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URBAN HEAT ISLAND MICRO-MAPPING VIA 3D CITY MODEL

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Keywords: Urban Heat Island, 3D City Models, 3D Solar Analysis

Abstract. Urban Heat Island (UHI) phenomenon has been a topic of intense study over the past several years. However, to visualise UHI model is still an issue. Common visualisation of UHI by using digital thematic maps shows that it is hard to perceive its impacts especially in a sophisticated micro-area such as in urbanized cities. Moreover, different building façade's material gives different UHI value. Therefore, there is a need in computing and visualising this phenomenon in three-dimensional (3D) perspectives. Recently, the development of 3D city modelling shows the potential of solving these gaps. This can be seen from the characteristics of 3D city models that are suitable in representing micro-areas (complex cities) for UHI studies. Based on this issue, this research aims to produce a 3D UHI model by using 3D city models as a tool for efficient and sustainable building design. The main objective is to produce a new approach in visualising UHI in 3D perspectives by instigating 3D city models. Thus, the UHI effect could be predicted precisely by calculating the building façades value. This research explores the 3D shadow analysis, 3D solar radiation and 3D orientation analysis in UHI modelling via 3D city models. From the analyses, the results show that the 3D city models are capable in presenting the solar radiation value for each building façade. Furthermore, this approach can be used to simulate future UHI analysis-prediction and advantageous for pre-development planning.

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