

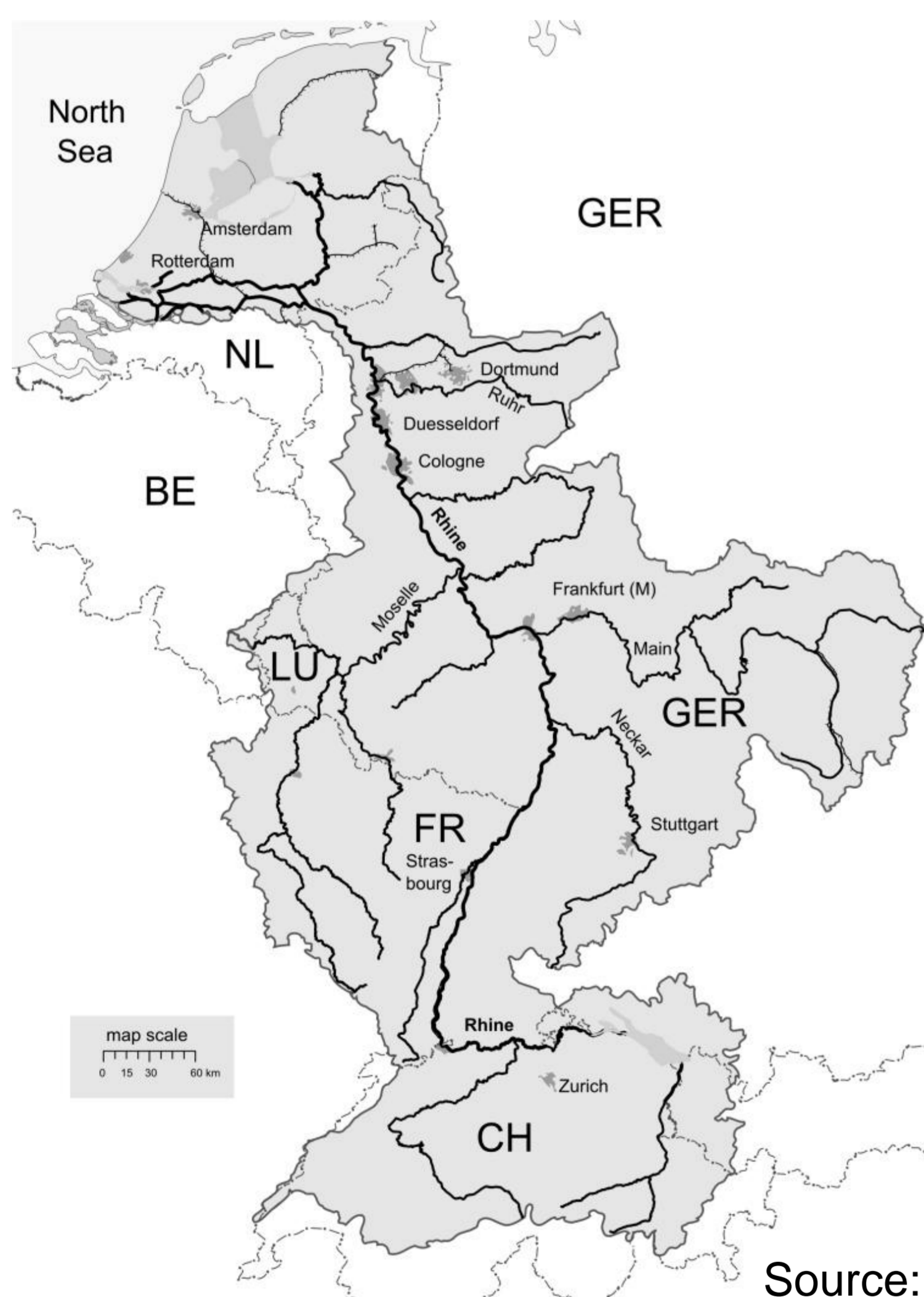
Institutional challenges of water governance to adapt to a changing climate – a case study of the Rhine

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Case study and problem statement

- 13 thermal power plants are located on the German part of the Rhine, further power plants are especially in France
- Cooling down thermal power plants is water-intensive
- Above a water temperature of 28° C in the river thermal power plants are forced to reduce the production or shut down to avoid damage to the ecosystem
- It is expected that in summer months the air temperature raises and precipitation decrease in riparian states (ICPR 2009)
- Past critical situations, i.e. heat waves in 2003 (Förster and Lilliestam 2009) and 2006 (expert interview)
- Challenge to manage the intensifying water use conflict; trade-off between:
 - Raising the temperature thresholds (and stress the ecosystem)? Relaxing regulations?
 - Shut down power plants in highly populated regions (and risk blackouts)?
- Aim of the study: Analysis and discussion of a newly developed institutional setting which could balance these needs. Called: Minimum power plant concept

Catchment area of the Rhine in Europe



River Rhine in Europe

- Connects the Alps with the North-Sea
- Nine riparian states
- 58 million people live in the catchment which encompass 200,000 km²
- River water is used for agriculture, industry, potable water, recreation and cooling down thermal power plants

Source: published with permission of the ICPR, own modifications (Stecker 2012)

Research design

- Framework and Method:** SES Framework in updated version (McGinnis and E. Ostrom 2011) used to structure the social-ecological system; literature review, expert interview
- Theory:** Polycentric Governance (e.g. V. Ostrom et al. 1961, E. Ostrom 2010); transfer of the implications of the theoretical approach to a 'practical' concept
- Research question:** How does the governance system of the Rhine cope with climate change induced and likely intensifying problems?
- Approach:** Analysis of one particular adaptation measure, the minimum power plant concept

Minimum power plant concept (MPP)

- Institutional setting developed in 2003f. between regulatory agencies, network operators and power plant operators in southwest Germany
- Constitutes **which power plant** of the region have to **reduce** which **amount** of their capacity until a certain point in time
- Defines also those power plants which are not allowed to shut down (idle running load of a network)
- Allows the increase of discharged water (1° C above, 29 °C river water temperature) as well as temperature of the water inside the power plant
- Non-public concept
- Source: Expert interview, press release, few public information (internet)

Discussion and preliminary results

- On the **institutional setting** discussed: MPP concept could serve as an best practice example for an adaptation measure which can balance the needs of social-ecological systems, **if certain alterations are made**

- More transparency of the concept
- Not clear, how the exceptions of environmental regulations are compatible with EU regulations
- Trade-off between safeguarding ecosystem and ensuring energy supply unclear

- On the **Theory:** Polycentric Governance useful approach for implementing adaptation measures

- On the **Framework:** The SES Framework is valuable for structuring complex case studies but until now some variables are unclear in their definition. Therefore, further work on defining variables is needed. It might also be fruitful to work on up-scaling the SES Framework and use it not only for micro level analysis (as it is done mostly in the existing studies)

References

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Chameleon Research Group

The Chameleon Research Group analyses and develops options for political and business action to adapt transport and energy utilities to climate change. The project runs from October 2009 to October 2013. Funding is provided by the German Federal Ministry of Education and Research (BMBF).