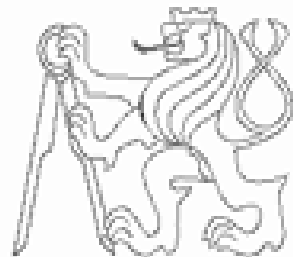


MANAGING MOUNTAIN WATERSHEDS IN THE CZECH REPUBLIC

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HISTORICAL CONSEQUENCES

- Stable forest percentage (34 %) since early middle ages.
- In mountain watersheds, the native tree species composition, Common beech (*Fagus sylvatica*), Norway spruce (*Picea abies*), and Common silver fir (*Abies alba*), converted to spruce plantations.
- More than 150 years discussed role of forests in the hydrological cycle: studies from paired catchments to run-off plots, and ecosystem studies.
- Forest management: from the sustainable production of timber to environmentally sound oriented forestry practices (integrated forest management).

RECENT PROBLEMS IN MOUNTAIN CATCHMENTS

- Spruce stands of a low ecological stability.
- Air pollution and acid atmospheric deposition.



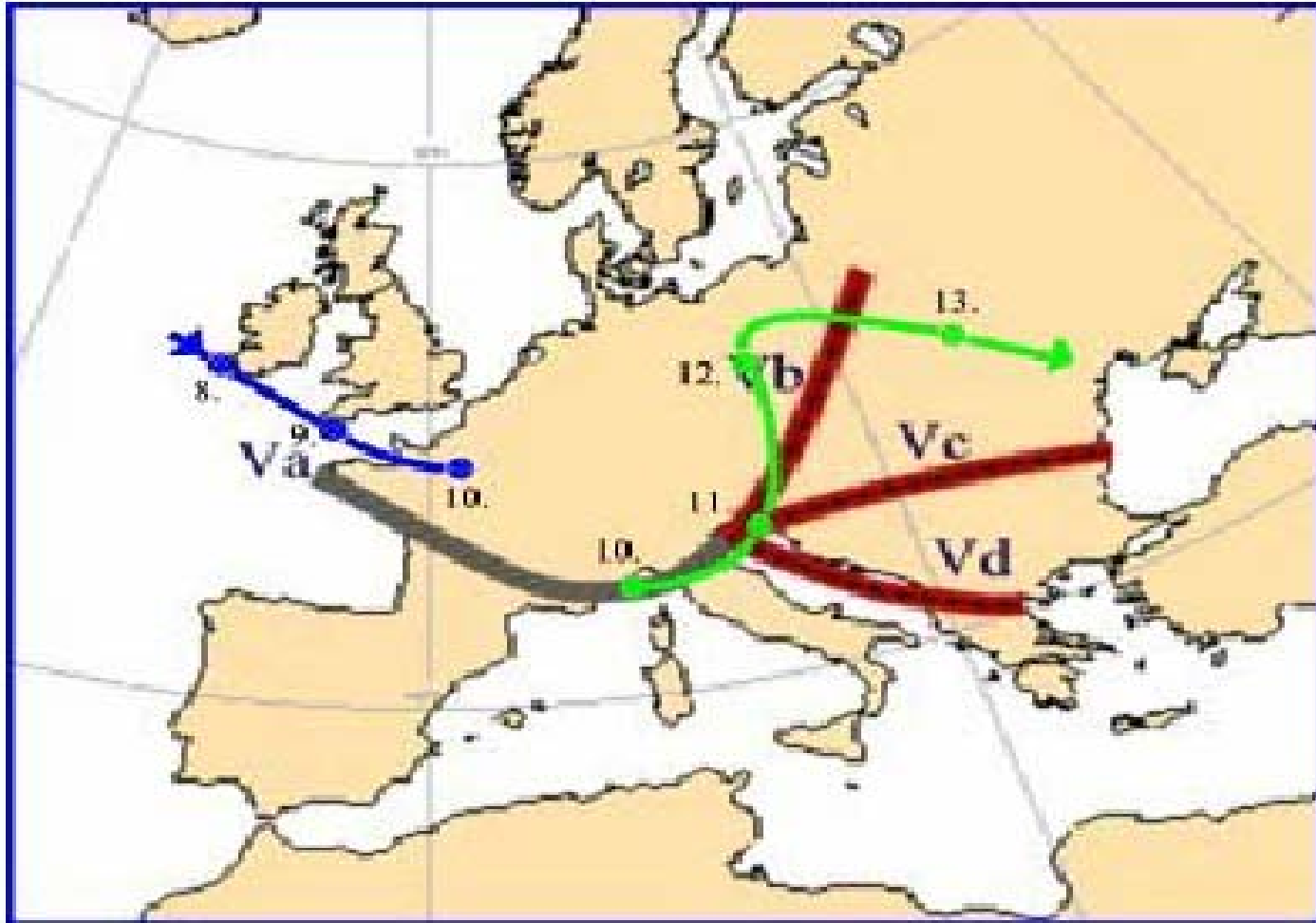
Acidification of both terrestrial and aquatic ecosystems, dieback of spruce plantations, an extensive clear-cut, soil loss.

- Global climate change.



