

Evaluation on the outdoor thermal climate using an integrated urban canopy model and geographic information: a case study in Shenzhen

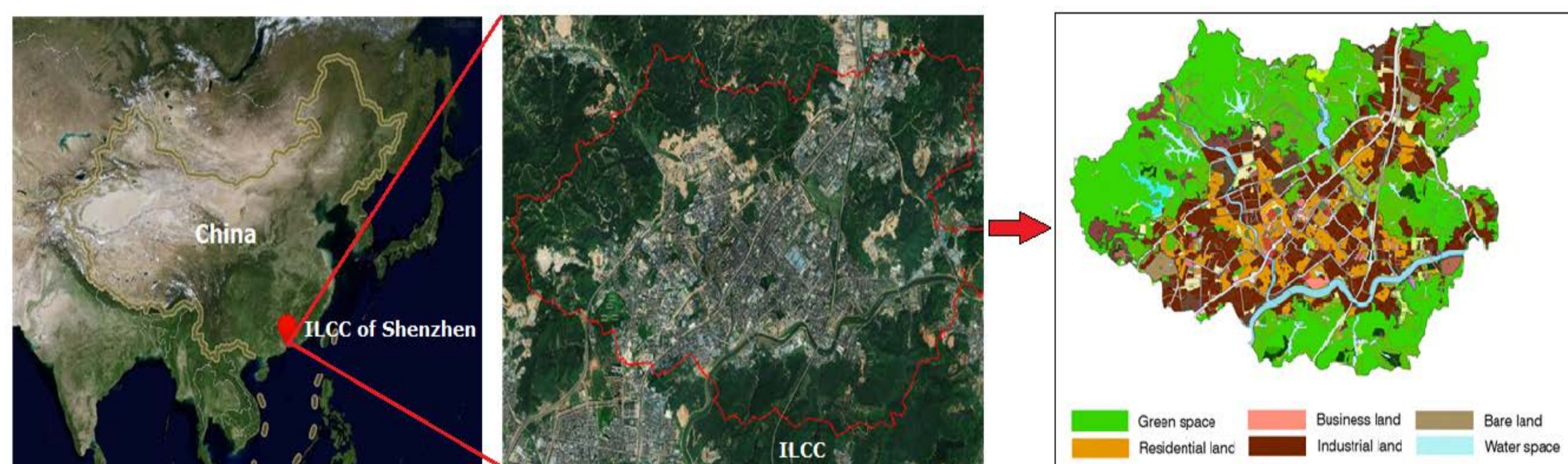
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Effective evaluation on urban microclimate is an urgent issue. This paper adopted an improved urban canopy model UDC to conduct long-term dynamic simulations of the outdoor climate in a case region in Shenzhen. Then with the Geographic Information System (GIS), the distributions of each meteorological parameter in different local urban areas could be expressed, which would provide the intuitive visualization for local urban climate.

