

MAPPING OF URANIUM CONCENTRATIONS IN GROUNDWATER SAMPLES

The geomorphology, geohydrology, lithology and ecological features of the area influence the uranium content in groundwater. The groundwater samples were collected from 75 locations of Davanagere district, Karnataka, India. Uranium analysis in the water samples was done using LED fluorimeter, based on fluorescence of dissolved uranyl salts. The uranium concentration in water samples varied from 18.41 to 173.21 μg per liter. Higher concentration was observed in the metamorphic, plutonic and volcanic/meta volcanic rock types. In all, 15.3% of samples showed concentration above the prescribed level of 60 μg per liter by AERB and 66.8% of the samples above the WHO and USEPA guideline value of 30 μg per liter. Higher uranium concentration in groundwater was observed in Harapanahalli and Jagalur taluk of Davanagere district, which falls in the Eastern Dharwar Craton, which is generally known to contain more radioactive minerals than the Western Dharwar Craton.

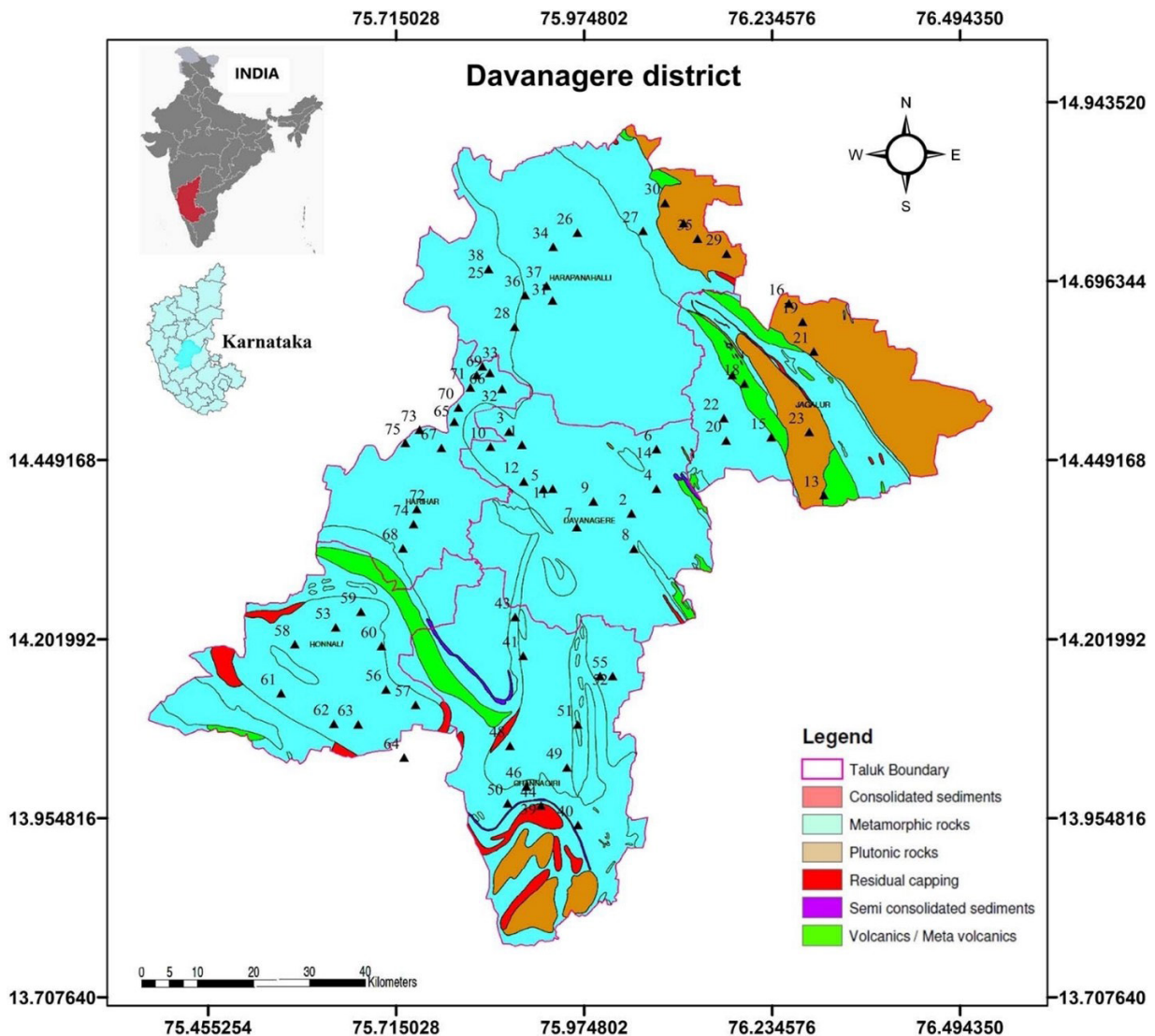


Figure 1: Geological map and sampling stations of Davanagere district.

