

Translating research into policy - the ICPR perspective

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Internationale
Kommission zum
Schutz des Rheins

Commission
Internationale
pour la Protection
du Rhin

Internationale
Commissie ter
Bescherming
van de Rijn

International
Commission
for the Protection
of the Rhine

ICPR - organization



founded in 1950 as an intergovernmental organization

6 members: Switzerland, France, Germany, Luxemburg, Netherlands, European Union

Observers:

1. Countries: Austria, Liechtenstein, Belgium (Wallonia)

2. Other river basin commissions

3. Non-governmental organizations – NGO's (17):
nature conservation, flood protection, drinking water industry, chemical industry

4. Other intergovernmental organizations (IGO's),
Navigation, ...

The Rhine catchment area



**Koblenz
ICPR**



**3rd biggest
European river**

9 countries:
Italy, Austria,
Liechtenstein,
Switzerland, France,
Germany, Belgium,
Luxemburg, the
Netherlands
&: European Union

The flood hazard: Rhine hydrography



3 main climatic regions:

Downstream of Cologne:

Northern German and Dutch lowlands

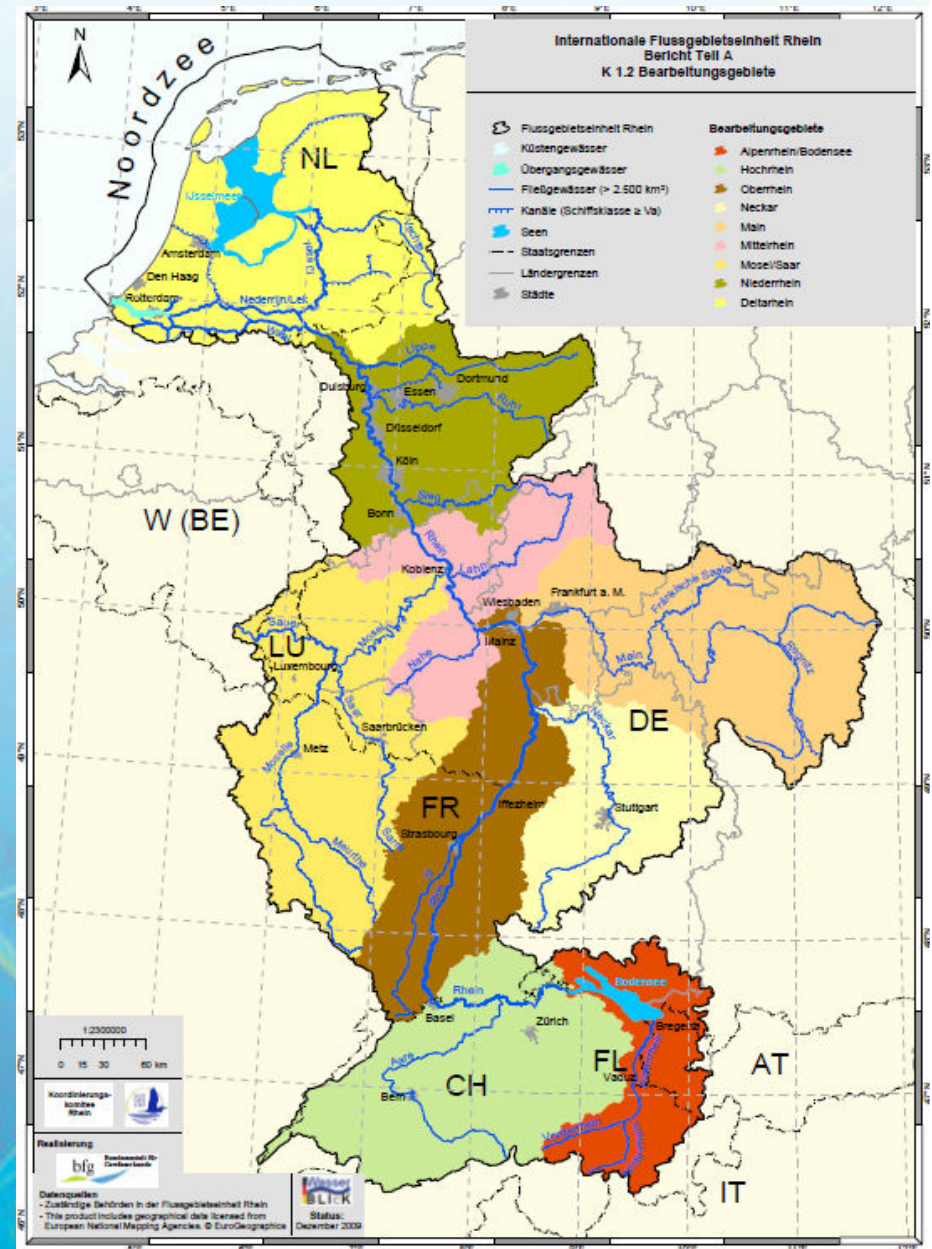
Between Basel and Cologne:

