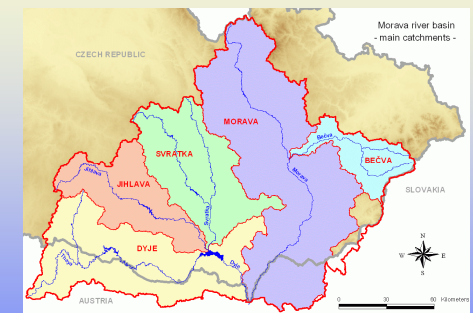
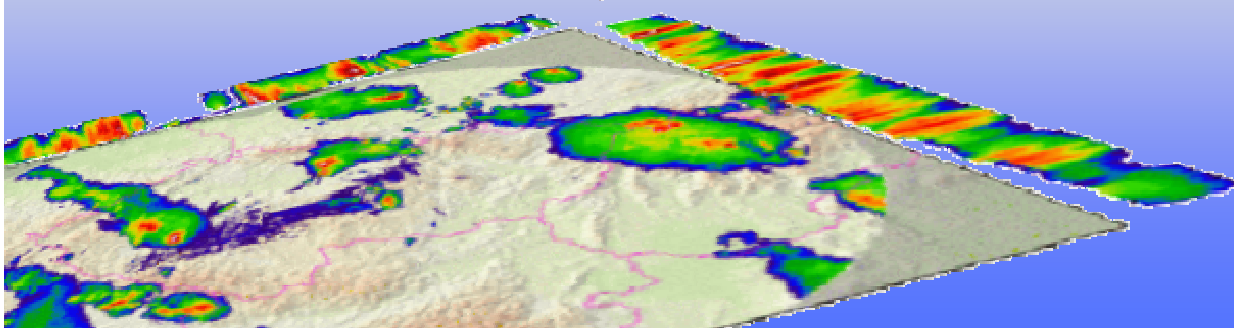


# Transboundary cooperation in the flood forecasting and warning service within the international Morava river basin

Eva Soukalová



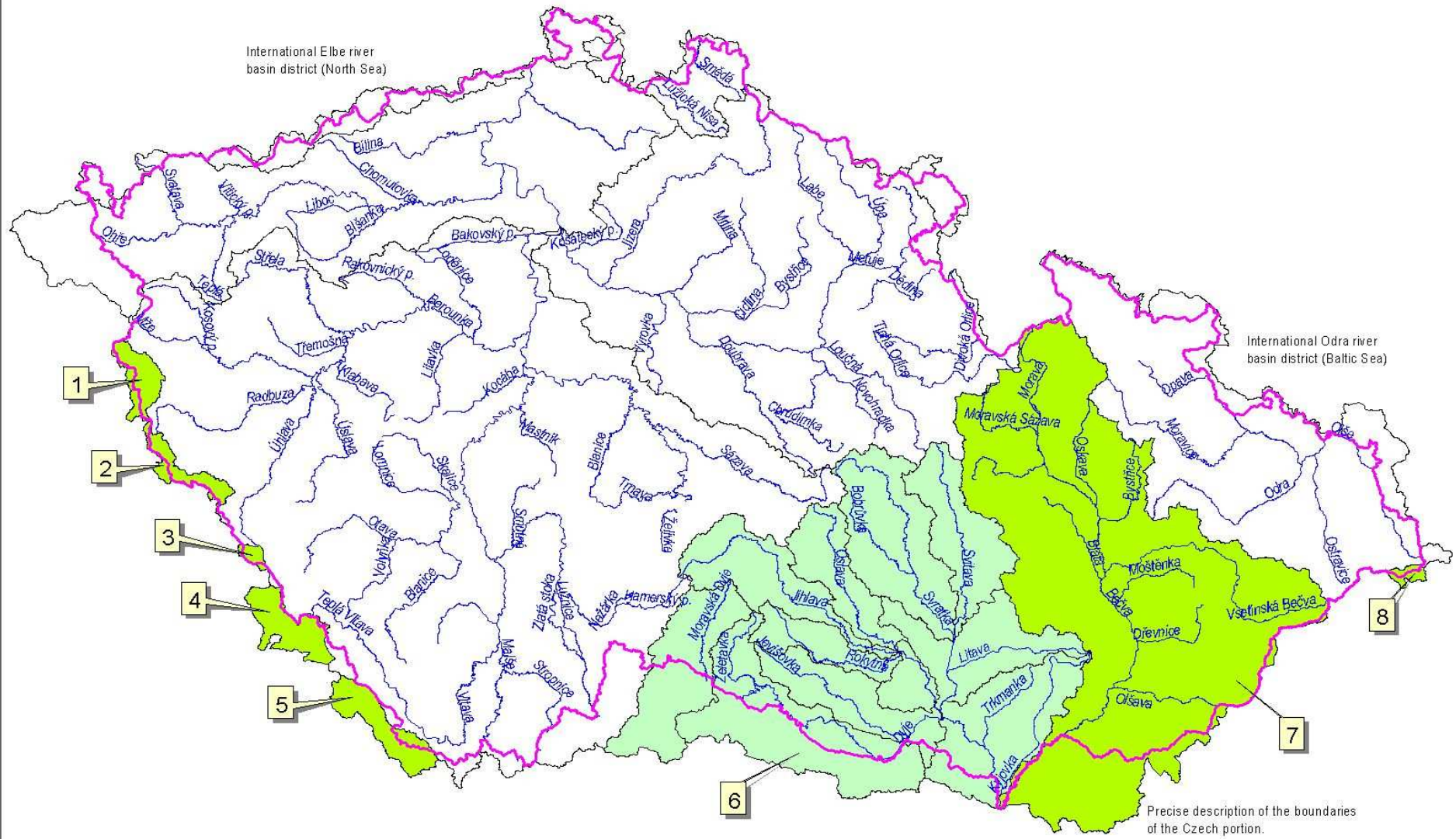
Český hydrometeorologický ústav, pobočka Brno



[eva.soukalova@chmi.cz](mailto:eva.soukalova@chmi.cz)

