

Characteristics of Isotope Hydrogeochemistry for Natural Water in Yumen Area, Gansu Province, P.R. China

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Introduction

Yumen region is located in the northwest of Gansu Province, P.R.China. There are two main kinds of geomorphological types, including the Qilian Mountain and the Hexi Corridor Plain. It belongs to the continental middle temperature drought climate area. The annual precipitation is 150-500 mm and the evaporation is 1300-1700 mm in the Qilian Mountain area, while the annual precipitation is 50-250 mm and the evaporation is 2200-2280 mm in the Corridor Plain area [1]. Surface water system includes Shule River, Baiyang River and Petroleum River. Isotope hydrogeochemical survey of natural water was conducted in Yumen region. 13 groups of stable isotope samples and 12 groups of ¹⁴C isotope samples were collected during the period from July to August 2018, then the values of $\delta^{18}\text{O}$, δD and ¹⁴C in natural water were analyzed.

Conclusions

According to isotope data of natural water in Yumen region, the equation of Meteoric Water Line(MWL) in Yumen region is obtained as follows: $\delta\text{D} = 9.81\delta^{18}\text{O} + 29.38$ ($R=0.99$), and the equations for isotope altitude effect of meteoric water are $\delta^{18}\text{O} = -0.00347H + 3.04$ ($R=0.92$), $\delta\text{D} = -0.00258H + 28.279$ ($R=0.89$). It concludes that the deep groundwater origins from the meteoric water and the average age of ¹⁴C in deep groundwater is 5836a.

[1] Donglin ZHANG, Xiangyuan ZHANG, (2005) *groud water*, 27(4), 256-259.