11th INTERNATIONAL WORKSHOP
on the "GEOLOGICAL ASPECTS OF RADON RISK MAPPING"
September 18th – 20th(22nd), 2012

ABOUT SEISMOTECTONIC CONTROL OF THE GROUND RADON FLUX

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Prague, Czech Republic - 2012

OBJECTIVE: The assessment of the seismological influence on the ground radon flux

This has been carried out by two ways:

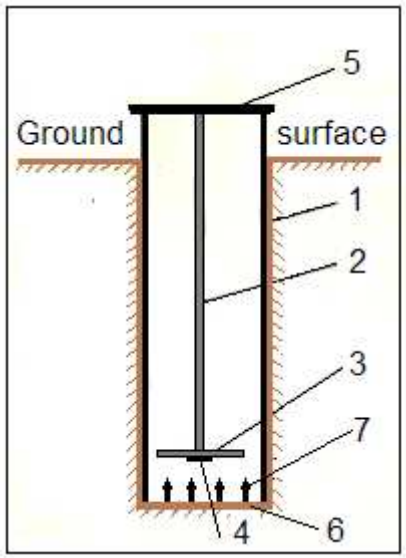
- synchronous monitoring of a radon flux in near-surface sediments on two test area differing by level of seismological activity

and

- observation over radon variations in natural conditions under influence of artificially induced vibroseismic fluctuations of various frequency.

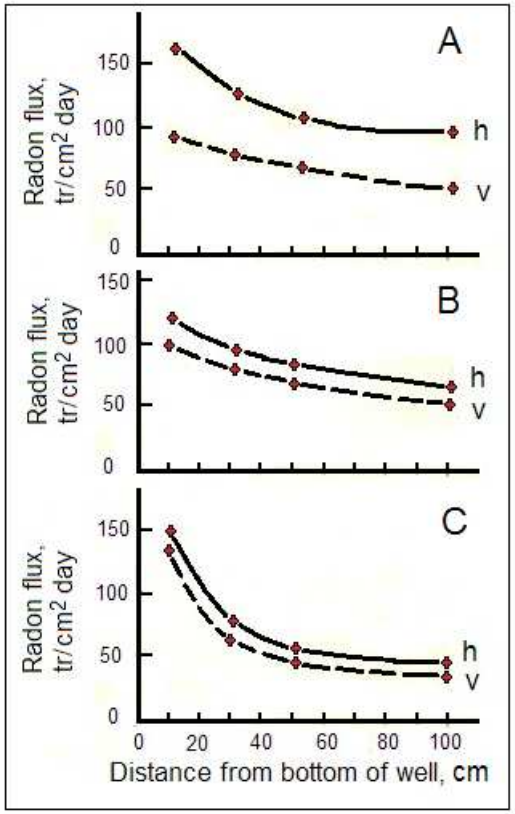
In both cases the concentration of radon flux was recorded in 1,2 m deep boreholes using the alpha-track method.

