



Variation of uranium and radon concentration in ground water along the track from non-HHP to HHP region of Tusham ring complex

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The levels of uranium and radon concentration in groundwater samples collected from some regions along the track from Amritsar city (Punjab) to Tusham ring complex (Haryana) has been analysed using SSTNDs from the health aspects point of view and also to observe its variation with the geological formations of the respective regions. In the high heat producing (HHP) granitic region of Tusham ring complex, Bhiwani District, Haryana, known to be composed of acid volcanics & associated HHP granites, uranium concentration in the groundwater water samples varies from 7.6 ± 0.03 – 59.6 ± 0.20 $\mu\text{g l}^{-1}$ with the average of 27.9 $\mu\text{g l}^{-1}$, which is comparatively higher than the average value of 17.4 $\mu\text{g l}^{-1}$ observed in non-HHP/non-granitic region of Amritsar, Punjab. Uranium concentration values in these samples show a wide range of variation depending upon different factors like source, location, depth and local geology etc. Except at certain specific locations in the HHP Tusham region, the levels of uranium concentration in the samples of ground water are lower than the international recommended safe limits.

The radon concentration in the ground water samples along this track has also been studied using the Alpha-Scintillometer (GmbH 2002). Although the radon concentration varied from 3.4 ± 0.6 to 15.7 ± 0.5 Bq l⁻¹ for the non-HHP Punjab region, but it has been to have a wide variation from 4.7 ± 0.7 to 49.7 ± 1.7 Bq l⁻¹ on approaching the HHP Tusham region. Although both uranium and radon distribution in groundwater was found to be related with the acid volcanics and HHP zones in the respective regions, but no general trend was observed for any relation with the source depth and surface radionuclide content. On the other hand, a slightly positive correlation ($R^2 = 0.5$) between radon content and uranium concentration in water samples of the studied region explicitly depicts that ²²²Rn concentration strongly depends on its progenitor content in water. The slightly higher values were observed from the ground water samples particularly of the areas falling in this belt of pre-Malani igneous rocks famous for lithological units, including felsite, granite and schist exposed in the area near Haryana-Rajasthan border. The values observed at certain locations are found to be higher than the international recommendations. The high uranium concentration observed particularly in some locations around Tusham Ring Complex can be attributed due to interaction of ground water with the soils as well as rock formations of this region and the local subsurface geology of the region.