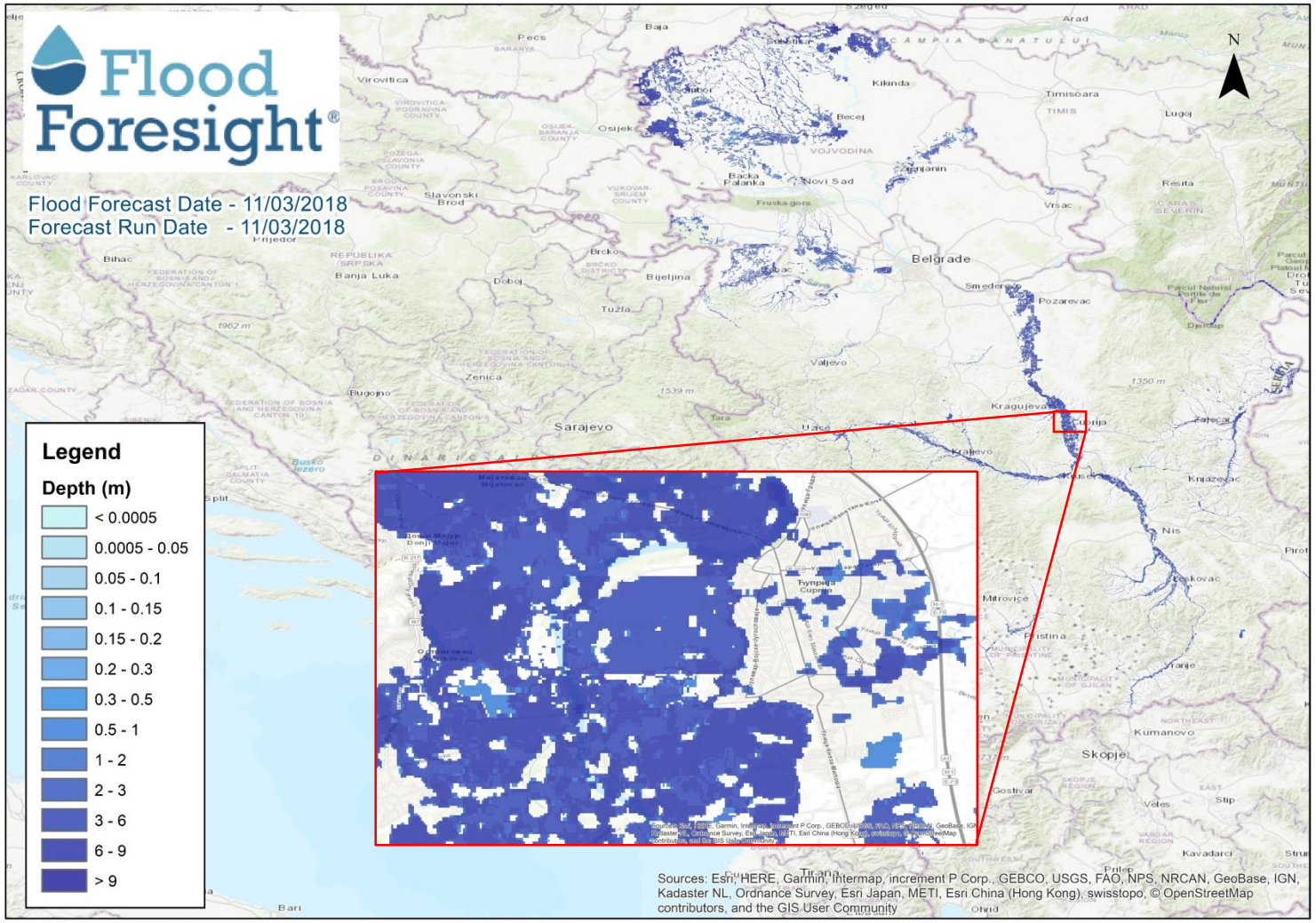
Forecast flood mapping



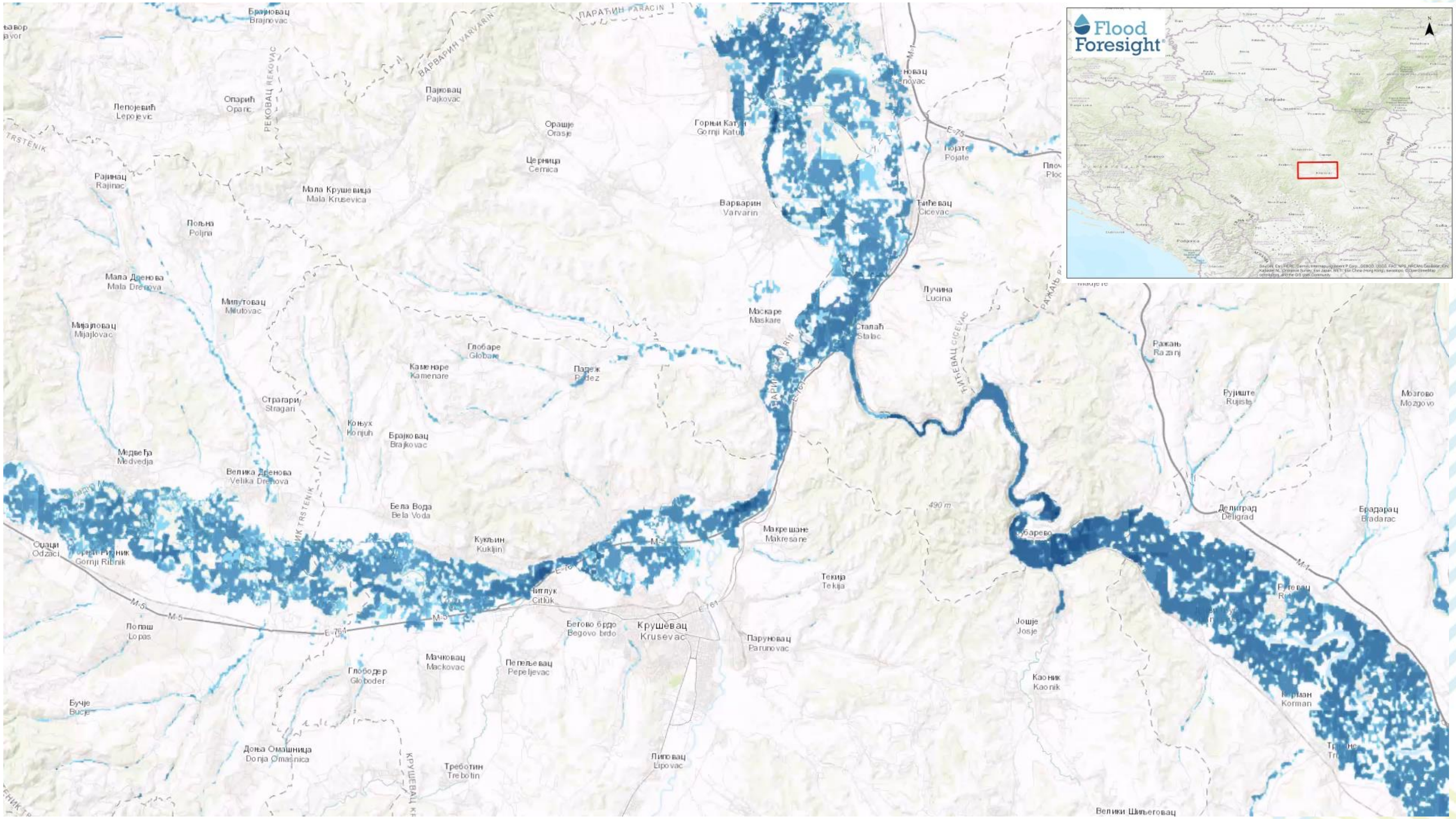
How it works


Flood Mapping
Generalised 2D hydraulic modelling with national coverage
National-scale Flood Maps
Library of mapping model outputs
Database of AEP to outline flood depth lookups
Static, pre-computed
Dynamic, operational
1. Real-time (gauged) or forecast (modelled) in-channel levels or flows
2. Lookup between in-river conditions and impact mapping
3. Select flood outline with closest match to forecast conditions
4. Intersect with flood receptors to derive impacts information

