



## Monthly Trend Analysis of Snowfall/Precipitation Day Around Southeastern Anatolia Project (GAP) in Turkey

Evren ÖZGÜR and Kasım KOÇAK

Istanbul Technical University, Faculty of Aeronautics and Astronautics, Department of Meteorology, Maslak, Istanbul, Turkey  
(ozgurev@itu.edu.tr;kkocak@itu.edu.tr)

Demand to water resources has increased due to increasing population and global climate change in recent years. Therefore, researches on water issue came into prominence more than before. Turkey has not enough water resources. The annual available amount of water has recently been approximately 1500 m<sup>3</sup> per capita. It is expected that available amount of water per capita will be about 1120 m<sup>3</sup> by 2030 according to population growth projection. The current population and economic growth rate will alter water consumption patterns. As population increases, annual allocated available amount of water per person will decrease. The projections for future water consumption would be valid on the condition that the water resources were projected from pollution at least for the next 25 years. It is imperative that available resources be evaluated rationally so as to provide clean and sufficient water resources for the next generation. In this study, Southeastern Anatolia Project (GAP) region was used as study area. Although GAP region has about 10% in both the total population and geographical area of Turkey, the region represents 28% of Turkey's total water potential mainly with the rivers Euphrates and Tigris. Mann Kendall trend test has been applied monthly to daily precipitation values which include the period of 1971-2011. Monthly snowfall and total precipitation days obtained from Turkish State Meteorological Service for 54 stations have been used in the study. Precipitation data have been analyzed separately as snow and rain. Changes in ratio of snowfall days to total precipitation days have been examined. One of the difference between snow and rain is that snow remains on the ground during long period of time. After air temperature rises in spring, snow begins to melt and it becomes important for agriculture, energy production and drinking water supply. Because ratio of snowfall days to total precipitation days was analyzed, only winter seasons have been used. The months which have snowfall days less than %1 of total snowfall days have not been considered. An analysis program developed by United States Geological Survey in 2005 was used in this study in order to make monthly trend calculations. In the study, ratio of snowfall days to total precipitation days were analyzed for 54 meteorological stations which are located in GAP region and its surroundings. Trends were calculated in 5% and 10% significance level for all stations. A decreasing trend was observed in 26 stations for 5% significance level and 34 stations for 10% significance level. Monthly decreasing trend was monitored in 37 months and 60 months for %5 and %10 significance levels, respectively.

**Keywords:** Trend analysis, Mann-Kendall test, Snowfall to Precipitation ratio, Southeastern Anatolia Project