

Report on Panta Rhei during the year 2016-2017

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SUMMARY

Panta Rhei is now in its second biennium, and is a highly successful initiative that is helping to shape and motivate the research of the international hydrological community towards the area of “Hydrology, Society and Change”. With more than 400 scientists involved in 32 Working Groups, we represent a significant force in current hydrological research. Even more so now than at the beginning of the Panta Rhei decade in 2013, the impact of humans and environmental change on hydrological systems is recognised as a driving theme in water science.

THE STRUCTURE OF PANTA RHEI

For the Biennium 2015-2017, during the IUGG General Assembly held in Prague, The IAHS Bureau nominated the following officers:

- Chair: Hilary McMillan (San Diego State University, USA)

- Target Leaders:

Dr. Heidi Kreibich; Helmholtz Centre Potsdam, Germany

Dr. Junguo Liu; South University of Science and Technology of China

Dr. Anne Van Loon; University of Birmingham, UK

Dr. Alfonso Mejia; Pennsylvania State University, USA

Dr. Dinis Juízo; Eduardo Mondlane University, Mozambique

Dr. Tobias Krüger; Humboldt University of Berlin, Germany

In contrast to the previous biennium, the target leaders were not assigned specific roles, but instead form a leadership team who undertake leadership tasks as required.

In July 2017, Giuliano di Baldassarre will take over from Hilary McMillan as chair of Panta Rhei. The handover process is well underway, and the new leadership team has been agreed as follows:

Dr. Veena Srinivasan, Ashoka Trust for Research in Ecology and the Environment, Bangalore

Dr. Fuqiang Tian, Tsinghua University, Beijing

Dr. Yasir Mohamed, UNESCO IHE, Netherlands

Dr. Tobias Krueger, Humboldt University of Berlin, Germany

Dr. Junguo Liu, South University of Science and Technology of China

Dr. Amir AghaKouchack, University of California, Irvine, USA

Dr. Heidi Kreibich, Helmholtz Centre Potsdam, Germany

Dr. Tara Troy, Lehigh University, USA

WORKING GROUPS

Panta Rhei is organised through Working Groups formed by the community, each group representing a specific research area relevant to the overarching theme of “Change in Hydrology and Society”. Each group is responsible for organising their own activities and contributing to wider goals of the Panta Rhei initiative, as well as reporting back to IAHS. Since the previous report to the Bureau, an additional 1 working group has been formed, giving a total of 32 working groups, as follows:

1. Hydro-meteorological extremes: Decision making in an uncertain environment - Chair: Adrián Pedrozo-Acuña
2. Large dams, society, and environment - Chair: Bellie Sivakumar
3. Thirsty future: energy and food impacts on water - Chair: Ana Mijic
4. Changing biogeochemistry of aquatic systems in the Anthropocene - Chair: Hong-Yi Li
5. Transdisciplinarity - Chair: Tobias Krueger
6. Natural and man-made control systems in water resources - Chair: Ronald van Nooijen
7. Water and energy fluxes in a changing environment - Chair: Maria J. Polo
8. Epistemic uncertainties - Chair: Paul Smith
9. Comparative water footprint studies - Chair: Arjen Y. Hoekstra
10. Hydrologic services and hazards in multiple ungauged basins - Chair: Hilary McMillan
11. Understanding flood changes - Chair: Alberto Viglione
12. Physics of hydrological predictability - Chair: Alexander Gelfan
13. Mountain hydrology - Chair: Shreedhar Maskey
14. Large sample hydrology - Chair: Vazkén Andreassian
15. Socio-hydrologic modeling and synthesis - Chair: Veena Srinivasan
16. Sustainable water supply in a urban change - Chair: Tatiana Bibikova
17. Water footprint of cities - Chair: Alfonso Mejia
18. Evolving urban water systems - Chair: Alfonso Mejia
19. Changes in flood risk - Chair: Heidi Kreibich
20. Anthropogenic and climatic controls on water availability (ACCuRACY) - Chair: Attilio Castellarin
21. Floods in historical cities - Chair: Alberto Montanari
22. Prediction under Change (PUC) - Chair: Hafzullah Aksoy
23. Data-driven Hydrology - Chair: Elena Toth
24. Modeling Hydrological Processes and Changes - Chair: Yangbo Chen
25. Resilience-based management of natural resources: the fundamental role of water and soil in functional ecosystems - Chair: David Finger
26. Integrating history, social conflicts and hydrology: From semi pristine to highly modified hydrological systems - Chair: Victor Rosales Sierra
27. Drought in the Anthropocene - Chair: Anne Van Loon
28. Water scarcity assessment: methodology and application - Chair: Junguo Liu
29. Improving Hydrological Systems Knowledge - Chair: Jun Xia
30. Process-based hydrologic modeling for decision making - Chair: Chaopeng Shen
31. Status and future of African river systems - Chair: Jörg Helmschrot
32. Comparative Study on the Co-evolution of Coupled Human-Water Systems – Chair: Fuqiang Tian

