

# Ecohydrological characteristics and distribution of groundwater dependent ecosystems (GDEs) in Langxi river watershed, North China

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## Abstract

Groundwater dependent ecosystems (GDEs) must have access to groundwater to maintain their ecological structure and function. The rapid expansion of humans has increased demands on groundwater for consumption, industry and agriculture, these demands alter groundwater regimes of natural GDEs, resulting in the degradation of ecosystem health. In order to improve the conceptual understanding of the role of groundwater in such ecosystems, this study examined key aspects of GDEs (hydrogeology, hydrogeochemistry and biodiversity) in the Langxi river watershed, North China. Results indicate that the karst in Langxi river watershed is well developed. The water chemistry types in the watershed were mostly HCO<sub>3</sub>-Ca type with different clustering characteristics, which indicate different degrees of interaction between surface water and groundwater, and that the recharge processes and flux of GDEs are different. Land use type and humidity maps were obtained by remote sensing interpretation, and combined with the groundwater isolines, it can be seen that in the dry season, when the groundwater level higher than the maximum depth of vegetation root system, and areas with high humidity, were the GDEs distribution areas. Water quality of the Longchi and Zhangxia Group aquifer is good and the content of Sr is high, suggesting that it can be used as a partial strontium type natural mineral water. It was also found that there are several types of stygofauna in the GDEs of the Langxi river watershed, indicating that the water quality of the sampling points has not been contaminated.

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