



Assessing Drought Using Cordex Ensemble Climate Models In Mediterranean Climate Region Of Turkey

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Drought has been a significant result of climate change that impacts the variability and the long term mean of precipitation regimes. Mediterranean region is one of the hotspot regions in the world that will be significantly impacted from the expected change. Hence, it is important to monitor drought considering the increasing population and intensive agricultural and touristic facilities in the Mediterranean climate regions of Turkey. This study aims to assess the trends in drought by using the Standardized Precipitation Index (SPI) for 60 locations that are selected from the regions under Mediterranean climate conditions in Turkey. The SPI values for different timescales - from 1 month to 1 year - are estimated for past and future by using the observed and modeled data. The model grid data that corresponds to 46 meteorological stations are obtained from 12 different climate models on CORDEX project. These 12 models are constituted by coupling 4 different Global Climate Models (GCM) and 6 different Regional Climate Models (RCM). Monthly observed and modeled precipitation data are compared to measure performances of the seasonal GCM/RCM pairs. Afterwards, a modified Mann-Kendall trend analysis test is applied on the SPI and annual precipitation values for the whole period (1972-2099). The trend is estimated by linear regression for the locations on which Mann-Kendall results indicate statistically significant change. In conclusion, a critical increasing drought trend is detected for some regions, where model predictions over these locations are consistent with each other. However, the variability of the results for some other regions for different SPI timescales demonstrate the different behaviors between models. Similarity and divergence between the same GCMs and RCMs are also outcomes of the study. The analyses show an increase in drought with the magnitude and duration upwards the second half of the century while there is a significant decreasing trend at annual total precipitation for certain locations. It can be interpreted that the increase in drought has strong relation with decrease (increase) in annual precipitation (in daily mean temperature) for the region.