Low-mountain a. uplands

Catchment upstream of

Basel:

Pre-Alps and Alps



Rhine hydrography



Mean annual discharge - BASEL:

1,000 m³/s

Lowest discharge: 202 m³/s (Feb.)

Maximum in June

Extreme flood 1881: 5,280 m³/s

Flood 1999: ca. 5,000 m³/s (May)

Mean annual discharge at the D/NL border:

2,200 m³/s

Lowest discharge: 620 m³/s (1947, Nov.)

Minimum in autumn (Sept./Oct./Nov.)

Extreme flood: 12,600 m³/s (1926, Jan.)

Flood 1995: ca. 12,000 m³/s (Jan./Feb.)

60 years ICPR - Important issues



- **Water quality aspects** = water protection and emission reduction (since 1950 - 2010 - 2027?)
- **Ecological restoration** with salmon reintroduction programme (since 1987 - 2010 - 2027?)
- **Water quantity aspects:** floods and droughts (since 1995 - 2010 - 2027?)
- **Groundwater quality and quantity** (since 2001 - 2027?)
- **Climate change aspects** (since 2007 - ???)
- **Adaptation strategies** (first results 2011/2012?)

60 years ICPR - Processes



- The development of the ICPR was guided by a process of “**learning by doing**”... and
- considerably influenced by some **major disasters** like
 - The **Sandoz accident** in 1986 (reaction: Rhine Action Plan 1986 –2000)
 - The **floods** in the Middle and Lower Rhine in **1993 and 1995** (reaction: Action Plan on Floods 1998-2020)

Question:

Do we need new “disasters” for implementing measures to reduce negative impacts of climate change?

Conference of Rhine Ministers: October 2007



General assignment to the ICPR:

Record the changes of the runoff patterns and of water temperature in the Rhine catchment caused by climate change

Assignment to the EG KLIMA:

Draft a "Study of scenarios for the runoff patterns of the Rhine including water temperature"

= Prepare the development of precautionary concepts and adaptation strategies

ICPR: Climate change



- **Starting point** for climate change discussions within the ICPR: **Ministerial Meeting in 2007**
- Establishment of an **Expert Group (KLIMA)** under the responsibility of the Working Group on Floods
- **Main Tasks** of the EG KLIMA:
 - providing **scientific basis**
 - developing **hydrological scenarios**
- **Cooperation** with the **CHR** and **other ongoing projects** in different countries in the Rhine catchment

Climate change impacts – Why?



influence the following parts of water management:

- **Flood protection**
- **Water supply**
- **Water protection**
- **Hydromorphology**
- **Different uses:**
 - **Navigation**
 - **Hydropower**
 - **Cooling water**
 - **Drinking water**
 - **Agriculture**

ICPR: Main steps



... towards an adaptation strategy

- 1. Literature evaluation 2008/2009**
Summary synthesis of available literature
- 2. Accompany ongoing research projects 2008-2010**
Results of the projects RheinBlick2050, KLIWA, KLIWAS, etc.
- 3. Overall assessment 2010/2011**
Summary of the results of all studies and deduction of possible scenarios: Final report of the EG KLIMA
- 4. Development of adaptation strategies as of 2011**
in cooperation with the other technical groups of the ICPR

