

## IUGG23-3626: Scenario-based approach for assessing the impact of water management measures on hydrological drought dynamics

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In recent years, there has been considerable interest in a coupled human-water system perspective for modelling droughts impact and human responses, particularly during the Panta Rhei decade. Comparing observations (human-modified) and simulations (naturalized condition) is one of the most commonly used approaches to decouple human and natural forcings on water system changes. Although there are several studies that address the importance of human response to hydrological drought development by comparing observations and simulations, they often use only surface water models, which have limited ability to simulate flow during drought. This study aims to extend research on modelling human impact on hydrological droughts using a coupled surface and groundwater flow model. To this end, we conducted a model comparison using the Soil and Water Assessment Tool (SWAT) and its coupled version with the Modular Groundwater Flow Model (MODFLOW). The Kamienna watershed, where groundwater is predominant and has been significantly modified by human intervention, serves as a case study. The results support the main arguments that the coupled hydrological model significantly improves the simulation of hydrological extremes compared to the surface hydrological model in the groundwater-dominated watershed. In addition, preliminary results also suggest differences between the two models under different water management scenarios that could also affect their further impact analysis on hydrological droughts. The study improves our understanding of modelling hydrological drought under human-modified conditions and also helps for proper water management during drought mitigation.

**Keywords:** SWAT-MODFLOW, SWAT model, Panta Rhei, hydrological drought, Human interventions

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