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南水北调西线工程区地下径流模数、岩体透水性及隧洞涌水量预测

王 媛，秦 峰，李冬田

(河海大学 土木工程学院，江苏 南京 210098)

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摘要　针对南水北调西线引水工程区地形地貌和地质条件的特点，研究了该工程区地下水径流模数、岩体透水性的分布规律。提出了在遥感解译的基础上，以水文图分析法为主，结合野外泉流量和溪流量测验，综合评价地下水径流模数的方法。研究结果表明，贾曲单元地下水径流模数最大，其他单元则基本接近，越向西南，径流模数逐渐减小。通过现场压水试验数据的整理分析，结合现场钻孔同位素示踪试验，建立了Lu值随埋深呈负指数减小的变化规律。在数据整理中，提出了需剔除由于孔口止水处理不当造成的Lu值大于40 Lu的点，以及由于断层或裂隙密集带影响产生的“奇异”点阵等要点，使之更加符合实际。将建立的地下水径流模数和透水性规律直接应用于隧洞涌水量估算中，为该工程区水文地质条件的评价提供了依据。

关键词　岩土力学；南水北调西线；地下水径流模数；水文图法；遥感解译；岩体透水性；现场压水试验；隧洞涌水

分类号

GROUNDWATER RUNOFF MODULUS, ROCK PERMEABILITY AND PREDICTION OF WATER QUANTITIES OF TUNNEL IN WEST ROUTE OF SOUTH-TO-NORTH WATER TRANSFER PROJECT

WANG Yuan，QIN Feng，LI Dong-tian

(College of Civil Engineering，Hohai University，Nanjing 210098，China)

Abstract

Based on the analysis of topographic and geological conditions along the west route of South-to-North Water Transfer Project，the groundwater runoff modulus and the rock permeability properties are studied. Firstly，an integrated method for evaluating groundwater runoff modulus of non-karst plateau region is presented，in which the hydrological map analysis is mainly applied，combined with remote sensing interpretation and the analysis of field flow data obtained from the survey of regional springs and streams. In the analysis of hydrological map，it is emphasized that the influences of rainfall and snow melting should be considered during map being cut. In the calculation of groundwater runoff modulus according to field survey data of stream flow，a seasonal reduction coefficient is proposed. The research results indicate that the groundwater runoff modulus within the hydrogeological element of Jiaqu River is largest whereas those in the other elements have similar values. Secondly，the permeability of rock mass is also studied in terms of data analysis of field water pressure test and isotope trace test. In dealing with test data，a method of omitting unreasonable data is suggested，because these kinds of data are possibly caused by poor seal of orifice or by the occurrence of the faults passed across borehole. A negative exponential relationship describing the permeability variation with depth is developed. The results of the above parameters are finally applied to the prediction of water quantities flowing into tunnel.

Key words rock and soil mechanics；west route of South-to-North Water Transfer Project；groundwater runoff modulus；hydrological map analysis；remote sensing interpretation；permeability of rock mass；field water pressure test；water flowing into tunnel

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