



Identification of spatiotemporal patterns of biophysical droughts in Iran

Bahareh Kamali (1), Karim Abbaspour (1), and Hong Yang (2)

(1) EAWAG, Swiss Federal Institute of Aquatic Science and Technology, Dübendorf, Switzerland, (2) Department of Environmental Sciences, University of Basel, Switzerland

This study aims to identify historical patterns of meteorological, hydrological, and agricultural (inclusively biophysical) droughts in Iran over the last forty years. Standardized precipitation index (SPI), standardized runoff index (SRI), and soil moisture deficit index (SMDI) were used to represent the three types of droughts, respectively. Variables required for calculating the indices were obtained from a SWAT (Soil and Water Assessment Tool) model constructed for the country. The model was calibrated based on monthly runoff using the Sequential Uncertainty Fitting (SUFI-2) algorithm in SWAT-CUP. The indices were compared across temporal and spatial dimensions. Drought characteristics including number of events, start, end, duration and severity were derived to identify areas most prone to drought events. The results on provincial level show a variety of spatiotemporal patterns in different drought aspects over the country. The summary of analysis ranked drought events based on short-term severe droughts to multi-year duration events. Our analyses on three types of droughts provide a basis for further studies concerning drought impacts under future climate change and water resource management strategies in semi-arid areas.