Current reports from each Working Group are available at:

<http://iahs.info/Commissions--W-Groups/Working-Groups/Panta-Rhei/Working-Groups.do>

WEBSITE

The Panta Rhei webpages can be found at: <http://iahs.info/Commissions--W-Groups/Working-Groups/Panta-Rhei/>. Up to date information on the Panta Rhei structure, news items, working groups, relevant papers etc. can be found on the site.

PANTA RHEI – ACTIVITIES DURING 2016-2017

Scientific symposia

Panta Rhei Day workshop

On 23 April 2017 we held the second 'Panta Rhei Day' workshop at TU Vienna, with 28 attendees. This followed the successful first Panta Rhei Day workshop in 2016. The aim of the workshop was to bring together motivated Panta Rhei scientists to meet each other, discuss common research and plan future initiatives for Panta Rhei. Invited presentations were given by Sally Ramagecroft, University of Birmingham ("Seeking to quantify the human influence on hydrological drought from observations in case studies"), Doris D uthmann, TU Vienna ("Glacier mass loss or precipitation increase? Investigating the causes for recent streamflow increases in headwater catchments of the Aksu River, Central Asia"), and Giuliano Di Baldassarre, Uppsala University ("The next Panta Rhei biennium 2017:2019; ideas and discussion").

Participants chose two from four workshop sessions:

- 1. Panta Rhei stories:** Add your project to our online map with overview information of studies undertaken by working groups and Panta Rhei members
- 2. HSJ Panta Rhei opinion paper series:** Discuss ideas for future papers and contributions to discussion in the ongoing HSJ series.
- 3. Panta Rhei in Hydrology Education:** Develop ideas for education initiatives (e.g. mentoring schemes, teaching material) on the themes of "Hydrology, Society and Change" to support students and educators around the world.
- 4. Working Groups Lessons Learnt Discussion:** Hear from leaders and participants of successful and active working groups and discuss ways to energize your own working group.

EGU 2017

Several conference sessions at EGU 2017 were organised through Panta Rhei.

HS1.2 Hydrology, society and environmental change. Conveners: Hilary McMillan, Heidi Kreibich, Anne Van Loon, Tobias Krueger. Panta Rhei promoted this overarching session for all scientists working in the areas of hydrology, society and change, particularly focusing on gains in our understanding of human-influenced hydrological systems during the second biennium of Panta Rhei 2015-2017.

HS2.1.1 Hydrological extremes: from droughts to floods. Conveners: Anne Van Loon, Jan Szolgay , Lena M. Tallaksen , Gregor Laaha , Alberto Viglione.

HS2.4.2 Flood dynamics: processes, controls, consequences. Conveners: Sergiy Vorogushyn, Heidi Kreibich , Alberto Viglione , Luis Mediero , William Farmer.

IE2.2/HS3.3/ESSI3.11/GI1.13. Addressing the people-hydrology nexus: opportunities and challenges for hydrology with public participation and crowdsourcing. Conveners: Elena Toth, Linda See , Nick Mount , Amin Elshorbagy , Maurizio Mazzoleni.

HS5.1 Hydrology & Society: Transdisciplinary approaches to hydrology and water resources management. Conveners: Stuart Lane, Tobias Krueger , Eric Lindquist , Eva Nora Paton , Gemma Carr , Roland Barthel , Leon Hermans , Carly Maynard , Christopher (Kit) Macleod.

