

Accumulation of radioactivity inside Yoshimi archeological heritage

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The Hundred Caves of Yoshimi is a cluster of ancient grave caves dug on the cliff made of tuffaceous sandstone located in Yoshimi town, Saitama. It was designated as a national historic site on March 7, 1923. Built between late 6th century and late 7th century, the caves were initially made for only the blood royal and other big powerful families but later used for large scale of underground munition factory. At present, the area is used for tourist attraction. Continuous survey has revealed that the caves are heavily affected by salt weathering, mostly by gypsum. However, seasonal changes have also been observed in salt formation. As part of that survey, accumulation of natural radioactivity, significantly anomalous than background level, has been observed inside some of the caves of Yoshimi. The survey has been carried out to all accessible caves and radioactivity was measured by Horiba Radi PA-1000 radiation monitor within 2-5 cm of the wall. Radioactivity was found to be as high as 0.119 micro sievert per hour in some of the walls which is more than twice of the natural radioactivity found at the entrance of the area. This amount is marginally higher than the radiation dose limits for general public. Having similar rock type in all the caves, the reason of such accumulation of radioactivity is lichen formation in the inside walls which is a known bio-accumulator of radioactivity. Though studied walls are still out of reach of tourists visiting Yoshimi caves, spreading of lichen to other walls might increase the radioactivity risk. Such accumulation of radioactivity also needs to be considered if other caves are opened for tourists in future. Specific source of radioactivity also needs to be investigated through detail survey.

Keywords: Natural Radioactivity, Yoshimi caves, Weathering, Lichen, Bio-accumulator, Radiation dose