

Water futures - research under dynamic extremes (working title)

Open space workshop – concept note

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Issue

The management of the quantity and quality of freshwater resources is facing a double challenge: (i) extreme weather conditions due to climate change, resulting in severe droughts and floods; and (ii) extreme pollution from point and diffuse sources, crystallizing in large volumes of pollutants (e.g., input of nitrogen from agriculture) and a very high and daily increasing diversity of pollution (micro pollutants, coming from various sources).

In addition, these two extremes are intertwined, for instance when it comes to the use of substandard reclaimed water in dry areas, or the discharge of untreated wastewater in case of floods. As a result, the double challenge may pose significant risks to human health and ecosystems, hinder the achievement of the Sustainable Development Goals, and the compliance with regulations such as the European Water Framework Directive.

While the current situation itself is already challenging, the future is open and uncertain. We can plausibly expect different scenarios (alternative future developments), how these extremes will develop in the future. Possible scenarios range from baseline over moderate to extreme scenarios. The highly complex situation of double, intertwined extremes is thus further complicated through their dynamics - and the uncertainties related to these.

We assume that this situation has consequences for water research in the natural, engineering and social sciences. The main question is how water research should set strategic goals under complex und uncertain dynamics of their field. This refers to research topics that are of relevance from academic and practice perspectives, and to the design of research policies.

Goals, question and expected results of the workshop

Against this background, the workshop asks, if and how challenging water futures could and/or should affect the design and priorities of water research? After a brief introduction into current scenarios of water extremes, we would like to discuss with academics, administrators as well as practitioners:

- 1) What do scenarios of water extremes, i.e., the possible future developments of droughts, floods and pollution *and* their dynamics, imply for water research? Do they impact:
 - A) Research priorities of water research?
 - B) Focus and design of research policies?
- 2) If yes, what are the new topics and resulting questions for water research and water research policy?

As a result, an overview on possible effects of challenging water futures on water research topics and policies is created and circulated with interested peers. The results of the discussion may flow into a research policy brief or opinion paper, coauthored by all interested participants. This will support both, research communities to better prepare to alternative future developments of water extremes and to strategically design and implement research and research policy.

TIME SCHEDULE

Welcome, presentation of the WS goals and schedule, short introduction into current water extreme scenarios (10 min)

3-4 short input statements (e.g. oral presentations of thesis) (max.) 5 minutes each to stimulate the discussion. (high diversity: practice, natural sciences, engineering, political sciences). Presenters:

- Prof. Dr. Dietrich Borchardt (UFZ)
- Dr. Leif Wolf (Projektträger Karlsruhe)
- Dr. Johannes Cullmann (WMO)
- Prof. Dr. Jale Tosun (Universität Heidelberg)

2-4 working groups, each hosted by one participant/rapporteur (40 min)

Reporting back to the plenary and possible follow up (15 min)

Closing