



## **Regime shift detection in extreme daily precipitation in Romania**

**M. Baciu**, T. Breza, S. Cheval, A. Dumitrescu

National Meteorological Administration

97 Sos. Bucuresti-Ploiesti, Bucharest, Romania

Tel: +40-021-2303240 ext. 148

Email: madalina.baciu@meteo.inmh.ro

Heavy rains, severe floods, or other natural hazards related to extreme precipitation have been affected the territory of Romania during the last decades triggering immense damages and casualties. There is a huge public and scientific interest in obtaining a better perspective on the threats posed by precipitation hazards over the area. The scope of this study is to detect regime shifts in the extreme daily precipitation, and to identify their spatial patterns.

RClimDex has been used to get relevant annual indices constructed on the basis of daily data from 108 weather stations, covering the whole territory of Romania, along the interval 1961-2005. The research focuses on the following indices:

*A. Absolute indices:* annual total precipitation accumulated in wet days; 1-day and, respectively, 5-day maximum precipitation;

*B. Threshold indices:* number of days with precipitation totals exceeding 10 mm, 20 mm and 50 mm/day;

*C. Percentile-based indices:* precipitation amounts accumulated from events above the 95<sup>th</sup> percentile, and from events above the 99<sup>th</sup> percentile;

*D. Duration indices:* the maximum number of consecutive wet days; the maximum number of consecutive dry days;

*E. Other indices: simple daily intensity index.*

The statistical significance of the shifts in the mean and linear trend is analyzed using two non-parametric tests: Mann-Kendall and Pettitt. A recently introduced method based on sequential t-test analysis of regime shifts (Rodionov, 2004) has been used comparatively.

Results suggest that there are significant differences between the regions of Romania for each of the indices considered. There is no overall tendency observed, but as a general rule we argue that while the territory of Romania is becoming drier (i.e. positive trend, statistically significant in many cases, of the maximum annual number of consecutive dry days), the frequency and the intensity of extreme precipitation events follow a positive trend. The regime shift index reveals that, for most indices, the end of the 1970s and the period 2001-2005 were marked by dramatic changes. Preliminary studies suggest that these changes are in close connection with teleconnections.