About method of measurements of the radon flux



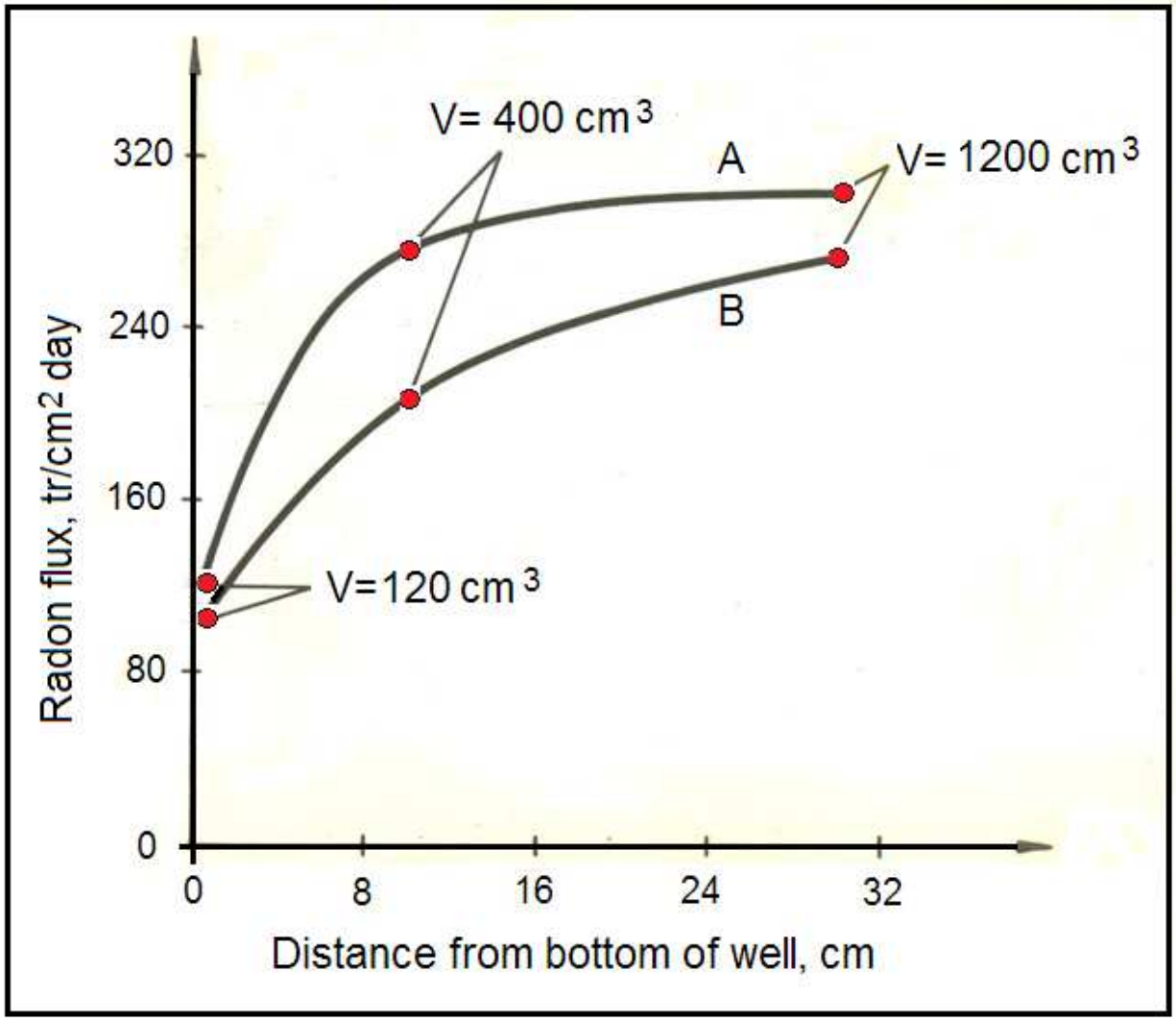
Scheme of construction for radon measurements

(1)- duraluminium tube; (2) - rod with horizontal floor (3) and special alpha-radiation sensor (4); lid (5); bottom of well (6); radon flux (7)

