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Global Hotspots of Hydrological Change and Water Crises: Panta Rhei Survey

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Panta Rhei is the scientific decade (2013–2022) of the International Association of Hydrological Sciences, IAHS. This initiative aims to reach an improved interpretation of the processes governing the water cycle by focusing on their changing dynamics in connection with rapidly changing human systems (Montanari et al., Hydrological Sciences Journal, 2013). Hundreds of water scientists have been involved in Panta Rhei so far, and several working groups have already produced significant outcomes (McMillan et al., Hydrological Sciences Journal, 2016). We first present some key achievements of this initiative by showing how Panta Rhei has advanced our understanding of interactions and feedbacks between hydrology and society. Then, we show the results of a recent survey of global hotspots of human-water interactions, i.e. contrasting case studies from around the world. The survey highlights how change in natural, technical, political and social factors can trigger different types of water crises: groundwater depletion, ecological degradation (e.g. drying lakes), increased drought severity, increased flood risk, water conflicts (e.g. upstream vs. downstream), and water quality calamities. This survey is a step towards a community-wide effort in collecting and sharing essential data to map the role of social and environmental change in hydrological trends.