

HIGH URANIUM CONCENTRATIONS IN THE GROUNDWATER OF THE RIO DE JANEIRO STATE, BRAZIL, MOUNTAINOUS REGION

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ABSTRACT: Unexpectedly high uranium concentrations, up to 930 $\mu\text{g L}^{-1}$, approximately thirty times higher than the WHO guidance level, were observed in groundwater samples from the mountainous region near Rio de Janeiro City, the so-called “*Região Serrana*”, approximately 60 km from the city. This region is characterized by a large amount of tourist activities and water-related industries, such as mineral water and breweries, that can be impacted by these findings. In addition, the water supplies in small communities of this region are partially or entirely based on groundwater sources. Uranium contamination was observed in 5 of the 16 counties in this region. Based on these data, this study concluded that the probability of obtaining uranium-contaminated groundwater is high in some specific areas of this region. In addition, high ^{222}Rn concentrations were verified, with levels reaching 1570 Bq L^{-1} . Furthermore, a maximum level of 4.6 Bq L^{-1} ^{210}Pb was also measured, which has a WHO guidance level of 0.1 Bq L^{-1} . Based on the present findings, it is suggested that any artesian well deeper than 80 meters in this region should be tested for uranium and ^{222}Rn . The potential impact of the present findings on the local brewery industry is also discussed.

KEYWORDS: URANIUM, GROUNDWATER, RIO DE JANEIRO