

Urban morphology and microclimate response – Overview and case study

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ABSTRACT

The aim of this study is to investigate the urban morphological factors that influence urban microclimate and outdoor thermal comfort in hot semi-arid climate. It explores the main features that influence the urban climate on microclimate scale, in addition to the environmental parameters that affect the thermal comfort and its relevant indices (PMV, PPD, PET). The study presents the assessment of outdoor thermal comfort of urban street canyons for selected locations in traditional and modern neighborhoods representing old and new fabrics of the city of Aleppo (Syria). The assessment of outdoor thermal comfort considered field measurements for selected days in the summer period, along with data derived from microclimate simulations for the same locations using ENVI-met numerical models. The outcome of the study shows that different types of urban morphology have different effects on their thermal conditions as the geometry of the canyons investigated has a strong impact on their thermal behavior, and a significant correlation was observed between the aspect ratio and the sky view factor, on the one hand, and outdoor thermal values, on the other.

Keywords: Urban morphology, thermal comfort, microclimate, urban simulation, ENVI-met, Aleppo city

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