

## 158 - GROUNDWATER IN DISCHARGE AREA AS A USEFUL TOOL FOR UNDERSTANDING RECHARGE PROCESSES ON DIFFERENT SCALE, A CASE STUDY IN JINAN, CHINA

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Discharge area is an important element in groundwater flow system but hasn't been given enough attention in the study of regional hydrogeology. The main objective of this study was to demonstrate the importance of discharge area in the definition of groundwater functioning and characterizing recharge processes which were crucial for groundwater resources management. Groundwater flow conditions in Jinan district where karst aquifers were the most important productive layers were described based on the potentiometric, hydrochemical and isotopic data from groundwater in discharge area. Hydraulic head data indicated the relationships between distinct hydrogeological units. The influence of fault zones and artificial exploitation on the hydrogeology of the system was also revealed by the potentiometric dynamics. Hydrochemical and isotopic data allowed distinct groundwater sources to be differentiated in the main aquifers and presented different recharge flow systems. Finally, a conceptual model of hierarchical groundwater flow system in Jinan district was proposed: shallow groundwater was considered to belong primarily to local flow system characterized by high nitrate concentration, enriched isotopic contents and short flow paths; thermal groundwater was derived from a regional flow system with highest recharge altitudes and slow flow velocities, confirmed by its high chloride and TDS concentrations and long residence time; among them, non-thermal karst water may be attributed to the intermediate flow system, originating from Southern range front, with uniform HCO<sub>3</sub>-Ca(Mg) facies and low nitrate concentration. Detailed knowledge of the whole groundwater system acquired from the analysis of discharge enables better management of this karst groundwater system.