

大气对流对土壤内热和水分迁移影响的数值模拟

Numerical Simulation of Heat and Water Transfer in Unsaturated Soil With Air Convection

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作者	单位
陈振乾	东南大学
施明恒	东南大学

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中文摘要:

对土壤中热和水分迁移过程进行了数值模拟及实验验证。理论上, 通过对土壤内热和水分迁移机理分析, 根据质量守恒和能量守恒原理, 建立了土壤非饱和区热和水分迁移的理论模型。并对大气对流条件下土壤内热和水分迁移进行了数值模拟。实验上, 对大气对流环境下土壤内热、水分迁移过程进行了研究。通过数值计算和实验测量, 获得了不同大气对流速度作用下土壤中温度、含水率分布。

英文摘要:

Coupled heat and water transfer in unsaturated soil was studied both theoretically and experimentally. Based on analyzing the mechanism of heat and water transfer in unsaturated soil, and the conservation principles of mass and energy, the theoretical model of heat and water migration in unsaturated soil was established. Numerical simulation was carried out for one dimensional heat and water migration by air convection. Experimental investigation of heat and water transfer of sandy soil with air convection was done. The temperature, volumetric water content and water table evaporation strength in varied air convection velocity were obtained by means of numerical simulation and experimental measurement.

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服务热线: 010-65929451 传真: 010-65929451 邮编: 100026 Email: tcsae@tcsae.org

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