

Groundwater chemistry in the Gunii Khooloi basin, Southern Gobi Region of Mongolia using multivariate analysis

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Water plays a vital role in the southern part of Mongolia where is climatically classified as an arid and semi-arid region, so called Southern Gobi Region of Mongolia (SGR). Groundwater serves as the only source of water supply and is largely utilized by mining companies such as the Tavan Tolgoi and Oyu Tolgoi Mine located in the SGR. The area is expected to face severe water shortages of mining and drinking water, which may be related to changes in groundwater recharge due to climate change. Understanding the geochemical evolution of groundwater and recharge mechanisms in the Gunii Khooloi basin is thus paramount for water resource management in this region. However, chemical compositions of groundwater in the SGR has not been studied so far.

In this study, the hydrogeochemical approaches have been introduced to characterize hydrogeochemical characteristics and its associated recharge processes in the Gunii Khooloi basin. To investigate this hydrogeochemical study, springs, groundwater in shallow wells and deep wells in the study area were sampled twice (in September 2016, and in June 2017). A total of 95 groundwater samples were collected within these two years for major chemical analysis in order to understand the general hydrogeochemical conditions of the Gunii Khooloi basin.

Here, we will present the groundwater chemical properties and relationship between shallow and deep groundwater in the Gunii Khooloi basin clarified by multivariate statistical analysis, such as principal component analysis (PCA) and hierarchical cluster analysis (HCA).

Keywords: Groundwater chemistry, Principal component analysis, Southern Gobi Region of Mongolia