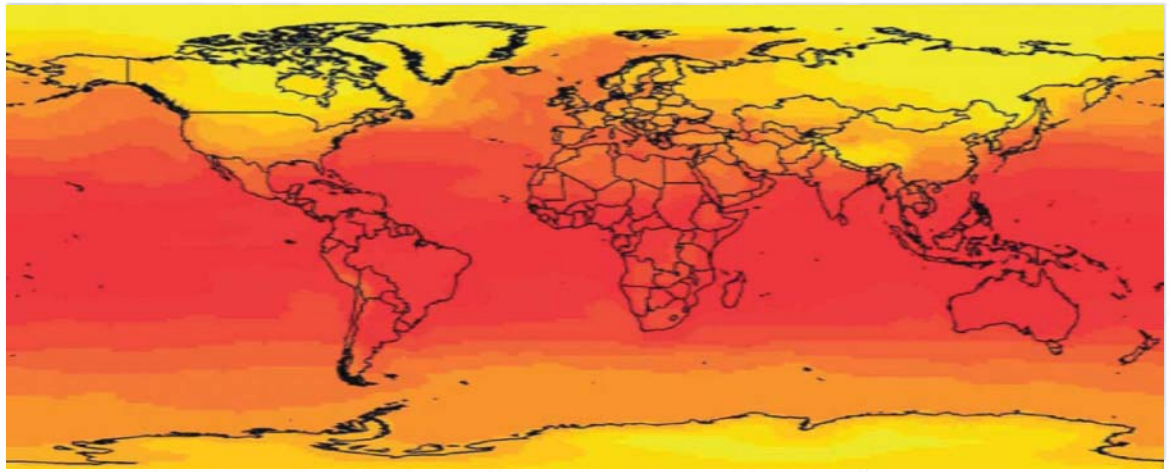

Towards an Adaptation Strategy in the Rhine Catchment

1st Rhine-Mekong Symposium
"Climate change and its influence on water and related sectors"
8-9 May 2014, Koblenz, Germany

Ben van de Wetering, ICPR

Rhine Ministers requested the ICPR:

- 2007: to carry out a **scenario study** regarding the impact of climate change on flow regime of the Rhine

- 2013: to develop a **climate adaptation strategy** for the Rhine catchment

Approach (1)

Identification of:

- **Direct effects** of climate change on (i) flow regime and (ii) water temperature

  (presentations of yesterday)

- **Indirect effect** thereof on
  - –ecology
  - –chemistry
- **Impact on different uses**

Approach (2)

Comparison of:

- measures required to mitigate impacts
- measures already ongoing and / or planned

For the strategy this will result in e.g.

- a confirmation that we are on the right track

  and / or

- new priorities, new action, redirection of action

Possible indirect effect on Ecology (1)

Effects of floods:

- most water organism are able to cope with floods

Effects of low discharges (in particular when combined with increased temperature:

- reduces oxygen concentrations
- increased concentrations of pathogens

Possible indirect effect on Ecology (2)

Effects of increased water temperature

- water temperature is a key factor for processes like reproduction, growth and migration

- temperature higher than critical , in particular over longer periods, can be lethal

→ **Changes in species contribution**

Possible indirect effect on Chemistry (1)

During floods

- high loads over a short period of time
- pollution from flooded industrial plants or buildings

During low flow

- higher concentration due to less dilution
- lower diffuse inputs due to less leaching

Possible indirect effect on Chemistry (2)

Resulting from higher temperature

- lower oxygen levels
- effect on processes such as mineralisation and denitrification

Possible impact on uses and users (1)

During floods

- higher risks for human and goods / higher flood protection level required
- reductions for shipping (e.g. bridges too low or danger from high flow)
- reductions for power production
- less potential for tourism

Possible impact on uses and users (2)

During low flow combined with high temperature

- supply of drinking water less secure
- reductions for power production
- reduced shipping (too low water depth)
- reduced irrigation in agriculture
- increased salt intrusion in delta region

Possible actions and measures

Basis for further discussion

- possible actions and measures to mitigate impacts have been identified

- in most fields actions and measures are already being taken or planned

Statement by Ministers in 2013

- flood prevention measures implemented so far go in the right direction
- measures taken to increase water retention and the flood resilience of areas have to be reinforced
- low flow events, in particular in summer and in connection with high water temperatures require more attention
- socio-economic developments have to be taken into account

… and finally

Discussion will continue aimed at finalising a strategic approach by the end of the year