Geophysical Research Abstracts
Vol. 17, EGU2015-10676, 2015
EGU General Assembly 2015

Relationship between the large-scale air circulation and frequency of very warm days in Romania

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In this work is investigated the relationship between the large-scale air circulation and frequency of very warm days (frequency of days with maximum temperature greater or equal to 90th percentile – FrTmax90). This analysis is conducted for summer and winter over the period 1962-2010. Daily temperature data recorded at 85 Romanian meteorological stations with complete observations over the study period were used to calculate the FrTmax90 for summer and winter. Daily air circulation types computed by using two objective catalogues, namely GWT (GrossWetter-Typen) and WLK (WetterLargenKlassifikation) from COST733Action were used to calculate the air circulation frequency for summer and winter. NCEP/NCAR gridded reanalysis data sets were used. For the GWT catalogue the sea level pressure data sets were used to classify the air circulation in the 18 types. In the case of the WLK catalogue the geopotential height at 925 and 500 hPa, zonal and meridional components of wind vector at 700 hPa and precipitable water content for the entire atmospheric column were used to classify the air circulation in the 40 types. For winter were obtained 4 clusters and for summer 8 clusters of FrTmax90 by using a clusterization method. These clusters present homogeneity related to the FrTmax90. The Pearson correlation coefficient (R) is calculated between the FrTmax90 and the air circulation types. The results show that correlation coefficients are greatest in winter than in summer for the GWT catalogue compared to the WLK catalogue. The greatest correlation coefficients was obtained during winter for southwestern-anticyclones (SW[A]) circulation type for all the 4 clusters according to the GWT catalogue. The northwestern-anticyclones-wet (NW-AAW) circulation type presents the greatest correlation coefficient only for the cluster 3 according to the WLK catalogue. We can note that these results depend on the both large-scale air circulation and orography (the Carpathians).