



## ***Sava HIS data interoperability and tools***

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**Capacity Building Workshop on Hydrological Data Exchange,  
standardization, and Interoperability in WMO's Region VI**

25-26 January 2024, Online

29-30 January 2024, Zagreb, Croatia

# Sava HIS within the Agenda

## Physical Session, 29<sup>th</sup> January 2024

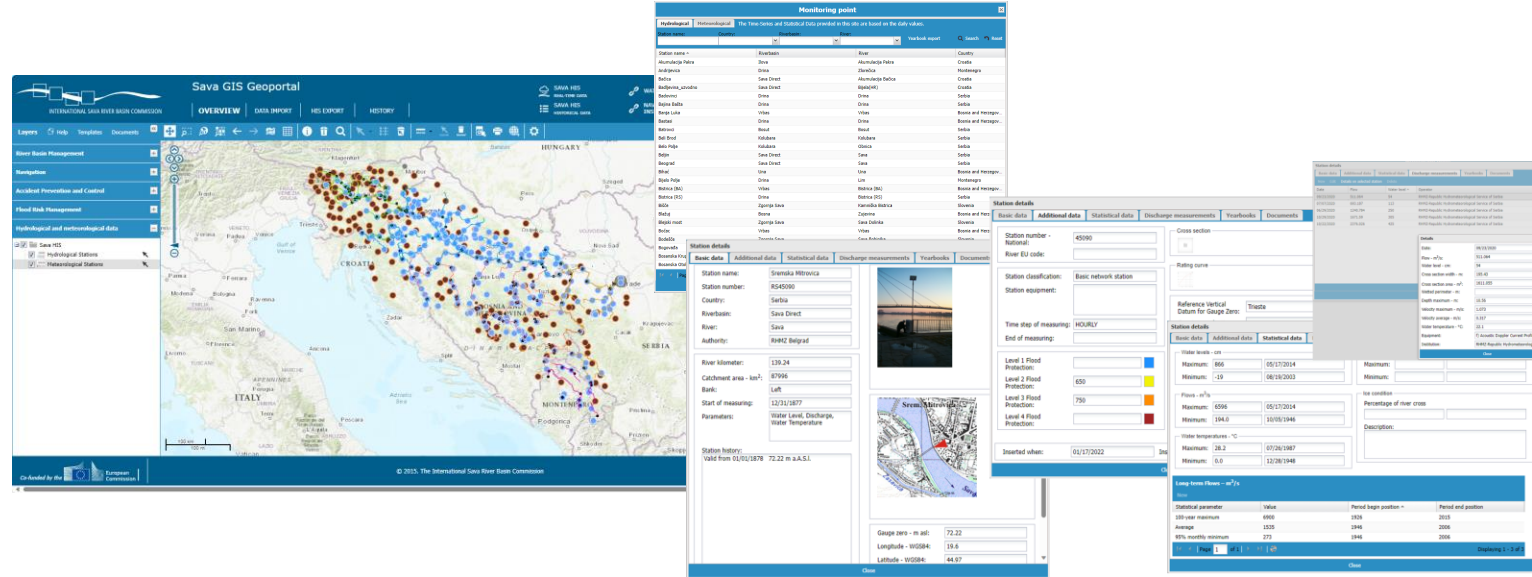
9:30–10:40	SAVA HIS (data interoperability and Tools)	Mirza Sarač, ISRBC
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# Sava HIS tools

## Sava GIS Geoportal

[www.savagis.org](http://www.savagis.org)