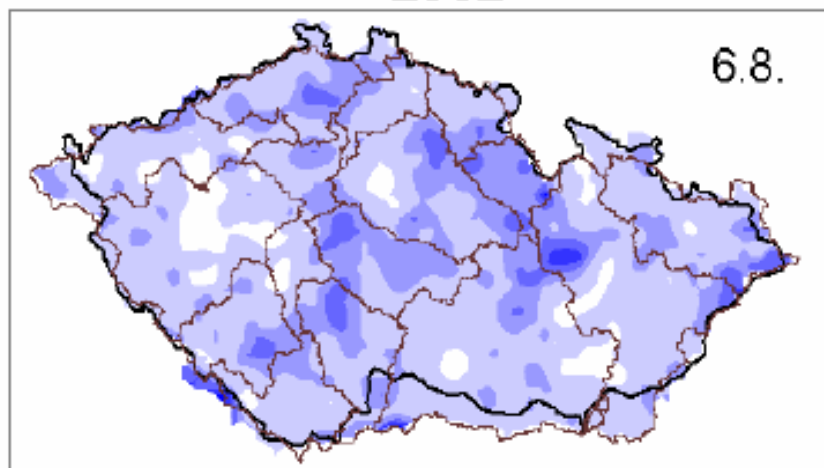
**Annual temperature: +2 (°C),
precipitation: +/- 5 (%),
water yield: - 15 (%),
drop in water quality, more frequent extremes.**

METEOROLOGICAL SITUATION: 11-13th August 2022.



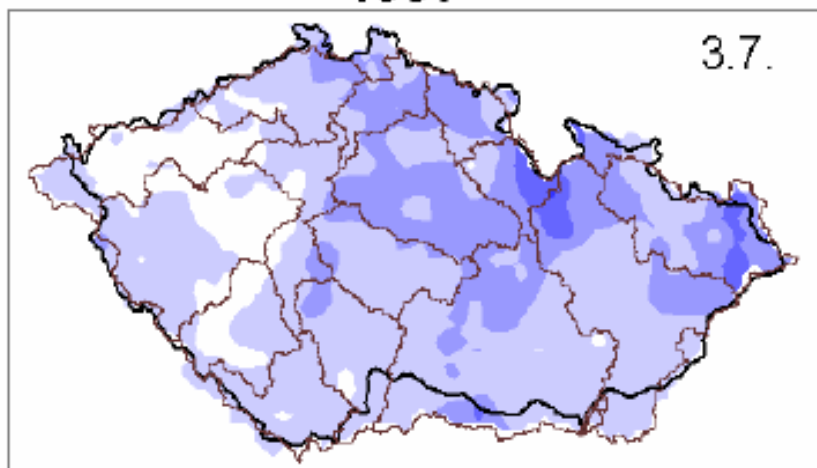
2002

6.8.

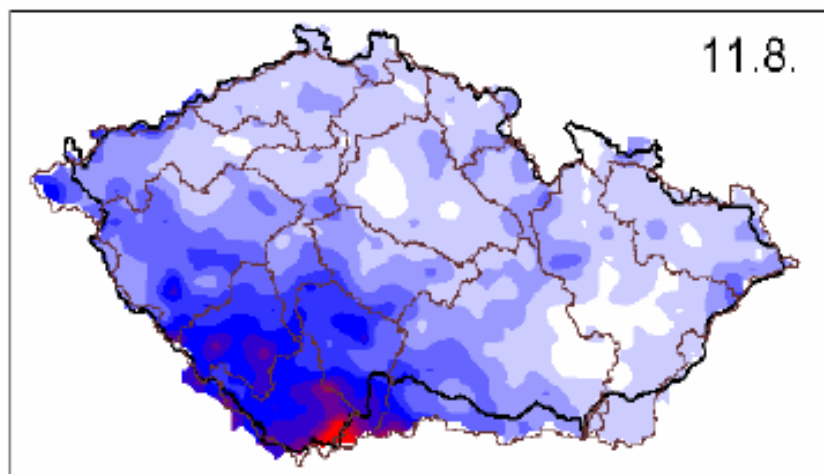


1997

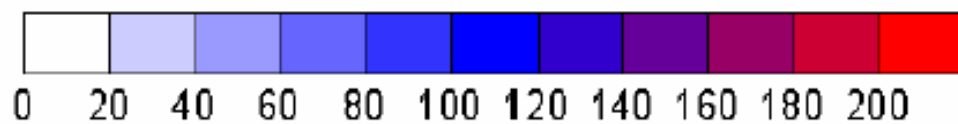
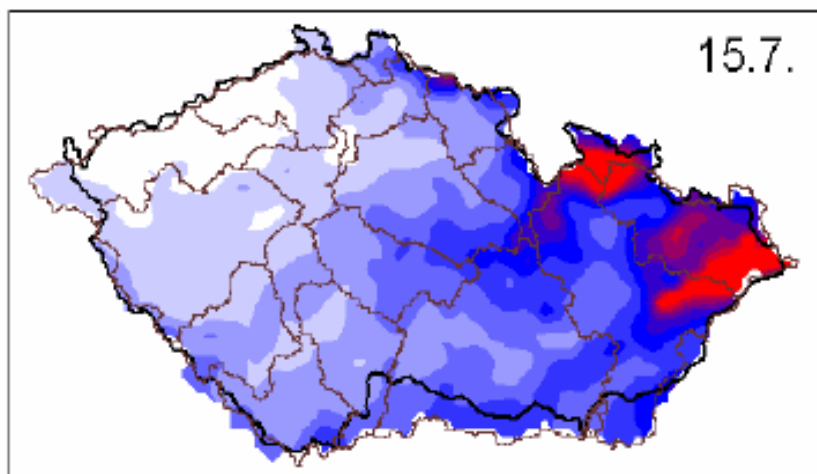
3.7.



