

Research on Microclimate Impact of Green Buildings Group in Beijing Based on MRSD

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Abstract: As urbanization enters a new era, the green buildings group enters a stage of high-quality development. It is necessary to put forward green development propositions that better meet the people's needs for a better life, focusing on people-centered development. Based on the dynamic evolution of the development of (multi-source remote sensing data) MRSD, a theoretical framework for analyzing the microclimate impact of green buildings group is constructed according to the inherent logic of green buildings group and microclimate. Two influencing mechanisms can be explained: (1) The influencing mechanism involves the structure, function and environmental characteristics of the green buildings group and the microclimate's temperature, humidity and wind speed. (2) Analyze the influencing mechanism of developing microclimate of green buildings group jointly generated by regulating circulation mechanisms. In addition, from the perspective of spatial and temporal changes and practical interpretation of the microclimate impact analysis of the green buildings group, the possibility of moving towards the high-quality development goal of the green buildings group is further explored. The purpose of the microclimate impact analysis of the green buildings group is to provide people with an urban ecological environment that meets expected standards and is committed to continuously improving the quality of the urban ecological environment and enhancing people's life satisfaction. Therefore, it is necessary to strengthen urban heat island control based on urban surface energy balance, establish an interactive feedback mechanism between green buildings and people's microclimate perception, and develop evaluation systems such as urban wet islands and wind islands, thus realizing the high-quality development of green buildings, promoting urbanization, and genuinely satisfying the people.

1. Introduction

Green buildings group are one of the main responsibilities of urbanization and are also the collective name for urban buildings. It can be divided into basic and non-basic buildings, composed of residential, office, commercial, etc. and education, medical, cultural, etc., respectively. In order to improve the quality of the urban ecological environment, urban planning also entrusts green buildings group to adjust the urban microclimate. Since the 21st century, green buildings group have become the key to urbanization, and microclimate has become an indicator. Unlike traditional buildings, green buildings group is more energy-saving, environmentally friendly and humane. Therefore, the microclimate impact analysis of the green buildings group is raised, and MRSD provides new technical means for microclimate impact analysis of the green buildings group.

MRSD originates from space information technology with satellites as the core. Its technology contains big data, cloud computing and artificial intelligence, and is also a tool for urban planning. From the perspective of technical structure, MRSD pursues high accuracy, high resolution and high efficiency, which can modernize urban planning through satellite, drone and ground observation combined with data processing, fusion and analysis. However, this is only in theory. Today, China has practiced a unique people-centered path. The comprehensive advancement of socialism with Chinese characteristics not only revolutionizes Chinese history and embodies Chinese wisdom, but also revolutionizes the world structure and contributes to human civilization. Therefore, when discussing the microclimate impact analysis of the green buildings group in China, it is necessary to

have a vision and pattern with Chinese characteristics. As a result, the proposition of high-quality development is put forward in the new era.

In short, analysis of the microclimate impact of green buildings group based on MRSD is the technical condition and guarantee for achieving high-quality development. From the current development situation, China's analysis of the microclimate impacts of the green buildings group has made progress, but there are also shortcomings. China has not yet fully figured out the effective path for MRSD and is still working hard to make progress. Therefore, China's microclimate impact analysis of the green buildings group still needs innovative development, which requires technical support and theoretical guidance.

Based on the above background analysis, this paper proposes a microclimate impact analysis method for green buildings group based on MRSD, aiming to explore high-quality development paths. The urban surface energy balance theory and multi-modal fusion method are used to solve the problems of urban heat islands, wet islands and wind islands. The main contents are four aspects: spatiotemporal distribution characteristics, influencing factors and mechanisms, effect evaluation and optimization suggestions, which effectively deal with the problem. The issue of urban ecological environment risks has theoretical significance and practical value.