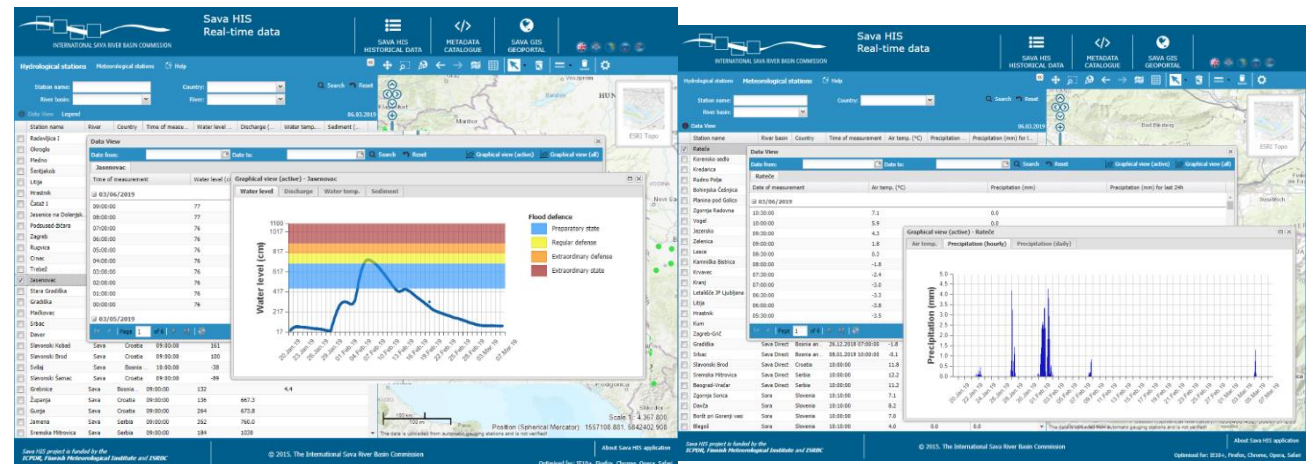
- ❖ Public users
- ❖ Registered users
  - Data upload/import
  - Data/metadata editing
  - Data download/export



## Sava HIS Real-time data

[www.savahis.org](http://www.savahis.org)

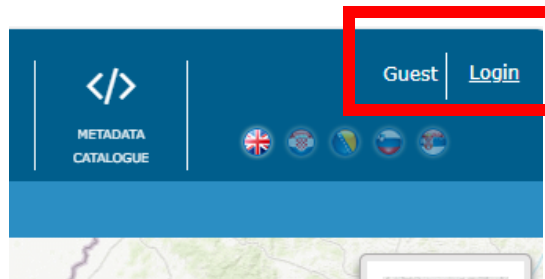
- ❖ Public users





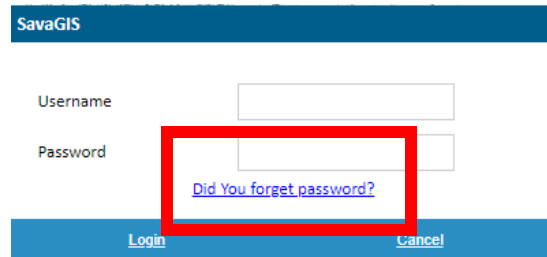
## Excercise 1: Data/metadata editing

- ❖ Open Sava GIS Geoportal  
[www.savagis.org](http://www.savagis.org)