# Morava River Catchment

## Geographical coverage of the international Danube river basin district (IDRB)



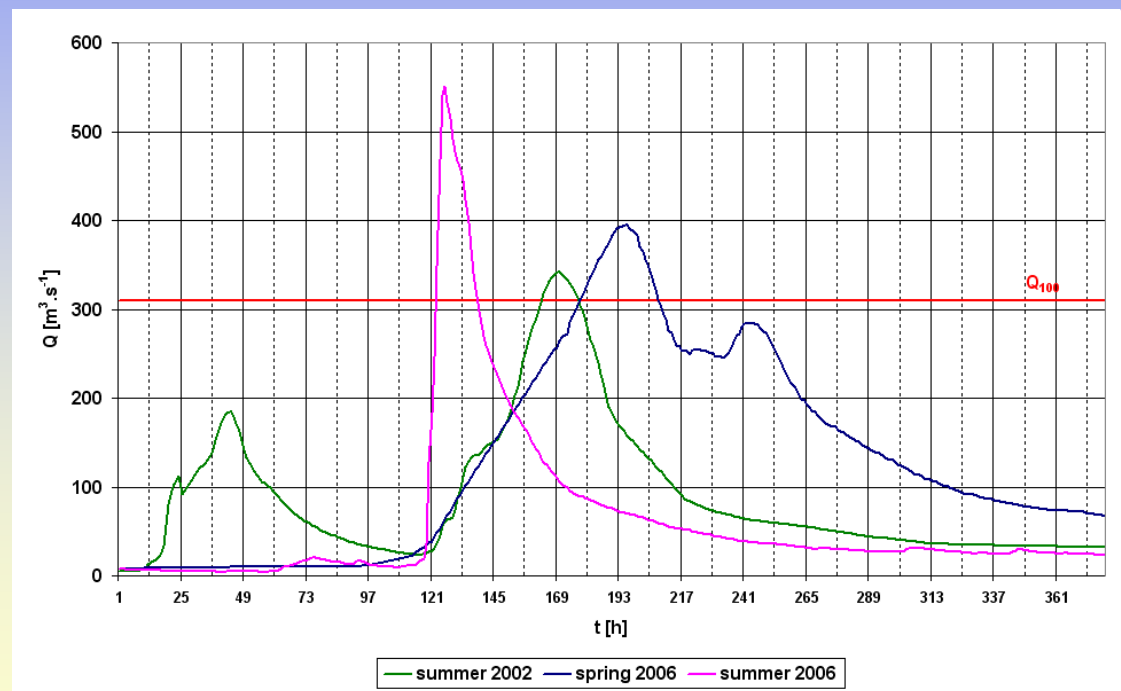




# Floods in the Morava river basin

## Comparison of summer flood 2002, spring and flash flood 2006 gauge station Podhradí - Dyje

- **winter and spring floods**  
1862, 1891, 2006
- **Summer floods**  
1883, 1930, 1938, 1997, 2002
- **Flash floods**  
1996, 2002, 2003, 2006
- **Ice floods**



# Arrangement of the international cooperation

- The bilateral agreements
- The exchange of all information related to flood protection and actual flood routing is realised by the Directives for the forecasting, reporting and warning duty on the Czech-Slovak border waters and Czech-Austrian border waters

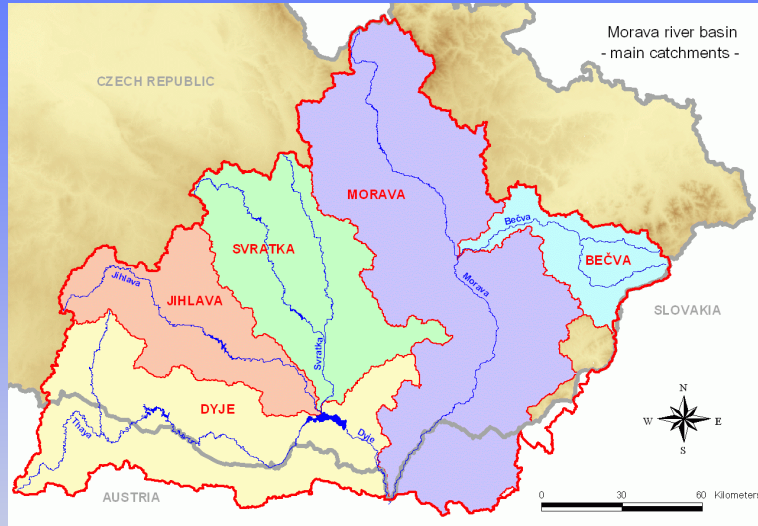
River basin rivers	Riparian countries	Treaties	Year of establishment
The Danube river basin Morava	Czech Republic – Slovakia	Treaty between the Government of the Czech Republic and the Government of the Slovak Republic about cooperation on transboundary watercourses	1999
The Danube river Basin Dyje, Morava	Czech Republic – Austria	Treaty between Czechoslovak Socialist Republic and the Austrian Republic on regulation of water management issues related to border waters	1967

