

SP/1a6/108/07

**Project on „Precission of CC impact on
water management, agriculture and
forestry “**

RNDr. Jan Daňhelka, Ph.D.

CHMI

Na Šabatce 17, 143 06 Praha-Komořany, CZ

e-mail: danhelka@chmi.cz

„Precision of Climate Change impact estimates in water management, agriculture, forestry and adaptation measures proposal.“

2007 – 2011

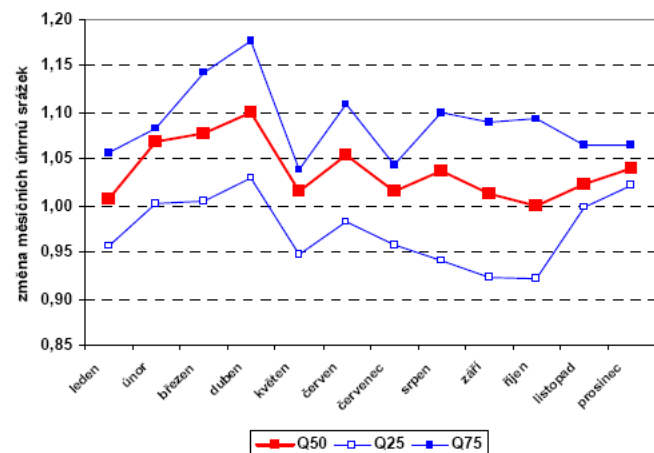
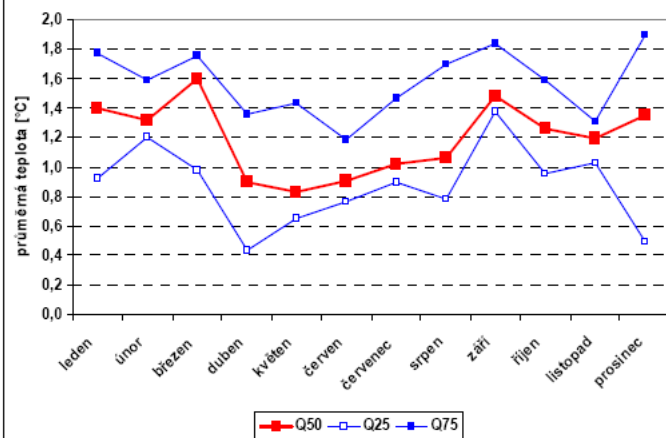
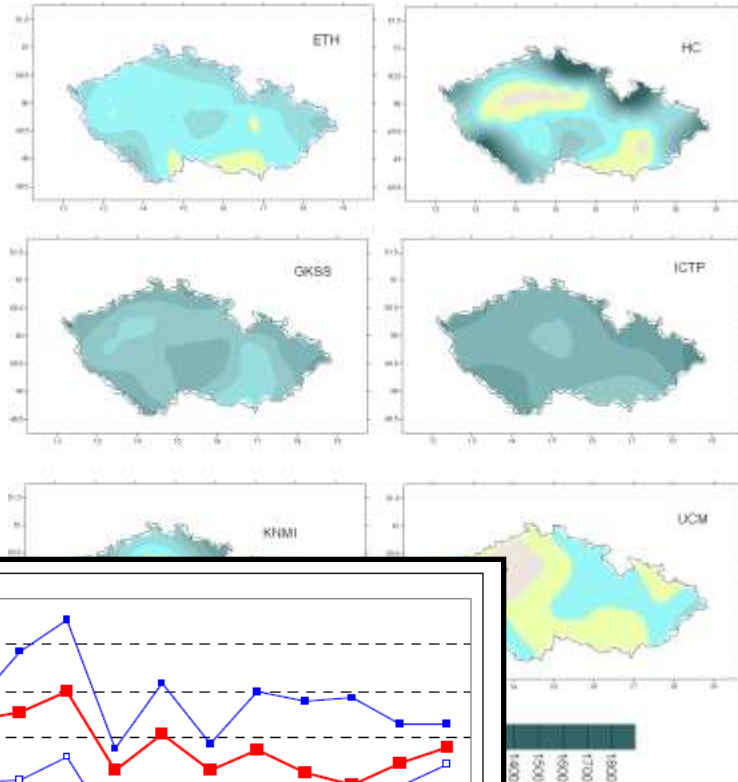
Team:

- **CHMI**
- **MF UK (Charles University)**
- **VUV TGM (Water Research Institute)**
- **System Biology and Ecology Institute, Academy of Sciences**
- **Plant Production Research Institute**

- *Regional CC scenarios (CHMI & MF UK)*
- *CC impacts on hydrological balance, water resource and adaptation measures proposal (VUV TGM)*
- *CC impacts on hydrological extremes (CHMI)*
- *CC impacts and adaptation measures proposal in agriculture (CHMI & VÚVR)*
- *CC impacts and adaptation measures proposal in forest management (USB E AV)*
- *Synthesis of CC impacts and adaptation measures synthesis including cost analysis in the Czech Republic (CHMI)*