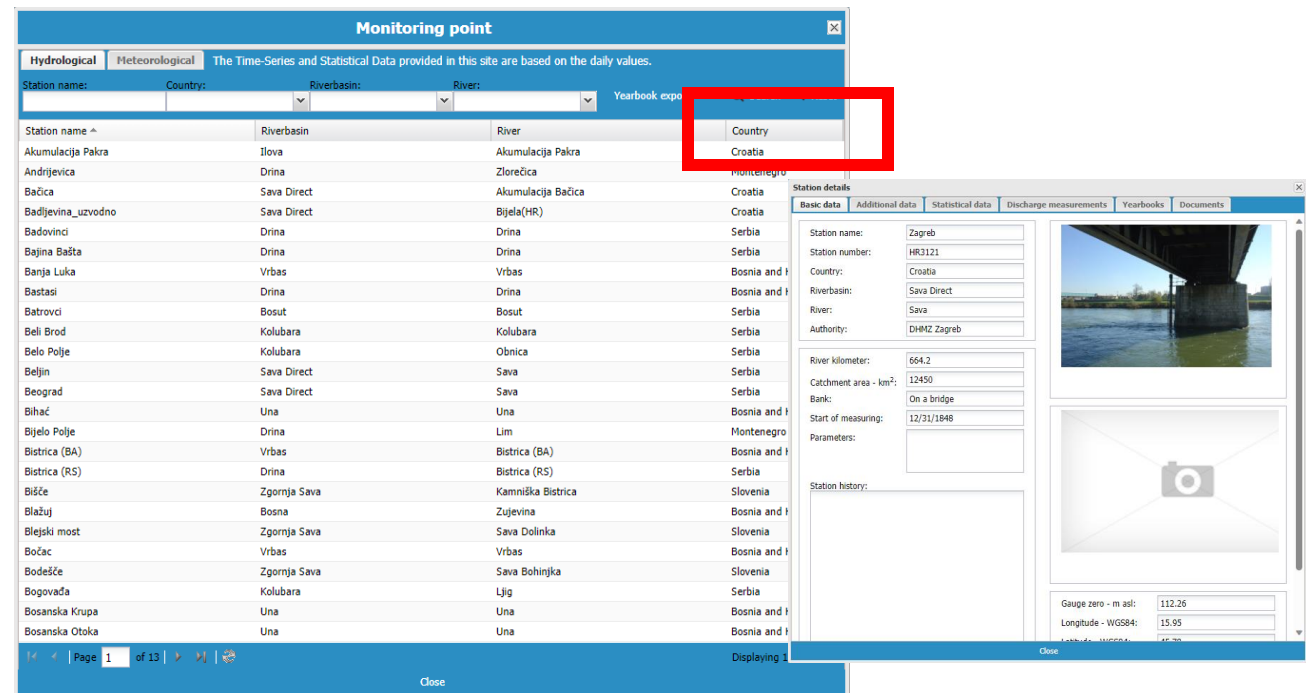
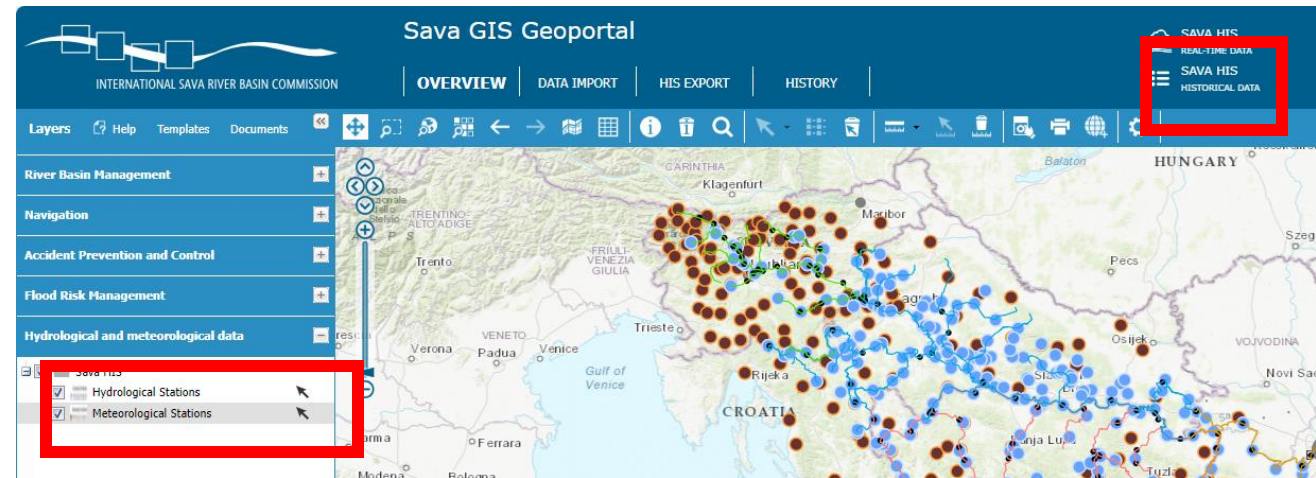