# Flood Action Plans of sub-basins

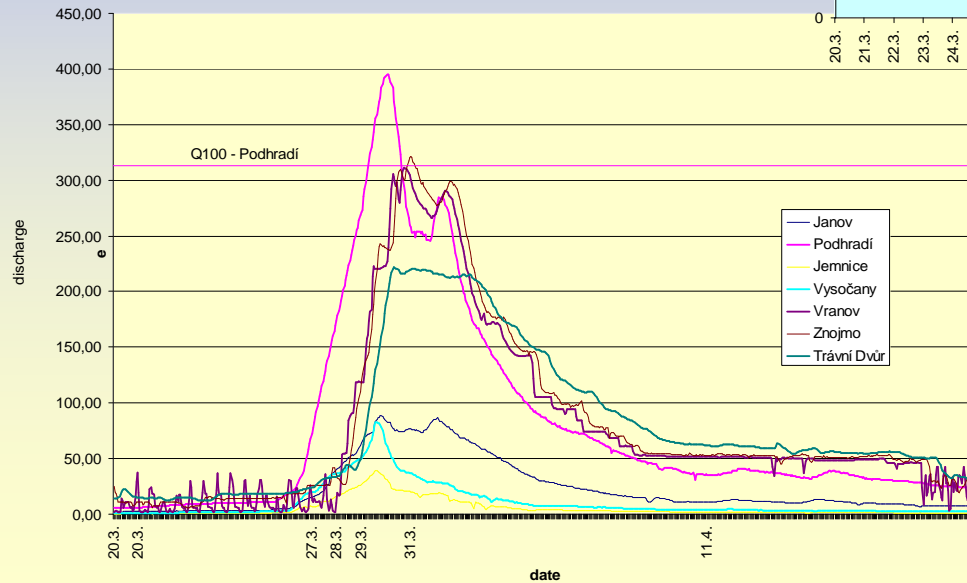
- To be adopted and published by countries preferably by the end of 2009
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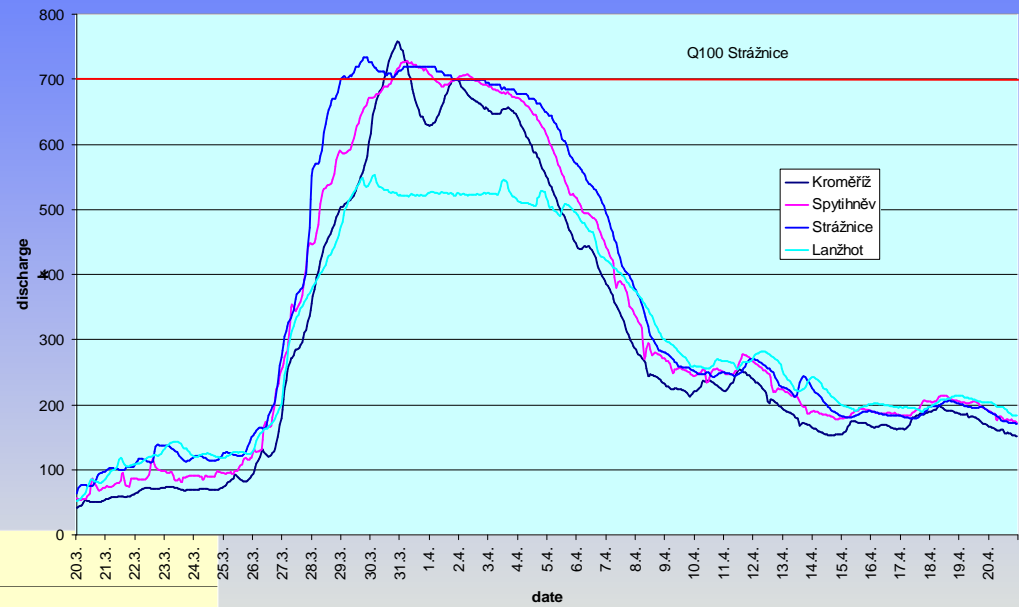
# Flood 2006



Hydrographs - Dyje



Hydrographs - Morava



Gauge station  
Moravský Svätý Ján  
(Slovakia)

$$Q_{\max} = 1\,547 \text{ m}^3 \cdot \text{s}^{-1}$$



An aerial photograph of a town in Austria, likely Melk, showing significant flooding. The Danube River is in the foreground, and a large, white castle with a red roof sits on a hill in the background. The town below is surrounded by water, and many buildings have red roofs. The surrounding hills are covered in snow and bare trees.

## Conclusions

The flood damages were estimated on 35 mil. Eur, there were large damages on the agricultural land due to flooding

Three people lost their lives during the flood

## Lessons learned

60 % of the Dyje catchment lies in Austria, cooperation with Austrian institutions must be improved

The permanent task is improving of the meteorological and hydrological forecasting and warning



# Memorandum of Understanding

drawn up by the Hydrological Services of the Czech Republic and Lower Austria  
represented by:

- Czech Hydrometeorological Institute (CHMI)
- Amt der Niederösterreichischen Landesregierung; Abteilung Hydrologie (Hydro NÖ)

## Part 1

### Providing and utilization of the measured data

Concerning the cooperation in the field data exchange for the river Dyje/Thaya the Hydrological Services of the Czech Republic and Lower Austria agree on the following items:

- The Hydrological service of Lower Austria

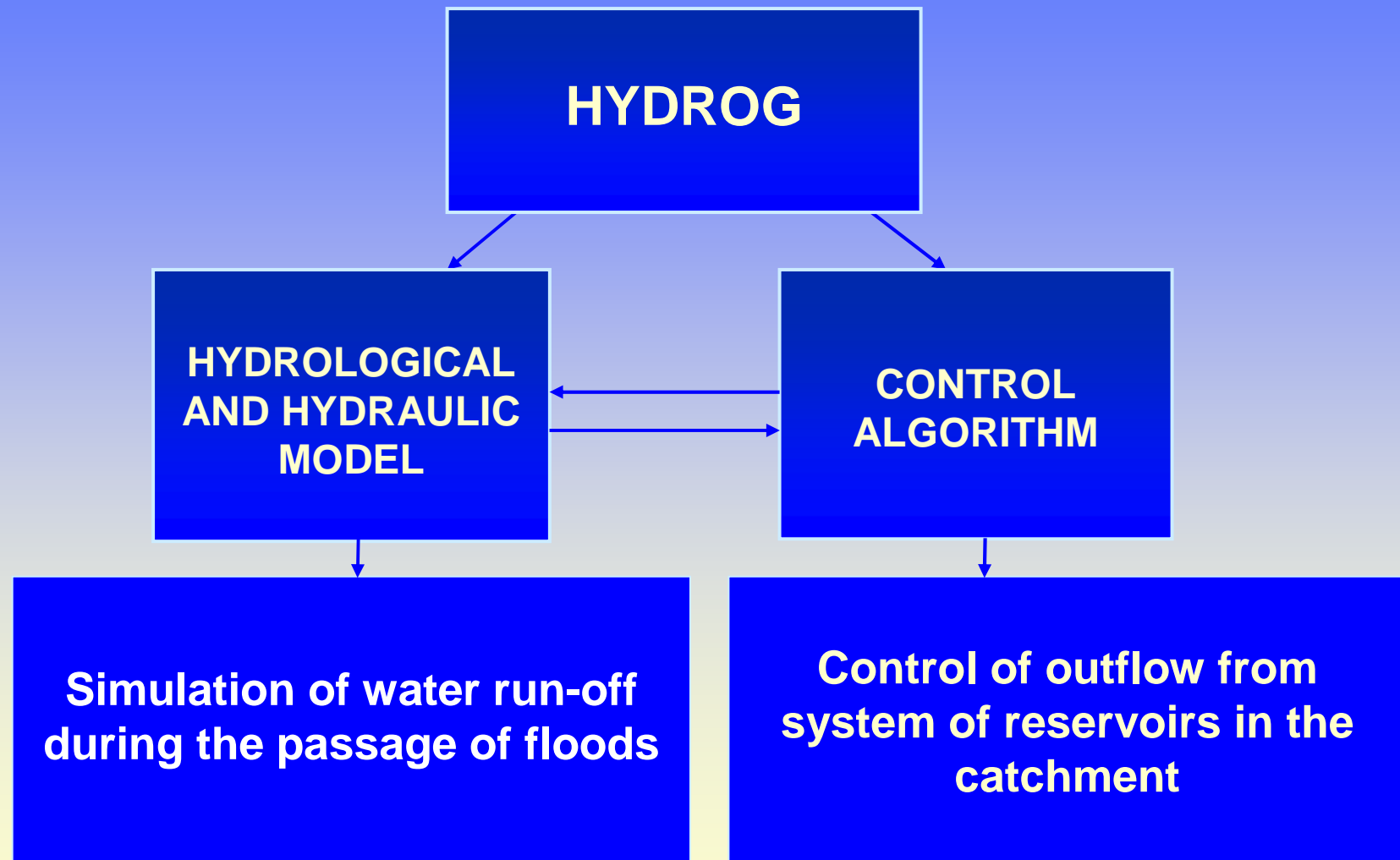
constructs a **new remote station** with sensors for:

