



SURVEY OF RADON ACTIVITY AT GROUND LEVEL IN VILLAGE HOUSES IN HUNGARY

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Our national survey in Hungary began in 1992, in the most beautiful European village: Mátradereske. In the dwellings of Mátradereske there is a wide range of radon activity concentration from 50 Bq/m³ to 2600 Bq/m³ in yearly average. In the first two years we have learnt the whole process of the measurement in this village: how to communicate with the local people with the help of the local students and their physics teacher, how to handle CR 39 track detectors in a reliable way, and how to evaluate the detectors by a home made semi-automaton.

The results in this village encouraged us to extend our survey to find a much wider statistics to see better the correlation between cancer cases and low dose radiation.

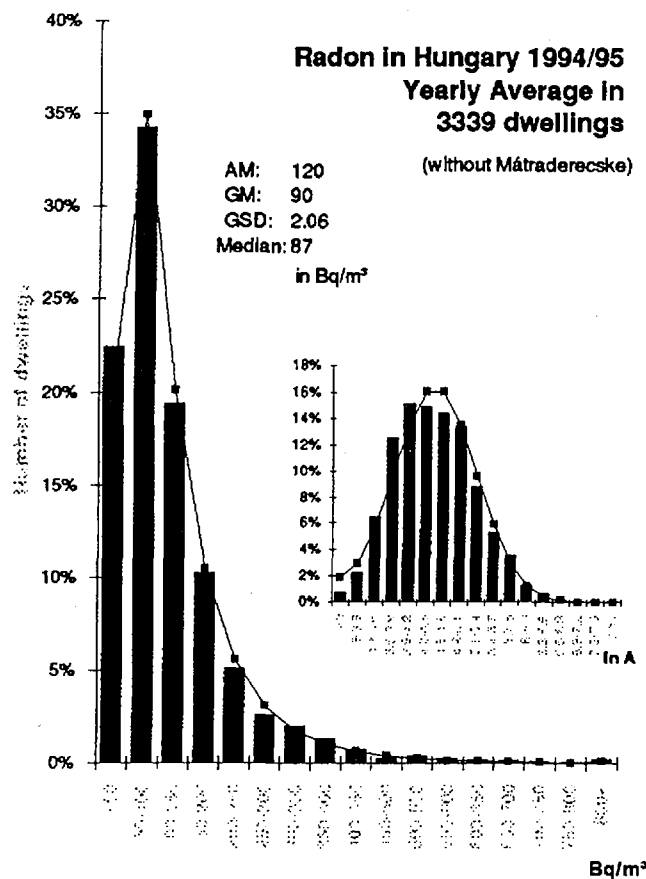


Fig. 1.

During the three years our survey of Mátradereske we have found the well-known daily and seasonal varying of radon, but something more came up: there are long term variations year by year, or maybe there was a sudden jump in the last few years. It is an interesting question whether these changes are

characteristic only for Mátraderecske, or for the whole country.

And we have learnt in Mátraderecske how to mitigate houses in different and inexpensive ways with success.

Mátraderecske prepared our group to carry out a ten times wider survey in the Hungarian villages all over in the country. Our co-workers are the local students and their teachers. When we distributed the detectors, the students of the Lauder Research Group visited the local students, and taught some nuclear physics and radiation protection for them.

The detectors were placed in the bedrooms at pillow level in three seasons (Autumn, Winter and Spring). We calculated the yearly average taking into account the time of exposure and estimated the Summer radon level as fifth of the Autumn-Winter value.

The CR 39 (from NRPB, England) were etched in 25 % NaOH solution at 86°C for 6 hours. The tracks were counted by the semi automatic system, which were built up by Elektronika 77, Budapest, and the software was developed by our group. For the calibration we got help from Jon Miles, NRPB, England. In the case of our detector's arrangement 1 track in 1 mm² means 37 Bq/m³ month.

In 1994/95 we measured the radon in more than 3700 houses in Hungary, we were able to calculate the yearly average in 3573 dwellings. Our sample represents the radon activity concentration at the ground level of houses in the Hungarian villages. It is quite interesting that together with Mátraderecske the mean value of the Hungarian yearly average is 132 Bq/m³, but without this village this is only 120 Bq/m³.

One can predict the percentage of the houses of higher activity concentration based upon the lognormal distribution of the measured houses in the previous year. (This was suggested to us by Jon Miles, NRPB, England.)

We tested this method on two villages by choosing randomly 20, 40 and 80 houses from the previously measured few hundred dwellings. Then we compared the real percentage and the predicted ones by the lognormal distribution.

The applicability of the method is shown in the following table.

	number of selected houses	over 400 Bq/m ³ (%)		over 800 Bq/m ³ (%)	
		prediction	reality	prediction	reality
Mátraderecske (from 470 houses)	20	12-57	22	0-26	6
	40	12-41		0-11	
	80	19-33		2-8	
Dunántúl (from 248 houses)	20	0.1-9.9	3.6	0-2.3	0
	40	0.4-7.5		0-1.3	
	80	1.1-8.7		0-1.2	

Table 1.

We found houses with higher radon level not only in Mátraderecske, but in 8 other villages in Hungary. In the year 1995/96 our survey continues

- in Mátraderecske,
- in the 8 villages of higher radon to get more data for the cancer research,
- in many villages enter the project in 1995,
- in some previously measured villages to follow the radon varying in time.

Thanks for the Engineers for Environment Foundation, for the Deák & Deák Financial Advisory Office,

for the OMFB, Elektornika 77 and for the OTKA Project of Atomic Physics Department, Eötvös University to sponsor the RAD Foundation, giving the financial background of our work.

Thanks to George Marx and to Jon Miles for their professional patronage and thanks the patience and the love of the world's most beautiful village, Mátraderecske.

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