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Examination of the simulated thermal conditions in a popular playground related to the human reactions and the judgment of the area design

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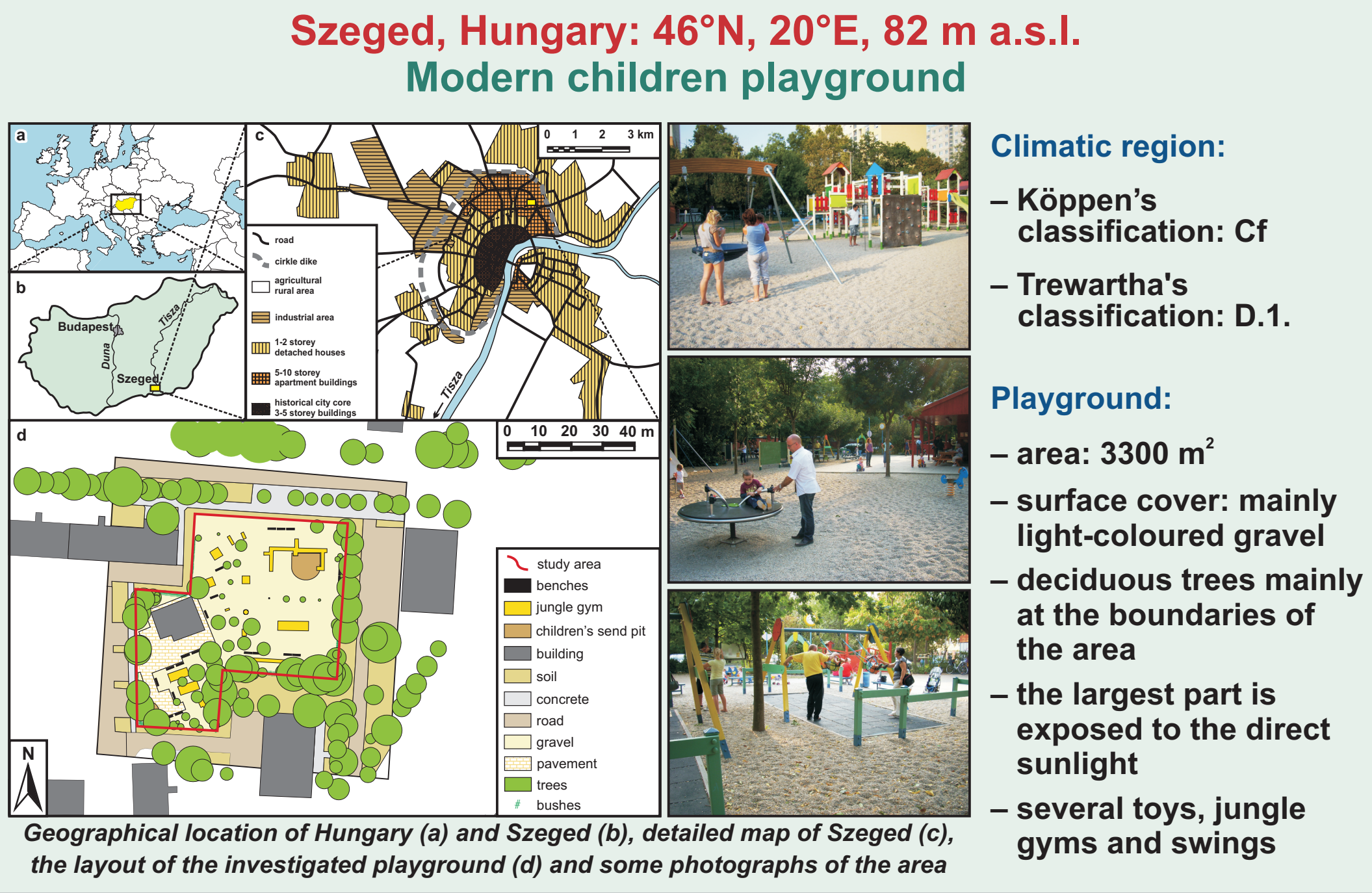
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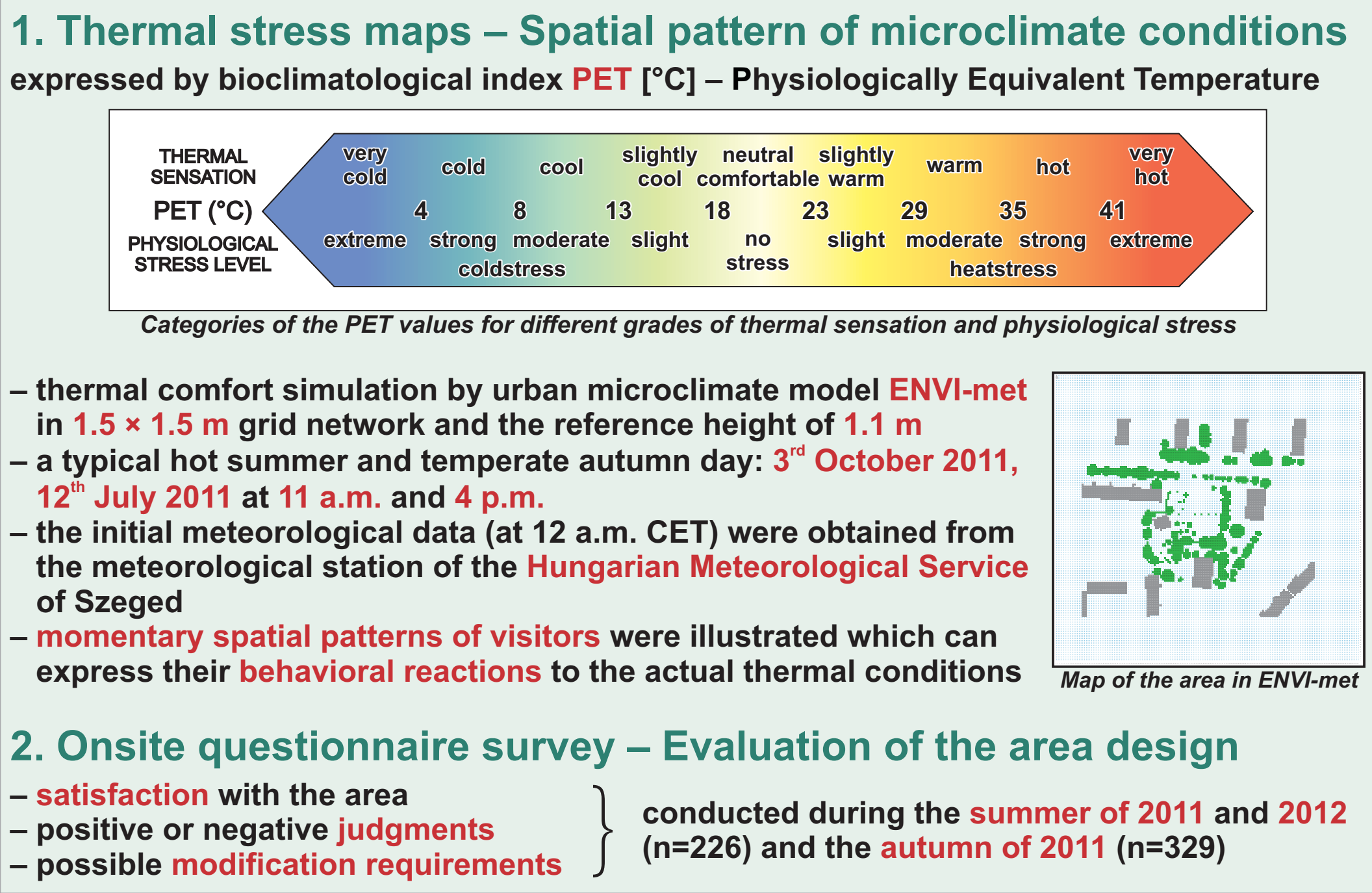
Introduction

