



Climate Change and Water Management in the German Danube Region

Ministerialrat Dipl.-Ing. Michael Becker

International Conference on Adaptation of Water Management
to Effects of Climate Change in the Danube River Basin; December 3, 2007, Vienna



Research Projects on Climate Change in Bavaria

1990-98

Bavarian Joint Research Project on Climate Change (BayFORKLIM)

Studies on Effects to the Environment

Since 1999:

Climate Change and Water Resources Management



Cooperation Research Project between

The Bavarian State Ministry for Environment, Health and Consumer Protection,

The Ministry of the Environment Baden-Württemberg

and the German Meteorological Service

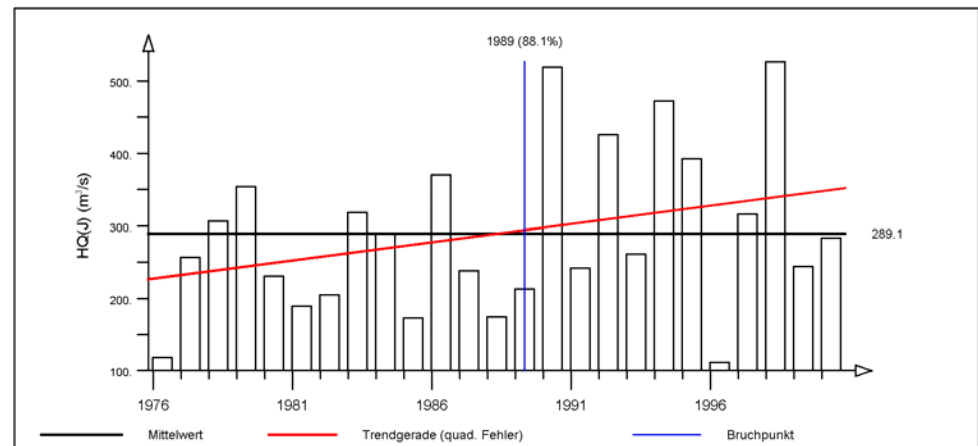


Main Working Areas in KLIWA

Area A

Analysis of hydrological and meteorological data concerning long term effects

What do we know about the climate change in Southern Germany and the Danube Region ?





Main Results of the Data Analysis for Southern Germany

Air temperature

- Raise in average by 0.5–1.2°C.
- In the Alps Raise in temperature about twice as high as in the average (+ 2 °C during the last 70 years).
- Most pronounced temperature increase in December at 1.8–2.7°C.

Duration of Snow cover

- Decrease of 30–40 % in low-lying areas (< 300m asl)
- In moderate altitudes (300–800m asl) about 10–20 %.

Precipitation

- Nearly no change in the annual average
- Increase in Winter, Summer went drier
- Short time precipitation in the winter increased by up to 30 % in parts of the Bavarian Forest in the German Danube region
- Moderate Flood events in the winter months have increased in these regions



