



Relevance comparison of meteorological drought indices for hydrological flow in Armand River basin, Iran

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Drought, which can be defined as a continuous and abnormal water scarcity and moisture deficit, is a common phenomenon in arid and semi arid regions. Often there is a link between the deficit in precipitation, which is considered to be meteorological drought, and shortage of streamflow the so called hydrological drought. Understanding this relationship can help us to prepare for occurrences and consequences of other types of drought as agricultural or socio-economic. Distinguishing the occurrence of drought is fraught with difficulties. Typically, drought indices will be used in order to assimilate rainfall or streamflow data as indicators for a more comprehensible image of the real world. Obviously, the purpose of a drought index is to have for decision making a single number which is more useful than rows of data.

Armand River Basin is a 9986 km^2 catchment located in the western part of Iran. It has regularly faced hazardous impacts of droughts with the worst on record for the period 2007-2008. In this research we compare the relevance of the meteorological drought indices: Standardized Precipitation Index (SPI); percent of normal precipitation and Modified China Z-Score (MCZI) to hydrological flow of Armand basin. These three indices have been applied to time series of precipitation for the hydrological years of 1969-1970 to 2007-2008. In order to regionalize rain gauge data to the whole basin a digital elevation model and a regression relationship between precipitation as dependent variable and height of rain gauge above sea level as independent variable were used. Consequently, a spatially weighted mean of the annual precipitation time series was used as input for the Iranian software DIP (Drought Indices Program) for calculating meteorological drought indices. Results indicate that SPI explains better than other indices the circumstances of drought events.

Keywords: Hydrological and Meteorological Drought, Modified China Z-Score, percent of normal precipitation, SPI