The prospects of solving of the radon problem in Azerbaijan

Ch.S.Aliyev[1], A.A.Feyzullayev[1], Valsangiacomo[2]C, R.J.Baghirli[1], M.Hoffmann[2], F.F.Mahmudova[1].

[1] ï Institute of Geology and Geophysics of Azerbaijan National Academy of Science (ANAS)

[2] ï University of Applied Sciences of Southern Switzerland (SUPSI)

Prague, 2014

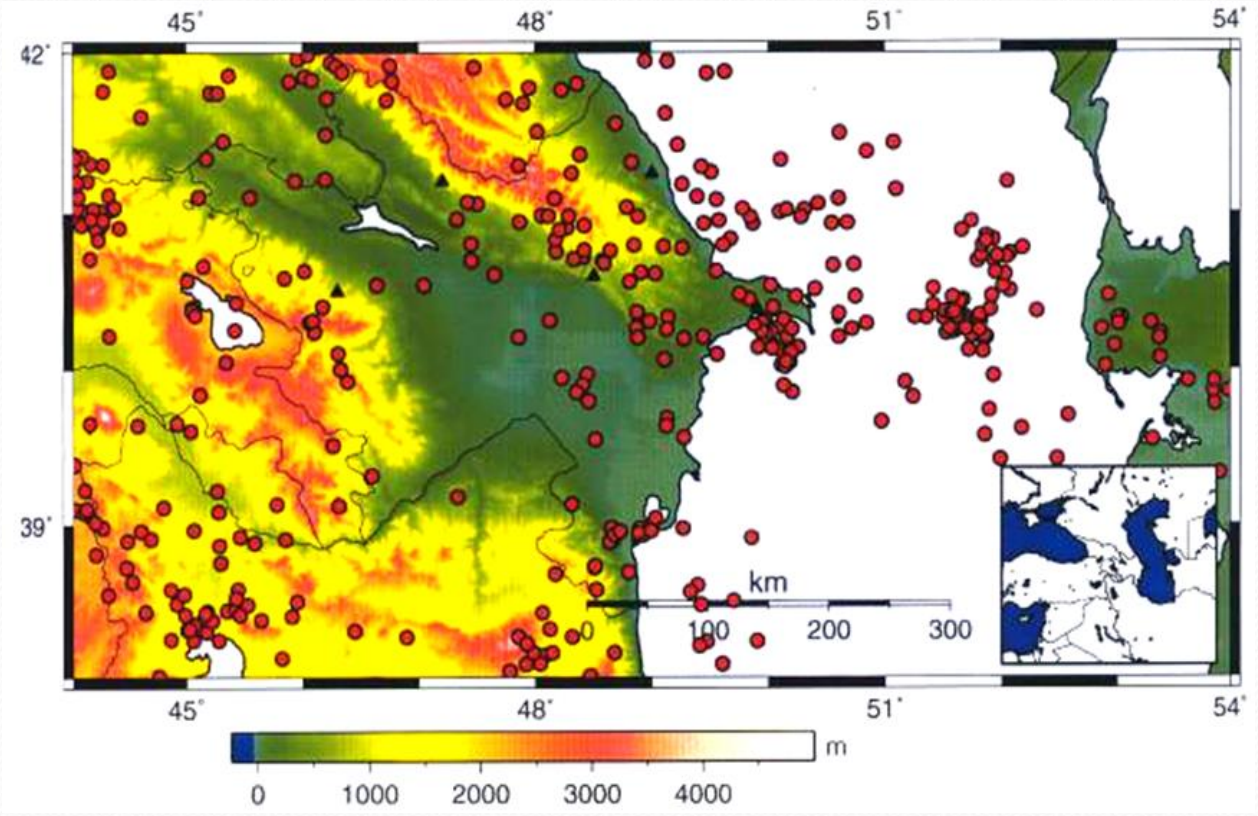
OUTLINE OF PRESENTATION

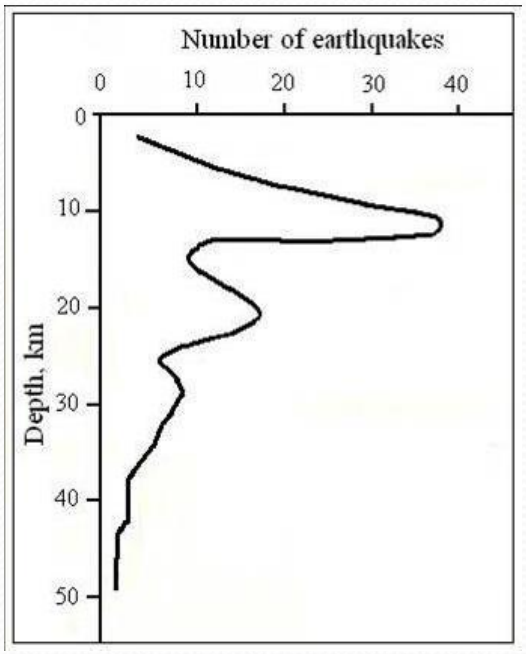
- About results of passive indoor measurements of radon in Azerbaijan
- Some results of measurements of radon in soil
- About first in-house test of radon mitigation
- New Radon State Program in Azerbaijan

- These studies were carried out with the financial support of the Swiss National Science Foundation (SNSF) under the grant “Creation of Cadaster and Map of Distribution of Radon in Azerbaijan Using the Swiss Methodology and Experience”. The studies were carried jointly by the Radon Competence Centre (RCC) of the University of Applied Sciences and Arts of Southern Switzerland (SUPSI) and Institute of Geology and Geophysics of Azerbaijan National Academy of Sciences.

