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The Role of Urban Green Spaces in the Urban Climate – The Case Study of the City of Bragança (Portugal)

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Urban Green Spaces (UGS) are known to change microclimate conditions, improving thermal comfort and reducing urban heat island effect (UHI). The research of the city-climate interactions can be an important contribution for urban planning, providing inputs for the definition of a climate relevant green infrastructure. Starting in 2011, a study is being carried out aiming at the analysis of the urban climate of Bragança (Portugal), a city located in a mountain area with a complex terrain. This presentation focuses on presenting local evidences of the UGS influence on urban climate and the potential role of the local green infrastructure in urban climate improvement. The research consists on a cross-evaluation between meteorological data, gathered from a network of sensors (23 temperature and RH sensors, three wind speed and direction sensors and one automatic weather station) and a GIS analysis of urban and topographical elements. This network covers seven local climate zones, including UGS (4 sensors). Results show that despite the small size of this city (aprox. 30.000 hab) there is an UHI that can be close to 3 ° C in summer with extremes of up to 6° C. Such results are related with the characteristics of the monitored sites showing that UHI is more intense in densely urbanized areas. Other local effects include: an early morning urban cold island effect, the presence of an altitude gradient and of dynamic processes, such as the nocturnal drainage of cold air. Regarding the different UGS in the network, their effects are variable, as reduced UHI intensity is more effective during the summer, mostly motivated by the presence of deciduous trees. UGS are still under the influence of the UHI gradient, thus being mostly warmer than peri-urban locations.

Finally, the role of the local urban green infrastructure in Urban Climate Planning is discussed.

Keywords: Green Spaces, Urban Climate, Urban Heat Island, Monitoring

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