



## **Quantification of hydrological droughts for development of a stakeholder-supported global drought information system (GROW-GlobeDrought)**

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The project GlobeDrought aims to develop a stakeholder-supported web-based drought information system that provides spatial descriptions of drought risks with consideration of three components: (i) drought hazard, (ii) exposure, and (iii) vulnerability. The focus is on water supply for human and ecosystems, crop productivity and the need for international food aid. The approach is to determine drought hazards by combining satellite-based remote sensing of vegetation conditions, spatial-temporal variations in terrestrial water storage changes (TWSC) from GRACE and analyses of precipitation data with hydrological modeling and crop modeling. The analysis of socioeconomic, governance-related and environmental data enables the quantification of exposure and vulnerability of social-ecological systems. The global-scale analysis will be supplemented by more detailed analyses for regions heavily affected by droughts such as Southern Africa, Eastern Brazil, Western India, and the Missouri River Basin of the United States.

Results on quantification of hydrological drought hazards are presented. Various hydrological indicators are calculated at global as well as regional scale, based on the output of model WaterGAP 2.2d for the period of 2003-2016, forced with WFDEI-GPCC. The evaluated output includes streamflow, soil water content, groundwater storage, water storage in surface waters and total water storage are determined at a spatial resolution of 0.5°. Each of these five variables is utilised to calculate risk-specific drought hazard indicators using different methods. In addition, total water storage anomalies (TWSA) -based indicators are also calculated using GRACE gravity field data and then compared to WaterGAP results. In the further course of the project, the uncertainty of the WaterGAP time series is to be reduced by assimilation of GRACE TWSA.