Regional CC Scenarios

- PRUDENCE
- Climate observation
- ALADIN-CLIMATE CZ
- Evaluation of projections



Hydrology and Water management

WRI - Hydrological balance and water resources

CHMI - Hydrological extremes

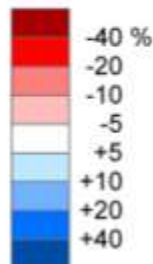
A – Floods

B – Droughts

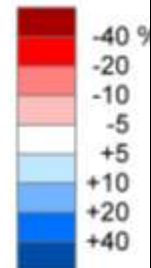
C – Experimental basins

Hydrology and Water management

River discharge: change in mean annual runoff



River discharge: change in mean annual minimum 7-day runoff



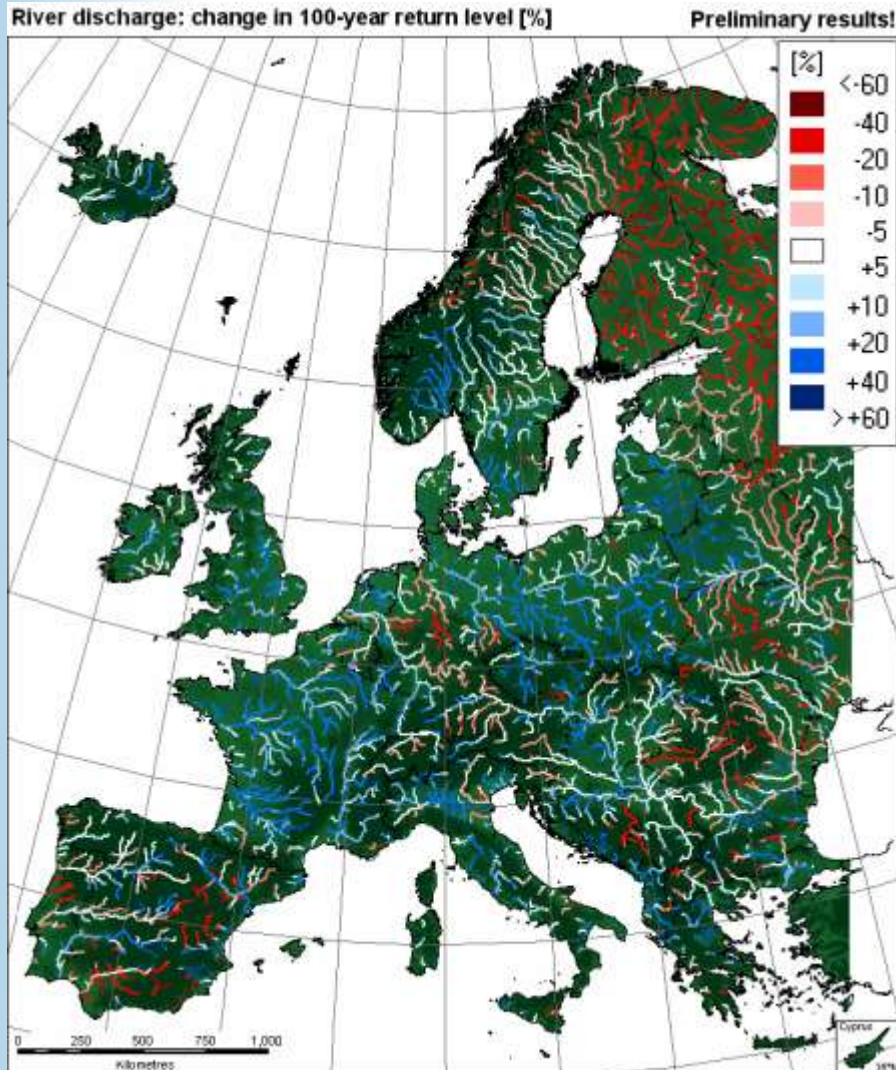
Hydrology and Water management

WRI - Hydrological balance and water resources

- **BILAN model**
- **WaterManagement model**
- **MODFLOW (ground water modeling)**

- **monthly and daily time step**
- **representative basins**

Hydrological extremes



Floods

- Assessing 30y time series?
- Weather generator
- 1000y daily timeseries
- 6h generator
- AquaLog modelling system
- Different scenarios of inputs
- Different scenarios of model parameters

Hydrological extremes

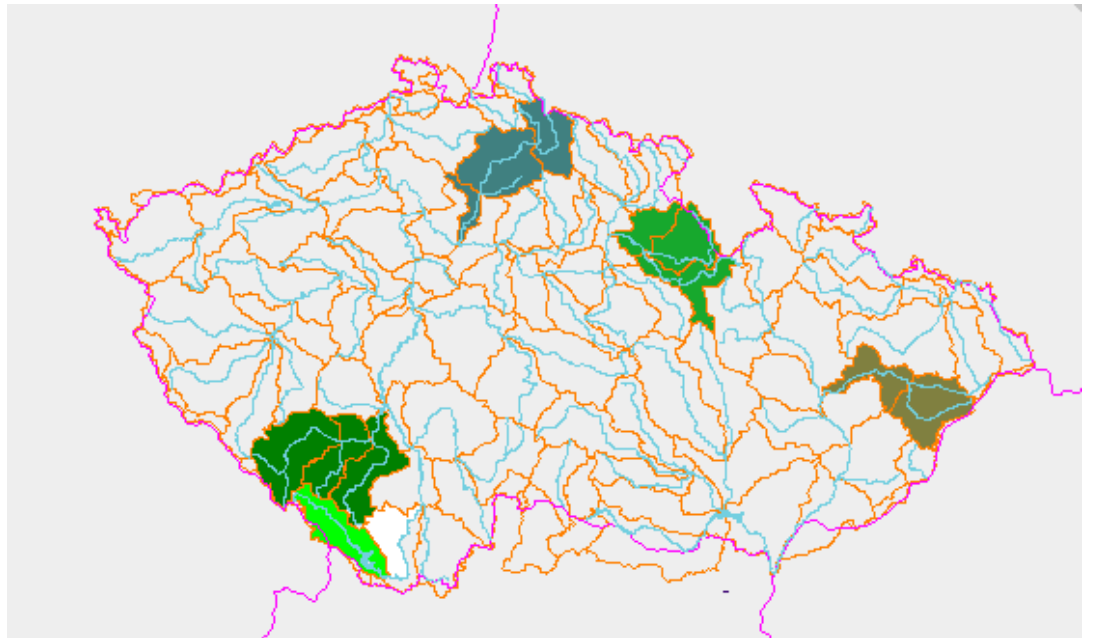
Basins:

