

# ***Interactive comment on “Developing predictive insight into changing water systems: use-inspired hydrologic science for the Anthropocene” by S. E. Thompson et al.***

## **Anonymous Referee #2**

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In response to major challenges of global change within the human dominated era, called Anthropocene, the authors aim to re-define the contours of water research. This effort is absolutely necessary and vitally important for the years to come. The paper clearly states that understanding coupled human-environment systems is a fundamental challenge and necessity (not only) for hydrology. The authors thus address a number of issues of specific importance. While the focus of the paper is on advancing progress in hydrologic modelling in order to improve predictions about system changes and their implications, I intend to make some brief comments from the perspective of socio-hydrology on selected underlying but essential aspects: One major

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issue in global change (water) research is the persisting separation between nature and culture that prevents us from understanding how deeply human dimensions are interwoven with the earth (water) system. The study of water, however, reveals that such a distinction is impossible because water is inherent to both physical and socio-political processes (see the large body of work by Bakker, Linton, Swyngedouw etc.). Therefore socio-ecological systems need to be thought of as changing through co-evolution between their social and ecological components (Gual and Norgaard, 2008). Despite these advances in studying human-environment relations in general, and the socio-hydro-cycle in particular, this paper frames human-environment interactions in rather broad, not very explicit, terms. And in regard to the ambitious objectives – a new research agenda for hydrologic research – the paper does not go far enough. It would be desirable if the authors gave a more comprehensive picture of the human system instead of considering it as a black box that needs to be filled somehow. A second aspect which is key to the overall framing of the new water science is use inspired science that should bridge the gap between science and policy. While “this is by no means a new idea” (O’Brien 2012: 2) since it is widely discussed under the Future Earth initiative (keyword: solution oriented, integrated and transdisciplinary science) there is a certain risk to maintain the simplistic, linear model ‘from scientific knowledge to action/policy’ (fig. 7 seems to reproduce this linear thinking). Instead, there is evidence that a transformation towards sustainability needs a deeper change than just more user oriented science or better water management approaches. Individual and collective learning processes, as well as different norms and values, which are context specific play a crucial role. (How will you address different scales and cross scale interactions (local to global, from historical analysis to predictions) with your approach?) In conclusion: The article is well written and worth reading, because it addresses a number of key issues. However, within a new water research we need to think about human-environment interactions and system change in new ways, otherwise we risk maintaining the destructive socio-hydro relations.

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