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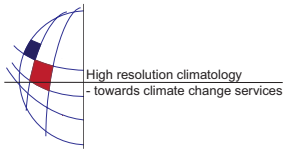

Multilevel analysis of spatial temperature variability in Brno region

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Urban climate is typical with changes in temperature regime compared to rural landscape. This is related to e.g. prevalence of artificial surfaces or production of anthropogenic heat. An Urban Heat Island can be a typical demonstration of urban climate. Temperature variability in urban environment can be studied on different levels using different data sources such as standard meteorological measurements, special-purpose measurements or e.g. thermal satellite imagery. Spatial distribution of land surface temperatures (LST) in Brno and surroundings was modeled using available satellite imagery from Terra ASTER and Landsat 7 ETM+. We present two different methodological approaches that can be used for construction of LST fields. Since Landsat 7 ETM+ offers a single thermal imagery, the first approach uses emissivity maps that must be constructed from land-use categories in advance. Terra ASTER provides five thermal images and both emissivity and LST can be computed directly from them. We compare both methods and provide LST maps for Brno region. These maps are used to describe spatial distribution of LST and to detect areas that are typical with higher LST values. Whereas thermal imagery provide spatially consistent information on surface temperatures, effects of urban environment on air temperatures can be studied with the help of network of special-purpose meteorological stations. Such network has been established in Brno region during 2009. Spatiotemporal changes in air temperatures are described for a set of days with a radiation type of weather. Spatial interpolation methods of air temperatures within urban environment are discussed and compared with results of LST mapping.