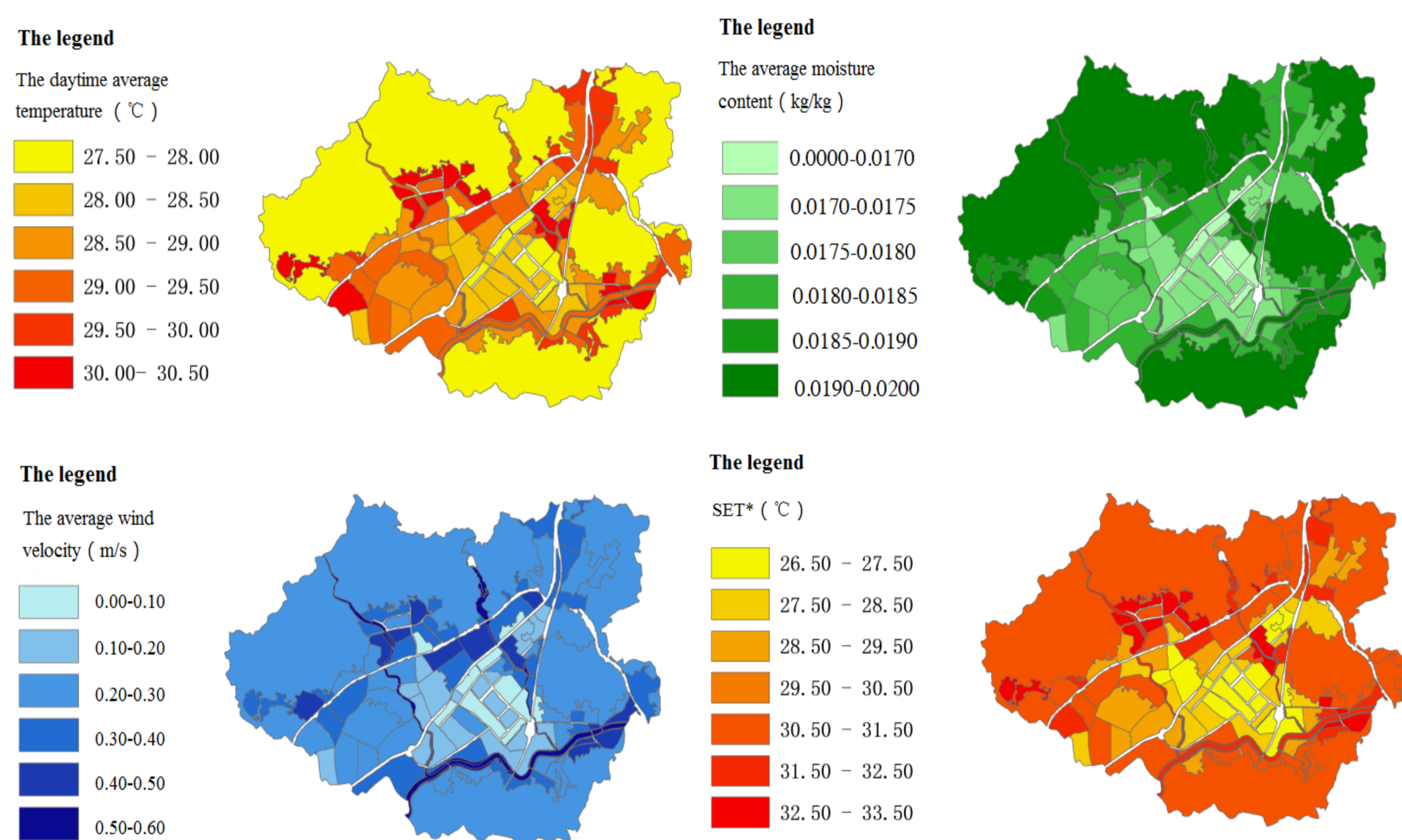
Study area

The International Low Carbon City of Shenzhen in South China with 53.42 km² was adopted as the study area due to its various underlying surface types and building types. The whole area has been divided into multiple blocks for detailed urban planning.