- ❖ Register

- ❖ Open the PROCESSED DATA tool

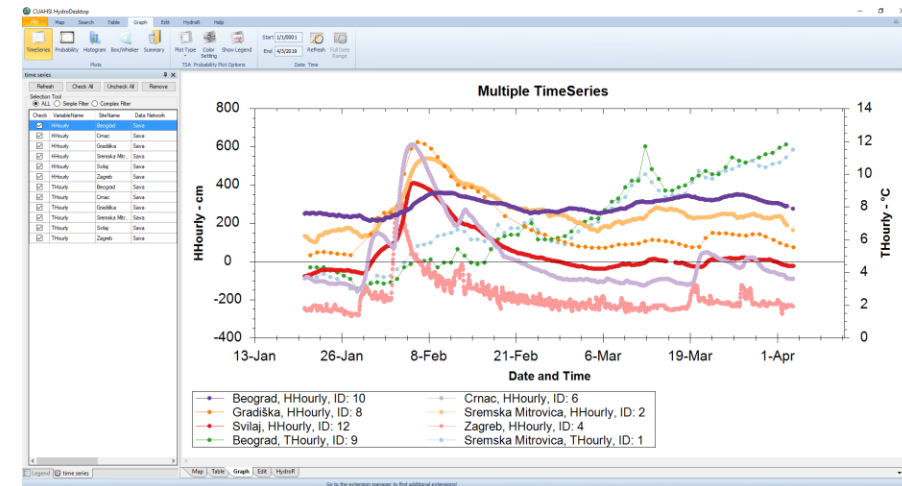
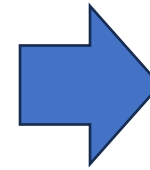
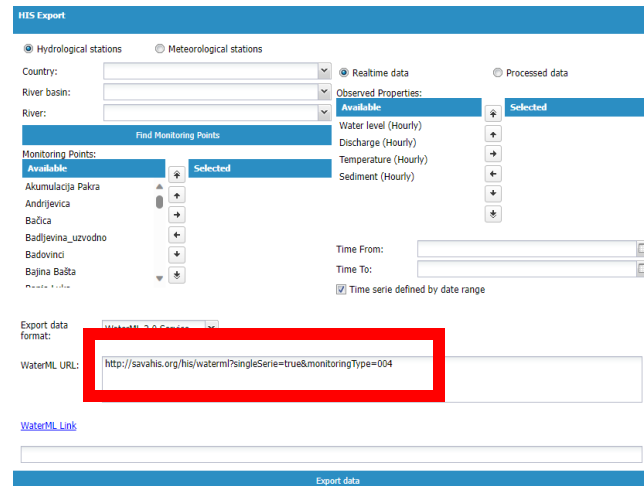


- ❖ Sort stations per country and:
  - Choose an existing station open and inspect/edit



## Excercise 2: Create the Water ML 2.0 web service (API)

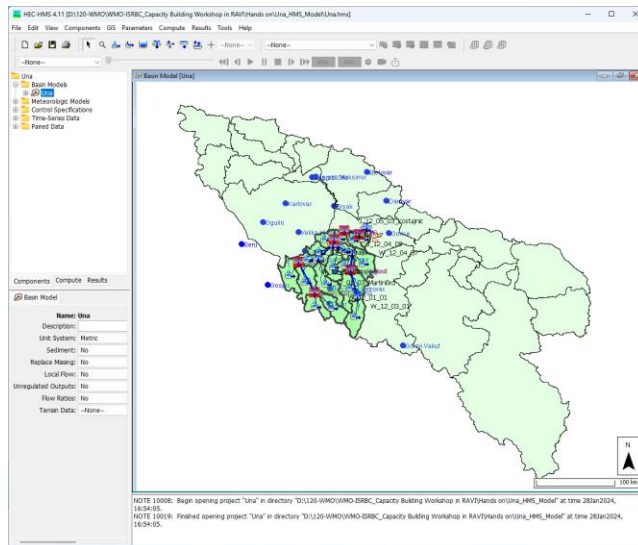
- ❖ Open the HIS EXPORT tool
- ❖ Sort stations per country and choose:
  - Existing stations
  - Time resolution
  - Parameters
- ❖ Create the WML 2.0 web service (API)
- ❖ Use the created URL to import it into the HydroDesktop



## Excercise 3: Modeling using the Sava HIS data

### ❖ Case study:

- The hydrological HEC-HMS model at the transboundary Una River basin, shared by Bosnia and Herzegovina and Croatia



- In original model the following stations for inputs are in use:
  - 21 meteo stations (BA: 11, HR:10)
  - 5 hydro stations (BA: 3, HR: 3)

### ❖ Scenario:

- Meteo stations in Croatia out of work
- Hydro stations in Bosnia and Herzegovina out of work

### ❖ Task:

- Use Sava HIS to prepare inputs at available stations (precip and air-temp data, as well as observed flows)
- Perform the model simulation to analyze flows at locations with no in-situ hydro observations

PRECIP and AIR-TEMP (from BA)

Bihac
Bosanska Krupa
Bosanski Petrovac
Cazin
Drvar
Kljuc
Lusci Palanka
Rmanj Manastir
Sanski Most