11.8.



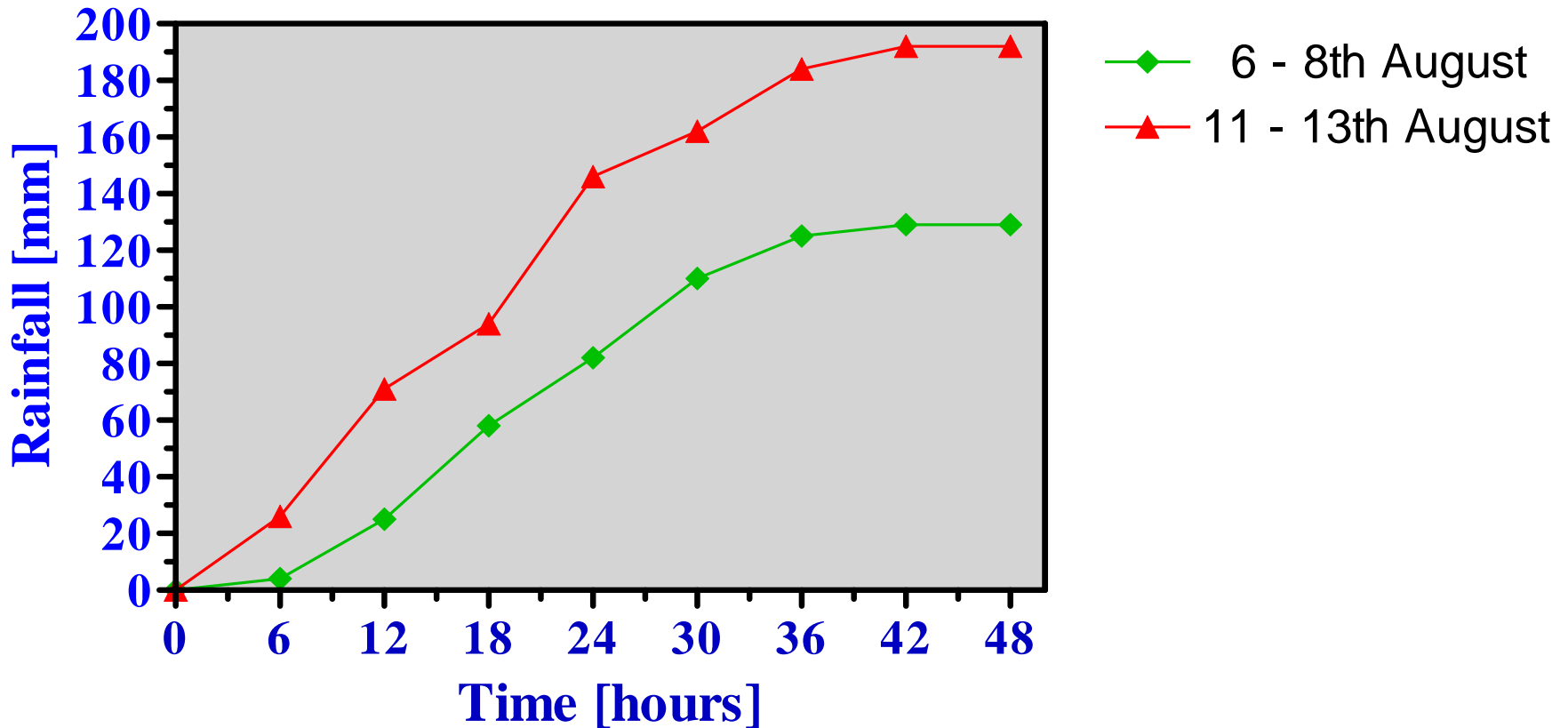
15.7.



RAINFALL: 6 - 13th August 2002, Churanov (the Sumava Mts.)

6 – 8th August: 129 mm/48 hours

11 – 13th August: 192 mm/48 hours



Prague, 14th August 2002



the Lesser Town ...



