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Desertification assesment using the standardized precipitation index in Çankırı, Turkey

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Abstract: Drought is an important phenomenon, which is complicated to model and define. To understand the reason of drought, scientists proposed different desertification indexes. Standardized Precipitation Index (SPI) is one of the most important index that used to predict desertification. SPI can be used for determining the wet or dry condition of an area based on the rainfall data. In this study, SPI was used for assessment and analysis the occurrence of droughts. For this purpose, used from 50 years monthly rainfall data were evaluated in 5 time periods. In the light of this, we obtained the rainfall data of Cankiri from the Turkish State Meteorological Service. Then, rainfall data was used to generate SPI values based on Gamma distribution. The generated SPI values are categorized in order to identify the wet or dry conditions. There are seven different SPI classes based on SPI values such as extreme drought, severe drought, and moderate drought, near normal, moderately wet, severely wet, and extremely wet. This categorization showed a preliminary opinion for the area we included. Then, we generated 3, 6, 9, 12, 24-moth SPI scores for Cankiri. However, we only used 3-month SPI values because it provided a seasonal estimation of precipitation. 3-month SPI was appropriate for agricultural regions. So, it was more effective in underlining available moisture conditions. Moreover, non-parametric trend analysis approach Mann Kendall (MK) is applied to the generated 3-months SPI data. We illustrated the drought and wet conditions of 50 years data with trend analysis based on SPI values. Furthermore, the results of trend analysis are investigated and the changes in weather conditions based on SPI values are underlined.
Keywords: SPI, Mann kendall, Drought, Rainfall, Drought, Trend analysis