

论文

地下水中氚同位素分布模型及其应用

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摘要:

为了合理评估当地降雨对浅层含水层的补给特征, 为水资源评估提供理论基础, 根据水量平衡原理、质量平衡原理和氚同位素衰变原理推导了水量平衡方程式及建立了地下水放射性氚同位素分布模型和地下水更新周期计算公式。基于该研究模型, 计算受降雨补给的地下水氚浓度首先需要恢复当地降雨多年氚值系列; 然后运用曲线法计算地下水氚值分布。上述模型在焦作煤矿区得以验证和应用, 结果显示焦作煤矿区浅层地下水的更新周期为62 a, 验证了模型科学及合理性; 同时表明地下水中氚浓度与补给降雨有紧密联系, 而与排泄水体没有关联。应用地下水氚同位素分布模型能有效评估当地降雨入渗补给情况, 而地下水更新周期计算公式可评估地下水开采情况及更新特征, 实用价值显著。

关键词: 氚同位素; 更新周期; 同位素分布模型; 地下水

Distribution model and application of groundwater tritium isotope

Abstract:

In order to assess reasonably local rainfall on the shallow aquifer recharge characteristics and provide a theoretical basis for water resources evaluation, based on the principle of water balance, mass balance principle and the principle of tritium decay, the distribution model of groundwater tritium isotope and water balance equation were deduced, and groundwater updated cycle formula was established. The tritium concentration of groundwater recharged by rainfall can be calculated, based on the above models. Firstly it need to restore years tritium series of local rainfall, then calculate the tritium value distribution of groundwater by using curve method. The above models were validated and applied in Jiaozuo coal mining. The result shows that shallow water has 62 years update cycles in Jiaozuo mining area, at the same time, groundwater tritium concentration is closely associated with rainfall recharging, but is not associated with groundwater discharging. The result is reasonable and scientific. The oretical calculations based on the model for the rational development and utilization groundwater are simple and convenient. It has an important value.

Keywords: tritium isotope; update cycle; isotope distribution model; groundwater

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