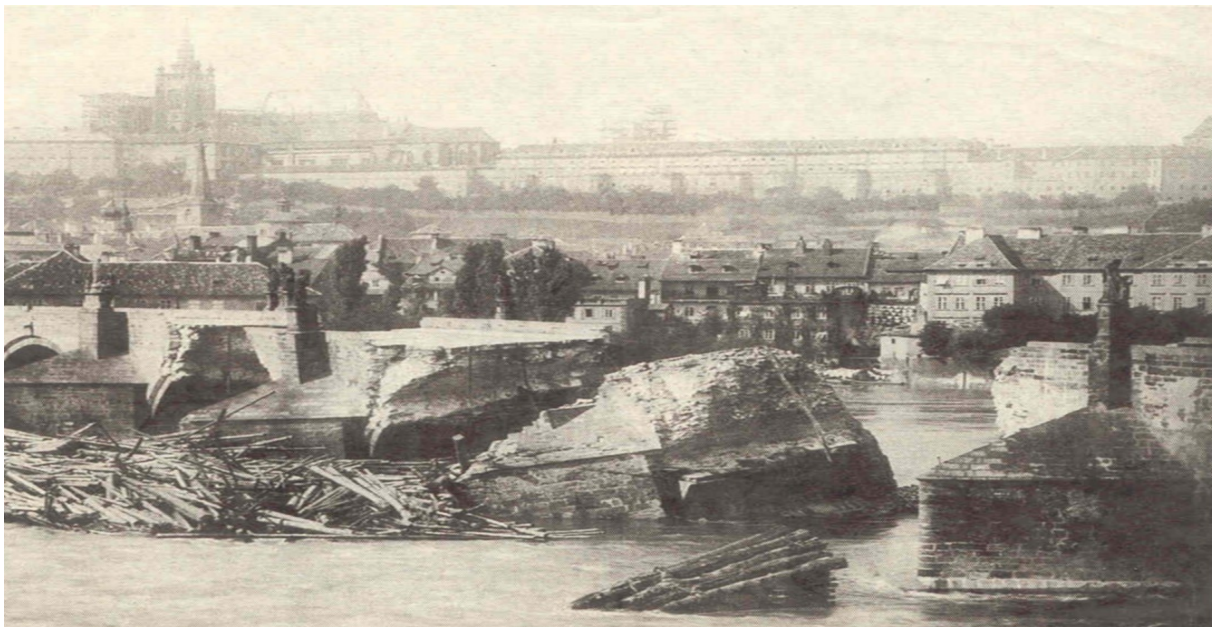
the city quarter “Karlin” ...



the Charles Bridge ...



1862

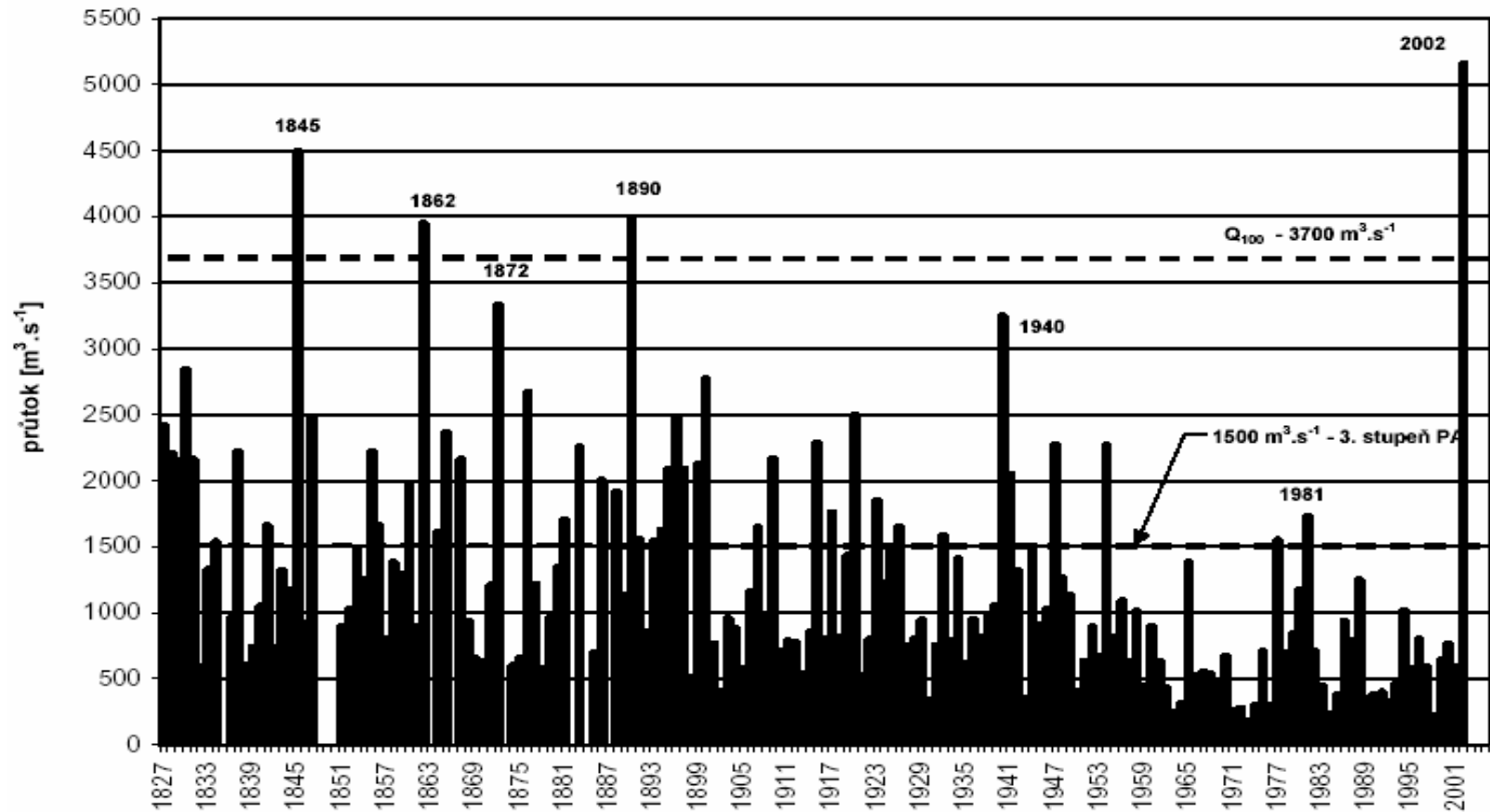


1890

Floods at the Moldau River in Prague (26,800 sq.km), 1827-2002

Discharge [cub.m/s]

