

Research Project: RheinBlick2050



1st Rhine-Mekong Symposium

“Climate change and its influence on water and related sectors”

8-9 May 2014, Koblenz, Germany

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Secretariat CHR

Content

1. Goal, Motivation and Management
2. Approach
3. Main Findings
4. Conclusions and Outlook

Goal

- Development of joint climate and discharge projections for the international Rhine River basin
- Assessment of future changes of hydro-meteorological regimes, floods and droughts in the Rhine basin
- Meta project, based on existing ongoing projects, results and data of the partners

Motivation

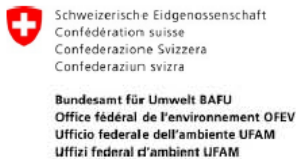
- There are (going to be) changes in the climate system of the Rhine River basin
- These changes have variable impacts
- Decision makers need adequate adaptation and mitigation strategies based on reliable information
- There is a need for common climate change and discharge projections
- CHR has a coordinating role in hydrological research

Consortium and relation to other projects

- Steering and coordination



- Project group members (plus their respective project partners)

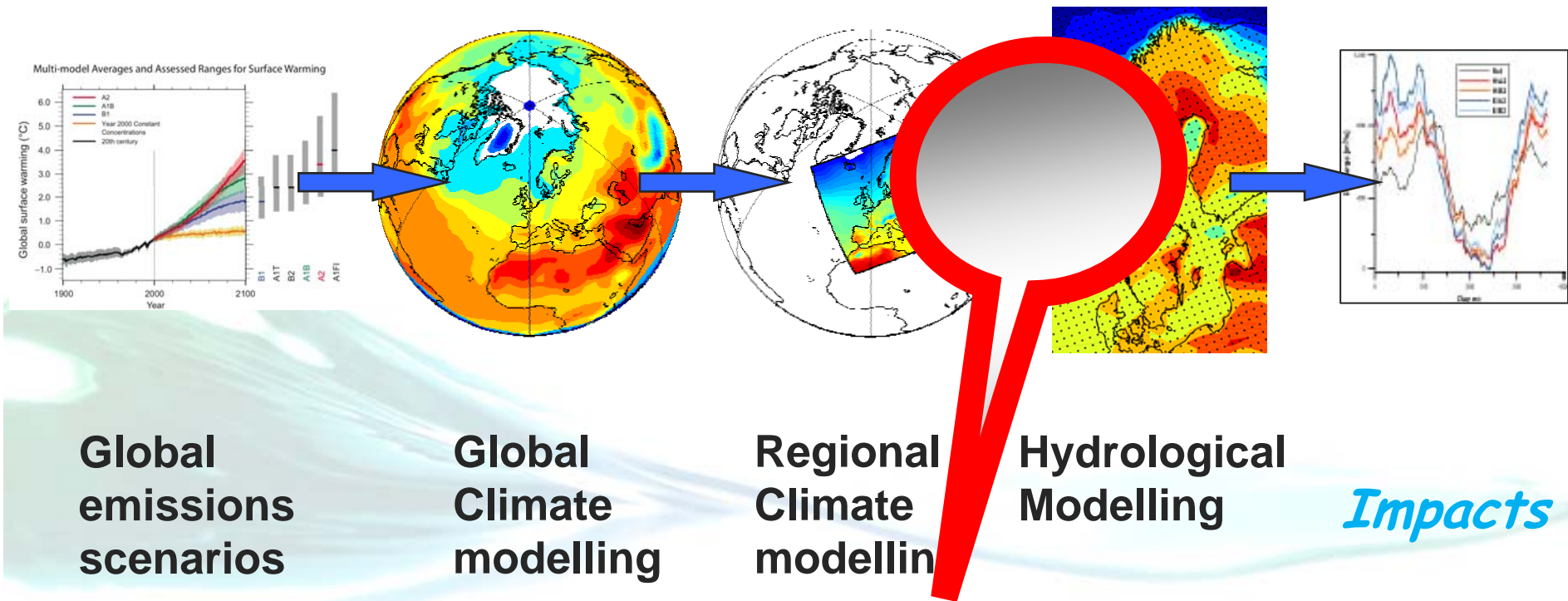
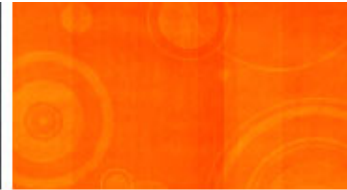


