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Analysis of Drought in Küçük Menderes River Basin using SPI and SPEI Drought Indices

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Drought as a slow-growing natural phenomenon has very dramatic effects on areas and populations, causing economic and environmental problems, which can lead to irreversible damages. Many researches show that changes on climate and land-use exaggerate the drought impacts. According to observations, the period of 2011-2015 was the warmest five-year period on record globally. In the presented study, statistical analysis of drought in Küçük Menderes river basin in Turkey was carried out due to its significance with the biggest agriculture share. In the analysis, the standardized precipitation index (SPI) and the standardized precipitation evapotranspiration index (SPEI) at multiple time scales (3, 6, 12 and 24 months) were computed. Required data which include monthly precipitation and temperature for the period of 1972-2016 were evaluated in the basin. Before computation of drought severity indices, homogeneity analysis was carried out and missing data in the recorded series were completed using linear regressions with respective reference series. Standard normal homogeneity test, Buishand range test, Pettitt test and Von Neumann ratio test were used for homogeneity checks on the data set. Mann-Kendall non-parametric test was also used to detect possible trends in precipitation and temperature data sets. Spatial distribution of droughts in the basin was revealed by using the Kriging method.