Orlice River

Jizera River

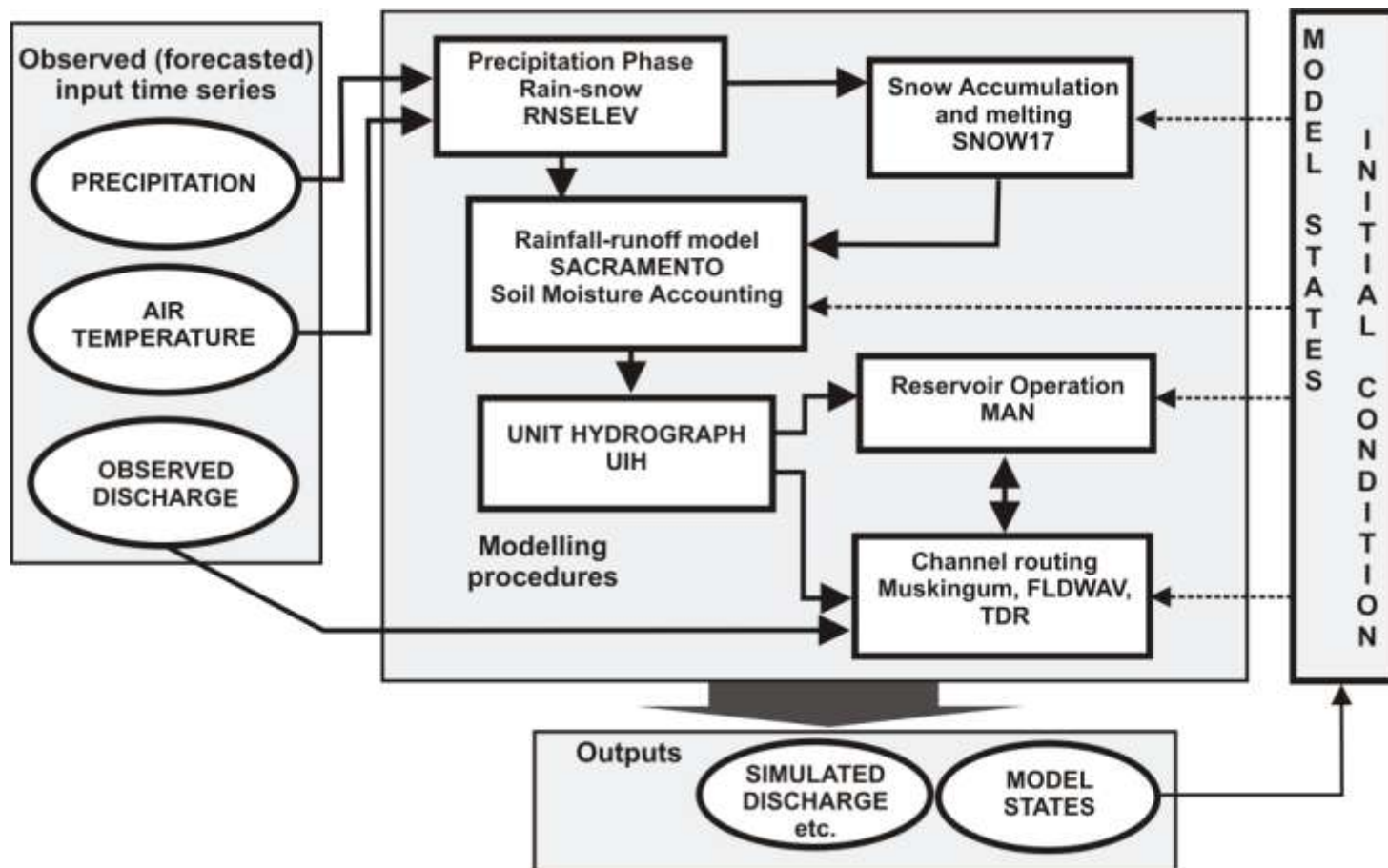
Upper Vltava River

Otava River

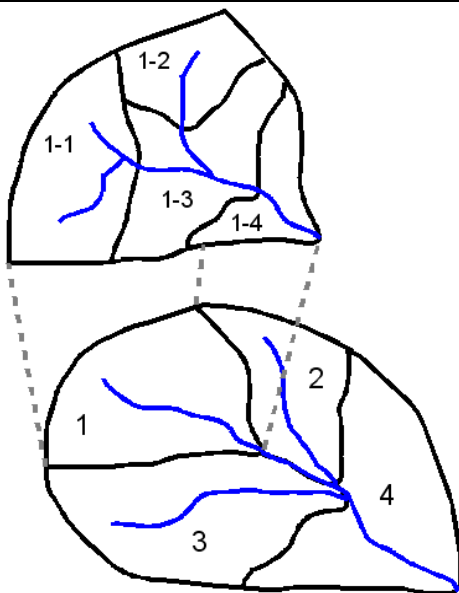


Hydrological extremes

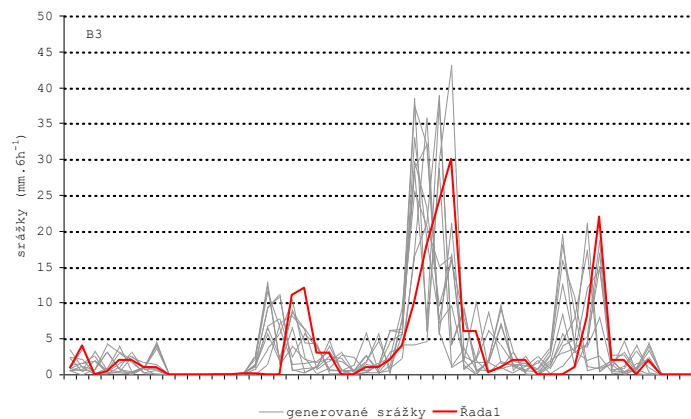
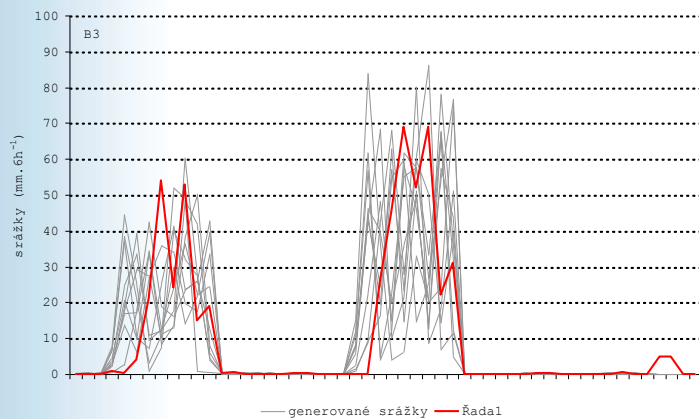
AquaLog hydrological modeling system



Hydrological extremes



Volume ratio	Sb1 ratio	Sb2 ratio	Sb3 ratio	Sb4 ratio
12.8.2002	0.075	0.452	0.370	0.104
7.8.2002	0.079	0.414	0.432	0.075