- Stakeholder involvement (definition of end-user requirements)



AG H
AG H / EG Klima

Impact of climate change on hydrology

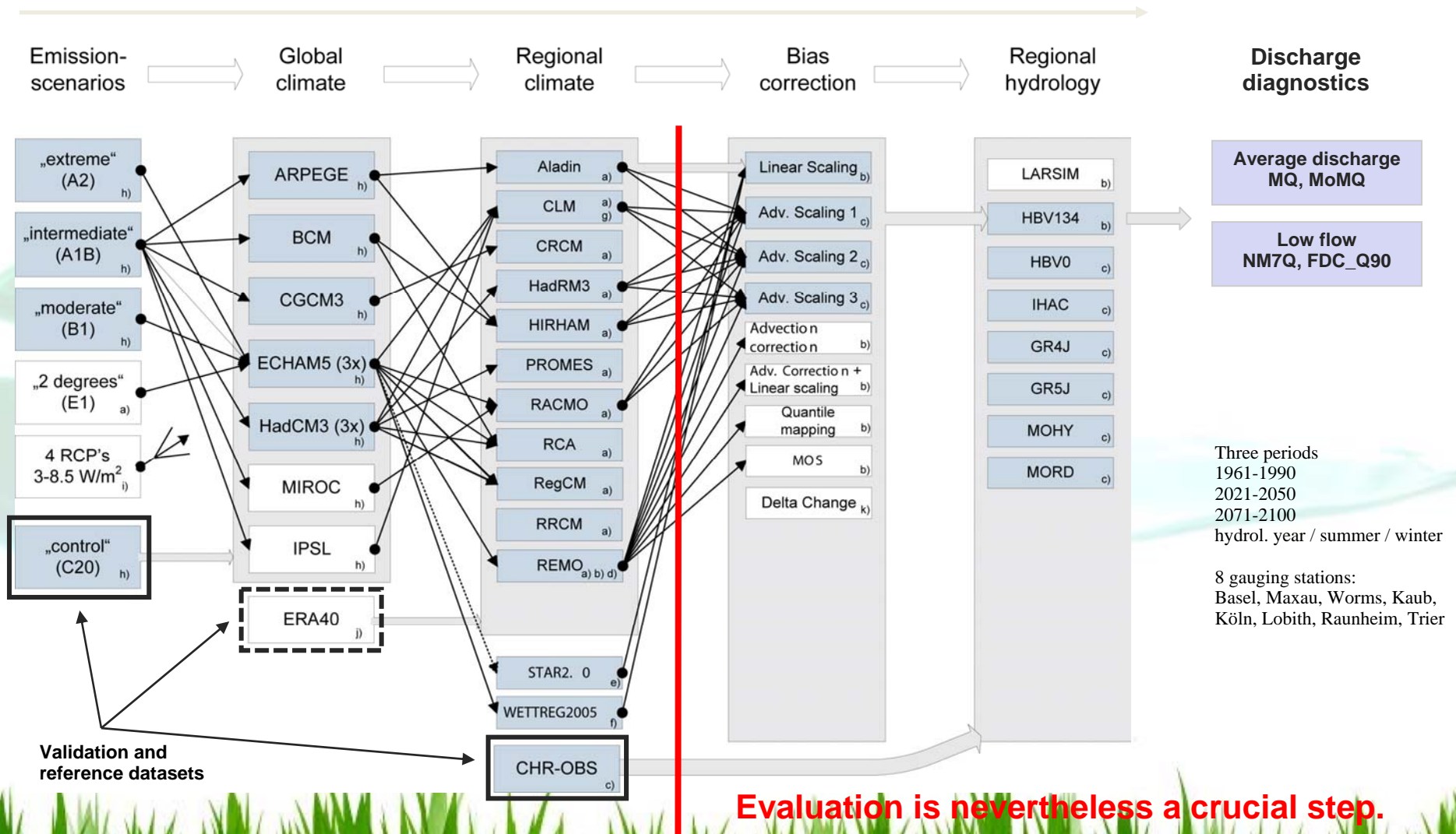


