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Instrumental case studies of hydrosocial extremes

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Every year floods or droughts affect more than 100 million people, especially the most vulnerable. The severity and frequency of these hydrological extremes have dramatically increased due to climatic and anthropogenic changes. This alarming trend calls for a better understanding of the dynamics between water and society (i.e. interplay between human and natural systems) and the resulting implications for hydrological risks.

Recent attempts to explain coupled human and natural systems schematizing their interactions and feedback mechanisms in mathematical models, or through quantitative studies, have not sufficiently considered the heterogeneity of human beings and social processes. As a result, those studies have not completely accounted for how hydrological risks are distributed across different social groups. This research aims to complement quantitative studies of socio-hydrological processes and to provide a deeper understanding of human-nature interactions by historically and spatially retracing those dynamics in specific contexts.

Through instrumental case studies, the research first explores how social and natural factors have influenced the hydrological regime and then infers why these factors affected the (co-)evolution (in time) and (re-)distribution (in space) of hydrological risks.
Our case studies consist of human-water systems that are significantly affected by floods and/or droughts in the past, where human activities have also significantly altered the hydrological regime, e.g. Cape Town, Las Vegas, Brisbane, Lower Limpopo Valley. Comparing two or more cases with distinct hydrological and social features is expected to provide a deeper understanding of the primary mechanisms influencing human-nature dynamics, opportunities and risks.

Our work emphasises issues of equity and justice, while uncovering social and power geometries that affect the distribution of hydrological risk. As such, it provides an original and significant contribution to the 2013–2022 scientific decade of the International Association of Hydrological Science (IAHS) “Panta Rhei - Everything Flows”.