6.8.2002	0.100	0.428	0.377	0.095
28.8.1999	0.068	0.477	0.368	0.088
28.10.1998	0.104	0.557	0.274	0.065
6.8.2006	0.072	0.413	0.432	0.083
11.8.2002	0.108	0.560	0.263	0.069
7.6.2002	0.071	0.377	0.458	0.094
29.6.2006	0.099	0.534	0.305	0.061
24.3.2004	0.094	0.408	0.394	0.104
2.6.2004	0.085	0.392	0.455	0.068
20.3.2002	0.072	0.420	0.414	0.093

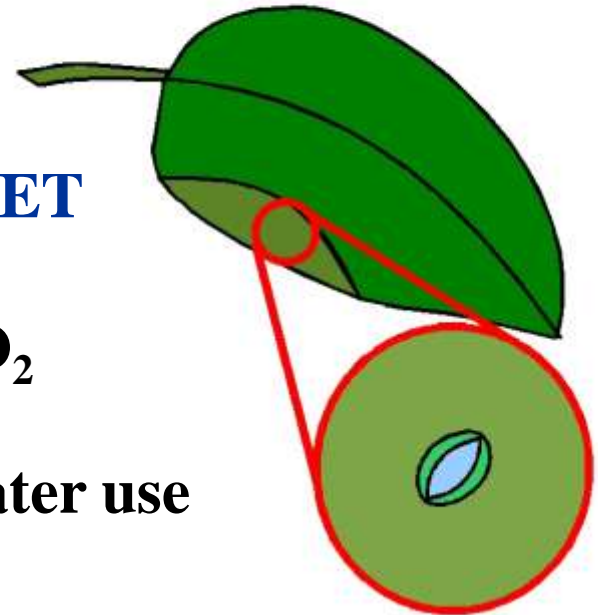
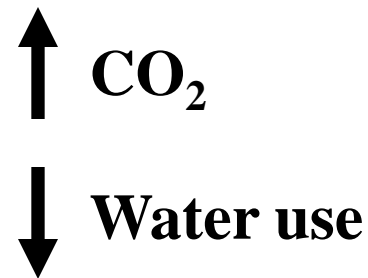