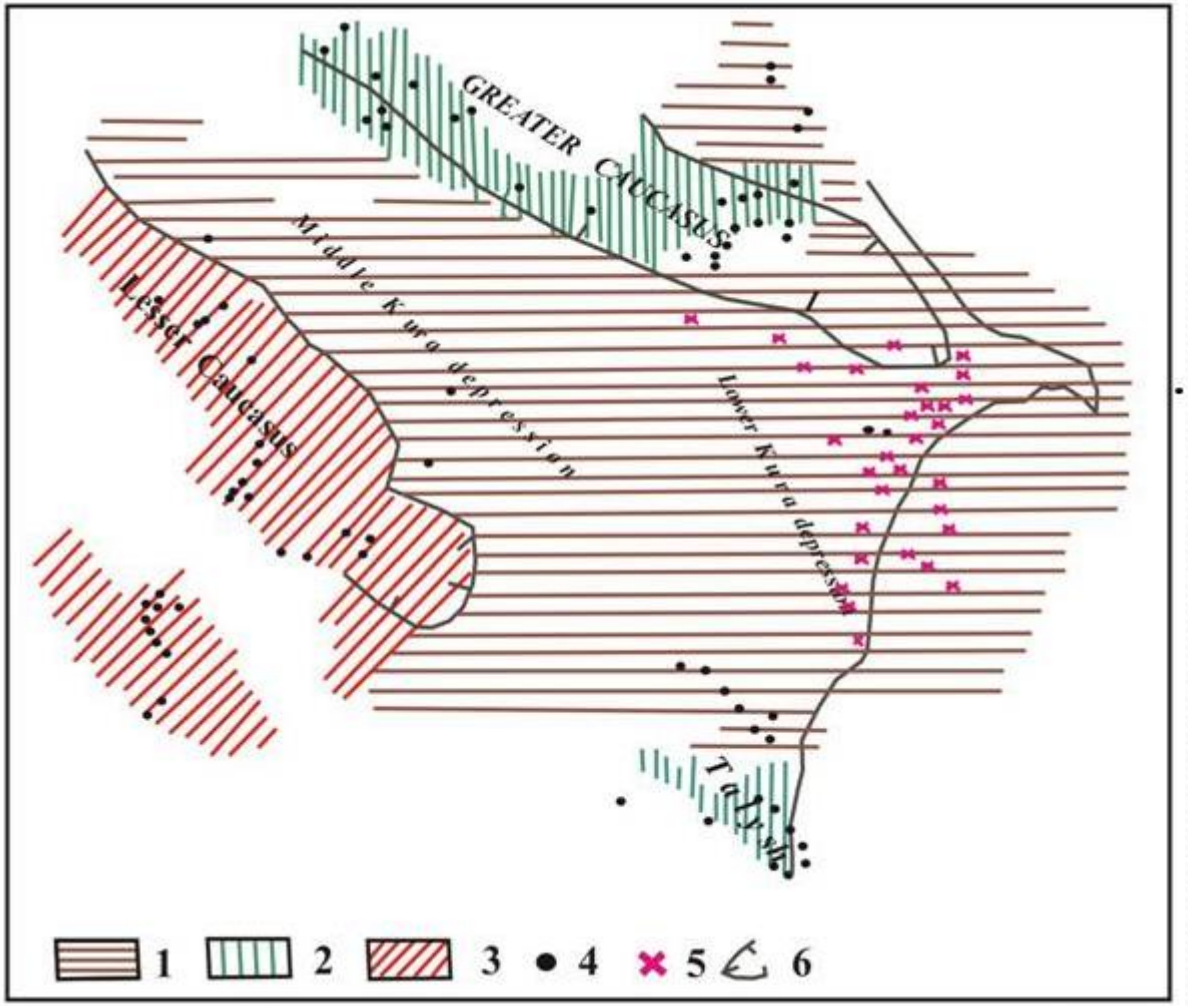
Geological map of Azerbaijan

Map of distribution of the earthquakes events with magnitude M≥4 and earthquakes hypocenters vs. depth, Azerbaijan



