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Variation of groundwater quality monitoring data in Korea

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The international lack of water is publicly known. Over time, interest in groundwater and surface waters has increased for domestic use as drinking water and agricultural water. Due to the impacts of climate change, floods, landslides, droughts and other disasters related to water are becoming more and more important, and the need for water resources planning and management is emphasized. This study was aimed to assess the trend of groundwater quality in Korea. We also investigated the main drivers behind the trend and are attributed to rock-type and land use. Data was collected for 10 years from groundwater quality monitoring in Korea. Twelve water quality parameters were analyzed year by year. The collected data was statistically analyzed using a nonparametric method (Mann-Kendall trend test, M-K trend test). In addition, normality was analyzed by histogram (K-S test / Kolmogorov-Smirnov test or S-W test / Shapiro-Wilk test) and box plot. The Mann-Kendall trend test used the data for more than 5 years to identify the trends. The results were displayed on the map of the whole country, showing trends by regions. All of the water quality parameters were not statistically normal as a result of verifying the normality of the whole data through P-value in the histogram. Also, it was not normally distributed as a result of verifying the normality of yearly collected data through box plot. As a result of testing the normality of the M-K trend test using P-value, the T and HCO_3- increased nationwide, and the pH, Eh and NO_3- decreased nationwide. While, Cl-, Mg2+ and SO42- increased in the central area and decreased in the south. Potassium decreased markedly in the south, and EC and Ca2+ showed no regional trends. The reason for the regional difference was thought to be the influence of the rock type of the area where the irrigation had been installed, and it was affected by the land use. This work was supported by the National Research Foundation of Korea (NRF) grant funded by the Korea government (MSIT) (No. NRF-2015R1A4A1041105).