Bias correction is needed



The modelling chain

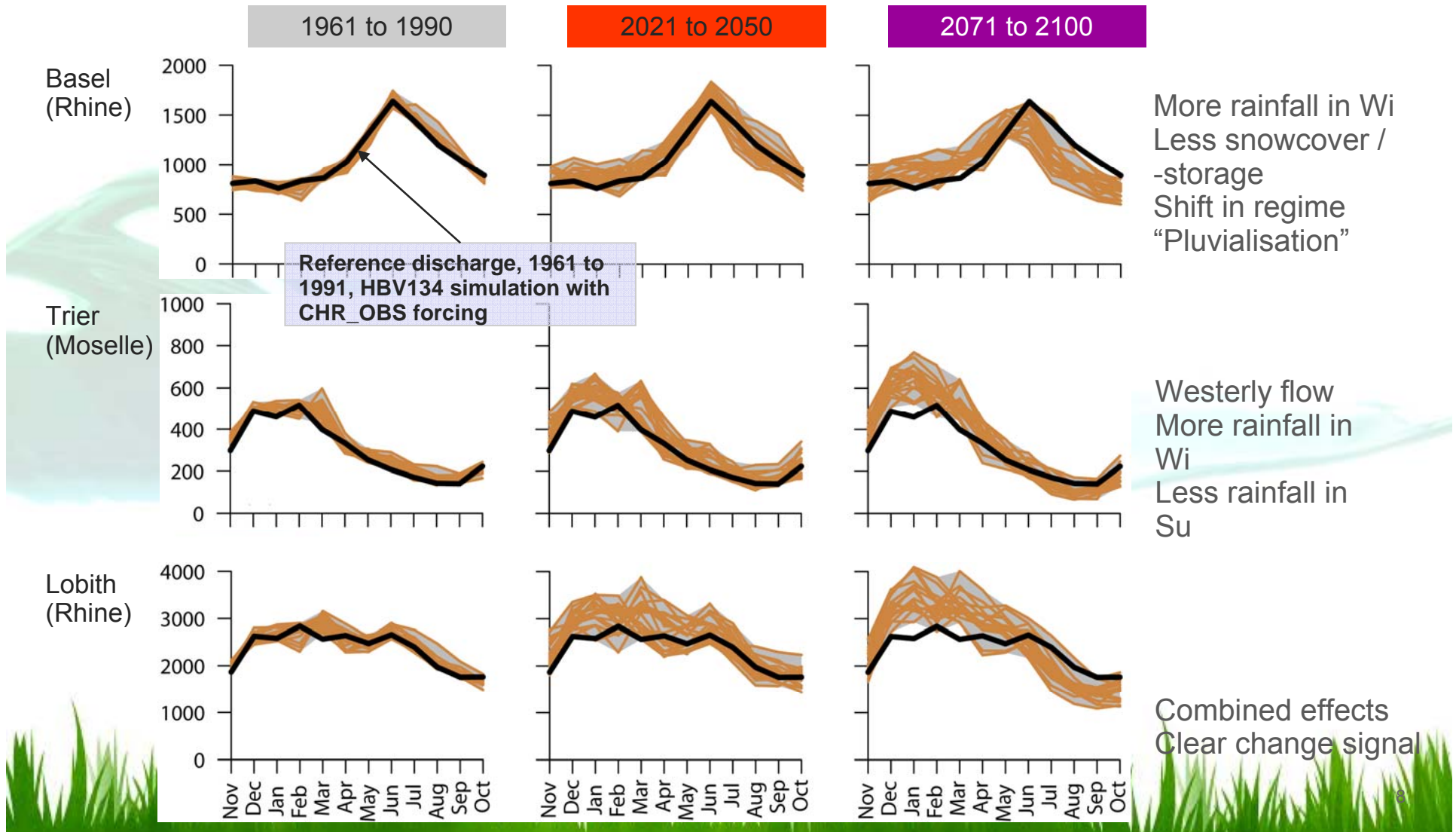
Multi-Model approach is a key concept for uncertainty assessment.