2. Analysis of the Microclimate Impact of Green Buildings Group in Beijing Based on MRSD

2.1 Background and Significance

2.1.1 Definition and Characteristics of Green Buildings Group

The green buildings group is a concept that has developed in parallel with urbanization. It is "soaked" in the concepts of energy conservation, environmental protection, and humanization, demonstrating the sustainable development orientation of urban planning and reflecting the green development strategy of socialism with Chinese characteristics in the new era. However, it is still difficult to be unified and accurate when constructing the definition and essence of the green buildings group with some technical or economic standards. Therefore, this paper adopts a broader and more flexible perspective and defines the green buildings group as urban buildings with certain structural, functional and environmental characteristics that can not only meet people's needs for life, work, and entertainment but also interact with the surrounding areas [1]. Coordinate the natural and social environments to achieve the balance and optimization of the urban ecosystem. The characteristics of green buildings group are mainly reflected in the following aspects:

(1) Energy saving: The green buildings group reduces the energy consumption and carbon emissions of the building by using efficient building materials, equipment and systems, as well as reasonable building layout and design, and improves the energy efficiency of the building and the proportion of renewable energy utilization.

(2) Environmental protection: Green buildings group improves the air quality, water quality, and acoustic environment quality inside and outside the building by increasing green coverage, water distribution and ventilation conditions, as well as reducing pollutant emissions and noise interference, thereby improving the environmental friendliness and ecological adaptability of the building.

(3) Humanization: By meeting people's diversified, personalized, and intelligent needs, as well as promoting people's health, safety and comfort, the green buildings group can improve the functionality, aesthetics and comfort of buildings and improve people's quality of life and happiness.

2.1.2 The Concept and Influencing Factors of Microclimate

Microclimate is an important standard for the urban ecological environment and a detailed expression of urban climate. Meteorology and geography discuss different definitions of microclimate from the perspectives of spatial and time scales [2]. Some scholars believe that microclimate is the climate of a certain local area in the atmosphere or the exchange process between the surface and the atmosphere. It is precisely because microclimate is more local, complex and dynamic to a certain extent that it belongs to applied science for human activities. The history of microclimate research can even be traced back to ancient Greece, and its main activities include

observing, recording and analyzing various meteorological elements. The concepts and methods of microclimate are closely related to the development process of urbanization. Urbanization becomes an important factor affecting microclimate by changing cities' form, structure, and function [3]. The main contribution of urban climate theory during the Industrial Revolution was the discovery of the urban heat island phenomenon. Therefore, the microclimate concept initially focused on measuring urban heat islands based on the temperature standard properties.

2.1.3 The Influence Mechanism and Effect of Green Buildings Group on Microclimate

Compared with the non-green buildings group, the green buildings group emphasizes the relationship between architecture and microclimate and has the characteristics of regulating urban climate. Although some scholars question that there may be no direct relationship between the green buildings group and microclimate, most scholars believe that the green buildings group can rationally evaluate microclimate. Oak, O'Neill, and others proposed a classic impact model of green buildings group containing four elements. Since then, this model has become a typical tool for microclimate impact analysis of green buildings group, thus developing the concept of urban surface energy balance. These scholars believe that green buildings group have regulatory properties and are "regulators of urban climate." Only when green buildings group' structure, function, and environmental characteristics are coordinated with the surrounding natural and social environment will green buildings impact the microclimate. Make a positive impact. Thus, the microclimate is the result of the green buildings group. Some scholars have summarized the impact of green buildings group on microclimate into dual models: the urban heat island impact model based on temperature and the urban wet island impact model based on humidity. The former focuses on reducing urban surface temperature, while the latter focuses on increasing urban surface humidity and improving urban water circulation. Although the impact of green buildings group on the microclimate has experienced some practical failures, from the perspective of high-quality development, it can improve the quality of the urban ecological environment and people's life satisfaction. Subsequently, sustainable development has gradually become a consensus in the research and practice of microclimate impact analysis of green buildings group.