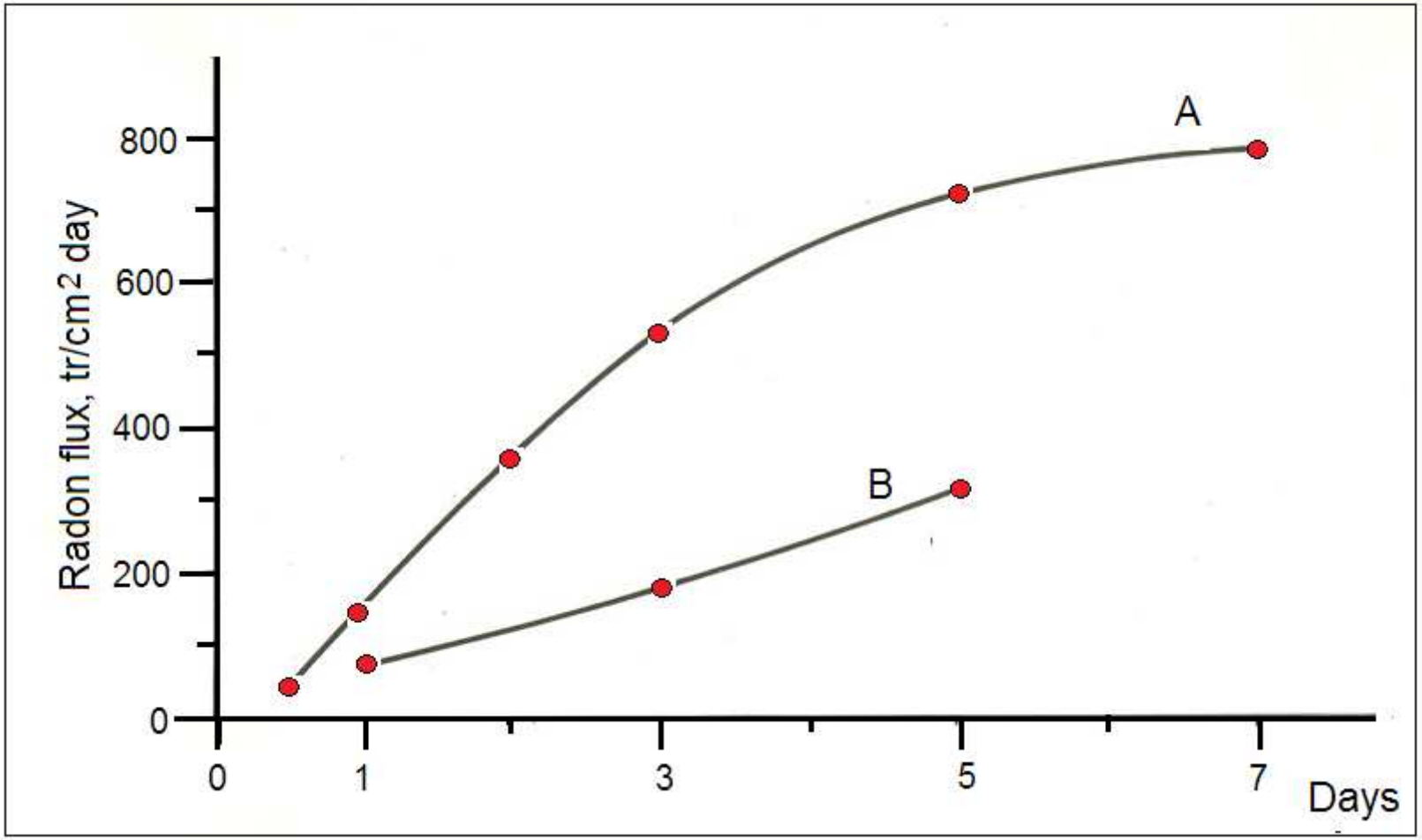


Radon flux vs. distance from bottom of different (A, B, C) wells (in open regime): (h)- *horizontal* and (v) – *vertical* position of sensor

Radon flux vs. volume of closed chambers in two different wells (A and B)