CC impacts – Mean flow changes

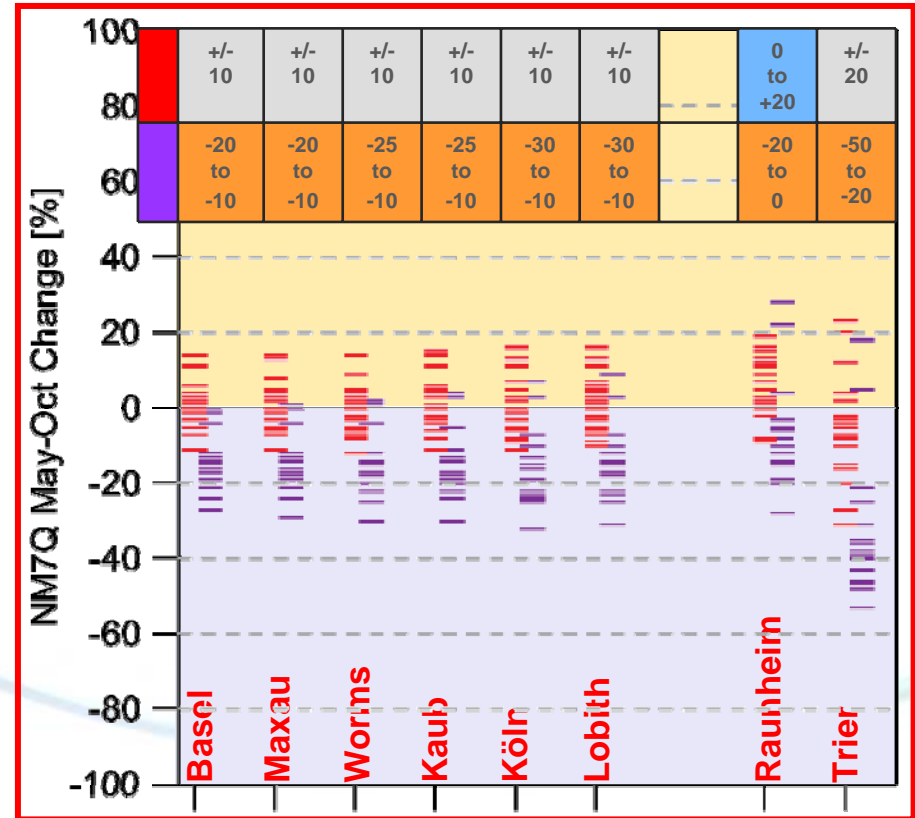
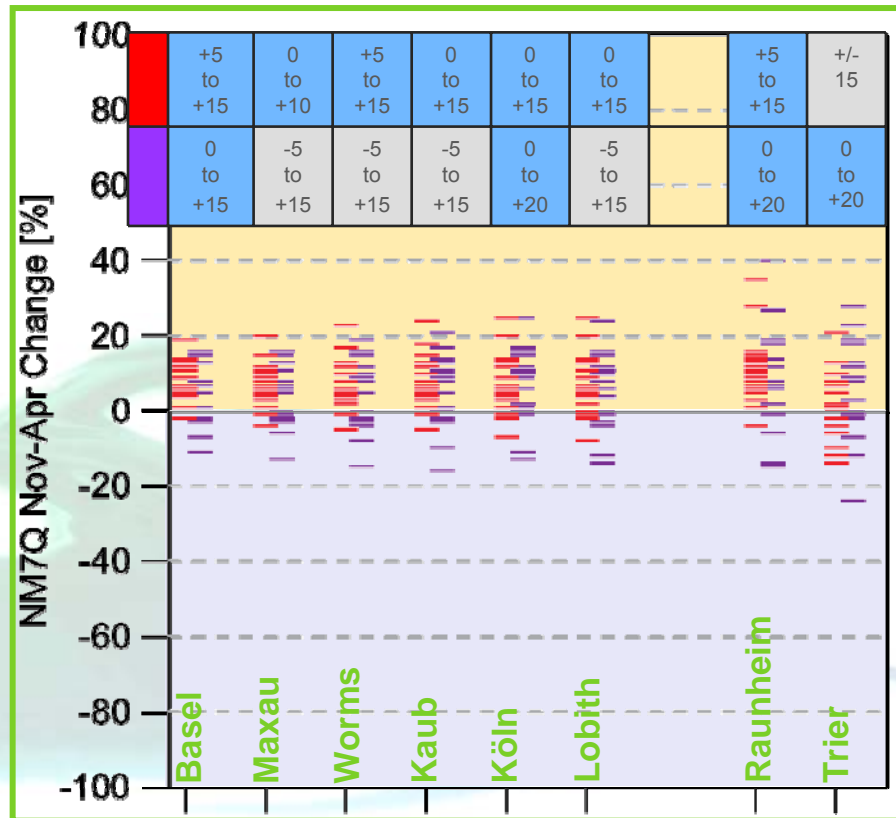
Modified discharge regimes throughout the basin

