Geophysical Research Abstracts
Vol. 16, EGU2014-9590, 2014
EGU General Assembly 2014

Variability of torrential rainfall intensities over different intervals in Romania

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Torrential rainfall events constitute one of the natural hazards periodically affecting Romania and triggering severe damage and life loss. The amount and especially the intensity of precipitation are the main factors defining this phenomenon as a hazard. This study analyses the variability of extreme precipitation (torrential rainfall events), with data resulted from precipitation records from 41 weather stations, over the 1965 – 2007 interval, in the warm season (April-October). Precipitation amounts exceeding certain thresholds over the 43 years were selected. Finally, the largest annual values were chosen for specific durations. The analysis was performed for 15 durations ranging from 5 to 1440 minutes. The time variability of torrential rainfall events was analyzed with Mann-Kendall statistics, at the same time computing the linear trend. Pettitt test was used to determine the shifting points in the data series. This study also attempted to identify certain homogeneous areas in respect with the torrential rainfall events over Romania, based on a cluster analysis. As regards the temporal variability, the most conclusive results yielded for the series corresponding to the 5, 300, 360, 720 and 1440-minute duration respectively. The general trend of precipitation over the mentioned durations is an increasing one, statistically significant for the 0.1 significance level. The clustering analysis pointed out rather differentiations between the very short durations (5, 10, 20 minutes) and long durations (720 and 1440 minutes). The paper is the result of activities developed within the CC-WARE Project (Mitigating Vulnerability of Water Resources under Climate Change), contract no. SEE/D/0143/2.1/X.