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分形理论及其在土壤空间变异研究中的应用

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Fractal theory and its application in the analysis of soil spatial variability: A review.

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摘要

土壤具有不同程度的空间变异性，土壤空间变异研究对于土壤管理有重要意义.本文简要综述了分形理论及其在土壤空间变异研究中的应用，重点讨论了利用矩方法计算土壤属性分形维,多重分形分析土壤空间变异性及基于多重分形谱参数的土壤属性尺度转换.早期研究验证了分形理论在分析土壤空间变异中的有效性和应用潜力，国内外近期研究则报道了利用分形及多重分形理论分析土壤空间变异的最新进展.分形理论可以成为量化土壤属性空间变异性及尺度转换的重要工具.

关键词： 分形理论 土壤属性 空间变异 尺度转换

Abstract：

Soil has spatial variability in its attributes. The analysis of soil spatial variability is of significance for soil management. This paper summarized the fractal theory and its application in spatial analysis of soil variability, with the focus on the utilization of moment method in calculating the fractal dimension of soil attributes, the multi-fractal analysis of soil spatial variability, and the scaling up of soil attributes based on multi-fractal parameters. The studies on the application of fractal theory and multi-fractal method in the analysis of soil spatial variability were also reviewed. Fractal theory could be an important tool in quantifying the spatial variability and scaling up of soil attributes.

Key words： fractal theory soil attribute spatial variability scaling process

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