



Spatial variability of land surface temperatures and air temperature measurements in Brno area (Czech Republic)

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Temperature variability within an urban environment can be studied on different levels using different data sources such as standard meteorological measurements, special-purpose measurements, mobile measurements or e.g. thermal satellite imagery. Spatial distribution of Land Surface Temperatures (LST) in Brno (Czech Republic) has been modeled using available imagery from Terra ASTER and Landsat 7 ETM+ satellites. 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 fields of the study area. These fields are used to describe spatial distribution of LST and to detect areas that are typical with higher LST values. Analysis of single-channel Landsat data indicates a clearly higher LST values for build-up areas compared to agricultural and forest areas in neighborhoods. However, found differences in LST between urban and non-urban areas are not so evident. Possible reasons are discussed and several geographical factors are used for explanation. Spatial variability of LST fields within the study area is compared with air temperature measurements made in a special purpose network of stations in Brno area. Spatiotemporal changes in air temperatures are described for a set of days with a radiation type of weather. Differences in mean daily air temperature variability at urban and rural stations are presented. Satellite measurements of LST and air temperature measurements are compared with respect to possible urban heat island formation in the Brno area.