HS5.3 Advances in socio-hydrology. Conveners: Saket Pande, Murugesu Sivapalan , Giuliano Di Baldassarre , Alberto Viglione.

HS7.4 Climatic variability and the hydrological cycle. Conveners: Ioannis Markonis, Demetris Koutsoyiannis , C. Cudennec , João de Lima , Alberto Montanari , Serena Ceola.

AGU 2016

A Panta Rhei session was organized at AGU 2016, on “Hydrology, Society, and Environmental Change: Coupled Human-Water Dynamics across Scales”. The session was very successful with 14 oral presentations and 25 poster presentations. Our invited speakers, each giving 30 minute presentations, were Prof. Nandita Basu speaking on “Monsoon Harvests: The Socio-Ecohydrology of Agricultural Rainwater Harvesting and Groundwater Depletion in India” and Prof. Sally Thompson speaking on “What hydrological dynamics emerge from the interaction of land conversion and flood levee construction?”.

Panta Rhei Drought in the Anthropocene workshop: 19-21 September 2016

This workshop was organized by the Drought in the Anthropocene working group that investigates the interaction between drought and people. The research questions addressed in this workshop were:

A: How are people enhancing/alleviating drought events?

B: How are people impacted by drought events?

C: How are people responding to drought events by changing water use, land use, water management, water storage?

D: How do these feedback processes result in aggravated drought conditions and more (or other, e.g. ecological) impacts? And how in alleviated drought conditions and less impacts?

International CNC-IAHS workshop "Water scarcity assessment: Method and application"

On September 23, 2016, the academic conference of CNC-IAHS was held in Nanjing, China. More than 200 experts, scholars and graduate students from different universities or institutes participated in this conference. The IAHS subsequently conducted a series of symposiums on water system tracing and dating, hydrological forecasting in changing environments, hydrology and social

systems and their interactions in changing environments, urban hydrology and uncertainty analysis. During this conference, IAHS arranged a total number of more than 100 academic reports, providing an excellent platform for communication, which effectively promote the integration of the research exchange of hydrological science.

Upcoming Workshops and Conference Sessions

Seventh International Conference on Flood Management – ICFM7 in Leeds, UK on 5 -7 September 2017. Session: A Panta Rhei perspective on changes in flood risk

The main aim of this session is to present and discuss results from various countries and disciplines on changing flood risk and risk management. Abstracts are invited for contributions that cover research as well as practical implementation of risk assessment and management.

The Second IAHS Panta Rhei International Workshop on Water System Knowledge Innovation and its Practices in Developing Countries: November 20-22, 2017; Gorgan, Iran

This international workshop aims to bring together scientists from worldwide (in particular from developing countries) and various disciplines that share a common interest in addressing the challenges of understanding and managing the water systems. The broad aims are to enhance the contribution of strategic scientific and technical research and innovation to the sustainable management of water systems, including rivers, groundwater and wetlands.

IAHS Port Elizabeth 2017.

Panta Rhei will be represented at many of the sessions in this conference, and particularly the session “Hydrology and the Anthropocene”, Convener: C. Cudennec, Co-Conveners: Hubert H.G. Savenije, Hilary McMillan, Anil Mishra, Junguo Liu. An open evening discussion session on future directions for Panta Rhei will be led by Giuliano di Baldassarre, Jun Xia and Christophe Cudennec.

AGU 2017.

The Panta Rhei session “H070. Hydrology, society and environmental change: Coupled human-water dynamics across scales”, Convenors: Hilary McMillan, Murugesu Sivapalan, Giuliano Di Baldassarre, has been approved for AGU 2017, and is currently being advertised.

EGU 2018.

A Panta Rhei session “Hydrology, society and environmental change.” Convener: Giuliano Di Baldassarre, Co-Conveners: Heidi Kreibich, Tobias Krueger, Anne Van Loon, has been requested for the EGU 2018 program.