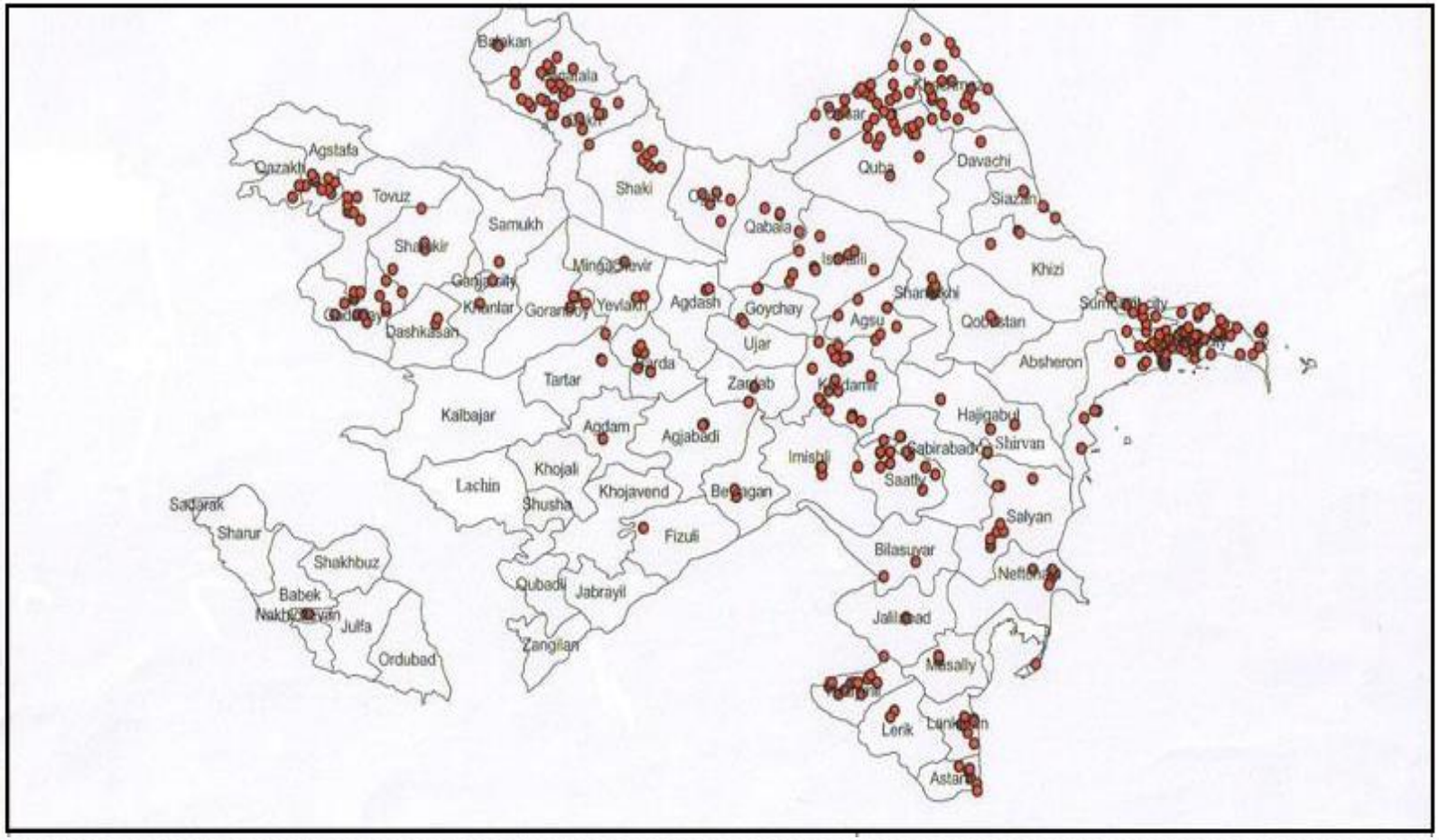


Schematic map of distribution of natural gas seepages on Azerbaijan territory: **1-mineral and thermal springs**; **2-mud volcanoes**; 3- carbon dioxides; 4-mhetanic gases; 5-mhethane-nitrogen gases; 6-counters of geotectonic units.

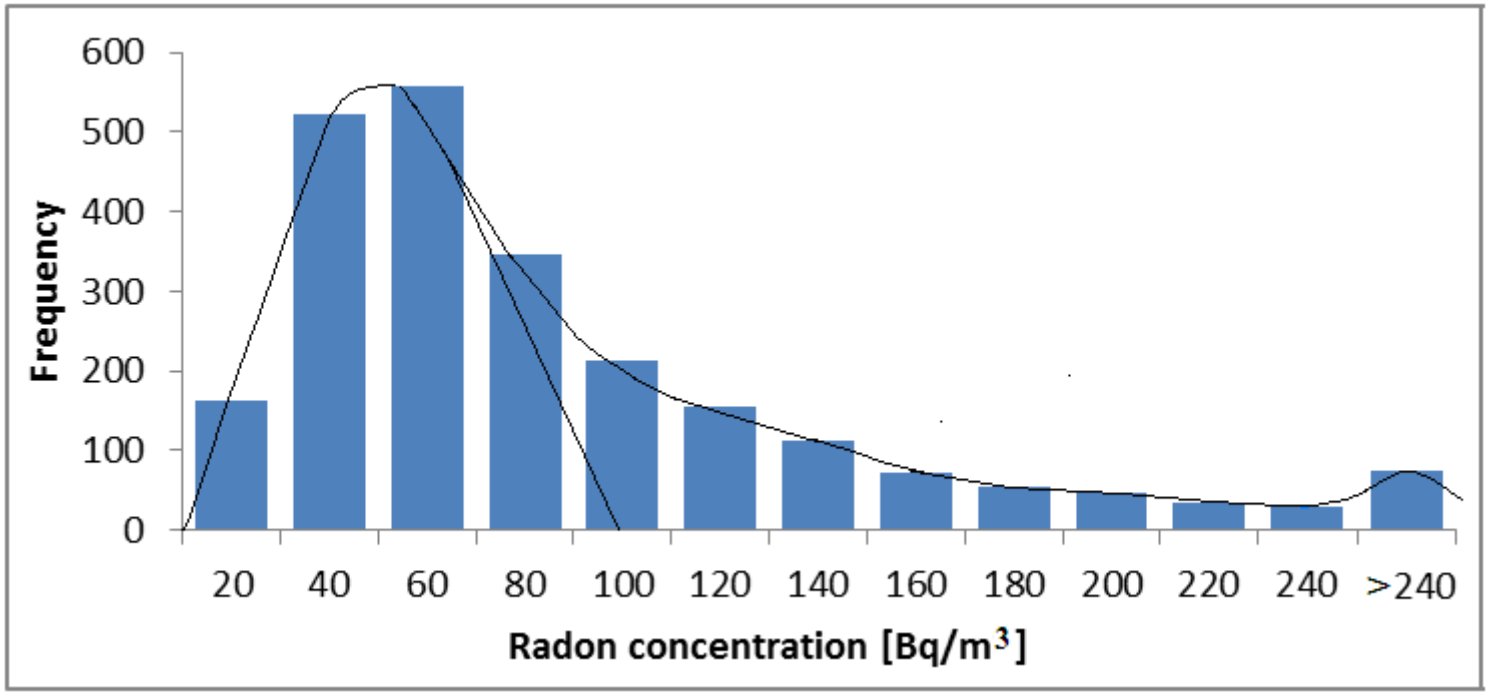


- About 2500 radon dosimeters of type *Gammadata-Landauer* were placed in different regions of the Azerbaijan, mainly in residential and in some cases in industrial buildings, during the period of November-December 2010. The exposure time is about two months. Several dosimeters (around 50 pcs.) were installed in oil fields of the Absheron Peninsula and kept there from March to April 2011.