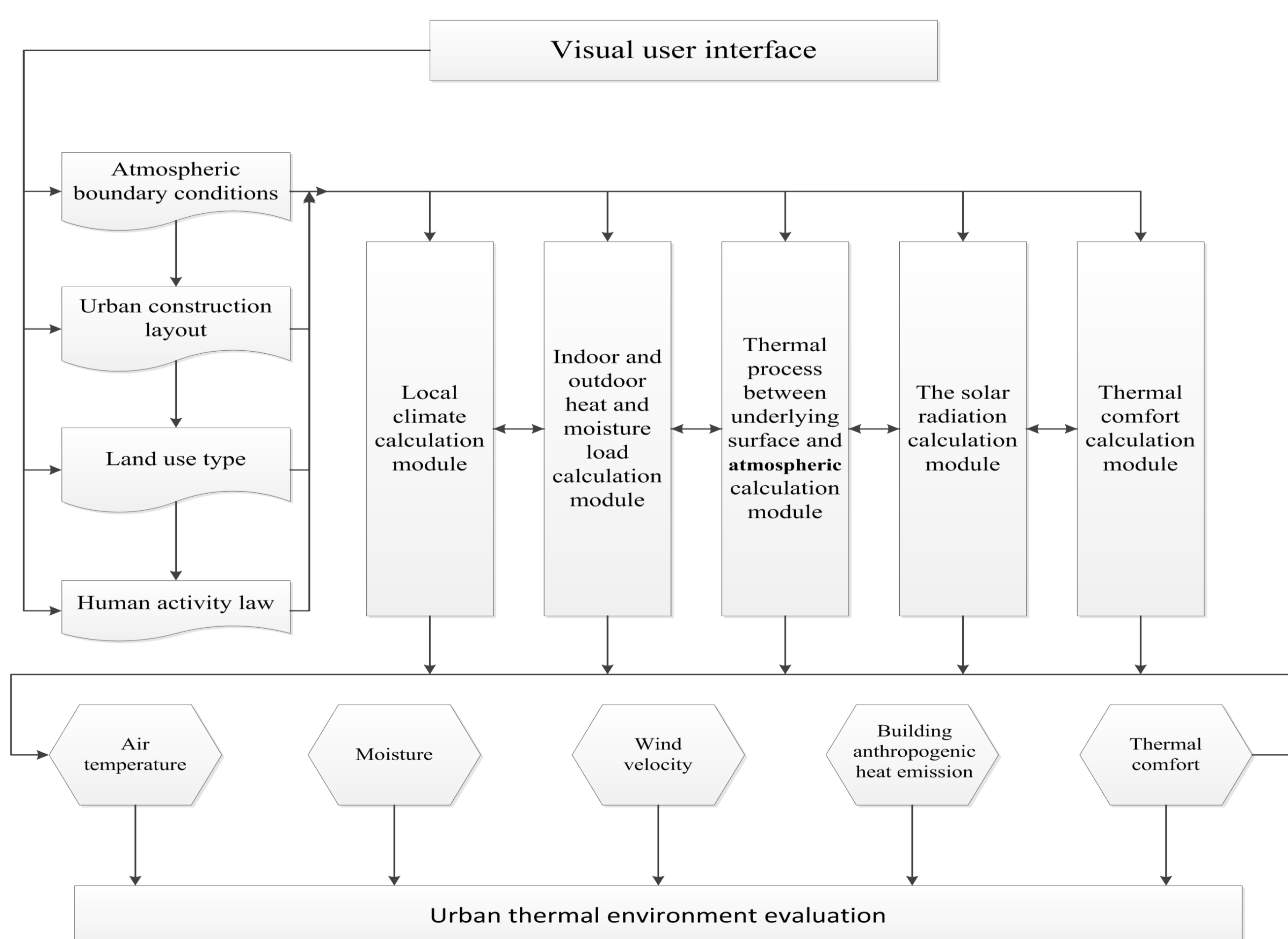
Simulation results of the thermal climate of the whole study area

The average values of the air temperature (T_a), relative humidity (RH), wind velocity (V), standard effective temperature (SET^*) during the simulating interval were considered. The spatial distribution maps of them within different blocks were expressed.



Calculation Model

An improved multipurpose regional thermal climate prediction model (UDC) was adopted as the calculation model to conduct dynamic simulations for each block of ILCC. With digital information of underlying surface and basic meteorological data, the model could obtain the hourly meteorological data of the study area with five calculation modules.



Conclusions

Long-term dynamic simulation of the summertime thermal environment in a region of Shenzhen was conducted by a UDC model. The spatial distribution maps of different meteorological parameters were obtained by combining GIS. Results show that the parameters in different urban blocks varied a lot due to their different underlying surface compositions. The distributions of comprehensive thermal comfort index SET^* emphasized that a climatic conscious urban design is necessary.

Aknowledgements

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