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Analysis of the renewability and vulnerability of the deep groundwater in a typical section in Huaihe River Basin area

Xiaomin Sun
Nanjing Hydraulic Research Institute, Hydrology and Water Resource Department, China (451776877@qq.com)

In this paper we have collected deep groundwater samples along 4 profiles in 37 cities or counties with the Huaihe River Basin area. Multiple tests have been conducted to determine their hydrochemical characteristics. Isotopic data show that their characteristics vary spatially. Specifically, three distinctive deep groundwater regions are identified: Shayinghe River System, Guohe River System and the Ancient Yellow River System. Further comparison indicates that the Ancient Yellow River deep groundwater system has a better connectivity to the shallow groundwater, which implies faster renewal rate and greater exploitation potential. At the same time, groundwater renewability is coupled with vulnerability. The deep groundwater renewability should be taken into account during exploitation, in order to avoid possible contamination.