

Hydrolic and geologic factors controlling surface and groundwater chemistry in Turpan Basin

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The Turpan Basin is located in the arid central Asia as the lowest non - rainfall basin in the world, Flaming Mountain is crossed the basin and separated two parts such as North and South. Surface water resources are limited in this arid region and water demand is mainly lead by the Kariz and groundwater pumping. In a classic Basin and Range groundwater system, water flows from recharge areas in the mountains to discharge areas in adjacent basin. Discharge areas are generally occupied by oasis. The aquifer in Turpan Basin consists of high porosity deposits such as gravel, sandy gravel, coarse - grained sand and fine - grained sand dominated by silt, clay and limestone. The North Basin is mainly consists of gravel dominated by sand, and the South Basin is gravel dominated by silts and clays.

Depend on the chemical analysis data, water type of the river and open channel recharged from river water of mountain in Turpan Basin similar to the water type of river in mountain area as $\text{HCO}_3 - \text{Ca}$, but water type of the river and open channel recharged from the springs different to river water in mountain are as $\text{SO}_4 - \text{Ca}$. The $\text{HCO}_3 - \text{Ca}$ type identified in the surface water samples at the mountain area, the $\text{HCO}_3 - \text{Ca} - \text{Na}$ type and $\text{SO}_4 - \text{Cl} - \text{Na} - \text{Ca}$ type identified of groundwater in the oases, the $\text{SO}_4 - \text{Cl} - \text{Na}$ type identified in groundwater near the desert and lower part of the Flaming mountains. Stable isotope values of water samples mainly plotted upper side of the global meteoric water line, which related to the melt water. Stable isotope values of deep groundwater are depleted than the values of modern melting water in high alpine mountain area. Isotopic enrichment occurred river water, lake water and some shallow groundwater in the basin due to the evaporation. Isotopic result shows that groundwater in Turpan Basin recharge from melting of glaciers in high alpine area. The hydrological and geological condition affected to the water quality, but did not any significant affect to isotope content.