<<中国-澳大利亚含水层补给管理新进展>>

图书基本信息

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前言

Managed aquifer recharge （MAR） is the intentional recharge of water to aquifers forsubsequent recovery or environmental benefit. Aquifers may be recharged by a range ofmethods using wells and infiltration systems， to increase groundwater supplies and improvetheir quality or to redress saline ingress or land subsidence.　　To date in China the major applications of MAR have been in infiltration basinsestablished in the 1990s， such as the groundwater dams， infiltration wells and trenches inShandong province， with a total recharge capacity exceeding 200 million m3/a. River bankfiltration projects have been established in South China to improve the quality of water forindustry and agriculture. Injection wells are now in routine operational use for sustainablemanagement of geothermal reservoirs in North East China with reinjection of 4 million m3/a.In addition， there are recharge projects to reduce land subsidence in Shanghai. Ademonstration project in Beijing is exploring wastewater treatment processes to precederecharge for sustainable projects that protect human health. New research in Jinan is startingto explore recharge of roof rainwater to replenish a karst aquifer that feeds historicallyimportant springs.　　In Australia infiltration basins have been used， for 50 million m3/a of agriculturalsupplies， since the late 1970s， commencing in the Burdekin Delta， Queensland. More recentlyurban stormwater and reclaimed water resources have been used in MAR， via injection wellsin South Australia and infiltration projects utilising soil aquifer treatment in WesternAustralia and Northern Territory.

The China-Australia Managed Aquifer Recharge （MAR） Training Workshop held inJinan October 27 ~ 31， 2008， was supported by the AusAID Public Sector Linkages Program， the National Natural Science Foundation of China， Shandong Institute of Geological Surveyand Jinan Water Resources Bureau in order to facilitate the exchange of information andexperience on MAR among Australian researchers and Chinese researchers and water resource managers. In large parts of both countries groundwater is a resource under stress, and in urban areas the possibilities of urban runoff and treated sewage for augmenting groundwater supplies are being trialled or used. This workshop proceedings documents the way MAR is being used or could be developed to address some of Chinas water resource management challenges. It provides a guide to developing MAR schemes based on Australian and Chinese experience. The material presented takes account of technical， health or environmental risks and the methods used to manage those risks.

内容概要

本书精选了中国一澳大利亚含水层补给管理研讨会论文，其主要内容包括可管理含水层补给的地址的选择、设计，有关水力学知识，地球化学特征及水质变化，风险评估，数学模型及模拟、指南，中国和澳大利亚有关可管理含水层补给的案例研究等。
本书适合从事地下水科研、教学、管理及相关部门人员参考使用。

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章节摘录

The cooling of produced geothermal fluid caused by injection of colder fluid has beenreported in a few high-enthalpy geothermal fields. For low-enthalpy geothermal fields， therehas not been any such report， even in the cases where the distance between the productionwell and injection well is rather small.Therefore， it may be concluded that forproduction-reinjection doublets in low-enthalpy geothermal fields， one does not have to fearabout the cooling of the production water， if the distance between production well andinjection well is greater than a few hundred meters， and the amount of reinjection in not veryhuge. In designing the distance of reinjection and production wells of a doublet system， a fewfactors should be considered， including the type of geothermal reservoir， the geologicalstructure of the geothermal field， the permeability and thickness of the reservoir， the directionof fluid flow， the temperature difference between the reservoir and reinjection water， the flowrate of reinjection etc. But in the cases that a large number of reinjection wells and productionwells will be placed among a rather small area， care has to be taken， and proper tests have tobe carried out and proper modeling has to be done before any such injection project is started， so as to avoid premature thermal breakthrough.　　5.2 Tracer test　　Tracer breakthrough can be a very good precaution for thermal breakthrough. Tracertesting is one of the most important aspects of geothermal reinjection， which has become aroutine for reinjection experiments. Tracer tests can provide information about the flow pathsand the flow velocity of the geothermal fluids between the injection and production wells. Forfractured reservoirs， the volume of the aperture can be deduced from the tests. Thisinformation can be used to predict the cooling due to reinjection （Axelsson and Stefnsson，1999）. For reinjection projects that are large-scale or a number of production and reinjectionwells in a relatively small area， it is strongly proposed that a tracer test be carried out.　　5.3 Monitoring　　Monitoring is one of the most important elements for geothermal management. For ageothermal field with reinjection， a proper monitoring program is even more important.Besides the monitoring of reservoir pressure， temperature， amount of production， chemicalcomposition of geothermal fluid etc， the water level in the injection wells， temperature ofinjection water， amount of injection and chemical composition of injection water should alsobe monitored. The purpose is to find out the changes of the geothermal system caused byreinjection， especially the cooling of the produced geothermal water.

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