Summary Report of "Panta Rhei Symposium on Comparative Socio-hydrology of Floods, Droughts, and Water management" April 26-28, 2018, Beijing, China

The Panta Rhei Symposium on comparative socio-hydrology of floods, droughts, and water management was held on April 26th – 28th, 2018 in Beijing, China, organized by Department of Hydraulic Engineering, Tsinghua University and supported by the International Association of Hydrological Sciences (IAHS).

This symposium aim to bring together natural and social scientists, and water decision makers, interested in furthering the quantitative understanding of the interactive feedbacks between humans and water systems in both local and global contexts, to share ideas and identify common grounds, leading to new collaborative activities. More specifically, the symposium concentrated on phenomena related to human-flood and human-drought interactions in terms of temporal dynamics, or spatial-temporal dynamics such as upstream-downstream, domestic/trans-boundary connections.

President of IAHS, Prof. Guenter Bloeschel, addressed opening of the symposium and Chair of Panta Rhei, Prof. Giuliano Di Baldassare, gave Keynote addresses. Sixteen presenters gave oral presentations in four topical sessions within 2 days. The topics presented mainly focused on drought responses dynamics, social response to floods, nature of human-flood

system, co-evolutionary dynamics of human-water system, and social research in socio-hydrology.

In the afternoon of 26th and 27th April, extensive discussions were held in the World Café session, which allow every participant to brainstorm on questions and initiatives focusing on phenomena/narratives, data, perceptual/conceptual models/generalization, and building a culture of collaboration with decision makers for both local and trans-boundary social-hydrological issues,

Tables below show the top questions and initiatives brainstormed.

Local Socio-hydrological Issues	**Transboundary Socio-hydrological Issues**
Phenomena/narratives **Questions:** 1. To what extent can we generalize about these phenomenon? 2. Is there Legacy risks? Certain projects are easily reversible while others cannot be easily changed and have legacy effects? "legacy effect" one thing that worked well in long age may not work now 3. What drives transition between focus on development vs restoration **Initiatives:** 1. Generic patterns? Otherwise SH(social-hydro) cannot be sustainable, cannot be a discipline 2. conduct comparative case studies to understand or ban response to extreme events 3. Create environment for interdisciplinary research	**Phenomena/narratives** **Questions:** 1. Scale effect of the transboundary issues? International, state, sectors? 2. Relationship between downstream and upstream, cooperation/conflict among countries? 3. Power dynamics (wealth or military influence) **Initiatives:** 1. National level governance for transboundary; 2. Comparative studies on the phenomena from different climatic, economic and political gradient to investigate the complexity in transboundary or transnational rivers ; 3. Model-based experiments studies on the cooperation among riparian states using game theory ;
Data **Questions:** 1. Are lab or field experiment feasible for socio - hydro? (including natural experiments) 2. How can we assimilate data of different qualities or resolutions? 3. How to deal with changing	**Data** **Questions:** 1. How do we measure trust , cooperation , sovereignty in water systems ; 2. How to encourage the public to collect data for scientist? (simple / cheap equipment);

prevalence of data over time in longitudinal studies? **Initiatives:** 1. Use social media as a data source for public attention + opinion + to run surveys. 2. Assemble longitudinal data sets of floods, droughts and response. 3. Community initiative to assemble a community comparative socio-hydro data set with a specific aim.	3. How to dig out the phenomena by organizing the raw data? **Initiatives:** 1. Game theory for demonstrate the value of data sharing; 2. Identity the fundamental goals / culture for different stakeholders. 3. track the information flow through mass media
Perceptual/conceptual models/generalization **Questions:** 1. How to quantify social variables in S.H. models. 2. Can model be flexible for different scales? 3. How to link complex / simple models to exploit the respective strengths. **Initiatives:** 1. Panta RHei initiation: intercomparison study on S.H. models. 2. Translate S.H. model into practical tools for decision makers. 3. New strategies/ protocol to evaluate S.H. models	**Perceptual/conceptual models/generalization** **Questions:** 1. How to schematize with a SH model different social, econ, cultural backgrounds problems in 2 countries /regions? 2. How to link fast/slow process in a trans-boundary model? 3. -How to capture formal and informal institution? **Initiatives:** 1. Explore ways to model interactions such as information exchange, trust, flows of water and people, power; 2. Explore previous studies about water cooperation/conflicts in new SH models; 3. Explore the applicable usefulness of stylized;
Building a culture of collaboration with decision makers **Questions:** 1. How to reframe research questions to address practical problems or existing questions that interest decision makers? 2. What are the costs of bad decisions? What are profit for good decisions? 3. How do we build trust between	**Building a culture of collaboration with decision makers** **Q**uestions: 1. How to use communication tools to enhance involvement among people with different languages? 2. How to build trust and collaborate among decision-makers in different countries? **Initiatives:** 1. To develop socio-hydrology

scientists and decision makers? **Initiatives:** 1. Data sharing platform for both scientists and decision-makers; 2. Build models that can be self-corrected correspond to the interests of stakeholders; 3. Visualize teaching materials for journals to publish for the public.	models of the water system as communication tools in the participation process; 2. Cross-national initiates for common model development; 3. Use of socio-hydrology outputs to develop water diplomacy tools.