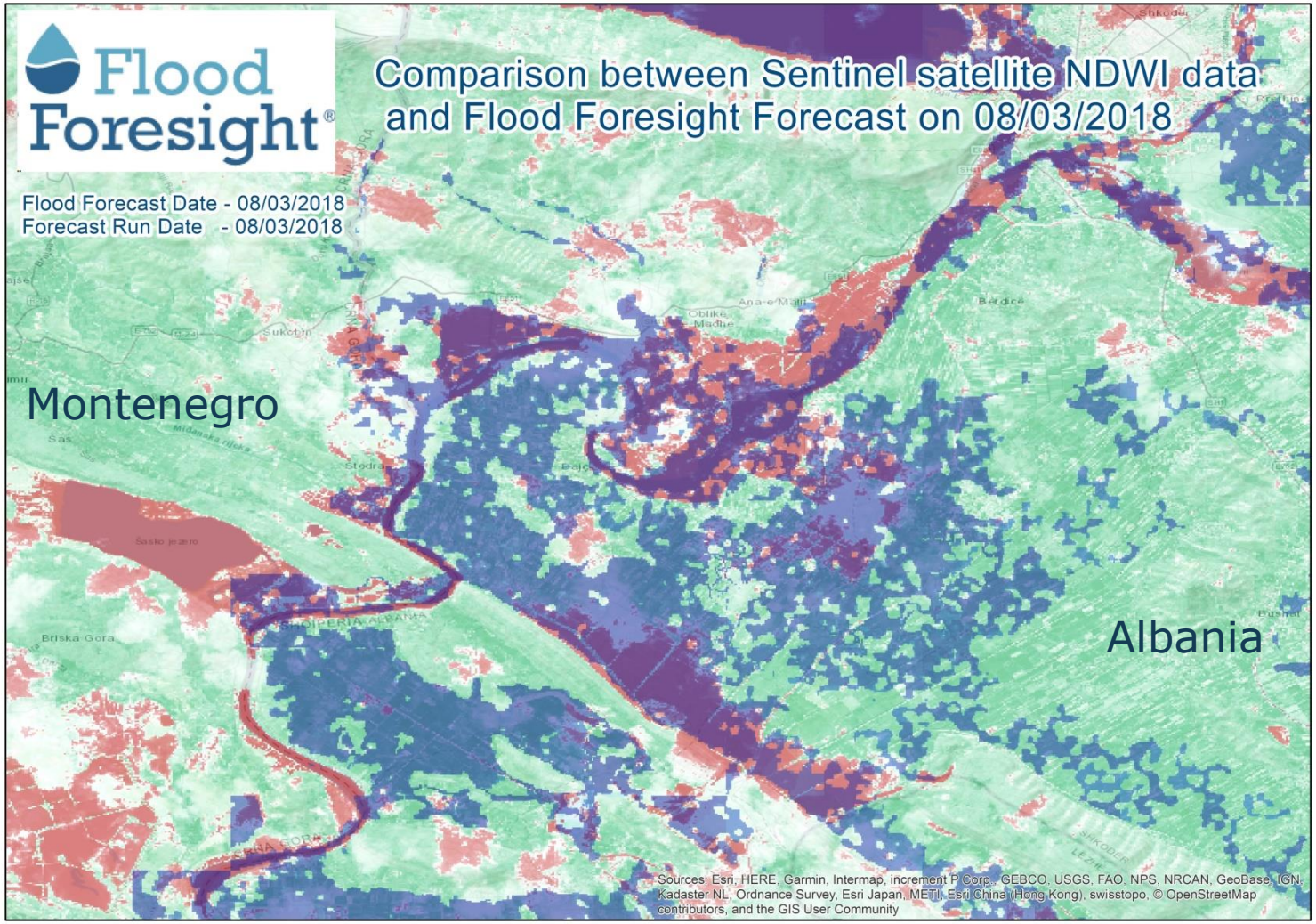
Transnational flood footprints



Forecast flood mapping



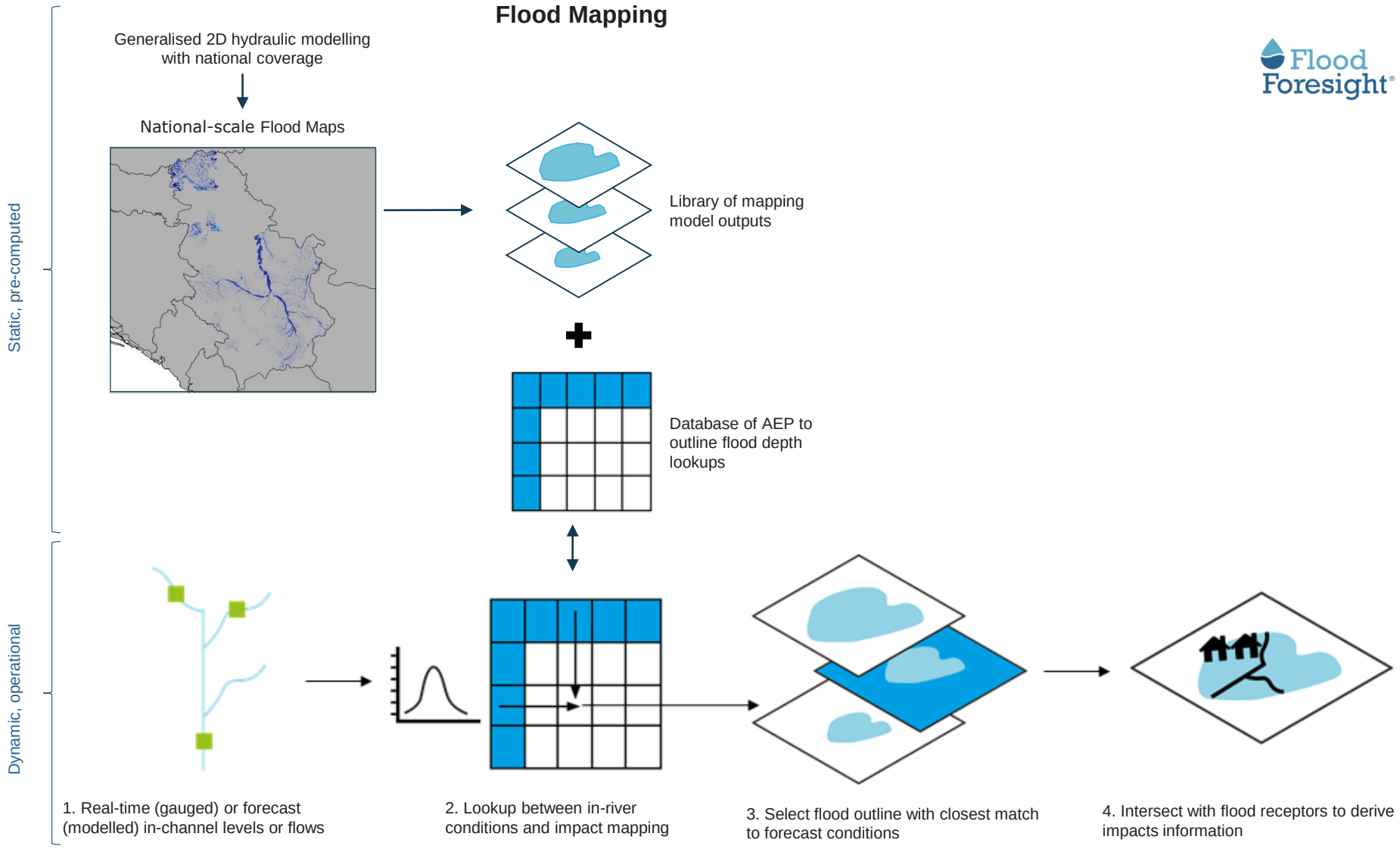
Validation



Flood Foresight footprint

Satellite footprint

Simulation Library: Flood maps



Simulation Library: Impacts

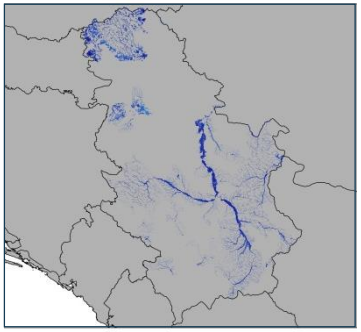
Impact Mapping

Flood Foresight®

Static, pre-computed

Generalised 2D hydraulic modelling with national coverage

National-scale Flood Maps



Library of mapping model outputs

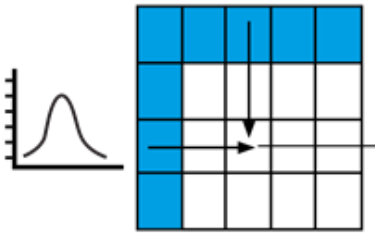
Intercept with flood receptors to derive impact information