- precipitation, air temperature and snow level

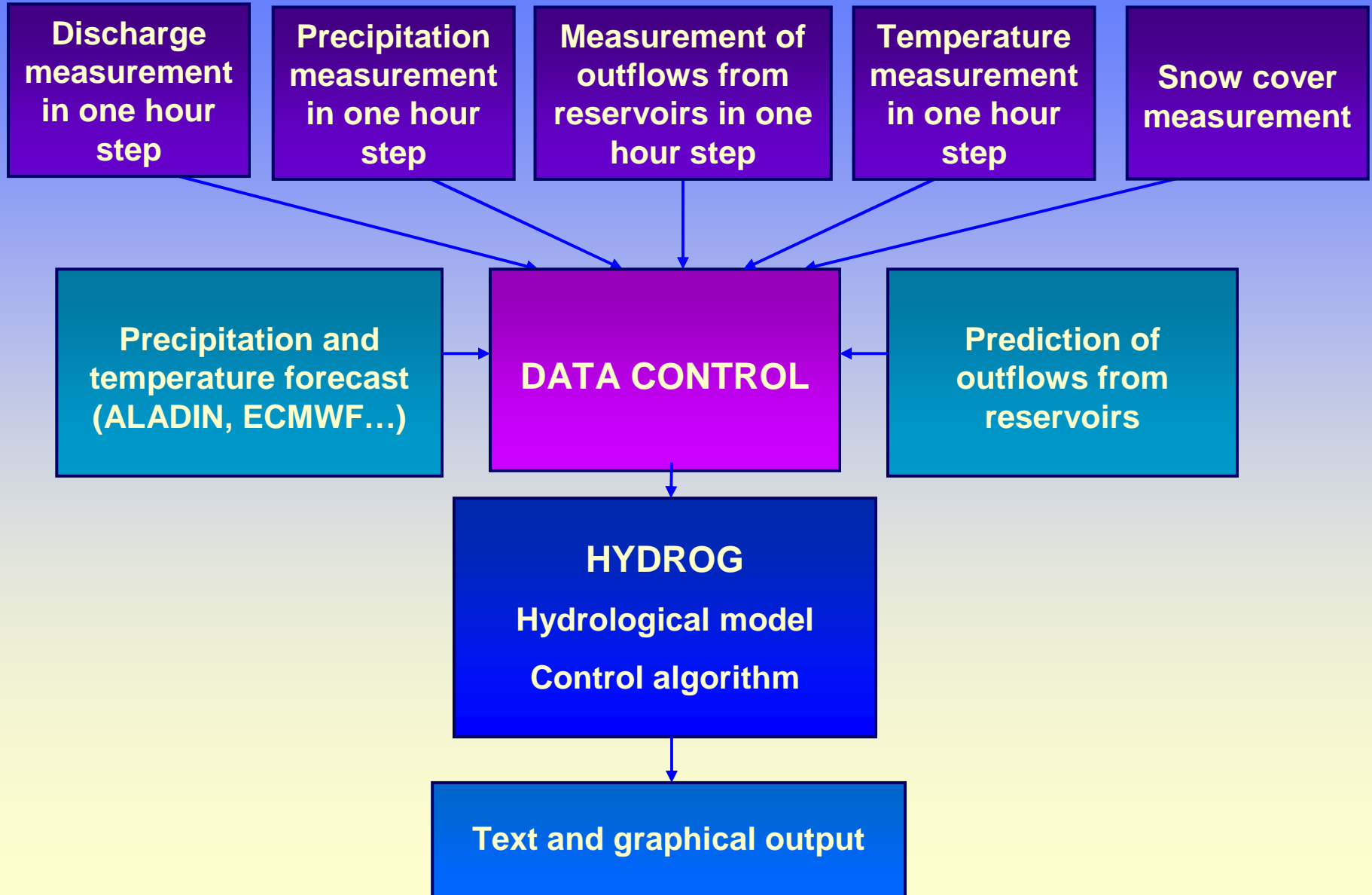
**Limbach**

existing remote stations with **additional sensors** for:

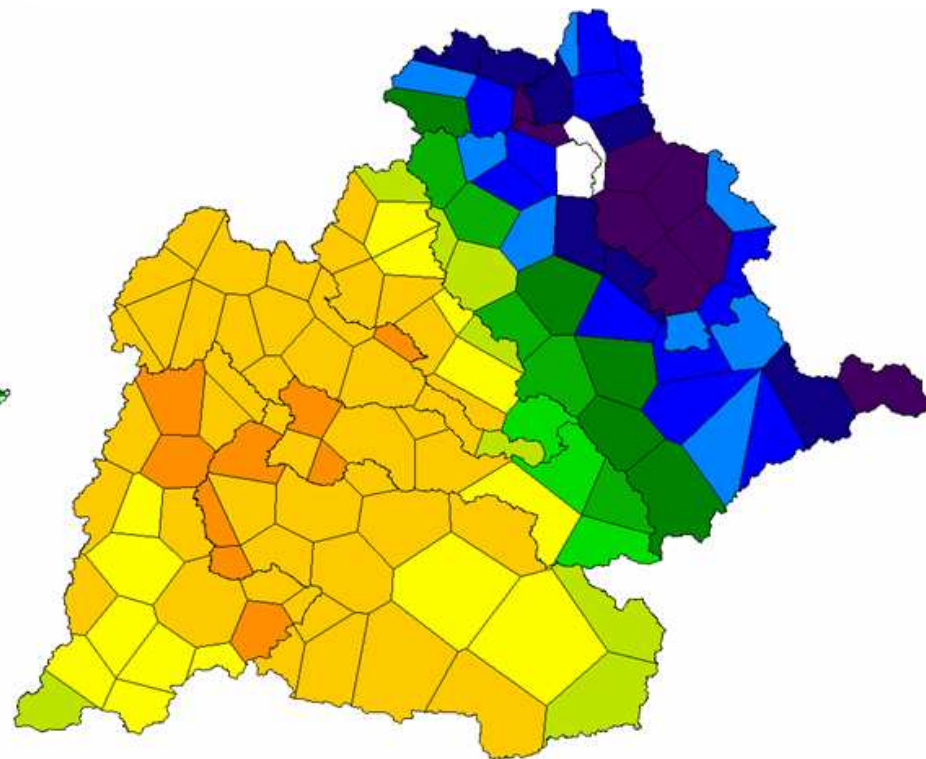
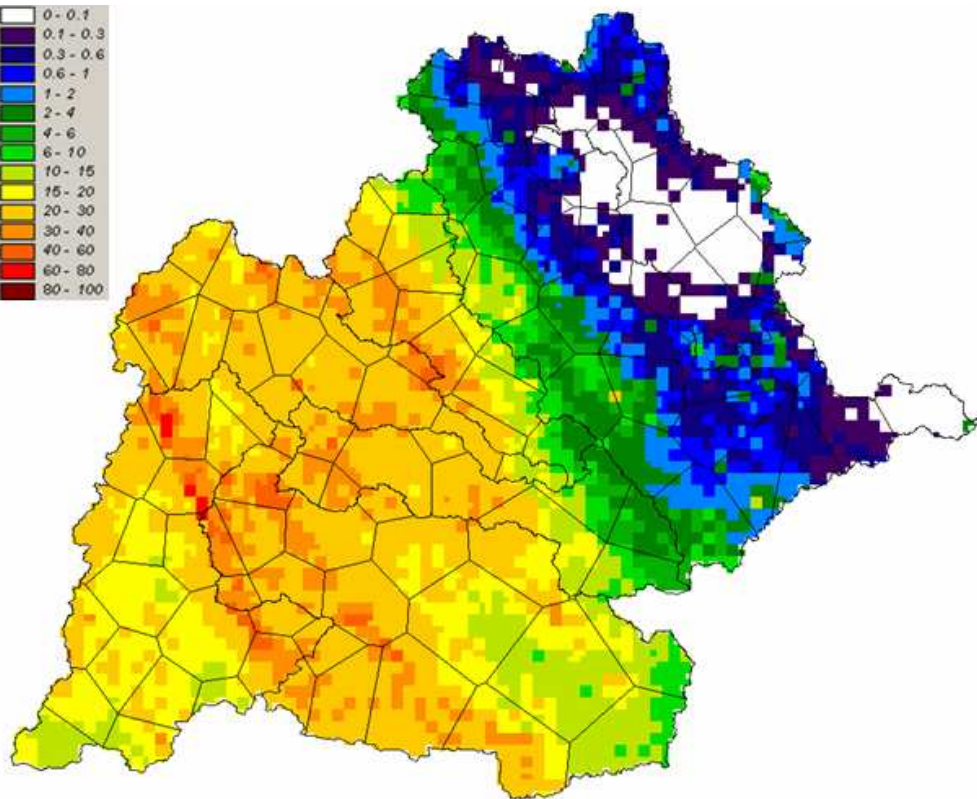
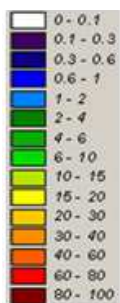
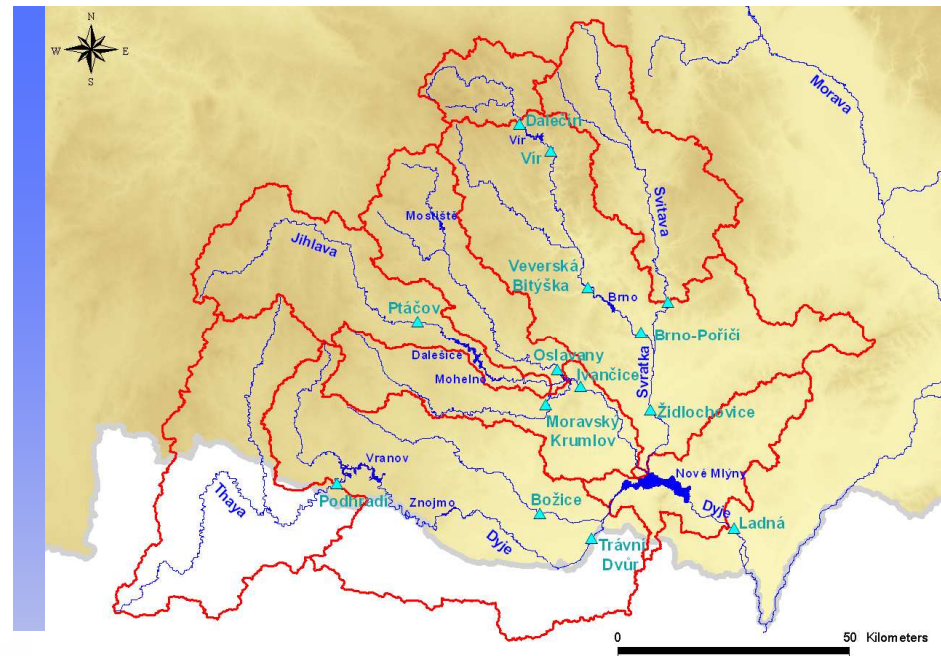
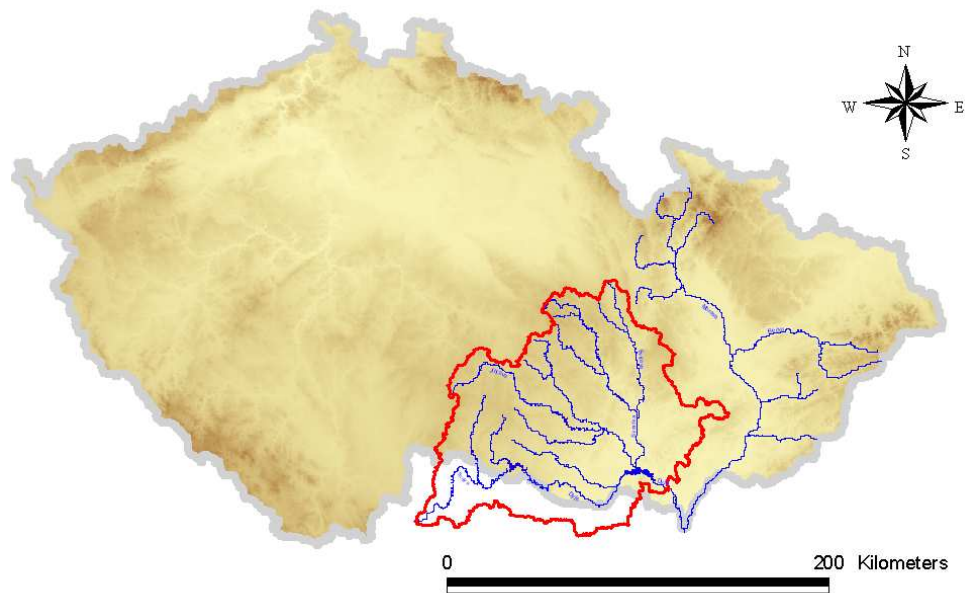
# Hydrological forecasting model HYDROG