Hydrological extremes

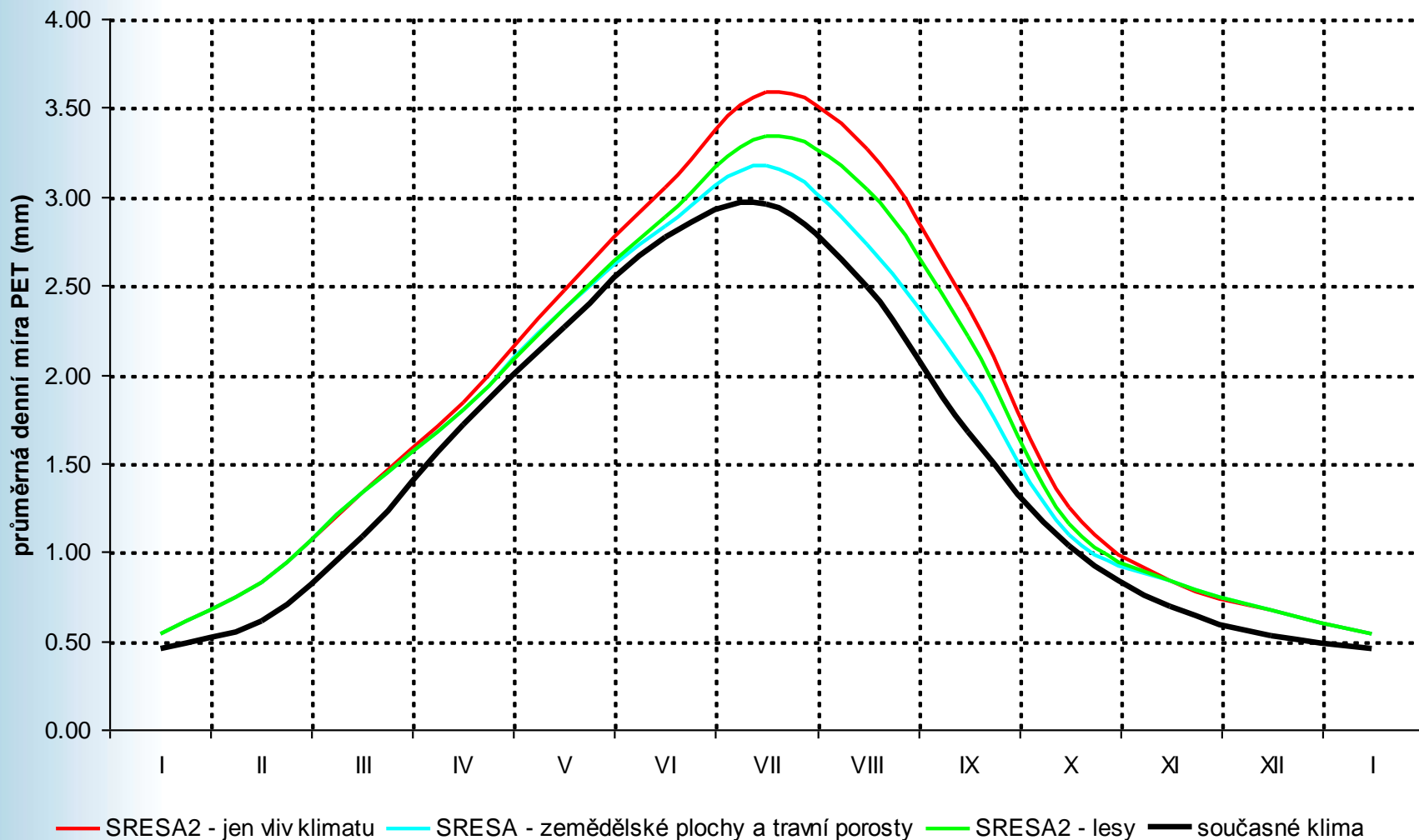
Model parameters

- **PXADJ** – precipitation input adjustment
- **PCTIM** – definition of impervious land cover
- **UZTWM** – dimension of one soil zone
- **RIVA** – Effect of riparian vegetation
- **ETdemand** – parameter of potential PET

