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A changing city in a changing climate - mapping local climate zones in Tirana in 2007 and 2018

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Abstract:

In recent years, urbanization in the Kombinat district of the municipality of Tirana, the capital city of Albania, has changed the character of the area. Until a few decades ago it was a semi-industrial outer district of SW Tirana, with mainly low-rise buildings or medium-rise buildings, but gradually it became a sub centre of the city and lost its industrial character. Nowadays, the demographic movement towards urban areas is increasing, especially in the municipality of Tirana, and the Kombinat district is one of the destinations for immigrants. All these changes have a huge impact on the urban environment and landscape. The environmental status in urban areas is dependent of the physical characteristics of the buildings, streets and parks, and based on these features the areas can be sorted into Local Climate Zones. Although the modernization and the urban development is mostly welcomed in the Kombinat district, the urban planning must pay attention to the processes that can negatively affect the urban environment and thus, the quality of life of the inhabitants. This paper aims to present the elaboration of the data and the generation of Local Climate Zoning (LCZ) of Kombinat quarter for the years 2007 and 2018.

The generated maps (figure 1) were compiled as a result of a meticulous work. The collected data, such as height of the buildings, road network, DTM, trees, paved and unpaved area was partial or missing. These data were derived and obtained from the DSM, an available data with 1 meter spatial resolution.

The results have shown that the Kombinat quarter Local Climate Zones have been transformed negatively from year 2007 to year 2018 (figure 1). The main impact is the construction activity. In compact midrise zone (LCZ 2) and compact low rise zone (LCZ 3), the difference is positive, which means that these LCZs increased, respectively 1.82% and 6.55% during 11 years. The impact of the increasing compact-type zones is noted in the shrink of the other LCZs, especially for the sparse arrangement of small or medium-sized buildings in a natural setting (LCZ 9), the open medium zone (LCZ 5) and the open arrangement of low-rise buildings (LCZ 6), respectively 4.66%, 1.54% and 1.13%. The high-rise build type area, such as compact high-rise build type can create more heat island effect in the urban area, so this is a build type which should be avoided when urban plans are applied.

This study provides information on how the quality of the environment and the life of the population living in Kombinat quarter has changed during the eleven-year period from 2007 until 2018. It was noticed that the population growth and the constructions of new buildings or residences have already had a negative impact on the local climate zones of the Kombinat quarter. We conclude that the continuing increase of compact-type built-in areas should be avoided in order to maintain the sustainability of urban development.

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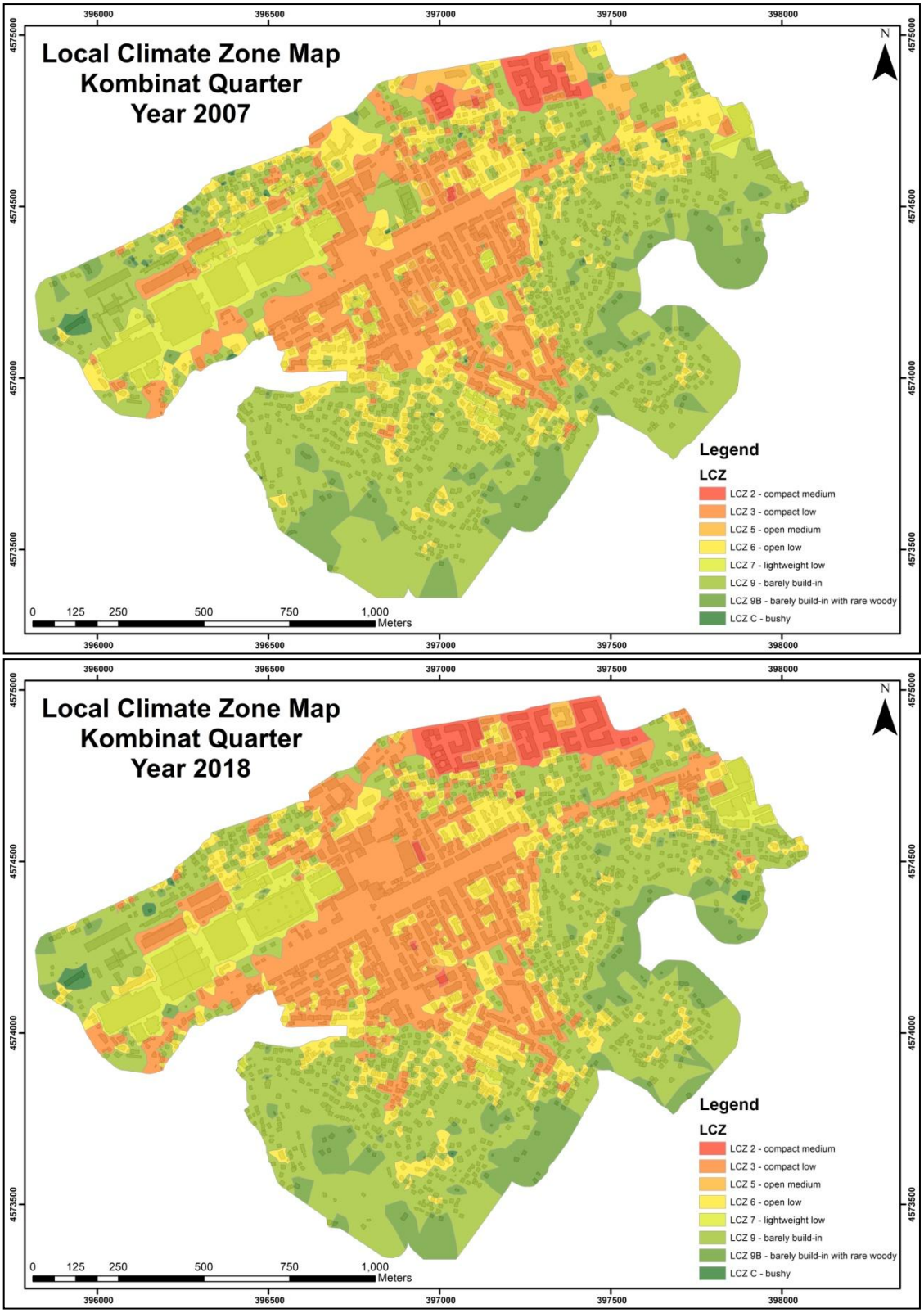

Figure 1. The maps of the final results of the Local Climate Zone, Kombinat quarter, year 2007 (top) and year 2018 (bottom). The coordinates and the map projections are in UTM34N system.

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