# Input data

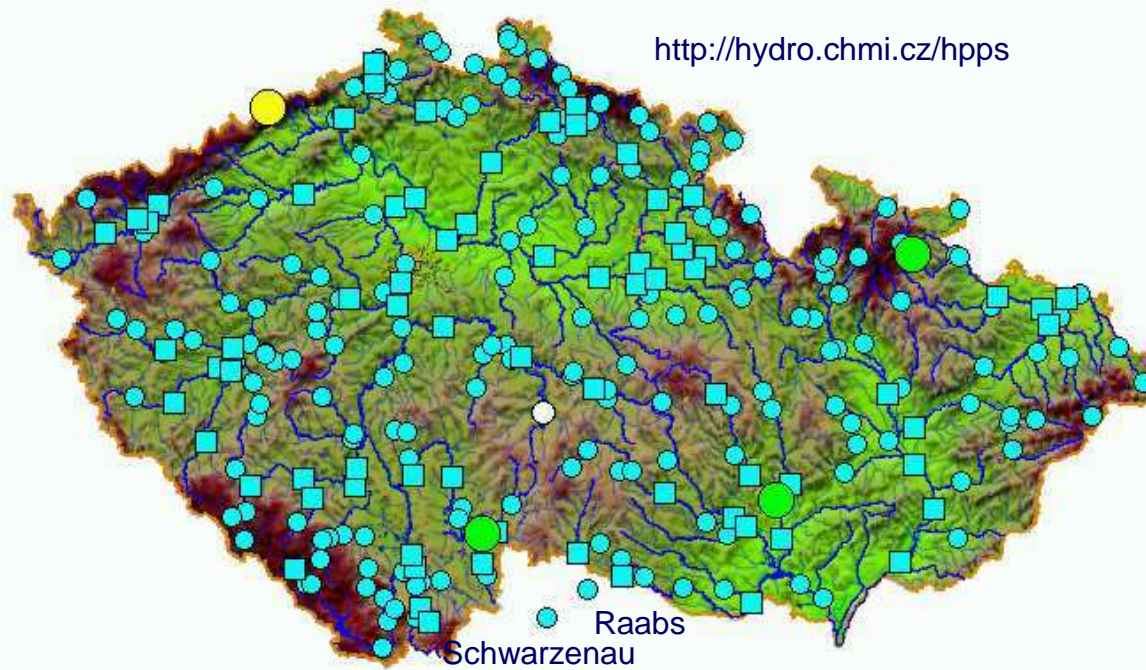
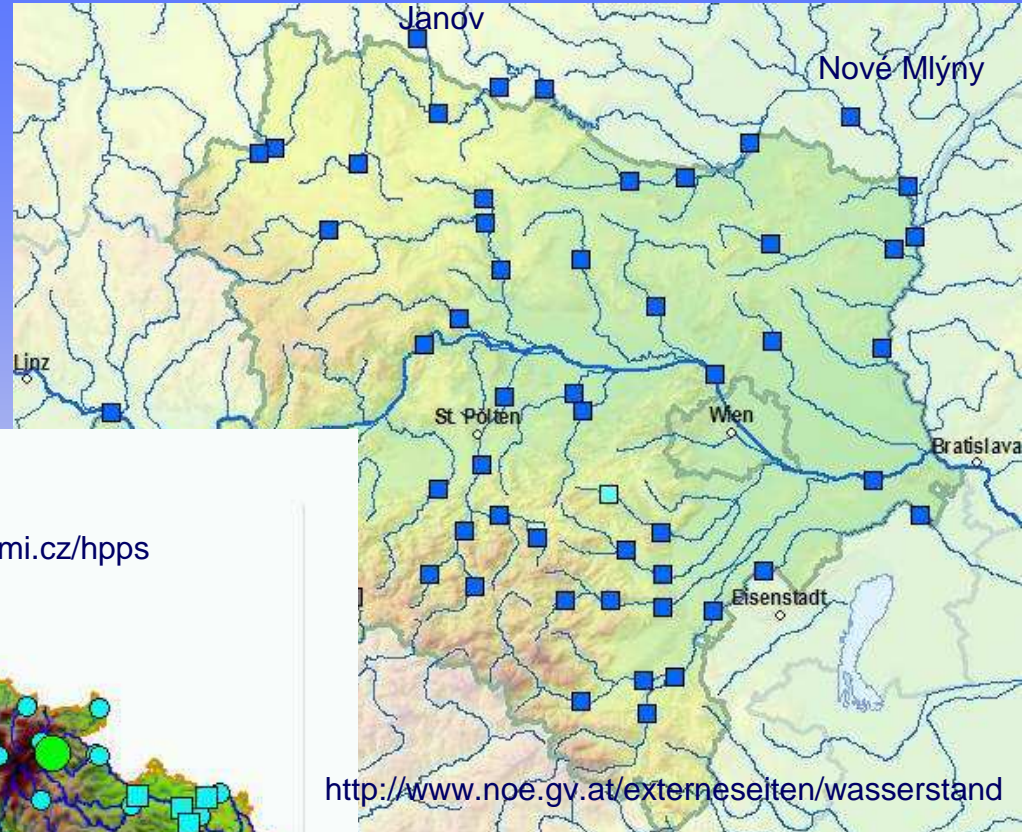






