农田土壤表层粗糙度信息解析 Soil Surface Roughness Indices, Interpretation and Application

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关键词： 土壤 粗糙度 耕作 时空变异 信息解析

摘 要： 耕作后农田土壤地貌属于具有趋向性的随机表面。由随机过程角度看，它随时间的变异满足各态遍历性质。揭示它的时空变异特征对于客观评价农田耕作质量、探讨表层土壤水运移规律、优化农田管理具有较高的实用价值。因此，基于各种粗糙指数的信息解析是精细农业技术体系研究热点之一。本文从不同尺度数学模型、时空变异多因素分析、直接与潜在应用价值等方面作了系统性分析。 The surface elevation of a tilled field shows both oriented and random morphologies. Based on stochastic process theory, the temporal variability of the tilled surface roughness over time fulfills the ergodic property. Characterizing the temporal/spatial variability of the tilled surface by using different indices is beneficial in assessing the tilled quality, studying soil water movement, and for optimal management of agricultural field. Therefore, interpretation of various roughness indices has become a focus in precision agriculture worldwide. In this general review, a broad discussion of soil surface roughness that contains multi-scale models, multi-factor analysis on temporal/spatial variability, and direct or potential utilities in agricultural activity was provided.

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