Climate Change and Water Management in the German Danube Region

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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
  ᵉ  𝑄_{100} + 15%
  ᵉ  𝑄_{200} + 7,5%
  ᵉ  >𝑄_{500} ± 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-Plank-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!