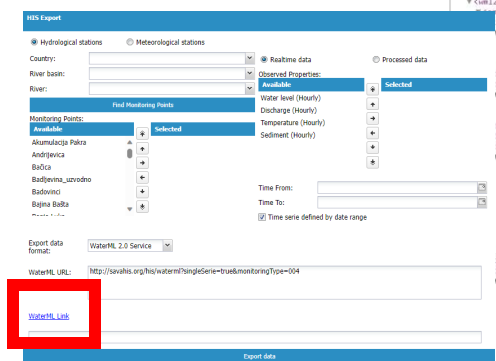
FLOW (from HR)

Kostajnica
Struga Banska

# Sava HIS interoperability

## Excercise 3

- ❖ Create the **Water ML 2.0** file
- ❖ Use the created file to import it into the HEC-DSS
- ❖ Import the observed data into the HEC-HMS hydrological model
- ❖ Run the HEC-HMS model to perform simulations at locations with no observations

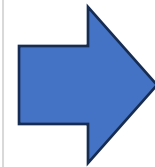
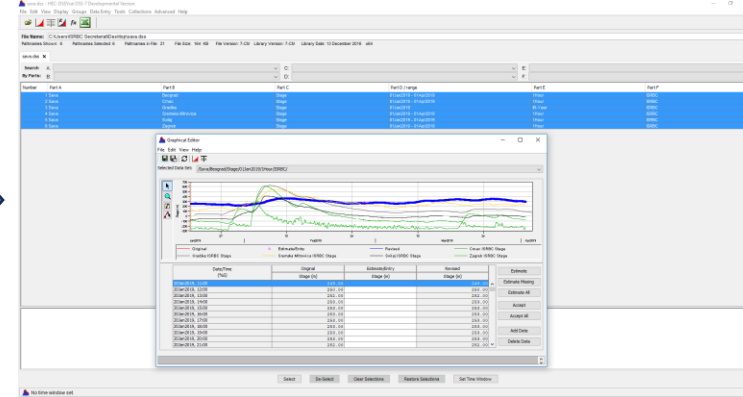


The HES Export dialog box shows the following configuration:

