



Observed changes in seasonal heat waves and warm temperature extremes in the Romanian Carpathians

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Extreme high temperature have a large impact on environment and human activities, especially in high elevation areas particularly sensitive to the recent climate warming. The climate of the Romanian Carpathians became warmer particularly in winter, spring and summer, exhibiting a significant increasing frequency of warm extremes. The paper investigates the seasonal changes in the frequency, duration and intensity of heat waves in relation to the shifts in the daily distribution of maximum temperatures over a 50-year period of meteorological observations (1961-2010). The paper uses the heat wave definition recommended by the Expert Team on Climate Change Detection and Indices (ETCCDI) and exploits the gridded daily dataset of maximum temperature at 0.1° resolution (~ 10 km) developed in the framework of the CarpatClim project (www.carpatclim.eu). The seasonal changes in heat waves behavior were identified using the Mann-Kendall non-parametric trend test. The results suggest an increase in heat wave frequency and a lengthening of intervals affected by warm temperature extremes all over the study region, which are explained by the shifts in the upper (extreme) tail of the daily maximum temperature distribution in most seasons. The trends are consistent across the region and are well correlated to the positive phases of the East Atlantic Oscillation. Our results are in good agreement with the previous temperature-related studies concerning the Carpathian region. This study was realized within the framework of the project GENCLIM, financed by UEFISCDI, code PN-II 151/2014.