Main Working Areas in KLIWA

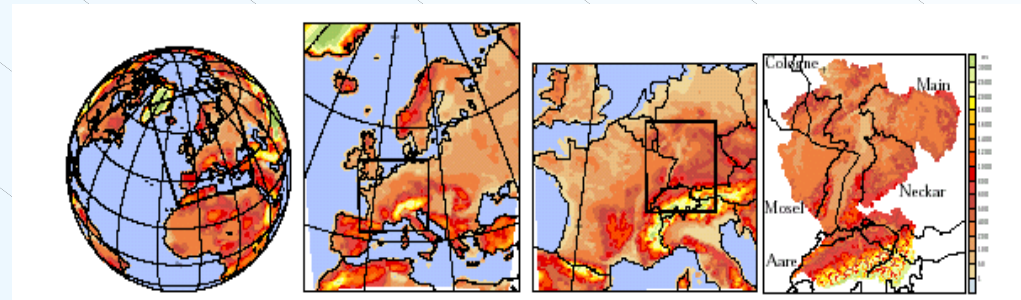
Area B

Prognosis by means of Regional Climate Models and Water Resources Models

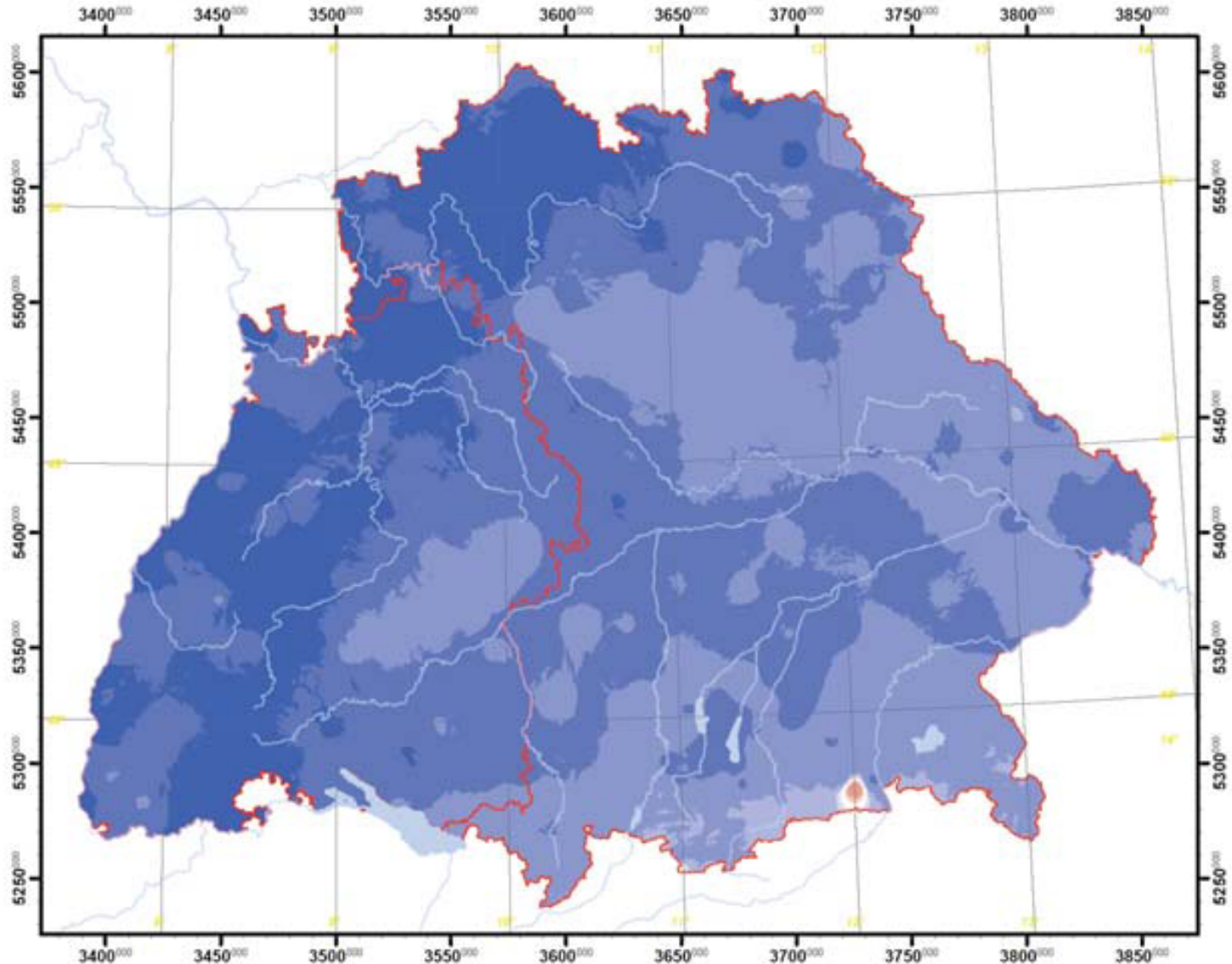
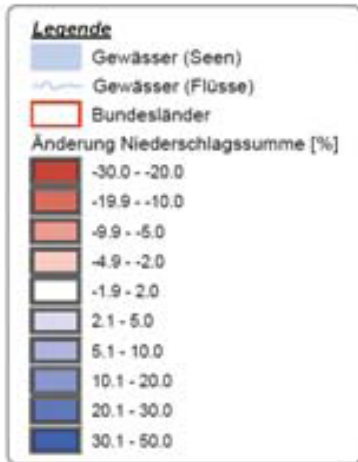
- How can we achieve knowledge about the regional climate change ?
- How certain are the results ?

Simulation of the climate change effects using a modelling chain:

- Global Climate Model
- Regional Climate Model
- Water Resources Model



Change in mean Precipitation (November – April) Scenario „Future“ versus „Present Situation“





Main Working Areas in KLIWA

Area C

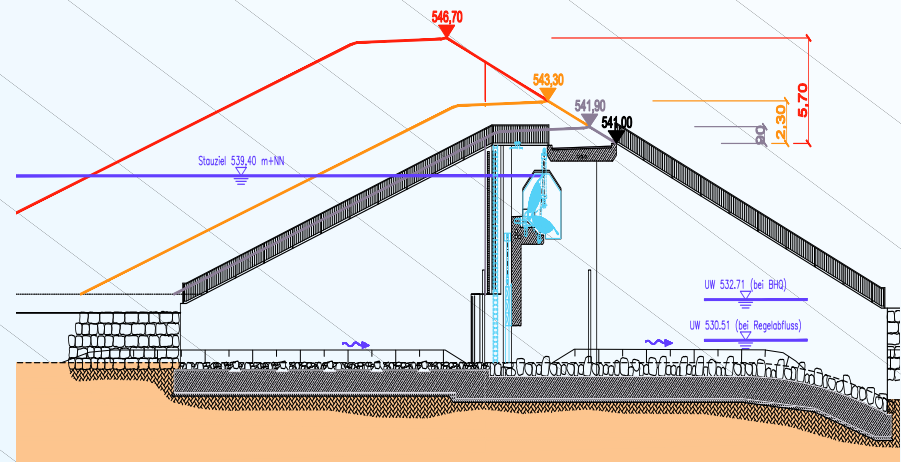
Recording future changes in climate and water cycle

Area D

Adaptation Strategies for Water Resources Management

- How vulnerable are our Water Systems and Infrastructure ?
- What kind of strategies have to be developed?
- For which sectors of water resources ?

Priority was given
to develop strategies for
Flood Protection





Adaptation Strategy concerning Floods in Bavaria

- Design of new Flood Protection Measures under consideration of Climate Change;
- But still uncertainties in the prognosis of regional effects of climate change

- Since 2005 up to now

Global Addition on the Design Floods

∞ $HQ_{100} + 15\%$

∞ $HQ_{200} + 7,5\%$

∞ $>HQ_{500} \pm 0\%$

- Regional adjustments on the addition will be made as soon as new results are available



Future Work

- Simulations using new Szenarios of Regional Climate Change based on the ECHAM 5-Model of the Max-Planck-Institute in Hamburg
- Improvement of the Water Cycle Simulations using the new Szenarios for Southern Germany
- Further Studies on the Impacts of Regional Climate Change concerning
 - Storm Water Management
 - Natural Groundwater Recharge
 - Low Flow Conditions and Droughts
 - Drinking Water Supply
 - Water Quality



Thank You for your attention !