



Changes of the synoptic conditions of Urban Heat Island Development in the region of Debrecen, Hungary between 1961 and 2010

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Synoptic conditions have a remarkable impact on urban climate like other local- and micro climates. Synoptic conditions with clear skies and calm weather are advantageous for the development of the thermal excess in the settlements compared their environment called Urban Heat Island (UHI). There are numerous studies on the spatial and temporal features of the phenomenon. Much less attention has been paid to the synoptic conditions of UHI development. The aim of the present paper is to reveal the characteristics of the changes in the frequencies of synoptic conditions advantageous and disadvantageous for development of UHI on the base of a 50 years long time series.

Synoptic condition categories of UHI development have been established on the base of values of wind speed, cloudiness and precipitation ranging from advantageous to disadvantageous conditions. Frequencies of occurrence of condition categories of UHI development have been determined. Advantageous and moderately advantageous conditions have been found to be dominant in the time series. Linear trend analysis has revealed a significant increasing trend in the time series of advantageous conditions. Increase of the frequencies of advantageous conditions has been analyzed for the seasons and months of the studied period as well. Spring and summer (April and June) have produced significant increasing trends of frequencies of advantageous conditions, while winter and autumn have not shown significant increase of those frequencies.

Detected tendencies have negative effects on urban energy consumption: they contribute to the increase of air conditioning energy demand in the summer and do not decrease the energy demand of heating in the winter significantly.