In urban environment climate parameters are modified compared to the natural areas and they have various effects on human organism. Urban bioclimatology examines the physiological impacts of these parameters on the human health and the thermal comfort requirements. In the last years there were several urban bioclimate research projects to evaluate the thermal comfort conditions of different design public areas, e.g. streets, squares and parks. It is not sufficient to create spaces only according to architecture facets. Urban planners and architects need to design also comfortable and enjoyable micro-scale climate conditions in the urban environment taking into account the health and well-being of the citizens. Microclimate aspects substantially determine also the subjective thermal reactions and the judgments of visitors. However, human comfort aspects usually are not considered in the urban planning processes in several countries (e.g. in Hungary). This gap can be filled by means of micro-scale numerical models in the planning phases or before the construction starts by providing an opportunity to reveal the different thermal conditions within the public areas. This poster analyzes the changes of the simulated microclimate conditions between two seasons and times with aid of an urban micro-scale model ENVI-met in a popular and well-attended playground of Szeged, Hungary. The resulting human reactions of the visitors according to their momentary spatial patterns and their subjective evaluation of the area design were also revealed.

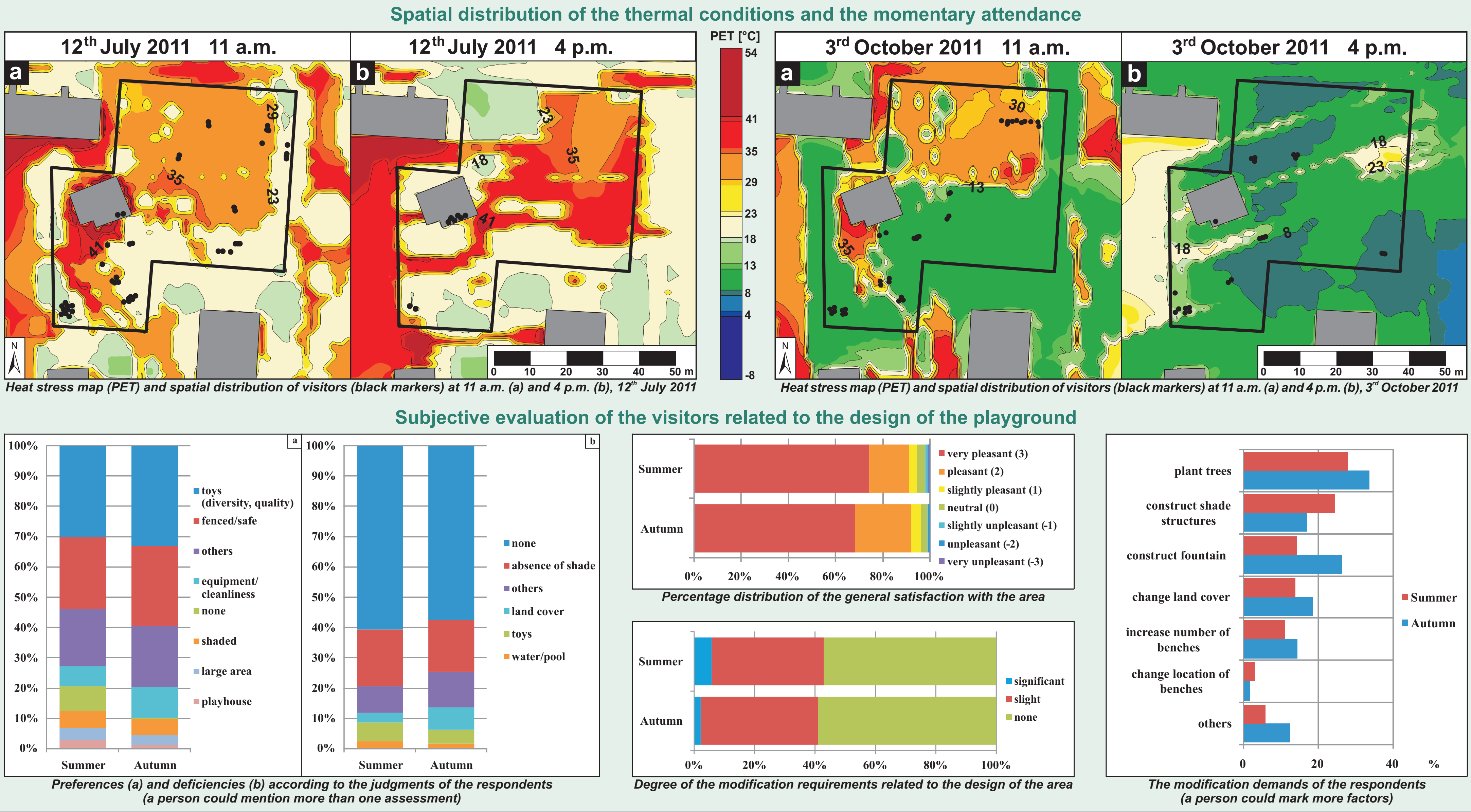
Study area



Methods



Results



Conclusion

According to the simulated thermal conditions, remarkable differences were found between the seasons and times depending on the position of the sun and the resulting shady conditions of the vegetation and buildings. Besides the direct sunlight, the radiation of the heated surfaces could greatly contribute to the development of the thermal stress conditions especially in the afternoon. As regards the spatial distribution of the visitors, it seems to be highly influenced by the patterns of the thermal conditions. Most people preferred the comfortable spaces protecting themselves from the direct solar radiation. However, the location and the preference of the playground toys also have significant impact on the spatial pattern in both seasons which increases the probability of exposure to thermal stress conditions. In order to decrease the unpleasant effects of heat load artificial and temporary shade structures and vegetation should be placed especially in the middle of the playground which is often exposed to the direct sunlight. These necessary modifications are clearly reflected in the demands of the visitors according to the onsite questionnaire survey. Vast majority of the respondents was satisfied with the design and would not change anything in the area. As a negative factor, however, small amount of shade was stressed out by several people and the most frequently marked modification demands reflect that people would prefer shady conditions, i.e. plant trees and construct shade structures.