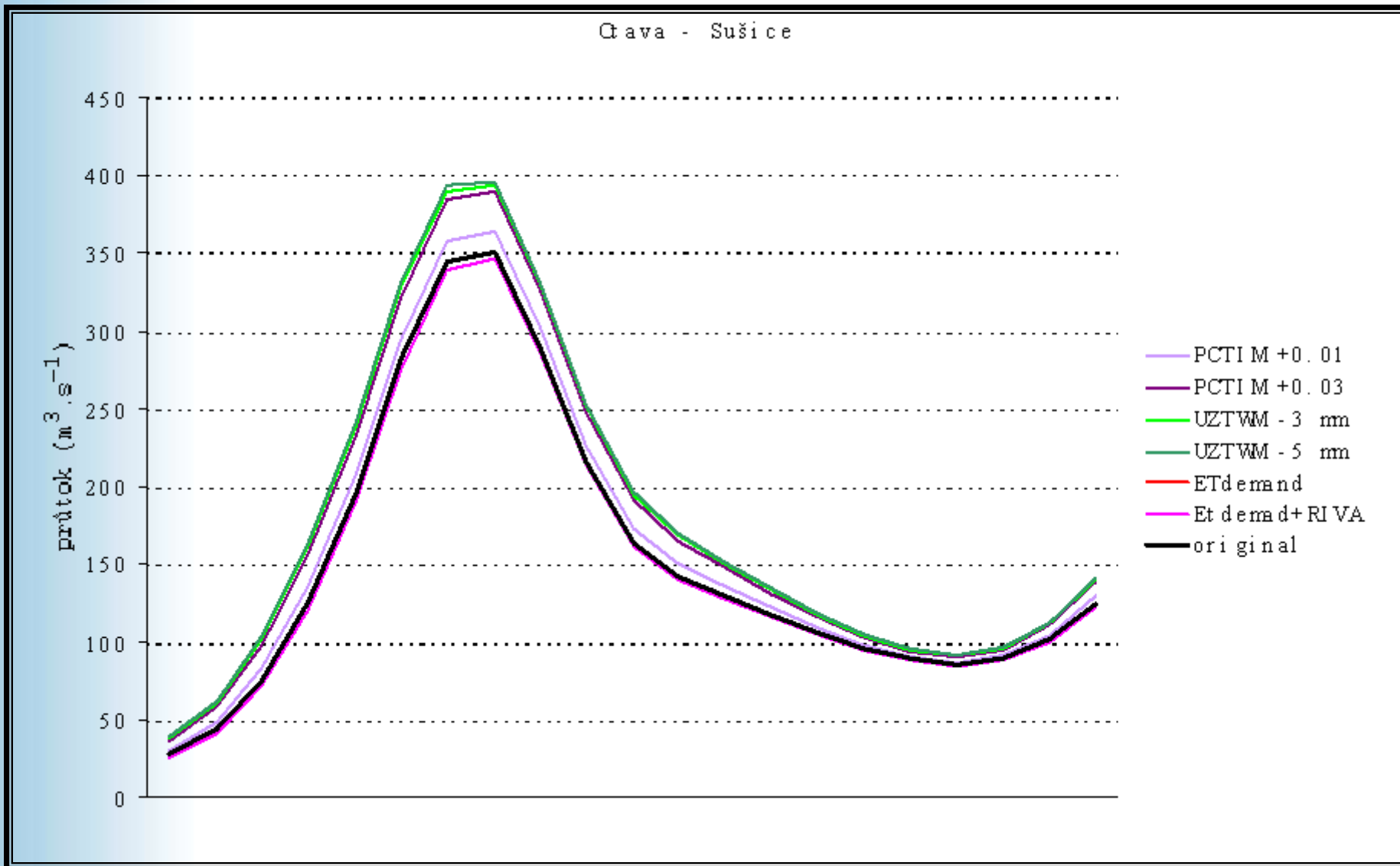
Changes in PET vers.– AET



Hydrological extremes



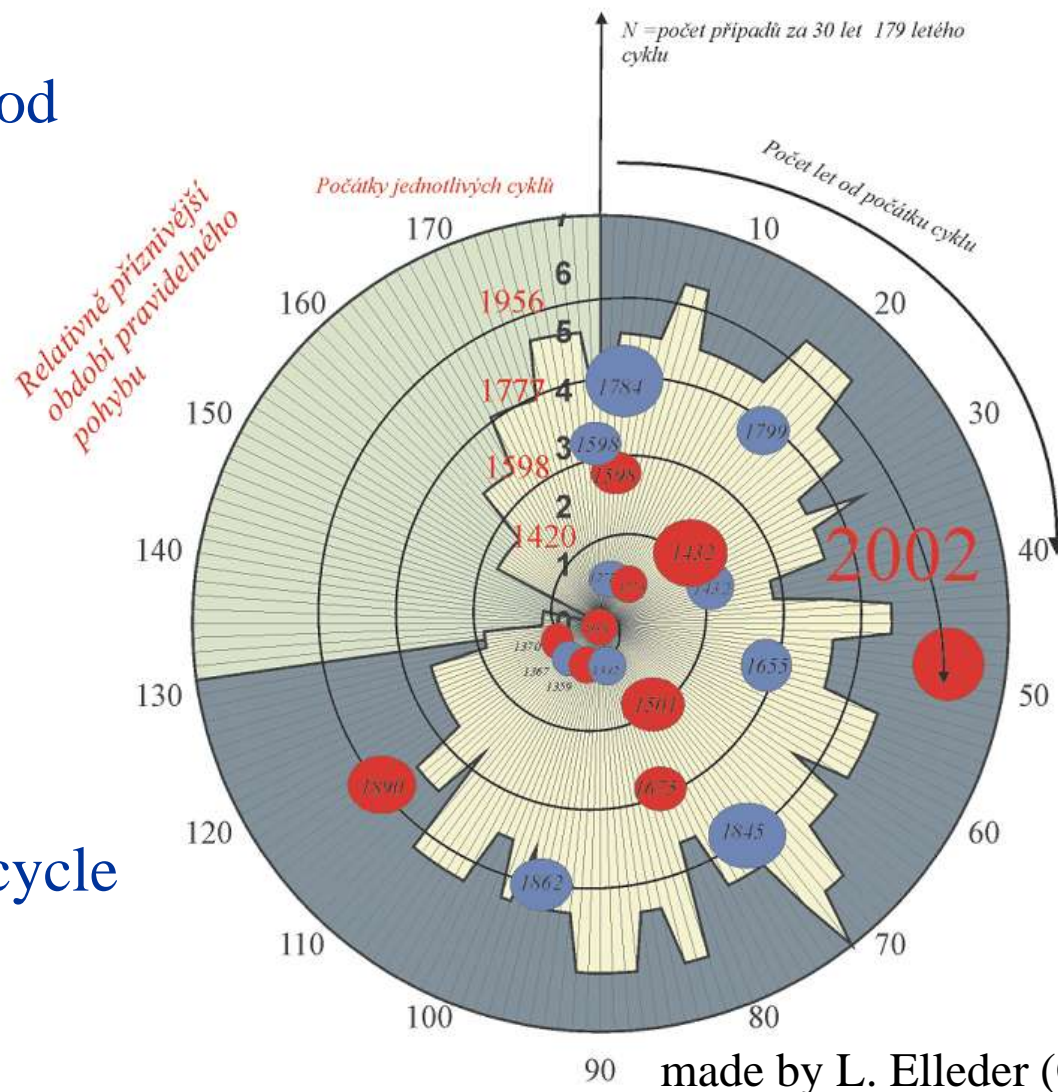
Hydrological extremes



