Radon and thoron measurements by nuclear track detectors

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Although the radon (²²²Rn) presents the main concern of inhalation dose contributor for general public recently the thoron (²²⁰Rn) has gained increasing attention among health physicists. In this study radon and thoron parallel measurements were executed.

Modified Hungarian detectors were placed at different sites, including homes, mines and caves, in Hungary in order to get information on the average radon (²²²Rn) and thoron (²²⁰Rn) concentration over the investigated period. These detectors were developed and evaluated at National Institute of Radiological Sciences (NIRS).

For the detectors placed in dwellings in Hungary a village Kövágószőlős was chosen. This is a village with 1200 inhabitants; the houses are mainly one or two stories. It is located in a little mountains (Mecsek) in the south part of Hungary. This village was chosen because there were several cancer cases in the same street of it and increased radiation-fear emerged among the inhabitants due to the situation that there was a former uranium mine not far from here. (Actually, some tunnel of the former mine can be found under the village.) Uranium tailings ponds under recultivation are located in its neighborhood as well.

The detectors were mostly placed in the living area of the houses. The data presented by them were analyzed and an annual dose on people was assessed using them.

The average radon concentration here was found to be 147 Bq m⁻³, which is slightly higher than the Hungarian average. The maximum was 1080 Bq m⁻³. The average thoron concentration was 88 Bq m⁻³, with the maximum of 714 Bq m⁻³.

Detectors were also placed in cellars of the buildings so as to confirm whether the soil work as the radon and thoron sources.

The detectors placed in caves and mines provided useful information about these special underground places.

Important feature of these investigations is the parallel measurement of radon and thoron, which is the first attempt in this scale in Hungary.