

Water Quality and Stable Isotope of Groundwater in Yiluo River Basin, China

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The study area is the Yiluo River basin in China. In this paper, the authors discuss mainly on the results of the field survey carried out from August 10 to September 20 in 2006. The authors made the measurements of pH, electric conductivity and water temperature in situ, and analyses of the water samples in the laboratory. The number of sampling points of groundwater is 67, and that of spring 4, that of river 16, and that of reservoir 3, and the total number of the sampling points is 90.

The results of this study are as follows;

(1) In generally speaking, groundwater flows toward the lowland area of the basin, i.e., the central part of the basin, but there is no spring and self-flowing well in the lowland area. However, there are some artesian aquifers in the basin, and it is necessary to distinguish them and treat as different groundwater.

(2) Electric conductivity of shallow groundwater is very high in the lowland area in the basin, and that of the deep groundwater is low. From the results of these measurements of electric conductivity of shallow groundwater, there are some groundwater contaminations in the large part of the lowland area of this basin.

(3) The water quality of groundwater in Yiluo River basin is mainly Ca-HCO₃ type. However, there are some indications that the water qualities changes caused by some interaction to the aquifer and human activities in the city area.

(4) In order to investigate the recharge area of groundwater and the flow pattern of the groundwater in a Yiluo River basin, the stable isotope ratio of D and ¹⁸O was measured. In groundwater and spring water, delta D values ranges from -80.77 to -51.99 permill, delta ¹⁸O values from -10.03 to -6.97 permill, river water delta D value from -65.31 to -51.07 permill, and delta ¹⁸O value -8.64 to -6.54 permill. The stable isotope ratio of the groundwater samples at the peripheral part of the basin is rather high value, i.e. ; heavy water, and in the central part of the basin, the value is low, light water. In the eastern part of the basin, down-stream part, precipitation at the high mountain area, to the southeast of the basin, with low delta D and low delta ¹⁸O may be flowing to the bottom of the basin.