$Q(2002) = 5,200$ versus $Q_{100} = 3,700$ [cub.m/s]

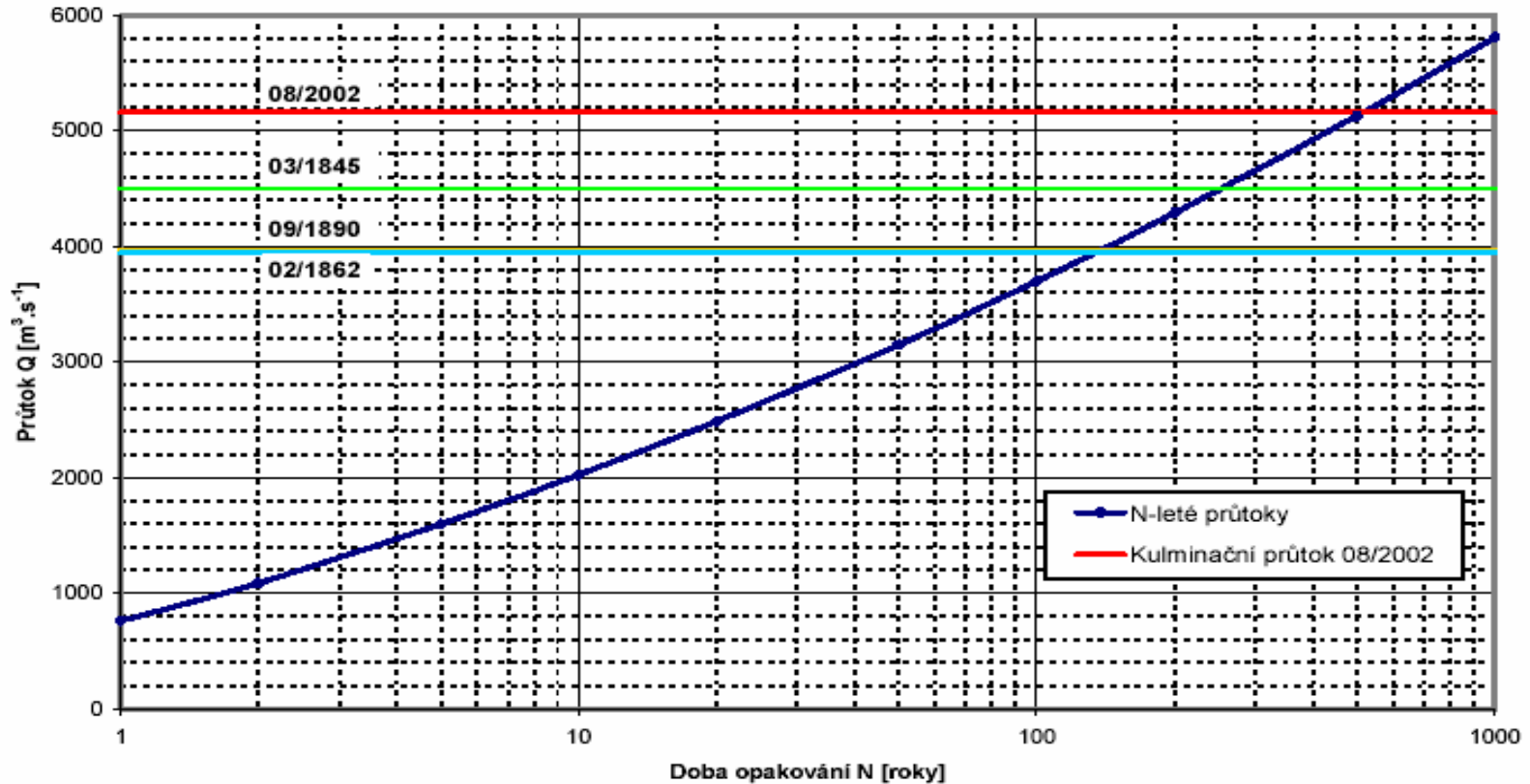


Year

RETURN PERIOD OF HISTORICAL FLOODS at the Moldau River in Prague (26,800 sq.km)

Discharge [cub.m/s]

August 2002: N = 500 years



Return period [years]

