Geophysical Research Abstracts
Vol. 14, EGU2012-14143, 2012
EGU General Assembly 2012

Urban heat island in Krakow, Poland: Land use versus land form interaction

A. Bokwa

Jagiellonian University, Institute of Geography and Spatial Management, 7 Gronostajowa St., 30-387 Kraków, Poland

Urban heat island is a well known feature of urban climate, related mainly to the changes in land use in urban areas and anthropogenic heat emission. However, the interaction between the land use and land form in urban areas and its impact on air temperature spatial patterns is much less known. Krakow is a medium size city located in southern Poland, in the valley of the Vistula River. The city is surrounded with convex land forms from three sides, with height differences up to 100 m. Built-up areas of the city can be found in both the valley bottom and on nearby slopes. Numerous studies completed after the Second World War (e.g. Hess 1974, Lewinska et al. 1982, Morawska-Horawska, Cebulak 1981) showed that the characteristic features of the climate of Krakow are e.g. frequent air temperature inversions, poor natural ventilation, large precipitation horizontal gradients. More recent research (e.g. Bokwa 2010) revealed e.g. a thermal asymmetry of the area. On the basis of 3-year (2009-2011) air temperature measurements in 21 points, completed with mobile measurements and analysis of available long-term series, it was proposed to define urban heat island separately in particular vertical zones of the city.

Bokwa, A., 2010, Wieloletnie zmiany struktury mezoklimatu miasta na przykladzie Krakowa [Multi-annual changes of the urban mesoclimate structure (using an example of Kraków)], Institute of Geography and Spatial Management, Jagiellonian University, Kraków, 258 pp.; available on-line: http://www.geo.uj.edu.pl/publikacje.php?&lang=1&page=monografie&menu=3&id=000155
Hess M., 1974, Klimat Krakowa {Climate of Krakow], Folia Geogr., ser. Geogr.-Phys., 8, 45-102.
Lewińska J., Bartosik J., Baścik J., Czerwieniec M., Zgud K., 1982, Wpływ miasta na klimat lokalny (na przykładzie aglomeracji krakowskiej) [Impact of a city on the local climate using an example of Krakow], Inst. Kształt. Środ., Warszawa.
Morawska-Horawska M., Cebulak E., 1981, Badania pionowego zasięgu miejskiej wyspy ciepła nad Krakowem [Studies on vertical extent of urban heat island over Krakow], Folia Geogr., ser. Geogr.-Phys., 14, 43-50.