The effective ingestion dose and lifetime cancer risk to the population were calculated using uranium concentration in the drinking water. The annual ingestion dose to the population of Davanagere district because of varied from 15.00 to 141.11 μSv per year.

People consuming groundwater where uranium concentration is above the maximum contamination limit are prone to radiological and chemical risks. The higher uranium activity is correlated with the geological structure of the study area. Concentration of uranium must be monitored periodically to assess the radiological risks to the public.

Reference: Hidayath M., Lavanya B.S.K., Namitha S.N., Chandrashekara M.S. and Pandit S.A. Mapping of uranium concentrations in groundwater samples of Davanagere district, Karnataka, India, and assessment of effective dose to the population. Radiation Protection Dosimetry, 2024, 200(11–12), 994–1002. <https://doi.org/10.1093/rpd/ncae036>

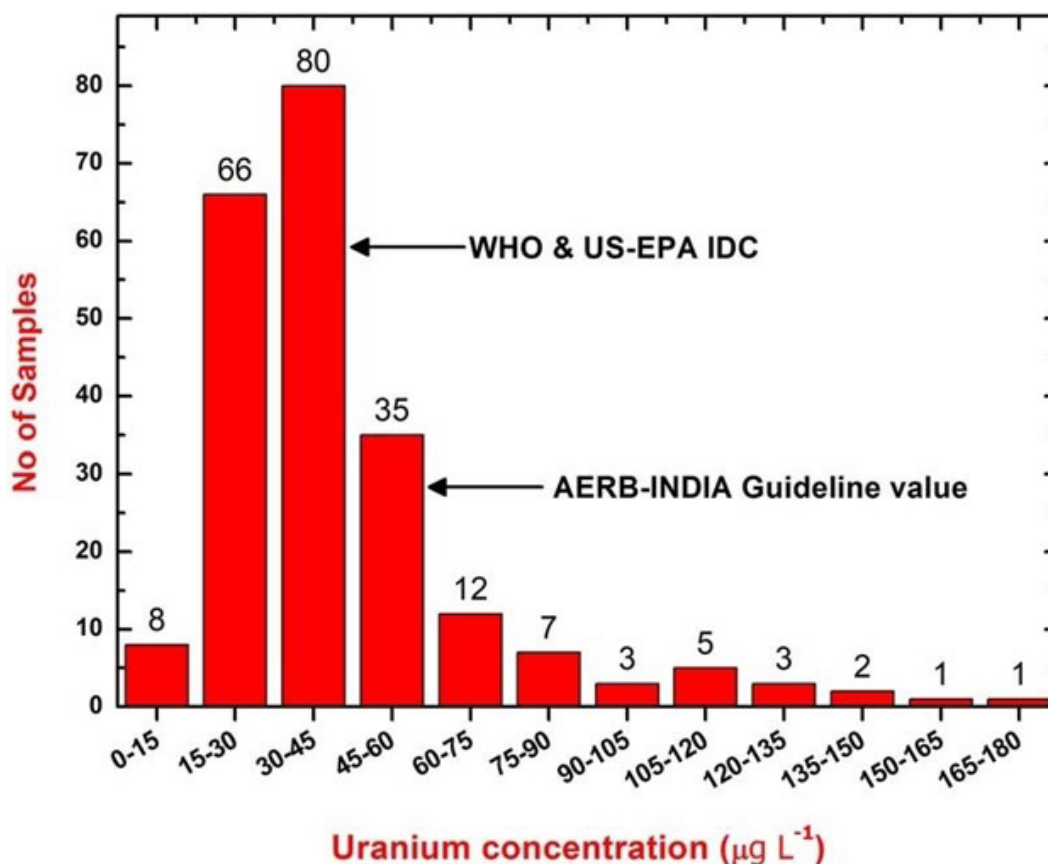


Figure 2: Frequency distribution of uranium concentration in water samples of Davanagere district.