2.2 Research Status and Issues

The concept of microclimate impact analysis of green buildings group focuses on urban ecological environment issues. The urban ecological environment is the application of urban planning thinking in urbanization. In order to overcome the shortcomings of traditional urban planning, a green urban planning framework enters the research field as a new alternative model. The basic idea of this framework is that green building groups should ensure the effective realization of urban microclimate, set professional standards for urban ecological environment output, "capture" urban surface energy balance through technologies such as MRSD, and use multi-modal fusion methods to measure Urban heat island, wet island and wind island, etc. The green city planning framework reconstructs urban planning, emphasizing the need to enhance the regulatory effect of the green buildings group on the microclimate and build the sustainability, adaptability, coordination, and optimization of the urban ecological environment.

3. Research Content and Methods

3.1 Research Areas and Objects

Beijing is the capital of China and the center of politics, culture, science and technology, and education. It embodies the rapid development of urbanization and directly reflects the quality of the urban ecological environment and people's quality of life through green buildings. Some components of the development of green buildings in Beijing are gradually taking shape, and green buildings and various evaluation systems are gradually receiving attention. However, from a microclimate perspective, some green buildings group' practice remains in the formalist stage and is still inconsistent with the logical framework and generation mechanism of green urban planning, leading

to problems such as urban heat islands, wet islands, and wind islands. Therefore, this paper chooses Beijing as the research area, aiming to explore high-quality development paths for analyzing the impact of green buildings on microclimate. This paper takes green building groups as the research object, based on documents such as the "Beijing Green Building Development Plan (2016-2020)" and "Beijing Green Building Evaluation Standards" issued by the Beijing Municipal Planning Bureau, as well as the "Beijing Green Building Evaluation Standards" issued by the China Academy of Building Sciences. Data such as the "China Green Building Label Certification Project Database" have determined the distribution and characteristics of Beijing's main green buildings group and classified and counted them.

3.2 Data Sources and Processing

From the data perspective, data sources and processing are the basic links in the microclimate impact analysis of the green buildings group and are also the core embodiment of MRSD. Therefore, this paper uses MRSD as the main generation logic. MRSD is the main information source of the urban ecological environment and the technical subject of microclimate impact analysis of green building groups. At this stage, this paper strengthens data processing control from data quality and fusion perspectives. There are three main forms: First, data preprocessing. MRSD can be formatted uniformly, error eliminated, and noise removed between acquisition, storage, and transmission. The second is data standardization. Achieve data credibility and comparability control by formulating data quality and fusion standards and disclosing data sources and processing methods to readers. The third is data internal process reengineering. Artificial intelligence, cloud computing, etc., have used innovative methods to improve data processing efficiency and analysis capabilities in recent years. However, compared with the international advanced level, the current utilization of China's MRSD needs to be further improved.

3.3 Analysis Models and Indicators

The analysis model and indicators are the core links of the micro-climate impact analysis of the green buildings group and the application of MRSD. The analysis model, indicator standards, and evaluation criteria in this paper are aimed at high-quality development, and the microclimate impact analysis of green buildings group mainly reflects sustainability and optimization. In the theoretical framework of green urban planning, accurate measurement, evaluation, regulation and optimization of urban microclimate are the core values and the highest criterion for analyzing the microclimate impact of green buildings group. The diversity of current MRSD types and the differences in the characteristics of green buildings group have led to the complexity and dynamics of urban microclimate. Although many scholars have proposed different analysis models and indicators, such as urban surface energy balance model, urban surface temperature model, urban surface humidity model, etc., as well as urban heat island intensity, urban wet island intensity, urban wind island intensity, etc., because data quality and data integration are still not perfect, the analysis models and indicators themselves lack a unified and standardized mechanism. Therefore, this creates a "short board" in the microclimate impact analysis of the green buildings group, which affects high-quality development.