Radon flux vs. exposure time in closed (A) and open (B) chambers

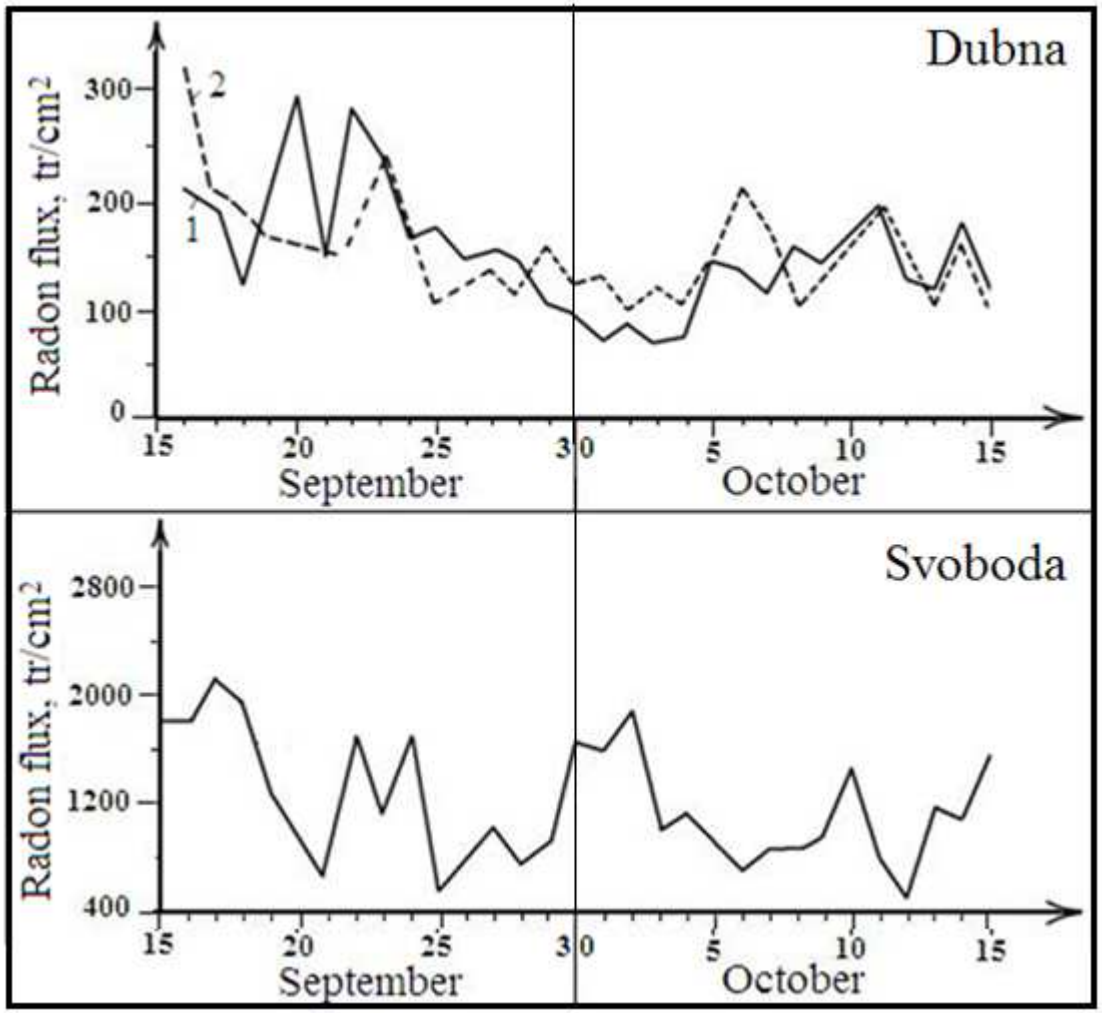


RESULTS OF INVESTIGATIONS

Schematic display of the measurement localities
(are shown with solid circles)

During the measurement period daily average air temperature and atmospheric pressure varied: in Dubna, within the range 0 – 14°C (mean 7,7°C) and 971-1006 mb (mean 991 mb); in Svoboda village within the range 7-18°C (mean 10,8°C) and 957-1001 mb (mean 986 mb), respectively. Over the observation period atmospheric precipitation was noted at both localities.

