

Analysis of the Spatial and Temporal Variability of Toxic Heavy Metal concentrations in ground water resources in Upper Sanyati Catchment, Midlands Province, Zimbabwe

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Abstract

Upper Sanyati catchment in the Midlands Province of Zimbabwe is important for residential, agricultural, mining and manufacturing activities. These anthropogenic activities are generating large quantities of waste and insitu are toxic heavy metals, whose contamination of the environment is of great concern especially to ground water supplies. The aim of the research was to analyze the spatial and temporal variations of toxic heavy metal loads in ground water resources. A total of two hundred and eighty eight ground water samples were analyzed for toxic heavy metal contents using an atomic Absorption Spectrophotometer Varian SpectrAA-100. The results for the wet season showed mean concentrations of chrome, lead, cadmium and nickel at 0.187, 0.033, 0.049 and 0.04mg/L respectively while the dry season results were 0.36, 0.056, 0.05 and 0.04mg/L respectively. Ground water pH varied between 6.3 and 8.4 at an average temperature of 25°C. Water supplies in the study area has higher concentrations of Cr²⁺, Pb²⁺ Ni²⁺ and Cd²⁺ exceeding World Health Organization permissible levels for domestic water users.

Key words: ground water; toxic heavy metals; contamination; acidity and alkalinity.