

ASSESSMENT ON HYDROCHEMICAL CHARACTERISTICS AND HEAVY METAL POLLUTION IN SURFACE WATER OF THE KHERLEN RIVER BASIN, MONGOLIA

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This research is aimed to understand the hydrochemical characteristics and quality status of surface water in the Kherlen river basin, Mongolia, where a variety of anthropogenic sources of water quality degradation are coexisting, such as coal mining, agro-livestock farming, and urban sewage. For this study, a total of 79 surface water samples were collected at 22 locations by four sampling campaigns in a rainy season between June and August of 2022. The chemical type of the Kherlen river was overall dominated by the Ca-HCO₃ type. However, the TDS values generally increased toward the downstream, from 56-71 mg/l at upstream sites to 108-268 mg/l at downstream sites. The turbidity levels ranging between 0.24 and 196 NTU showed the same trend, due to the washout of animal wastes and soil particles. The concentrations of total nitrogen (TN) and total phosphorus (TP), as well as the measurements of COD and BOD, also generally showed the similar trend. According to the Mongolian water quality standard, approximately 28% of all samples exceeded the limit of BOD (3 mg/L). The concentrations of heavy metals including Cu, Mo, Zn, U, As, Se, Hg, Ni and Co were also assessed. The concentrations of Cu, Mo and As were not high, up to 16.1, 3.6 and 7.9 µg/L, respectively. Calculation of the heavy metal pollution index (HPI) showed that 82% of the samples showed the “very good” status (82%; HPI 7.98-24.21) and “good” status (18%; HPI 27.59-41.47). This study shows that during the summer rainy season, surface water of the Kherlen river basin have generally low levels of heavy metals and nutrients but the levels of turbidity and BOD become significantly high. Continued, careful water quality monitoring is needed to elucidate the spatio-temporal change of water quality and major contamination sources.