



Trends in Turkey climate extreme indices from 1971 to 2004

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Climate change is brought about by the complicated interactions among the atmosphere, the oceans, the cryosphere, the surface lithosphere and the biosphere, which comprise the climate system. Climate change being extremely complex and totally global in its nature, cooperative activities with international and interdisciplinary program is indispensable for monitoring and predicting climate change.

Extreme climate events usually have strong impacts on society and a small change in the mean condition can cause a large change in the likelihood of an extreme. A joint WMO CCI/CLIVAR Expert Team on Climate Change Detection, Monitoring and Indices has been defined 27 core climate indices and Xuebin Zhang from Environment Canada generated RCLimDex software to calculate them. This software uses the free software R (see <http://www.r-project.org> for more information). The complete list of the 27 indices, software and users guide of RCLimDex are available from <http://cccma.seos.uvic.ca/ETCCDMI>

RCLimDex loads the data and has several QC checks and after that creates 27 core indices. Indices have some advantages versus data. The information provided by the indices not only includes how the mean values have changed over time but how the statistical distribution of the data changed. Also results give us very important information about the increasing or decreasing trends which will be held in 100 years. We have run RCLimDex software for 122 stations in Turkey for the period from 1971 to 2004. We selected the same data period in order to compare station's outputs for the same climatic period. To provide an overall picture of climate variation in the country, we computed average trend for every index, relative to the period 1971-2000.

The results show that numbers of summer days and tropical nights have been increasing all over Turkey while ice days and frost days decreasing. Projected average increasing in summer days is 59 days in 100 years. Most of the trends are statistically significant at the 5% level. Growing season length has been increasing over Turkey except coastal regions. This will be have positive effect on summer agricultural products but some trees needed chilling requirement like as orchard, will be negatively affected. Maximum of maximum, minimum of maximum, maximum of minimum and minimum of minimum temperatures have been increasing in most of the stations. Warm days and warm nights have been increasing all over Turkey while cool days and cool nights decreasing. Warm spell duration indicator has been increasing while cold spell duration indicator decreasing. Diurnal temperature range has been increasing in most of the terrestrial stations while decreasing in the coastal area. The maximum one-day and 5 days precipitation, simple daily intensity index and heavy precipitations have been increasing even in the 39 stations located in the Aegean and inland Anatolia mean annual total precipitation declines. Hopefully consecutive dry days have been decreasing especially in Konya, Karapınar, Çeylanpınar and Iğdır which they are suffering drought problem but unfortunately there is increasing trend in Karaman, Diyarbakır, Aegean, Marmara and Black Sea Region. Consecutive wet days have been increasing especially in eastern part of the Marmara and around of Burdur, Niğde, Sinop, Sivas, Rize, Kilis and Muş while decreasing in the Aegean and Konya.

As a summary, in general, there are large coherent patterns of warming across in the country affecting both maximum and minimum temperatures but there is a much more mixed pattern of change in precipitation.