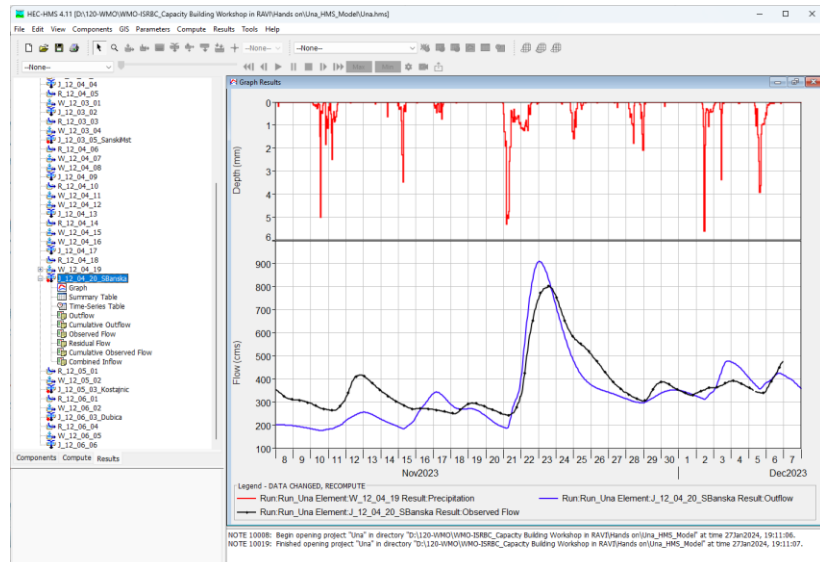
- Country: [Empty]
- River basin: [Empty]
- River: [Empty]
- Monitoring Points: Available (Selected)
- Export data format: WaterML 2.0 Service
- WaterML URL: <http://savhis.org/isa/waterml/sampleSeries=true&monitoringType=04>
- WaterML File: **WaterML\_Les** (highlighted in red)

```

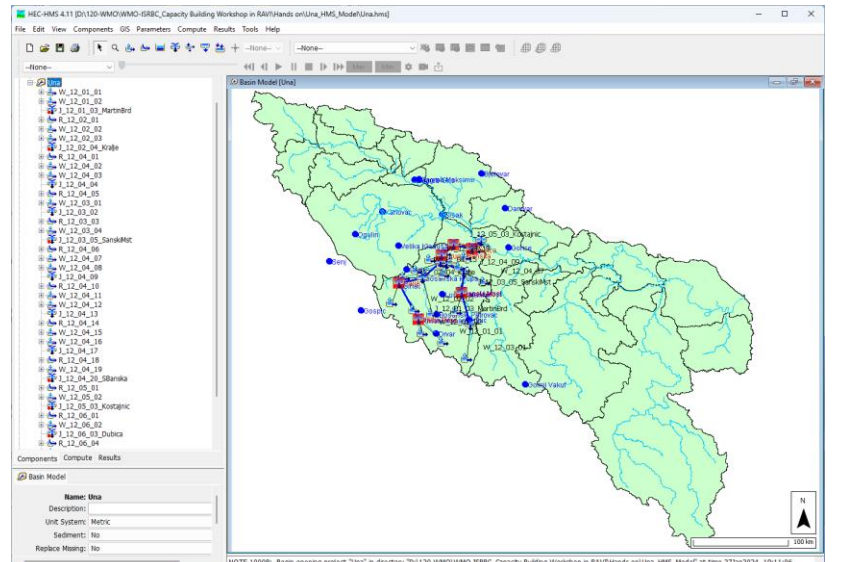
This XML file does not appear to have any style information associated with it. The document tree is shown below:
<?xml:collection xmlns:gml="http://www.opengis.net/gml/3.2" xmlns:uml2="http://www.opengis.net/waterml/2"
xmlns:sa="http://www.opengis.net/sampling/2.0" xmlns:sams="http://www.opengis.net/samplingSpatial/2.0"
xmlns:schemalocation="http://www.opengis.net/waterml/2.0 http://schemas.opengis.net/waterml/2.0/waterml2.0"
gml:description:igsa WaterML2.0/gml:description>
<?xml:observationMember>
<gml:Observation gml:id="Ig_Ob.Obs.hydro.153.T.Hourly">
  <om:phenomenonTime>
    <gml:timePeriod gml:id="Ig.ObsTime.153.T.Hourly">
      <gml:beginPosition>2019-01-20 11:00:00+01</gml:beginPosition>
      <gml:endPosition>2019-04-03 09:00:00+01</gml:endPosition>
    </gml:timePeriod>
    <om:resultTime>
      <gml:timeInstant gml:id="Ig_restime.153.T.Hourly">
        <gml:timePosition>2019-04-03 09:00:00+01</gml:timePosition>
      </gml:timeInstant>
    </om:resultTime>
    <om:observedProperty> MonitoringPoint="RS45090" ObservedProperty="Hourly"/>
    <om:featureOfInterest>
      <?xml:monitoringPoint gml:id="Ig_HP.Hydro.RS45090">
        <gml:description>Sava at Sremska Mitrovica</gml:description>
        <gml:name>Sremska Mitrovica</gml:name>
        <sa:sampleFeature xlink:title="Sremska Mitrovica"/>
      </?xml:monitoringPoint>
      <?xml:point gml:id="Ig_P.Hydro.RS45090">
        <gml:pos srsName="urn:ogc:def:crs:EPSG:4326">19.60000000 44.97000000</gml:pos>
        </gml:point>
        <?xml:sams:shape>
          </?xml:sams:shape>
        </?xml:sams:shape>
      </?xml:point>
    </om:featureOfInterest>
  </gml:Observation>
</?xml:collection>
  
```

The HEC-DSS software interface shows a table of data series and a graph window displaying a time-series plot of flow (m³/s) over time. The graph shows a peak in flow around late 2019, followed by a decline and then a secondary peak in early 2020.

The HEC-HMS 4.11 software interface shows a graph of flow (cm³) over time. The graph displays precipitation (red vertical bars) and outflow (black line) for the period from November 2023 to December 2023. The outflow shows a significant peak corresponding to the precipitation event.

The HEC-HMS 4.11 software interface shows a map of the Sava River Basin. The map displays the river network and various monitoring points (represented by blue dots) along the river. The basin is outlined in green, and the map includes a north arrow and a scale bar.



# THANK YOU FOR YOUR ATTENTION

Mirza Sarač

Advisor for protection against detrimental effects from  
waters and extraordinary impacts on the water regime

**International Sava River Basin Commission**

[msarac@savacommission.org](mailto:msarac@savacommission.org)