



Anthropogenic influences on streamflow drought termination

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Here we present the first assessment of the effect of different human activities (e.g. water abstractions, reservoirs) on the recovery of drought events, known as the drought termination phase. Despite the increasing influence of human activities on water resources in our current Anthropocene era, the impacts of these activities on drought termination (e.g. duration, timing and rate) remain unknown and unexplored. Knowledge in this area is crucial for water resource management.

Here we used six case studies in Europe to analyse the human influence on streamflow drought termination characteristics. All case studies compared a human influenced time series of streamflow (observation data) and a naturalised time series (naturalised through hydrological modelling, representing the 'natural' situation) for the same period. The application of a universal framework has allowed the study and comparison of the anthropogenic influences on the termination phase in different global locations.

Overall, results clearly showed the influence of human activities on drought terminations in all catchments. Groundwater abstractions, reservoirs and mixed influences were all found to increase the mean duration of drought termination, whereas water transfers into the catchment decreased drought termination duration. Results show that average drought termination rates increased in all case studies due to the human influence. It was also seen that start and end months of the termination phase were more skewed to certain months in anthropogenic influenced data than in the naturalised situation.

The cross-applicability of this framework facilitates the uptake of such analysis by others in the field of drought research. These results can be built upon by adding further case studies and covering other human activities to gain a wider understanding on how human actions are modifying hydrological droughts. Furthering this work can also help to improve drought management policies.