

The Geochemical Characteristics of the Earthquake Observation Wells and Groundwater in Jiangsu Province, China

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The geochemical characteristics of the earthquake observation wells always plays an important roles on earthquake reserch. In Xuzhou region, the TDS concentration of surface water samples around the observation wells remains the same as the geochemical characteristics of the piedmont plain region. However, the TDS concentration of observation wells (depth>300m) increases from <500mg/L to 500-1000mg/L. It shows a trend of deterioration. The hydrochemical facies of the observation wells are highly monotypic, which are HCO₃-Na·Mg. The water chemical composition of the observation wells water in deep confined aquifers (depth>300m) are less affected by surface water in the vicinity. In Suqian region, the observation wells (depth<200m), shows the same TDS concentration character as surface water. The water chemical composition of shallow confined aquifers (depth<200m) are affected by that of surface water. On the contrary, for the hot springs (depth>2000m), the change of hydrochemical facies is from HCO₃-Na·Mg to SO₄·Cl-Ca·Na, suggesting an increase of TDS. The water chemical composition of deep springs (depth >2000m) has less relationship with surface water. The observation ³He/⁴He ratios indicates 87% helium from crust. In the Donghai region, it is unexpected low TDS concentration for the deep hot spring (depth>2000m). The character of their hydrochemical facies is also similar with that of surface water. The observation ³He/⁴He ratios indicates that the mainly material source is the atmosphere. That means the water chemical composition of deep hot springs are affected by that of surface water, when the tectonic activity is low in this region.

The water chemical composition of shallow observation wells (depth>200m) is easily affected by surface water. In the deep observation wells (depth >300m), the impact degree of surface water on the water chemical composition depends on the tectonic activity. Consequently, the TDS concentration and hydrochemical facies analysis between the deep observation wells and surface water in the vicinity can be one signal for the regional tectonic activity in Jiangsu Province, China.