SUMMARY OF FLOODS: 1997 and 2002

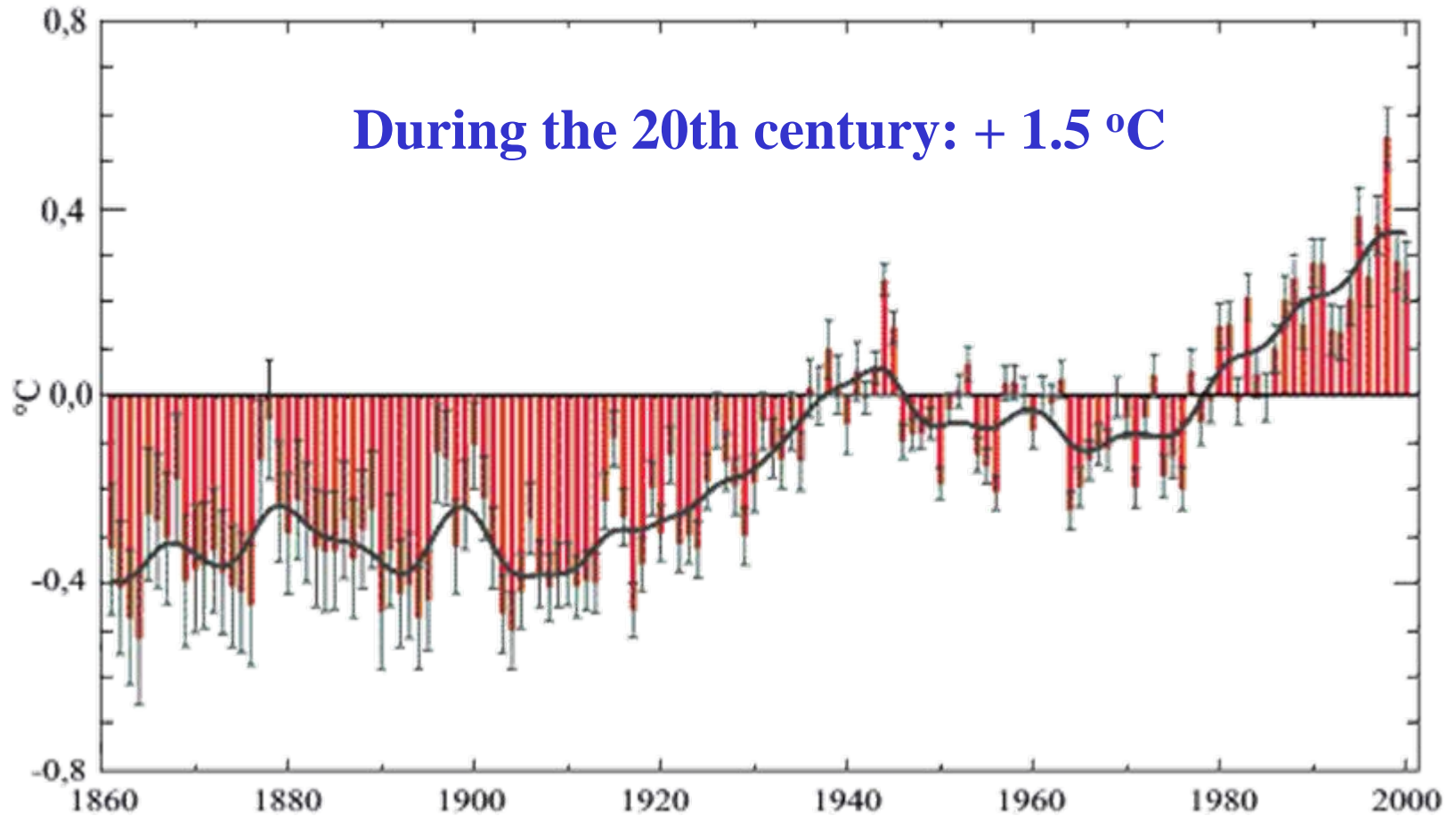
4 - 9th July, 1997

- Rainfall: 454 – 586 mm, daily maximum 234 mm, periodicities 50 – 100 years.
- Discharge: cca Q_{100} .
- Damages: cca 60 billion CZK.
- Action: mapping inundations, studying extreme hydrological events.

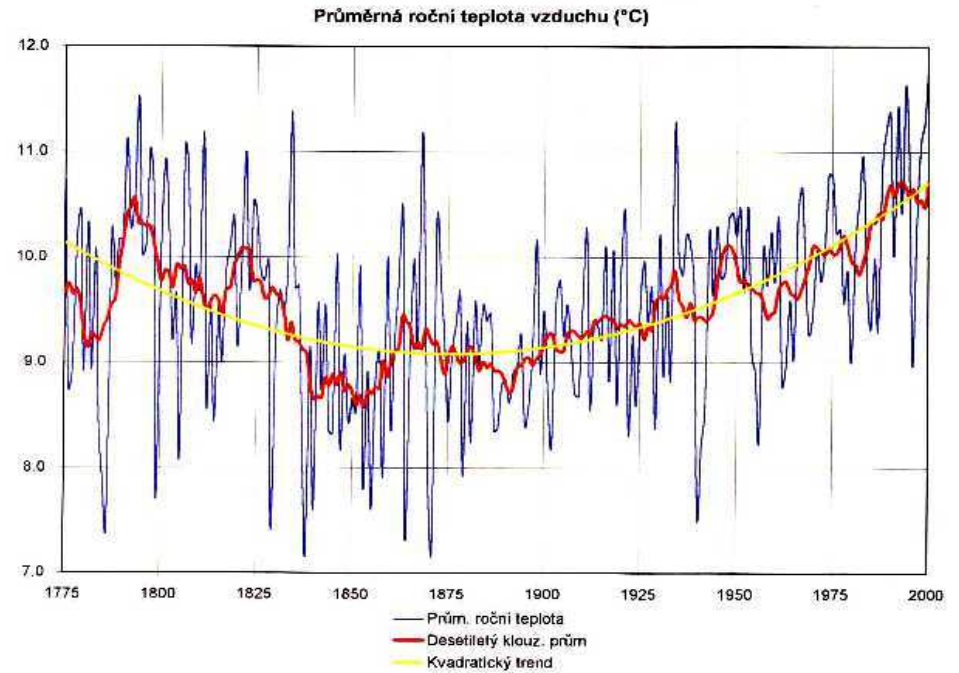
6 – 13th August, 2002

- Rainfall: 330 – 550 mm, daily maximum 313 mm, periodicities 50 – 100 years.
- Discharge: $Q_{50} - Q_{1000}$.
- Damages: cca 200 billion CZK.
- Action: mapping inundations, studying extreme hydrological events at small catchments, and the global climate change.

