



Temperature extreme events variability over Romania and their relationship with atmospheric blocking

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The dominant spatial and temporal patterns of interannual to decadal variability in the frequency of extreme temperature events recorded at 82 meteorological stations from Romania during 1962 to 2010 period are investigated using various univariate and multivariate statistical techniques. The frequency of extreme high temperature events is defined as the number of days in a season when maximum daily temperature was higher than the 90th percentile. An EOF analysis reveals that the dominant patterns of these extreme temperature indices are monopolar for all seasons and are strongly related with the frequency of the blocking events in the Euro-Atlantic region. The statistical relationship between the leading extreme high temperature patterns over Romania and the atmospheric blocking over the Euro-Atlantic region is investigated using a two-dimensional blocking indicator based on 500-hPa geopotential field. A composite analysis reveals that relatively high (low) frequency of warm events over Romania is associated with low (high) frequency of blocking in a broad region which extends from Iceland to Scandinavia. This pattern shows some resemblance with the blocking pattern associated to the positive (negative) phase of the North Atlantic Oscillation (NAO) with the main anomaly centers displaced toward Europe. Low (high) blocking activity over the Scandinavian region is associated with high (low) frequency of warm extreme events over Romania during summer. The time coefficients (PC1) associated to the dominant pattern of extreme warm events over Romania show strong multidecadal variations which are significantly positively correlated with the Atlantic Multidecadal Oscillation (AMO) index. Analysis of long-term extreme warm temperature indices over Romania in combination with two-dimensional blocking indicators calculated from the 20th Century Reanalysis Project (http://www.esrl.noaa.gov/psd/data/gridded/data.20thC_ReanV2.html) reveals a strong relationship between multidecadal variability of extreme high temperature events in Romania and AMO during the last century. We argue that both NAO and AMO influence the variability of extreme warm events over Romania through modulation of the frequency of atmospheric blocking in the Euro-Atlantic region.