TOWARDS CLIMATE CONSCIOUS URBAN DESIGN – DEVELOPING A SYSTEM OF PLANNING CRITERIA IN HUNGARY

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Keywords: climate conscious urban design, envi-met, planning criteria, public space development

Abstract: Urban microclimate has been afashionable topic in the last decade to involve quite a few researchers. Many have come to the conclusion that green surfaces are essential in achieving a climate-conscious urban environment. Apart from greenery there are also quite a few good and usable tools in order to improve urban microclimate such as solar sails, water surfaces, permeable paving, etc. It has come so far to facing also the question how urban planners can be helped by researchers to use in everyday planning routine the results of theoretical researches. In the new programming period of the European Union (2014-2020), the novel system of planning and funding gives the opportunity to implement the interests of climate conscious urban design. One of the main challenges urban planners and architects will have to face is to trigger a way of planning methodology in order to create an urban environment which can handle current climatic problems.

In our work we present the first version of a targeted indicator system, which can be used as planning criteria in the EU-funded urban public space development processes.

The main tool of our research was the ENVI-met model, which enables the quantitative comparison of the microclimatological effects of the usable interventions and their indicators. The results highlight the outstanding importance of trees among the possible solutions, and the need for integrated solutions with regard on every aspect of climate sensitive design.

INTRA-URBAN CLIMATE OBSERVATIONS IN TWO CENTRAL EUROPEAN CITIES BASED ON ONE YEAR NETWORK DATASETS

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This study introduces urban climate monitoring systems implemented in Szeged, Hungary and Novi Sad, Serbia in 2014 and analyzes the first datasets of 2014-2015. In order to ensure a representative number and placement of stations, the selection of measurement sites was based on Local Climate Zone (LCZ) maps developed for both cities. During the processing of the incoming data (air temperature and relative humidity, as well as global radiation and wind speed) a human comfort index (Psychologically Equivalent Temperature) is calculated from these parameters with a neural network method, and the measured and calculated parameters are interpolated linearly into a regular grid with 500 m resolution. As the results show the largest intra-urban thermal differences between the LCZ areas occur in the nocturnal hours reaching even 5°C. In the spatial distribution of human comfort conditions there are distinct differences in the strength of the loading between the neighbourhoods during the daytime. Overall, it can be stated that the monitoring networks are able to provide beneficial information for urban climate research and for the wider audience, too. They record data with proper spatial and temporal resolution and the accuracy of the sensors is satisfactory. Based on our evaluation the site selection was successful, as the temperature has different characteristics at sites with differently classified environment. The planned operation time of networks is minimum five years so the available long data series will provide an opportunity to perform spatially and temporally very detailed climatological investigations in relation to urban environment.

EVALUATION OF OUTDOOR THERMAL COMFORT IN URBAN TRANSFORMATIONS OF NOVI SAD (SERBIA)

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Keywords: algorithm, grasshoppers program, Novi Sad, Serbia, thermal comfort

Abstract: The automated calculation method for the outdoor thermal comfort calculation at different locations at street level is presented in Novi Sad (Serbia), as an example. With this automated calculation procedure - past, present and future state of the thermal environment in the urban transformations was calculated and compared. Our calculations are based on the usage of Grasshoppers program in which the algorithm was created and Universal Thermal Climate Index (UTCI) was calculated. This new approach provides faster acquisition of the results, detailed options for parameters input and numerous options for the graphical representation of the results. Application of this procedure can provide significant insight into the changes of the thermal environment as a consequence of urbanization that have to be taken into account in order to provide a lively urban environment for its residents.