

MEASUREMENTS OF Rn - 222 CONCENTRATIONS IN DWELLINGS IN AN AREA OF HIGH NATURAL RADIOACTIVITY

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ABSTRACT

An investigation was conducted on the levels of Rn- 222 concentrations in dwellings in Köprübaşı where there exists large uranium ore deposits. Considering the importance of the region in radioactive environmental programme of our Institute the radon concentrations of dwellings were measured by using LR-115 cellulose nitrate films as nuclear track detectors. The results have indicated that the range of radon levels in this area is 20-340 Bq/m³. The highest radon concentrations are observed in the stone buildings which were constructed with the material obtained from that area.

INTRODUCTION

Long term measurements by using LR-115 nuclear track detectors have been carried out to investigate the distribution of radon concentrations in dwellings in Köprübaşı located in vicinity of uranium ore deposits (1). One can think it might be a possibility of health risk even for long exposure to low irradiation doses. This is fundamental when some population group are living in an area of high level of natural radioactivity. It follows that more information about radon concentration level in the atmosphere of the dwellings in Köprübaşı seems to be necessary for considering the importance of the region. Taking this point into account the radon concentration has been measured in about hundred houses of the region in radioactive environmental programme of our Institute.

EXPERIMENTAL AND RESULTS

Kodak- Pathe LR -115 type 2 cellulose nitrate film is used as SSNTD for the measurements of radon in dwellings in the vicinity of uranium deposits. These small passive and inexpensive detectors are convenient for making the long term measurements of alpha activity of indoor radon. LR- 115 type 2 film in this study was cut into 1.2* 1.2 cm pieces, numbered and attached with the tape on the bottom of a numbered plastic cup. These sampling cups were hung to living quarters of dwelling. After exposing for a month the films were collected and processed chemically. Etching conditions in this process are % 10 NaOH at 60 °C for 2 hours (2) using 25 ml etchant for each film (3) in a thermo-controlled water bath. The number of registered alpha tracks per film area is manually counted using an optical microscope. To avoid poor counting statistics on each film normally an area of 1 cm² is counted. After counting, the alpha track density was converted to units of Bq / m³ radon. In our laboratory calibration 1 track/ mm² corresponds to an exposure of about 31.25 Bq/m³

radon and its daughters during a month (4). The distribution of radon levels in this region is shown in figure 1.

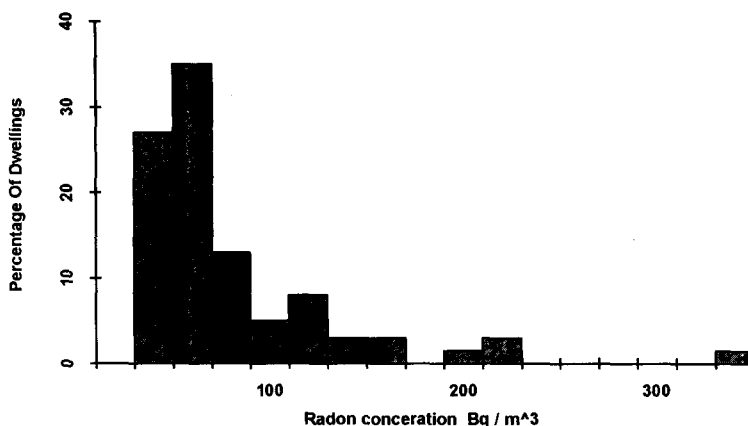


Figure 1. Radon concentration in Bq/m³ according to percentage of dwellings

The results have indicated that the range of radon levels in this area is 20-340 Bq/m³. The highest radon concentrations are observed in the stone buildings which were constructed with the material obtained from that area.

CONCLUSION

The survey of radon levels in Köprübaşı located in vicinity of uranium ore deposits indicated that a large percentage of the houses has Rn-222 concentrations below 100 Bq/m³ as a small percentage of the dwellings is above 200 Bq/m³. But these values are higher the corresponding values for the dwellings in İzmir (4) in radioactive environmental programme of our Institute.

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