CHANGES IN AIR TEMPERATURES in comparison with the climate normal of 1960-1990, IPCC (2001)

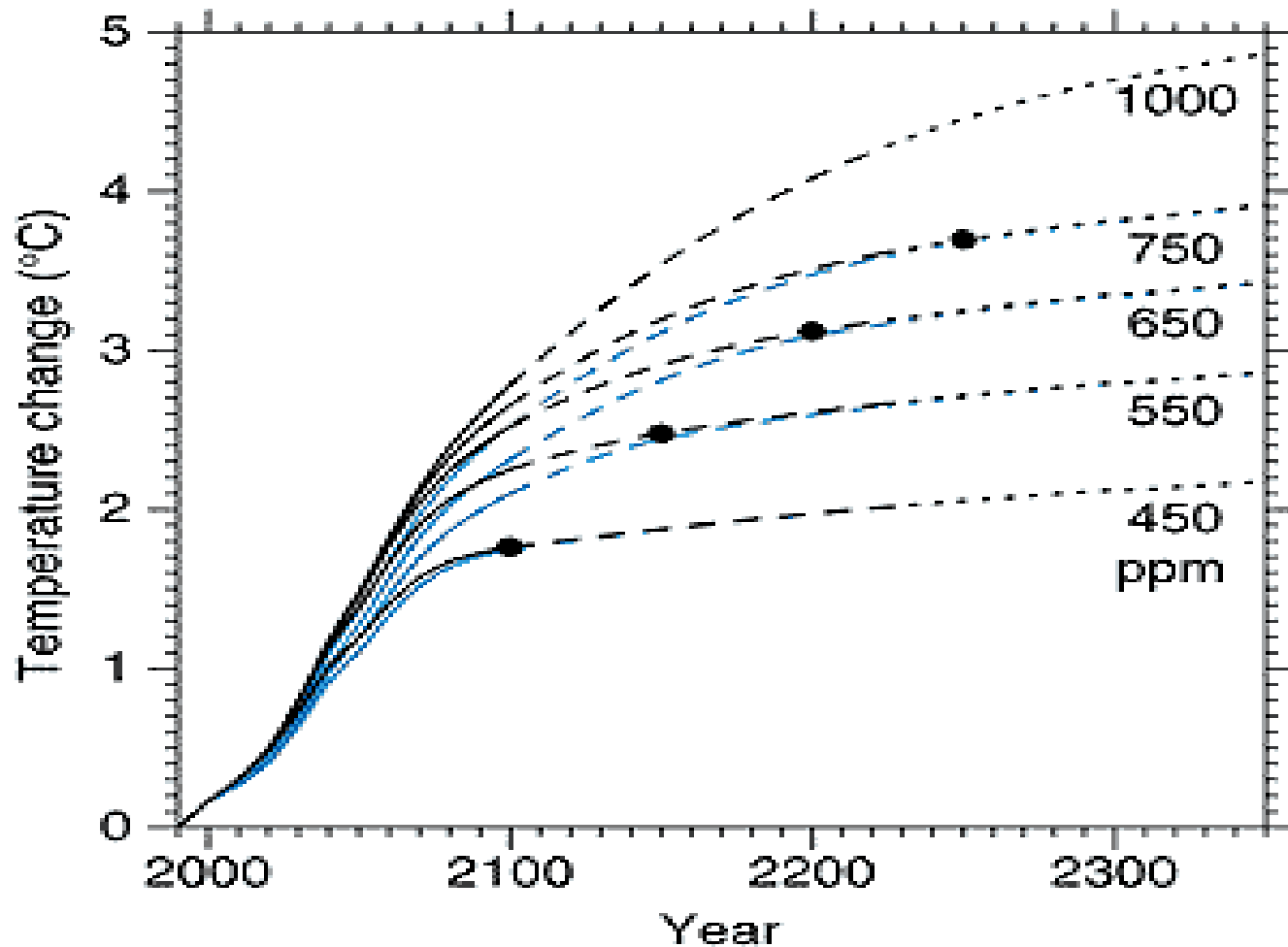


Prague – Klementinum (1775-2005)



PREDICTED AIR TEMPERATURE

for different scenarios of CO₂ emissions, 2000 – 2300,
IPCC (2001)



In the year 1750, CO₂: 280 ppm

EXPECTED EFFECTS OF GLOBAL CLIMATE CHANGE IN THE NORTH TEMPERATE ZONE

- Increased temperatures, wind, evapotranspiration, clouds, and precipitation.
- More frequent and higher values of extremes.
- More frequent El Nino effect.
- Higher rainfall intensities.