4. Research Results and Discussion

4.1 The Spatial and Temporal Distribution Characteristics of the Influence of Green Buildings Group on Microclimate

From the perspective of time and space, the distribution characteristics of the impact of green buildings group on the microclimate cannot accurately provide the information needed by a single data source. In this paper, the green buildings group in Beijing are mainly in the form of seasonal, diurnal, and spatial distribution. However, due to the problem of data quality and data fusion, there is a lack of relevant information and evaluation mechanisms of microclimate [4]. The core of this problem may be the diversity and complexity of data. In MRSD , urban microclimate is usually

described as "urban surface energy balance ". Its influence on green buildings group directly reflects the advantages and disadvantages of an urban ecological environment. However, most MRSDs are about urban surface temperature, humidity, and wind speed, and the urban surface energy balance is relatively scarce. The urban surface energy balance is generally difficult to obtain or measure [5]. Data asymmetry and imperfect data fusion directly lead to obstacles in analyzing the impact of green buildings group on microclimate.

4.2 The Influencing Factors and Mechanism of Green Buildings Group on Microclimate

From the perspective of influencing factors and mechanisms, urbanization has long restricted the ability of green buildings group to regulate microclimate. Since the 21st century, green buildings group integrating energy conservation, environmental protection and humanization have reshaped the urban microclimate by changing the city's form, structure, and function [6]. However, the shortcomings of traditional urban planning still restrict high-quality development. Urban surface energy balance remains to be improved due to data quality, data fusion issues, and the impact of green buildings group structural, functional, and environmental characteristics. Based on MRSD, urban surface energy balance is regarded as a direct way that green buildings group affect microclimate. However, the actual effect of the temperature-based urban heat island impact model on urban wet and wind islands remains to be discussed. At the same time, due to difficulties in data processing and data fusion, there is a lack of unified and standardized mechanisms for urban surface temperature, humidity, and wind speed. Therefore, analysis of the impact of green buildings group on microclimate does not always seem to achieve the goal of sustainable development, which shows that the analysis of the impact of green buildings group on microclimate is not only a technical problem but also faces theoretical and practical problems. The results of the impact of green buildings group on microclimate are shown in Figure 1.