1st Phase



Summary synthesis of available literature

- ✓ Prepared by an independent consultant
- ✓ Extensively discussed in the Expert Group (KLIMA) and the Working Group on Floods (WG H)
- ✓ Findings presented to Heads of Delegation
- ✓ Published as ICPR - Report Nr 174 on www.iksr.org in German, French and Dutch
- ✓ Summary available in English

1st Phase - continued



Summary of results for the Rhine catchment

Climate projections (until 2050) show:

- Rise of temperature in winter/summer
- Rise of water temperature
- Precipitation: wetter winters, drier summers

Possible consequences:

Winter: increase of runoff

Summer: decrease of runoff

Scientists only provide information in terms of mean values



Summary of results

- **Wetter winters, drier summers**
- **Increased winter runoff, decreasing summer runoff**
- **Results in form of bandwidth are more reliable than concrete values**
- **Bandwidth for average runoff is more robust than for extreme runoff**
- **Tendencies of the changes are very clear**
- **Conclusions of literature survey are re-confirmed**

2nd phase: Rheinblick2050:



Added value

- **Narrowing down uncertainties**
- **Use of a common method for the entire Rhine catchment (multi-model approach)**
- **Testing of different Bias-corrections: there is no optimal Bias-correction**
- **Given the great remaining uncertainties, indicating a bandwidth is more honest and at the same time a support for decision making!**

3rd phase: EG KLIMA



EG KLIMA – First indications

Signals of climate change during the 21st century for the near (- 2050) and far future (- 2100)

Qualitative evaluation: Bandwidth of change in % for different sub-basins

colour	Meaning	Explanation
Orange	decreasing tendency	A great majority (~ 80%) of projections indicates a decreasing tendency
Grey	No tendency	Approx. the same number of tendencies shows an increase resp. decrease
Light blue	Increasing tendency	A great majority (~ 80 %) of projections indicates an increasing tendency
White	No statement possible	Spread of values $\geq 50\%$ or methodical deficits

3rd and 4th phase:



**Final report of the EG KLIMA
(until April 2011):**

**"Study of scenarios for the discharge pattern of the
Rhine"**

=

***Basis for drafting
precautionary concepts and
adaptation strategies for water management***

Preparation of the 4th phase:



Potential impacts of climate change

In different fields of water management:

- **Water quantity: WG Floods**
- **Water quality: WG Substances**
- **Fauna & Flora: WG Ecology**

→ **Need of an interdisciplinary approach!**

Climate change potential impacts on water quantity?



More Floods?

**=> More flood mitigation
or protection?**

Low water?

**=> Water supply
for man &
ecosystem?**



Climate change: Potential impacts on water quality?



Increased runoff / intensive precipitation:

- **Increase of input of contaminants from diffuse sources**
- **Increase of input by overloaded sewage systems**
- **More frequent floods**
- **Remobilisation of historic contaminations from sediments**

Climate change: Potential impacts?



Low water:

- **Impacts on uses (navigation, drinking water supply)**
- **Concentration effects**
 - ⇒ **Quality of drinking water?**
 - ⇒ **Stressor for fish & other organisms**
- **Fish migration is hampered**

Climate change: Potential impacts?



Increase of water temperature:

- **Stressor for indigenous species**
 - **Change of migration /reproduction patterns & distribution of fishes**
 - **Change in populations & food webs?**
 - **Increase of species of (subtropical) neobiota?**
 - **Lower oxygen concentration**
- => Need to reduce anthropogenic inputs of energy (cooling water)?**

Concluding remarks



- **There is a well developed knowledge and experience for the Rhine catchment**
- **Nevertheless, scientists only provide information in terms of mean values!**
- **More information about the developments of water temperature is required**
- **More information about extreme floods and droughts is required...**

... possible in 5, in 10, in 20 or 30 years?

Need of a “no regret policy” and flexibility!

ICPR and Climate Change



Measures taken and planned since 1998/2000 to implement the

- **Action Plan on Floods**
- **Programme Rhine 2020**
- **WFD**

... already point in the right direction!

... will however not be sufficient!

... efforts must be intensified!

... and hopefully without new disasters!

We know enough in order to act!



ICPR website: www.iksr.org



**Koblenz
Dec. 1993 and
Jan. 1995**

1993
1995