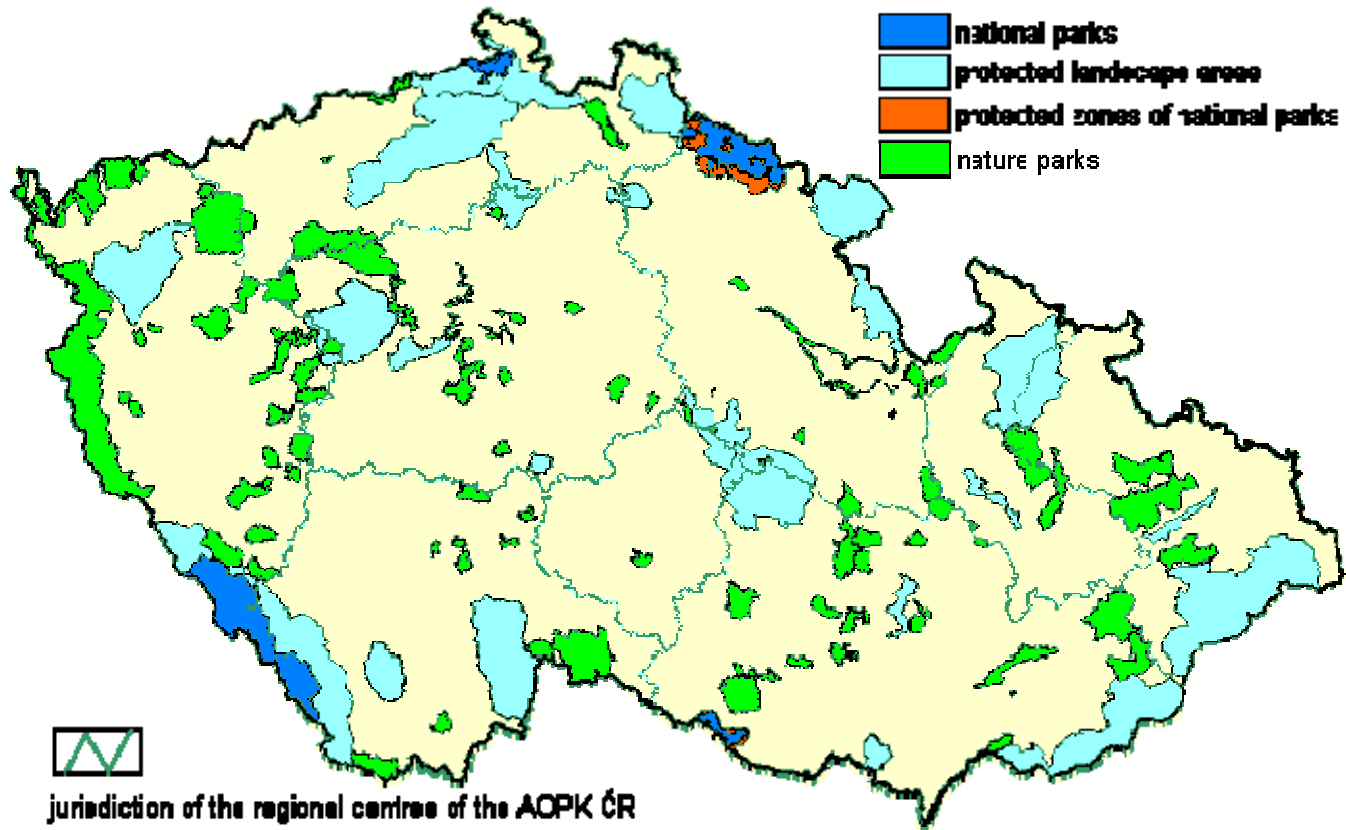
At the end of the 21st century:

- Water yield from catchments reduced by 15 – 40 % .
- Snow-pack reduced by 30%.
- Forest stands more exposed to the stress from dry episodes.
- 45% of spruce forests endangered.

MAIN TASKS

- Support stands near the native composition: to increase percentage of deciduous tree species, and return to the traditional forest practices (Sassari Declaration on “Next Generation of the Watershed Management Programme”).
- Integrated environmental control: sustainable oriented watershed management within the multi-sectoral process.
- Rehabilitation of acidified ecosystems and headwater wetlands, re-cultivation of mismanaged (ameliorated) catchments .
- Strategic Environmental Assessment (SEA, 244/1992) in the system of watersheds.
- Watershed program for the new civic society (public awareness, better quality of life, innovative planning).

NATURE PROTECTION



WETLANDS OF INTERNATIONAL IMPORTANTS:

Czech Republic: 10 Ramsar Sites (Including 2 Headwater Wetlands)



- **Peatlands of the Sumava Mts.**
 - The Sumava Mts. National Park
 - Site No. 494: 3 units (6,371 ha)
 - elevation: 730 – 1200 m a.s.l.
 - non-forested (shrubs, open bogs, swamps)
 - a special entomological interest (25 species of butterflies)
- **Mires of the Giant Mts.**
 - The Giant Mts. National Park
 - Site No. 637: 2 units (230 ha)
 - elevation: 1300 – 1440 m a.s.l.
 - forests, Alpine meadows and open bogs
 - support of birds, relict and endemic species

Thank you for your attention...