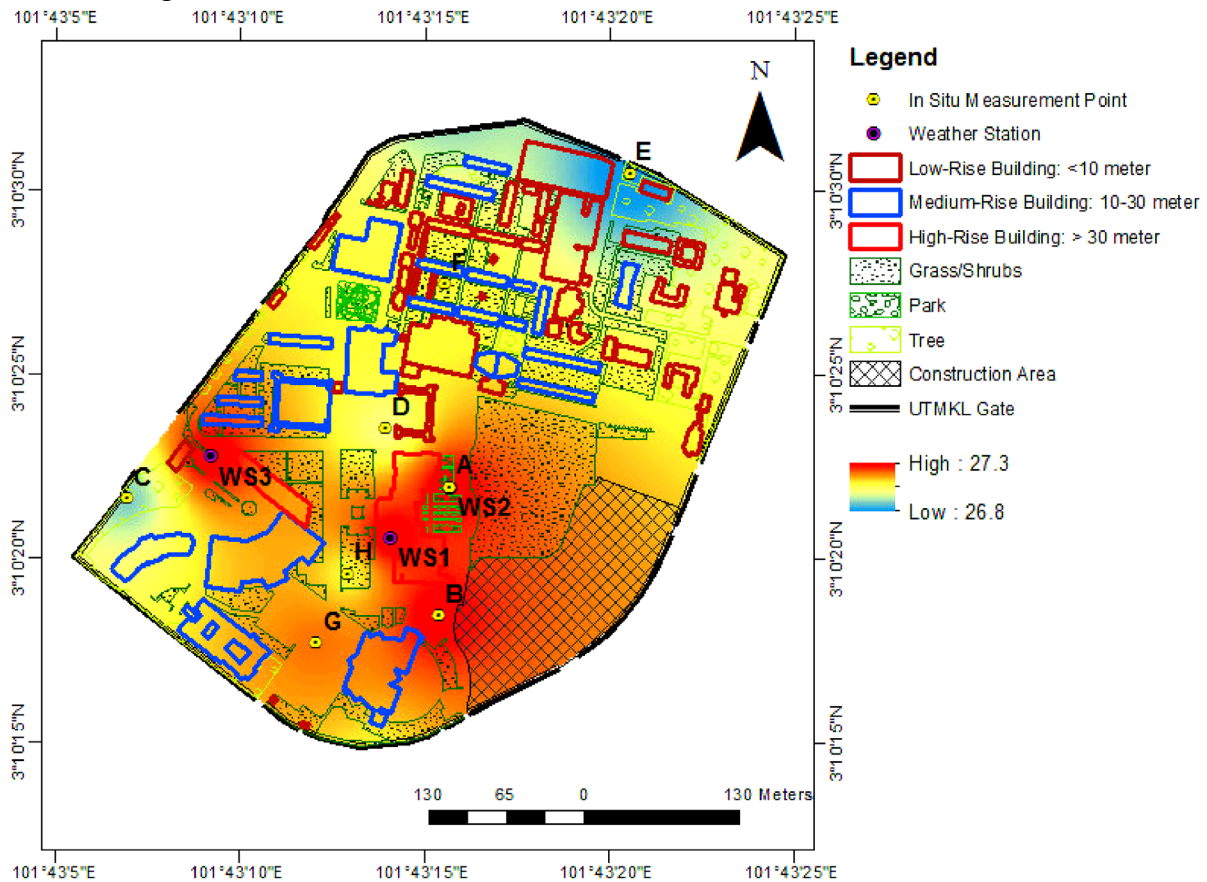


Figure 1 The influence result of the green buildings group on microclimate

4.3 Effect Evaluation and Optimization Suggestions of Green Buildings Group on Microclimate

Indeed, the analysis of the impact of green buildings group on microclimate cannot avoid the

"shortcomings" of applied science in both theory and practice. In the green city planning mechanism, MRSD is a standard and effective data acquisition tool that plays an essential role in data quality and fusion, which also makes MRSD not only a technical concept but also a theoretical and practical concept. Therefore, analysis models and indicators based on "urban surface energy balance" have become the evaluation mechanism for analyzing the impact of the green buildings group on microclimate. The practical interpretation of the analysis of the impact of green buildings group on microclimate is generally a sustainable development path gradually formed based on high-quality development, although this path includes attempts at exploration and experimentation. From urban heat islands to urban wet islands and wind islands, the analysis of the impact of green buildings group on microclimate is closely centered on optimizing the urban ecological environment. Although the analysis of the impact of green buildings group on microclimate should be committed to improving the unification and standardization of urban surface temperature, humidity, and wind speed to adapt to the requirements of MRSD, when the data diversity and complexity are amplified, it also brings about a dilemma, that is, the problem of data processing and data fusion. Overall, there is still room for improvement in the analysis of the impact of the green buildings group on microclimate in terms of data sources and processing, analysis models, and indicators. Its theoretical framework and method system also need further improvement, an important task for high-quality development.

5. Conclusion

Urbanization has entered a new era, which poses new challenges and requirements to the urban ecological environment. Green buildings group is not only a symbol of "high-quality development" of urbanization and an important means of urban planning, but also an urgent need to achieve sustainable development and safeguard people's interests. They essentially embody the inherent requirement of being people-centered. MRSD guides the microclimate impact analysis of the green buildings group to build a theoretical analysis framework and practical mechanism for green urban planning. In recent years, modern information technologies such as artificial intelligence and cloud computing have promoted the development of MRSD. Through data acquisition, data processing, and data fusion, it empowers the microclimate impact analysis of green buildings group and improves the accuracy and scientificity of urban surface energy balance. Its value aligns with the inherent logic of urban ecological environment optimization. Therefore, the microclimate impact analysis method of the green buildings group based on MRSD also provides a new path for high-quality development. In short, the sustainable improvement and development of microclimate impact analysis of green buildings group will help to regulate urban microclimate better and improve the quality of the urban ecological environment and people's life satisfaction.

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