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Green-Ampt模型参数简化及与土壤物理参数的关系

Parameters simplification of Green-Ampt infiltration models and relationships between infiltration and soil physical parameters

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中文关键词: [土壤](#),[入渗](#),[模型](#),[Green-Ampt入渗模型](#),[土壤物理参数](#),[入渗参数](#),[转换函数](#)

英文关键词: [soils](#) [infiltration](#) [models](#) [Green-Ampt infiltration model](#) [soil physical parameters](#) [infiltration parameters](#) [conversion function](#)

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中文摘要:

简化模型表达形式从而减少参数个数,对于Green-Ampt入渗模型的实际应用具有重要的现实意义。该文通过推导湿润锋处平均基质吸力与Philip模型中土壤吸湿率关系基础上提出了简化的Green-Ampt入渗模型,基于新疆222兵团两块壤质土壤田块上土壤水分入渗试验资料,分析了Green-Ampt简化入渗模型参数与土壤物理参数之间的关系,建立了模型参数与土壤物理参数之间的定量经验转换函数。结果表明,入渗参数A(组合参数)与土壤初始含水率呈对数负相关,相关系数为0.77,A与土壤紧实度和黏粒含量均呈指数负相关,相关系数分别为0.70和0.74。饱和导水率Ks与土壤紧实度和黏粒呈指数负相关,相关系数分别为0.74和0.73。A和Ks与土壤初始含水率、土壤紧实度和黏粒含量呈高度和中度多元线性相关,相关系数分别为0.9和0.79。研究表明Green-Ampt简化入渗模型能够在一定精度下分析土壤入渗过程。

英文摘要:

Simplifying the Green-Ampt infiltration model type and reducing its number of parameters have important significance for the practical application of the model. Based on the derivation of the relationship between the average matrix potential suction of the wetting front and the soil sorptivity of Philip model, the simplified Green-Ampt infiltration model was proposed. Using the field observed data obtained from two loam soil fields of 222 corps in Xinjiang province, the relationships between parameters of simplified Green-Ampt model and soil physical parameters were analyzed and then the quantitative experience conversion function was constructed. Results showed that infiltration parameter A was logarithm negative correlated with initial water content, and the correlation coefficient was 0.77. A was exponential negative correlated with soil compaction and clay content, and the coefficient was 0.70 and 0.74 respectively. Saturated hydraulic conductivity Ks was exponential negative correlation with soil compaction and clay content, and the coefficient was 0.74 and 0.73 respectively. High multiple linear correlation was found between A and soil physical parameters, and the correlation coefficient was 0.90. There was medium multiple linear correlation between Ks and soil physical parameters, and the correlation coefficient was 0.79. The average relative error between observed data and infiltration parameters obtained by experience conversion function was about 10%. The results indicated that the simplified Green-Ampt model has certain precision in simulating the soil infiltration process.

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