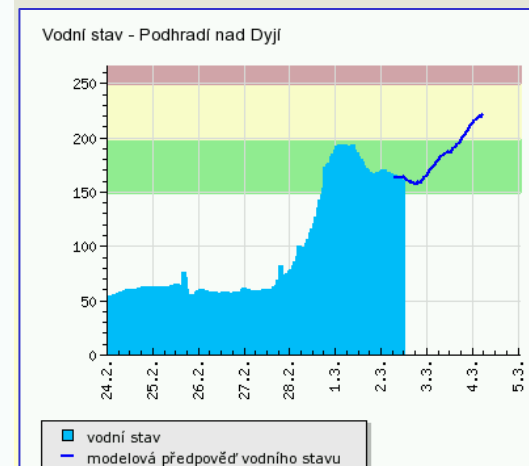


# Data exchange



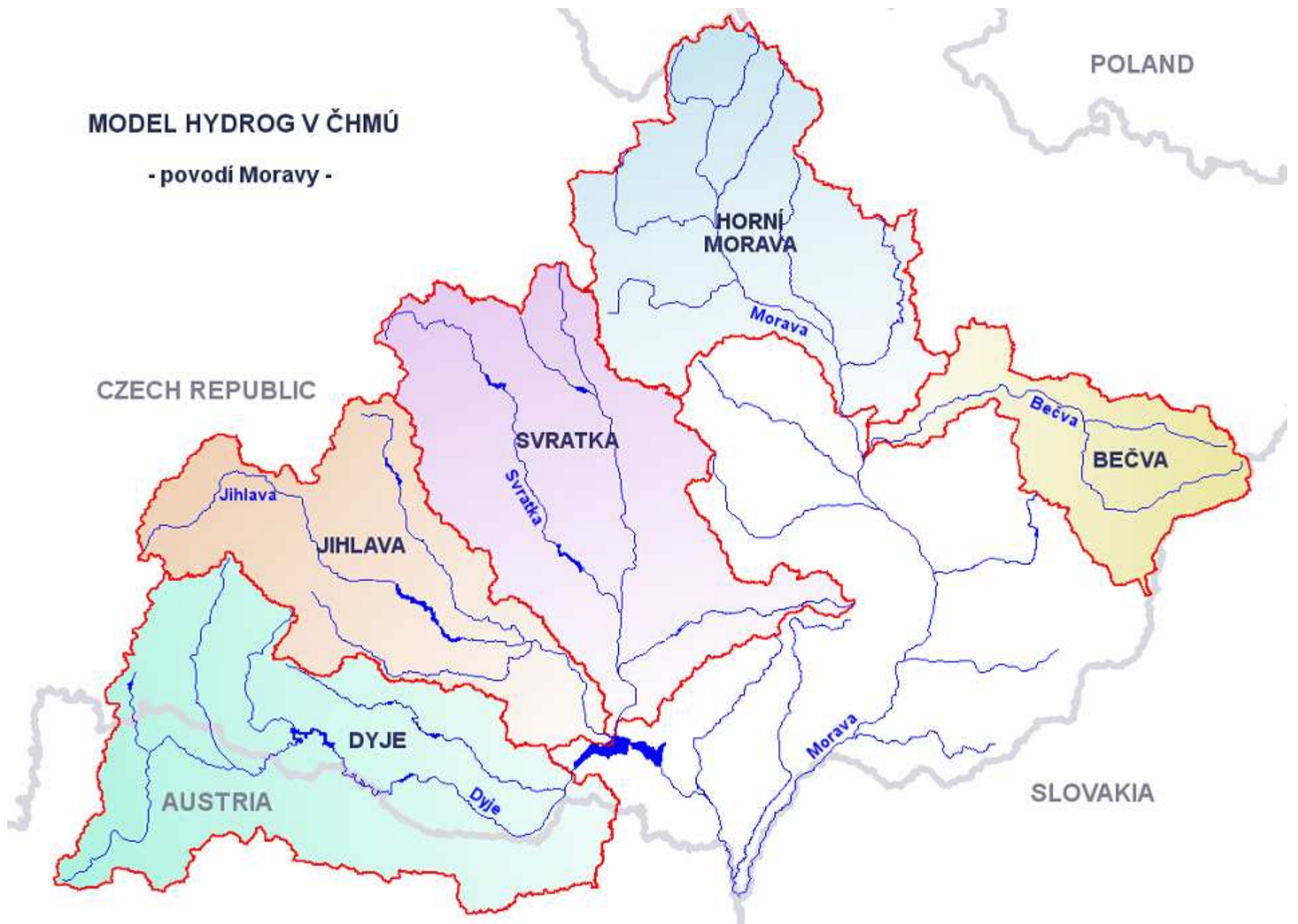
<http://hydro.chmi.cz/hpps>

<http://www.noe.gv.at/externeseiten/wasserstand>



# MODEL HYDROG V ČHMÚ

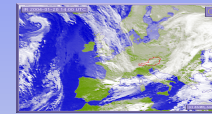
- povodí Moravy -





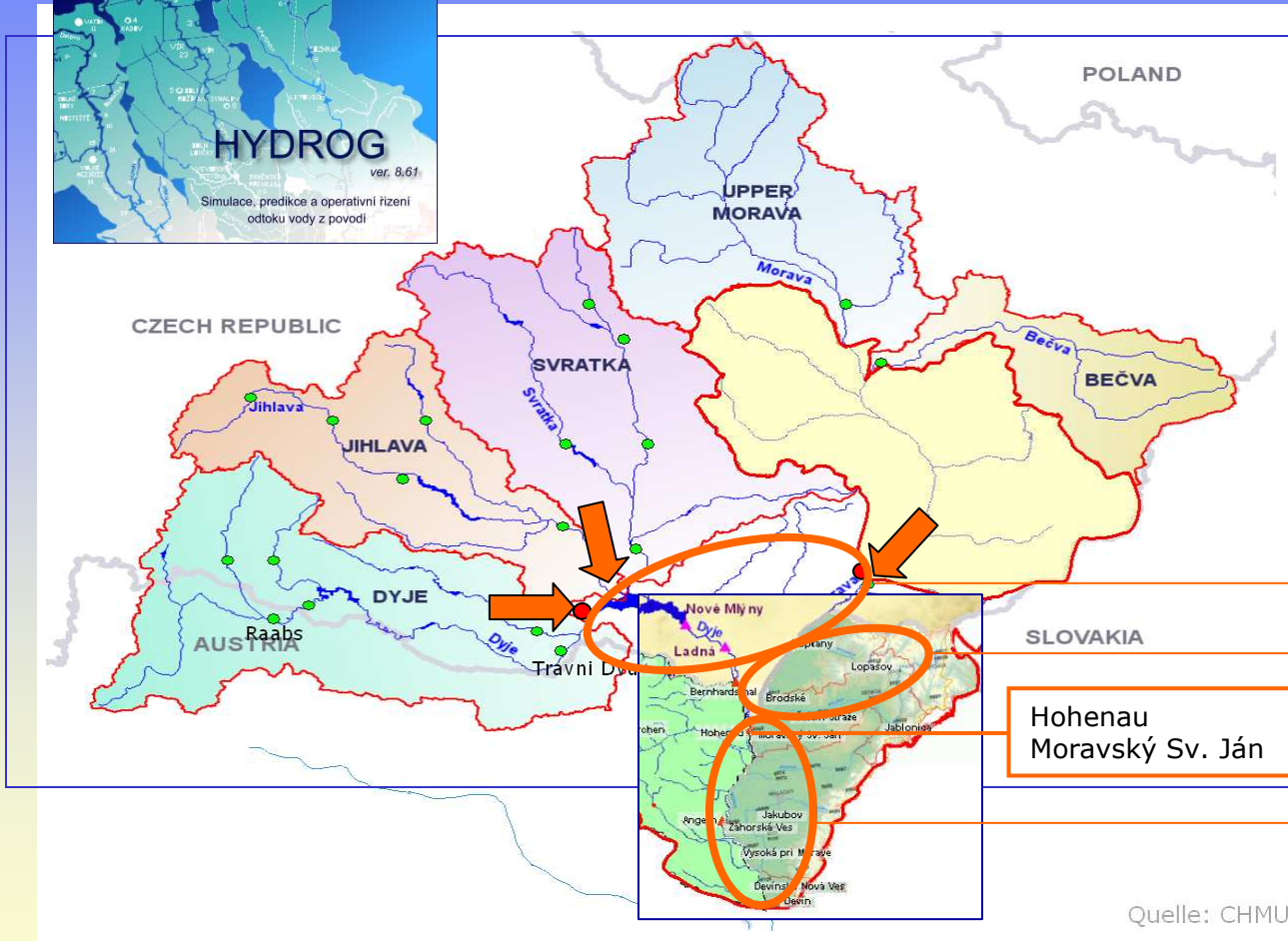
# Feasibility study for the trilateral CZ-A-SK Project

## Starting situation



Quelle

# Konkreter Systementwurf – neue Modelle



HYDROG - CHMU  
bis Hohenau

HYDROG - SHMU  
Myjava

Hohenau  
Moravský Sv. Ján

Modell – Land NÖ  
bis Devin/Donau

Quelle: CHMU





# Leadtime, Run time interval

## ➤ Lead time

- 0-48 hours => for public
- In addition 48-72 hours => only for the internal use (!!!!)
- all Information as timeseries  $Q(t)$ ,  $W(t)$

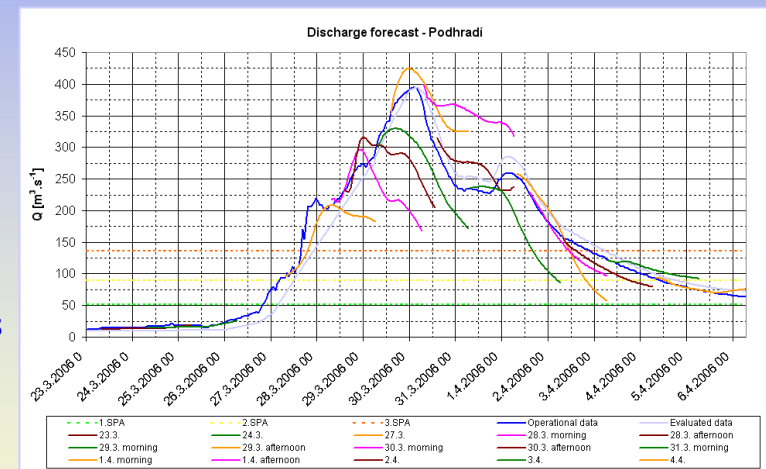
## ➤ Run time interval

### ➤ **Peacetime**

1 x daily (by 10:00 o'clock); on the working days

### ➤ **During the Flood**

- + the first calculation by 10:00 o'clock
- + the next calculations when the circumstances change
- + calculations by appointments



## Floods in the Morava river basin

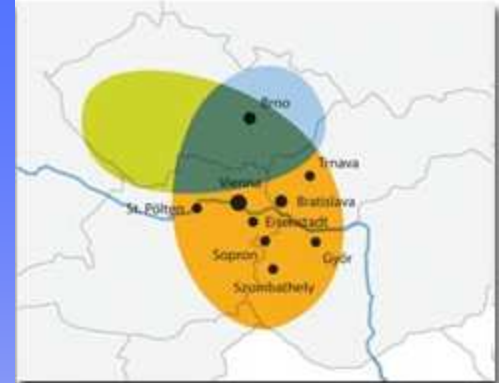


**Raabs an der Thaya summer flood 2002**



**Dürnkrot - Morava spring flood 2006**

# Central European Flood Risk Assessment and Management CEFRAME



## Goal of the Project

- In the CENTROPE Territory (Morava, west Slovakia, Northwest Hungary and Austria) there are the rivers Morava-Dyje, Danube and Leitha
- For this territory we must
  - compare and analyse the existing Floodprotection directories
  - flood risk analysis
  - harmonization of the flood design criterias





# CEFRAME - results

- Review and assessment of the current situation (including natural, hydrological conditions, floodplains and flood defences)
- Flood risk analysis and mapping
- Potential Damage Maps
- Draft for the harmonization design criteria and safety regulations along and across border sections, Floodmanagement
- To raise the awareness and preparedness of the general public
- Example for the other regions (Best Practice)

# Area for cooperation improvement

- to interlink regional and national agencies on sub-basins to facilitate and promote the exchange of source data
- Routing of the information downstream as the basis of improving efficiency and lead time of flood forecasting and warning
- To improve the methodology and tools of data collection, processing, forecasting and dissemination
- Harmonization for a common approach in assessment of flood-prone areas and evaluation of flood risk (CEFRAME)

# Distinguished Service Gold Medail Low Austria



**Thank You for Your Attention**

**Eva Soukalová**

**Czech Hydrometeorological Institute**

**[eva.soukalova@chmi.cz](mailto:eva.soukalova@chmi.cz)**