MQ [m³/s], 30-year long-term monthly mean discharge, annual cycles, Nov-Oct



Projections and scenarios of low flow

NM7Q (Multi-annual mean of lowest 7 day mean discharge per season)



- Winter: increasing tendencies for near / far future (0% to 15%)
- Summer: no tendency in near future; decrease of 10% to 30% in far future



Summary and conclusions

- An ensemble of 20 bias corrected projections of future climate has been selected for assessment of mean and low flow changes (2021-2050; 17 for far future)
- A simple bias correction method and with a semi-distributive hydrological model yield reasonable results for mean and low flow analyses.
- A transparent rule for definition of scenarios has been proposed.
- Winter MQ is projected to increase in near and far future (0% to +25% and +5% to +40%, respectively).
- Summer MQ shows no tendency in near future and a decrease of 5% to 30% in far future
- "Pluvialisation" of discharge regime projected for far future: Decrease of seasonality in nival regimes. Increase in pluvial/combined regimes.
- Winter NM7Q is projected to increase in near / far future (0% to 15%)
- Summer NM7Q shows no tendency in near future and decrease of 10% to 30% in far future

Outlook

- The “**lessons learned**” can be taken into account in **upcoming work** within CHR
- Overall framework can be used for **further studies with extended modelling components**
- Provision of **ensemble projections** rather than single solutions for **stakeholders and impact scenario users**
- No final answers and not the only solution of the ‘climate problem’

International Commission for the Hydrology of the Rhine Basin

CHR Climate change related report PDFs via <http://www.chr-khr.org>

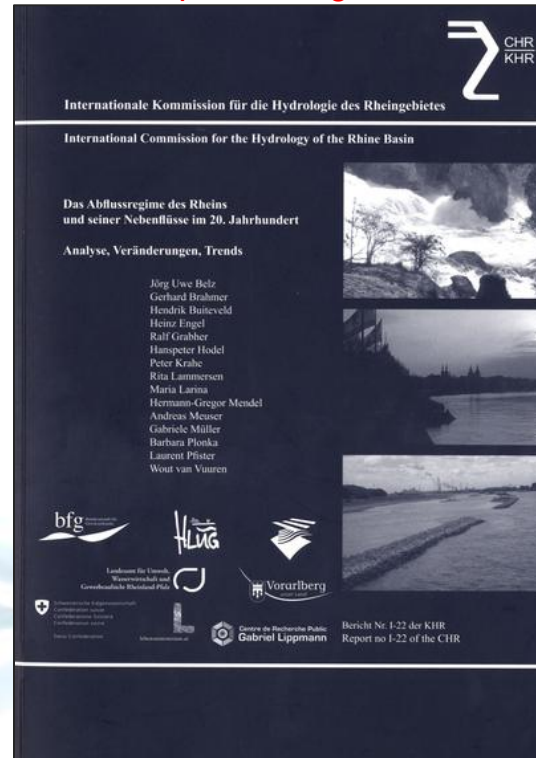
First CC impacts report



CHR report I-16
Grabs et al. (1996)

Impact of climate change on hydrological regimes and water resources management in the Rhine basin

Observed past changes



CHR report I-22
Belz et al. (2007)

Das Abflussregime des Rheins und seiner Nebenflüsse im 20. Jahrhundert - Analyse, Veränderungen, Trends

Projected future changes



CHR report I-23
Görgen et al. (2010)

Assessment of Climate Change Impacts on Discharge in the Rhine River Basin: Results of the RheinBlick2050 project