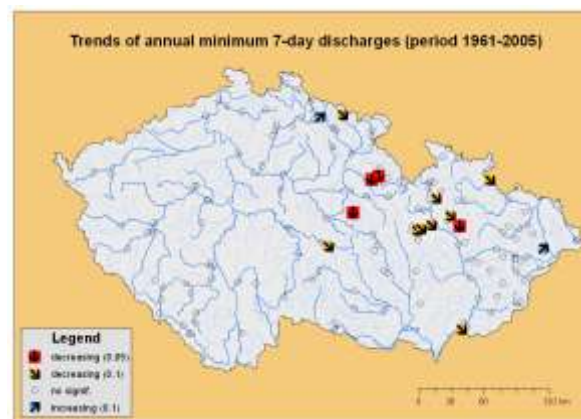
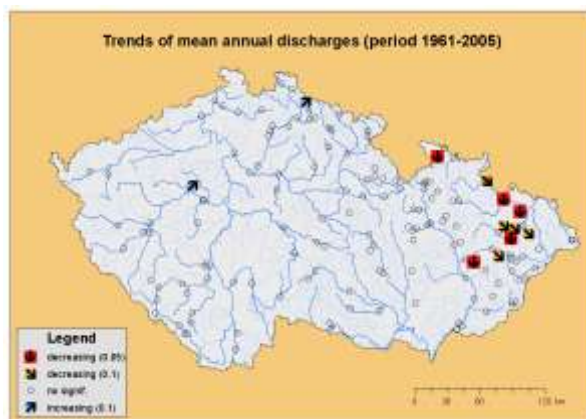
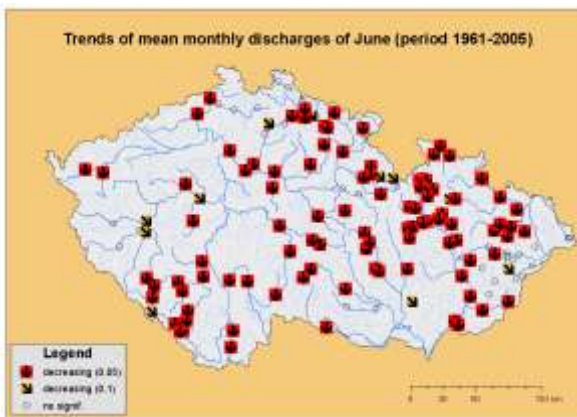
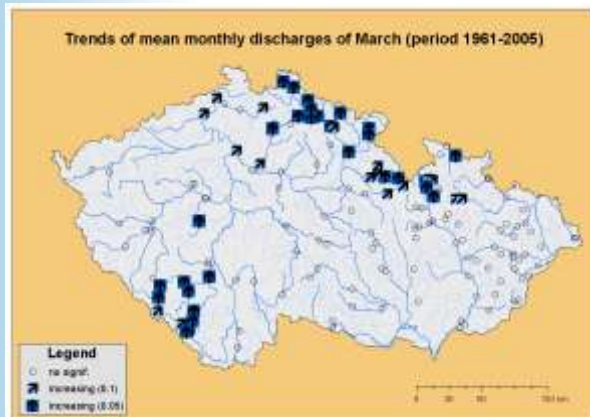
Hydrological extremes

