

## An Investigation of the Quantitative Correlation between Urban Spatial Morphology Indicators and Block Wind Environment

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**Abstract :** To achieve the research purpose of guiding the spatial morphology design of blocks through the indicators to obtain a good wind environment, it is necessary to find the most suitable type and value range of each urban spatial morphology indicator. At present, most of the relevant researches is based on the numerical simulation of the ideal block shape and rarely proposes the results based on the complex actual block types. Therefore, this paper firstly attempted to make theoretical speculation on the main factors influencing indicators' effectiveness by analyzing the physical significance and formulating the principle of each indicator. Then it was verified by the field wind environment measurement and statistical analysis, indicating that Porosity( $P_o$ ) can be used as an important indicator to guide the design of block wind environment in the case of deep street canyons, while Frontal Area Density ( $\lambda F$ ) can be used as a supplement in the case of shallow street canyons with no height difference. Finally, computational fluid dynamics (CFD) was used to quantify the impact of block height difference and street canyons depth on  $\lambda F$  and  $P_o$ , finding the suitable type and value range of  $\lambda F$  and  $P_o$ . This paper would provide a feasible wind environment index system for urban designers.

**Keywords :** urban spatial morphology indicator, urban microclimate, computational fluid dynamics, block ventilation, correlation analysis

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