

Publication

Attribution of local climate zones using a multitemporal land use/land cover classification scheme

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Author(s) Wicki, Andreas; Parlow, Eberhard

Author(s) at UniBasel [Wicki, Andreas](#) ;

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Worldwide, the number of people living in an urban environment exceeds the rural population with increasing tendency. Especially in relation to global climate change, cities play a major role considering the impacts of extreme heat waves on the population. For urban planners, it is important to know which types of urban structures are beneficial for a comfortable urban climate and which actions can be taken to improve urban climate conditions. Therefore, it is essential to differ between not only urban and rural environments, but also between different levels of urban densification. To compare these built-up types within different cities worldwide, Stewart and Oke developed the concept of local climate zones (LCZ) defined by morphological characteristics. The original LCZ scheme often has considerable problems when adapted to European cities with historical city centers, including narrow streets and irregular patterns. In this study, a method to bridge the gap between a classical land use/land cover (LULC) classification and the LCZ scheme is presented. Multitemporal Landsat 8 data are used to create a high accuracy LULC map, which is linked to the LCZ by morphological parameters derived from a high-resolution digital surface model and cadastral data. A bijective combination of the different classification schemes could not be achieved completely due to overlapping threshold values and the spatially homogeneous distribution of morphological parameters, but the attribution of LCZ to the LULC classification was successful. (C)

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