Prague historical flood frequency analysis

179 y solar activity cycle

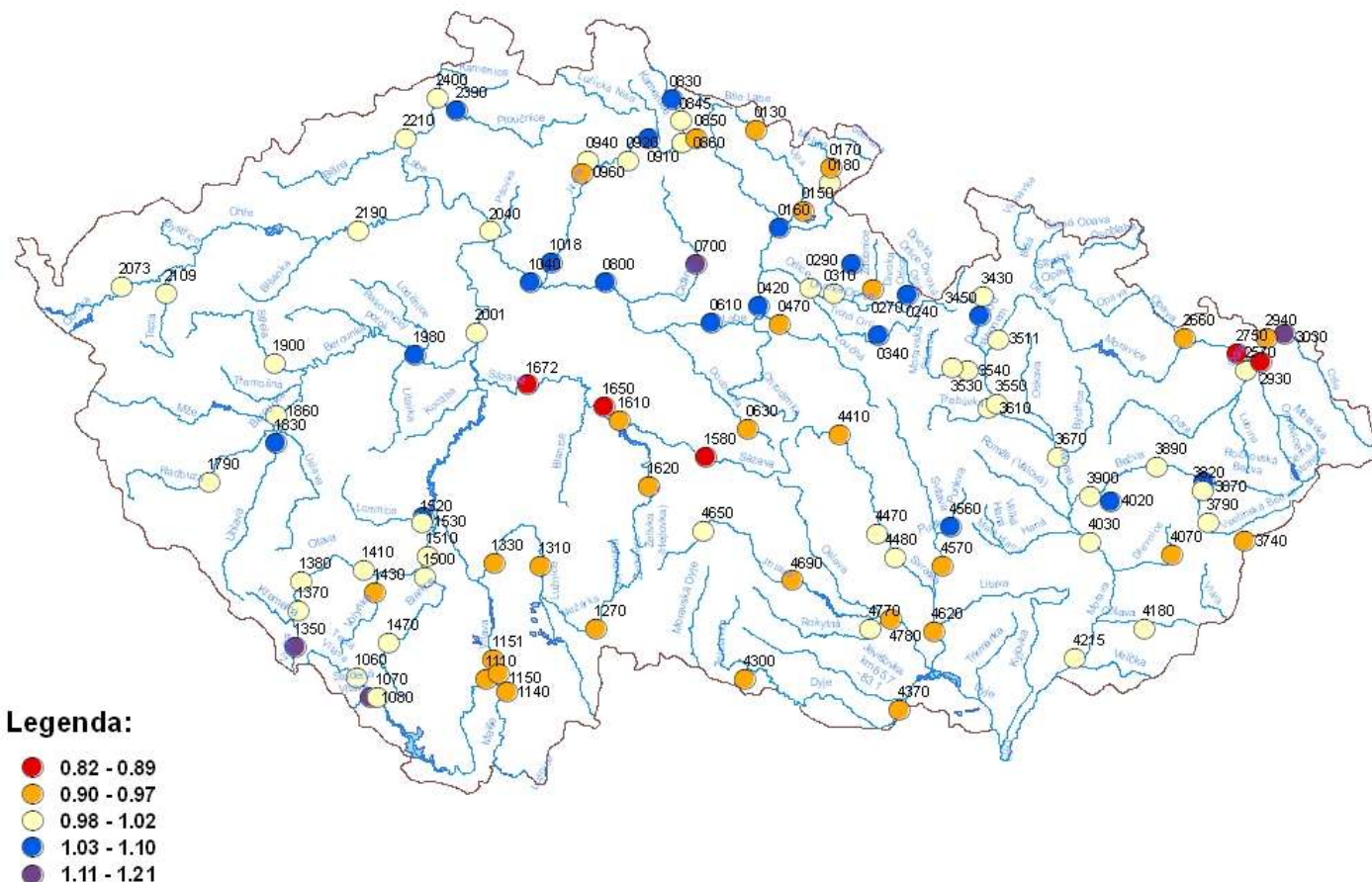


Hydrological extremes

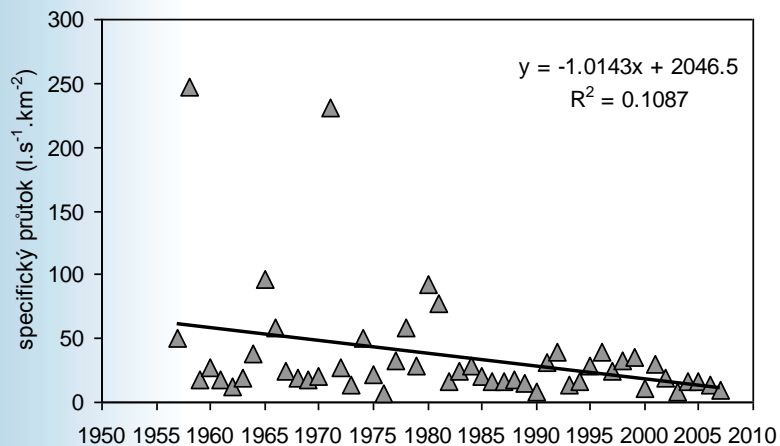


Hydrological extremes

Poměr Q_a (1961 - 2005) a Q_a (1931 - 1980)

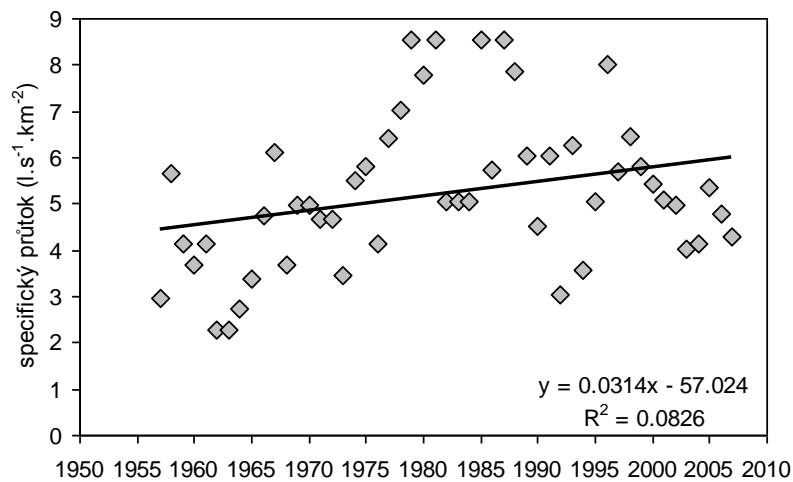


Hydrological extremes



Yearly peks

Annual averages



THANK YOU FOR YOUR ATTENTION

Jan Daňhelka

**Czech Hydrometeorological Institute
Na Šabatce 17, 143 06 Praha-Komořany, CZ
e-mail: danhelka@chmi.cz**