Variations of the underground radon at Svoboda village (Northern Caucasus) - and at Dubna city (Moscow region): 1 and 2 - different wells



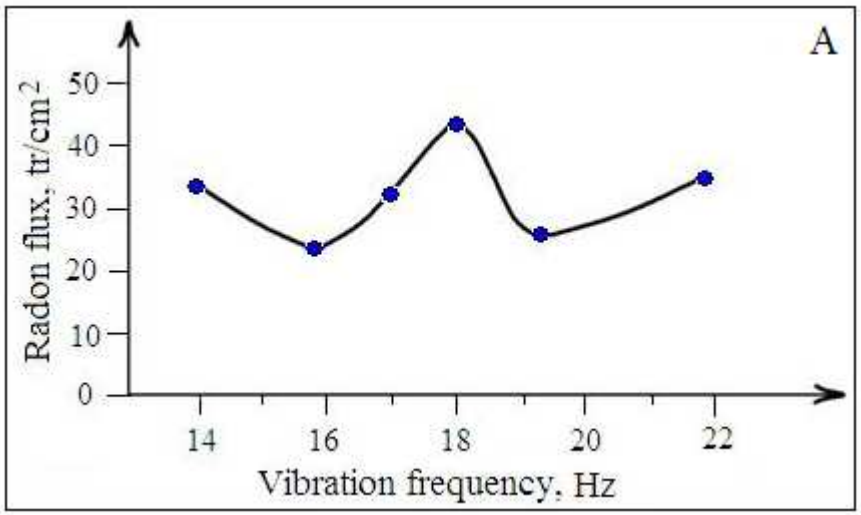
Results of synchronous measurements of subsoil radon flux on the two Russian sites with different seismotectonic conditions

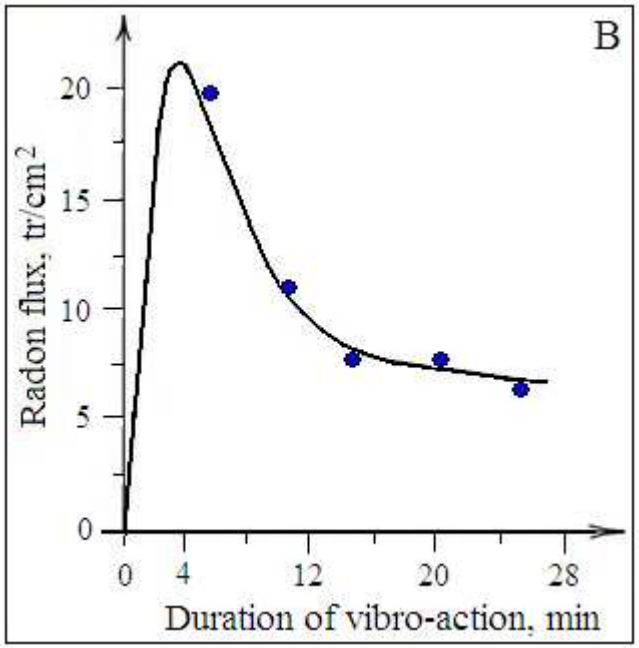
Measurements locality		Number of tracks on sm^2 per day	
		Range	Average
Dubna town	well A	74-300	159
	well B	104-244	152
Svoboda village		434-3014	1344

Results of experimental monitoring of radon fluxes during vibroaction (Table):

Radon fluxes vs. frequency (A) and duration (B) of vibration

Type of monitoring radon flux	Limits of variations of radon flux, tr/cm² 10 min	Average
No vibration action	0-2	1
During vibration action	11-46	24





Main conclusions

- radon flux in the near-surface layers is seismotectonically controlled;
- mobile and highly dislocated folded regions (as opposed to tectonically stable ancient cratons) are characterized by more favorable conditions for radon flux from soil;
- enhancement of a radon flow under influence of seismic fluctuations occurs most contrast at the certain (selective) frequencies.

THANKS
FOR
ATTENTION