



Classification of atmospheric circulation patterns associated to heavy precipitation in Romania

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During the last years an increasing number of heavy precipitation events causing floods with severe socio-economic damages have been recorded in Romania. Such extreme precipitation events have been observed in all seasons but most frequently in early spring in association with snow melting and during summer as a combination of mesoscale weather conditions and other environmental factors. Our study aims at classifying the atmospheric circulation patterns responsible for heavy precipitation events in Romania in order to better understanding the mechanisms of their occurrence. Based on daily precipitation totals from 100 meteorological stations in Romania for the period 1961-2006 we use different thresholds of heavy precipitation in order to identify the atmospheric circulation patterns associated to them, according to season and station grouping. As a large scale field we use the NCEP/NCAR reanalysis data of daily mean sea level pressure (SLP) and geopotential height at 700 hPa (G700) respectively, for the same period and for the spatial domain 30°W-70°E;30-80°N. We use the principal component analysis (PCA) on S-mode data matrix for SLP and G700 data and the non-hierarchical K-means method to cluster the atmospheric circulation patterns associated to heavy precipitation according to the results of the component scores obtained from PCA. Different number of clusters of SLP and G700 were identified for each season, depending on precipitation threshold and station grouping