



## **Analysis of long time Standard Precipitation Index series to detect the drought frequency changes in Hungary**

M. Lakatos, Z. Bihari, and T. Szentimrey

Hungarian Meteorological Service, Budapest, Hungary (lakatos.m@met.hu/ Fax: +36-1-346-46-87)

The precipitation has large temporal and spatial variability in Hungary. Monthly precipitation sum could be zero in any month in a year and at any place of the country, but it can be near or even above 200 mm as well. The year-to-year variability of the annual precipitation amount is high, so it has large influence on the agriculture and economy. The long-term precipitation trend shows decreasing pattern from the beginning of the last century. Calculation of the several drought indices is a commonly used method to detect the severe drought events. Analysis of the SPI (Standard Precipitation Index) series is performed in this study.

In climate studies the homogeneity of data series is of primary importance, since the SPI (Standard Precipitation Index) drought index calculation based on long time data series. That is homogenized daily and monthly precipitation amounts are used for SPI calculations in Hungary. Homogenization and complementing of precipitation data is performed by method the MASH (Multiple Analysis of Series for Homogenization; Szentimrey, 1999). Usually the station data series in Hungary are homogenized once in a year, at the beginning of each year after collecting the data also from all traditional precipitation stations.

The SPI calculator which is offered on the project page of DMCSEE (Drought Management Centre for Southeastern Europe) is applied for SPI calculations in Hungary.

In the drought mapping there are two ways: the first is when the SPI values are calculated in each grid point after gridding (by gridding part of MISH (Meteorological Interpolation based on Surface Homogenized Data Basis; Szentimrey, Bihari, 2007)) the station precipitation data, and then SPI values at all the grid point covering Hungary is visualized; the second one is when the station based SPI values are interpolated by method MISH (Meteorological Interpolation based on Surface Homogenized Data Basis; Szentimrey, Bihari, 2007) and then visualize them with a GIS mapping procedure. The differences in the results are also illustrated.

The time series of 1 month, 3 month and 6 month SPI from January 1951 to December 2009 are analyzed in this paper. The grid point SPI values enabled to calculate the proportion of the area falling into different categories of drought severity. The percentage series, which indicate the territorial expansion of the severe droughts, are also showed.

March - August 2003 was found as the most severe and extensive drought event from 1951 in Hungary. SPI maps, tables and diagrams illustrate that extremely dry situation in Hungary.

This study was supported by the project of Drought Management Centre for South East Europe (DMC-SEE).