Library of impact model outputs

Database of AEP to impacts lookups

Dynamic, operational

1. Real-time (gauged) or forecast (modelled) in-channel levels or flows



2. Lookup between in-river conditions and impact mapping

3. Flood impact maps and data

4. Early Warning Systems

Data and system integration

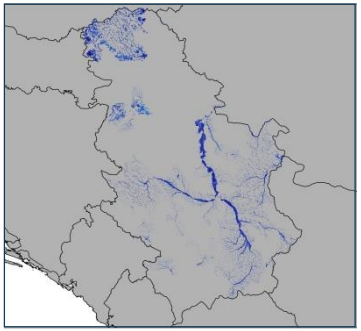
Impact Mapping

Flood Foresight

Static, pre-computed

Generalised 2D hydraulic modelling with national coverage

National-scale Flood Maps



Flood Maps

Library of mapping model outputs

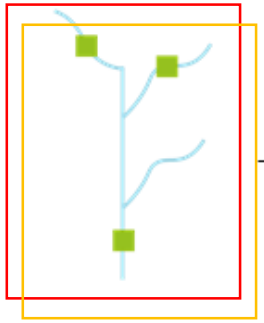
Intercept with flood receptors to derive impact information

Asset/exposure data

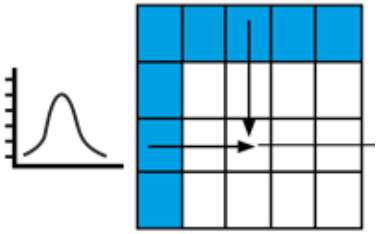
Library of impact model outputs

Database of AEP to impacts lookups

Dynamic, operational



River gauges / forecast models



Forecasting systems

3. Flood impact maps and data

4. Early Warning Systems

Challenges

1) Political and administrative obstacles

In order to **improve flood management at a trans-national or at regional level** (from forecast flood mapping and forecast impact mapping point of view),

- there is a very important pre-condition - **political willingness** (*sine qua non* condition)
  - the joint-activities performed by different national services / authorities should be foreseen in the **Bilateral Agreements** (on data exchange).

    or
  - a **Statement of national services** / **authorities Directors** on joint collaboration towards the implementation of planed activities is required.
- **a governance structure is needed**! (e.g. WMO, EU Network / Agency / Service; Sava Commission, ICPDR, etc.)

Challenges

2) Data management difficulties

- **Data availability**:
  - Flood hazard maps
  - Real-time forecasting models
  - Defences
  - Telemetered river gauges and ratings data
  - Asset/exposure data (population, buildings, critical facilities, transportation, etc.)

Forecast

Real-time

Impact

- **Transnational data sharing**, despite …
  - EU transition process
  - Progress made in Flood Directive implementation – 1st cycle (including publishing of national scale flood maps on national and/or EC websites)
  - Obligations for INSPIRE Directive implementation.

Opportunities

- EU Flood Directive will increase the availability of flood maps
  - Opportunity to bring into Flood Foresight framework
- Accessible/open data will feed further innovation
- For large basins, partially shared between many countries, a regional system is a better and a realistic approach
- Exchange not only observational data but also hydrological forecasts
- Adding flood and impact mapping to hydrological forecasts will improve early warning and response prioritisation
  - Manage the risk, not just the hazard
- Integration into existing EWS/decision support systems

Summary / next steps

Flood Foresight:

Interface between the meteorological and hydrological communities and flood decision makers

- Flexible, efficient framework for integrating best available data
- Moves beyond point-based forecasts to answer "where is the water?"
  - Enables impact and loss forecasting
  - Helps prioritise response activities
- Can integrate with existing models, data and Early Warning Systems

We are keen to explore pilot projects in the region

Hvala!
Thanks!

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