



## **Circulation conditions of strong heat island in Budapest, with applications in weather forecasting and climate impact studies**

Janos Mika (1,2), Ildiko Dobi (2), and Anett Ivady (3)

(1) Eszterházy College, Eger, Hungary, (2) Hungarian Meteorological Service, Budapest, Hungary (mika.j@met.hu, +36-1 346-4710), (3) Netkozpont Ltd., Budapest, Hungary

Heat island indices based on four surface-based air temperature data are derived and compared with large-scale circulation patterns and with local objective weather types in Budapest, Hungary. One of the four stations has strictly urban neighbourhood at the roof level. Another one, used as background rural station, is at the east-west edge of the town with gardened environment. Two other stations are positioned near the river Danube at the northern and southern edges of Budapest, but still under mesoscale effect of the city. Several indices combining day and night temperatures at the four stations are investigated. If we could establish effective relationships with the synoptic situations and/or weather types, we could use them in two further applications. The first one is the everyday forecasting of dangerous situations within the city on the days when the rural weather forecast claims about extreme temperature even at the rural sites. On summer hot days the weather-dependent UHI increases but on cold winter days decreases the risks on human health and technical equipments. The other scientific problem is whether the long-term season-dependent changes of the atmospheric circulation can modify the behaviour of the UHI even without further changes in the building in of the city. To answer this question the established relationships are combined with regional climate change projections of the circulation conditions.