ONGOING INITIATIVES

Panta Rhei opinion articles in HSJ

To encourage discussion and interaction between Panta Rhei working groups, and from scientists outside Panta Rhei, the Panta Rhei leadership team are organising a series of invited opinion articles in HSJ. The initiative is being coordinated by Heidi Kreibich with the assistance of the HSJ editors. We plan to bring together diverse opinions on some of the hot topics of hydrology in a changing world.

The status of the series is as follows:

2 Published in 2017 Volume 62 (3):

The role of experimental work in hydrological sciences – insights from a community survey by Th. Blume, I. van Meerveld & M. Weiler

Prediction in a socio-hydrological world by V. Srinivasan, M. Sanderson, M. Garcia, M. Konar, G. Blöschl & M. Sivapalan

2 accepted:

Challenges in operationalizing the water-energy-food nexus by J. Liu, H. Yang, C. Cudennec, A.K. Gain, H. Hoff, R. Lawford, J. Qi, L. de Strasser, P.T. Yillia, C. Zheng

Perceptual models of uncertainty for socio-hydrological systems: a flood risk change example by I.K. Westerberg, G. Di Baldassarre, K.J. Beven, G. Coxon, T. Krueger

2 under preparation:

Attribution of trends in impacts due to floods and droughts by Heidi Kreibich , Anne Van Loon, Laurens Bouwer, Veit Blauhut, Marjolein Mens , Henny van Lanen, Jeroen Aerts

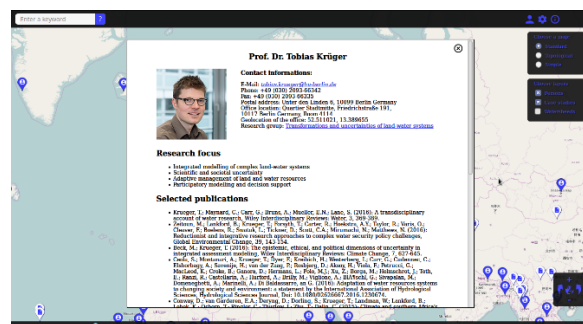
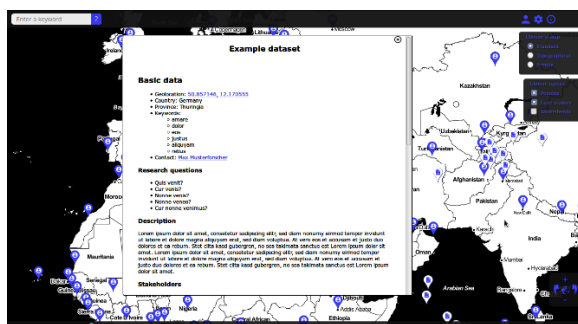
Mountain, rural and urban hydrology by M.J. Polo and co-authors

Panta Rhei Library

Online at <http://iahs.info/Commissions--W-Groups/Working-Groups/Panta-Rhei/Panta-Rhei-Library.do>

The Panta Rhei Library initiative aims to help Panta Rhei members learn about topics highlighted by Panta Rhei, which may be outside their usual sphere of research. This resource also promotes collaboration and knowledge sharing between Panta Rhei working groups. Each working group is invited to list up to 6 key papers that summarize the field for someone new to the topic. This includes up to 3 key papers in the field, and up to 3 papers written by group members (including a summary paper written by the group if that exists). Each paper is provided together with a very short explanation of why it is useful and relevant. So far, Panta Rhei Library collections are available for the working groups: Hydrologic Services and Hazards in Multiple Ungauged Basins, Water scarcity assessment: methodology and application and Understanding flood changes.

Panta Rhei Stories



The Panta Rhei Stories project is creating an online map with overview information of people involved in Panta Rhei, and studies undertaken by working groups and Panta Rhei members (see example above). This project is led by Tobias Krueger. The aim of the map is to provide an online resource that enables an overview of all the projects happening in Panta Rhei, and allows easy discovery of Panta Rhei researchers working in any location of interest.

Data collection is underway, and participants in the 2017 Panta Rhei Day filled in questionnaires to add their data and case studies to the map. The mapping software is in development and currently in the testing phase. We hope to release a 1st version by the end of 2017.

The Panta Rhei leadership team thanks IAHS for their continued support and encouragement.