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IMPACT OF URBANIZATION ON GROUNDWATER QUALITY: A CASE STUDY FOR THE KHAN-UUL DISTRICT IN THE ULAANBAATAR

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Abstract

The significant part of the natural life support system is groundwater. The resources of groundwater are being used for drinking, irrigation and industrial purposes. There are rising problems with deterioration of groundwater quality owing to Geogenic structure and anthropogenic activities. In Mongolia, fragile groundwater must be carefully managed to conserve its safety within standard limits. Because the scarcity appears in the spring season, is proved by the monitoring of the ground water level.

We have measured pH, total dissolved solids (TDS), fluoride, total iron and electrical conductivity (EC) content of groundwater samples, which collected from the shallow and deep aquifers in the Southwest side of Ulaanbaatar, Mongolia and included in the Tuul river basin.

The Total minerals value ranged from 153 to 705.2 with a mean of 348.6mg/L. The WHO2011 and MNS900:2005 specifies a desirable limit of 1000mg/L and study area shows all samples were meeting permissible limit as prescribed by standards. Only the waters of deep wells in industrial area contain the pick amount of minerals, such as over 700mg/L. The lowest point is Shallow well water in Upper "Zaisan" area.

Only in the industrial zone, major ions' concentration 2.5mg-eq/L and anions arranged that $SO_4^{2-}>HCO_3^->Cl^-$ and cations $Ca^{2+}>Na^++K^+>Mg^{2+}$ in shallow wells, for more deep aquifers their order changed $Cl^->SO_4^{2-}>HCO_3^-$, while ions order didn't changed just their concentration had fluctuated in the suburban and urban areas related to the depth and urbanization.

The recommendable limit of ammonium in drinking water is pointed out by MNS (900:2005) as 1.5 mg/l. Most of the observed samples were meeting to the permissible value aside from Suburban "Bio and Shuvuu" areas' shallower wells, which locate near the sewage water treatment plant of UB.

Key words: Ground water quality, Urbanization, Khan-Uul district of Ulaanbaatar, Aquachem,

Introduction

The anthropogenic disturbances through industrial pollution, increasing consumption and urbanization degrade the groundwater and impair their use for drinking, agricultural, industrial and domestic uses [2].

Ulaanbaatar city located in north central Mongolia, and its population as of 2014 was over 1.3 million; almost half of the country's total population. It existed at an elevation about 1310 meters(4300ft) in the Tuul River Basin [3]. The revealing water shortage in the spring season, has been demonstrated by hydrogeological monitoring in UB [4], last decade.