Map of distribution of radon measurement points

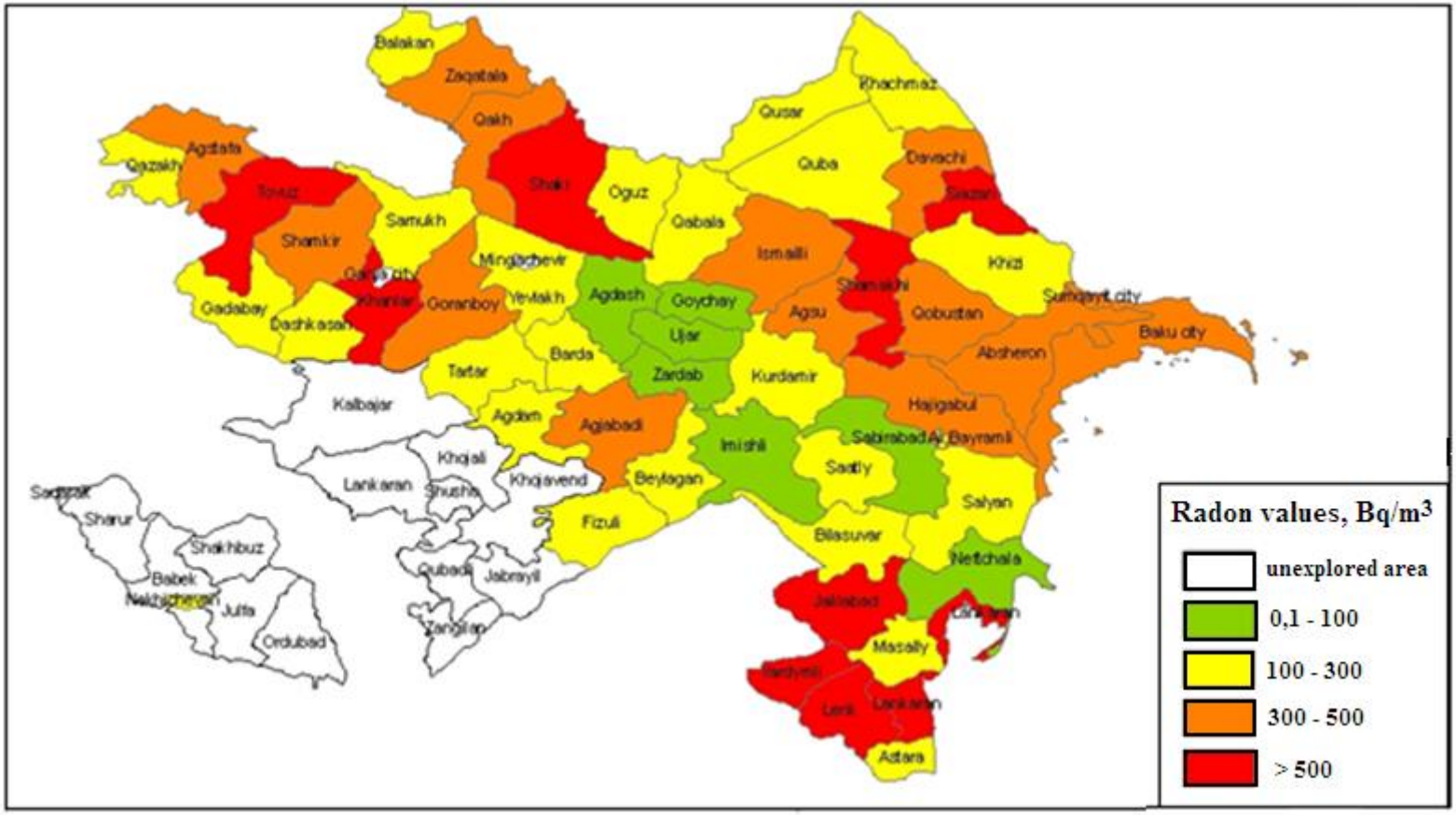


Histogram of distribution of radon concentration values, Azerbaijan

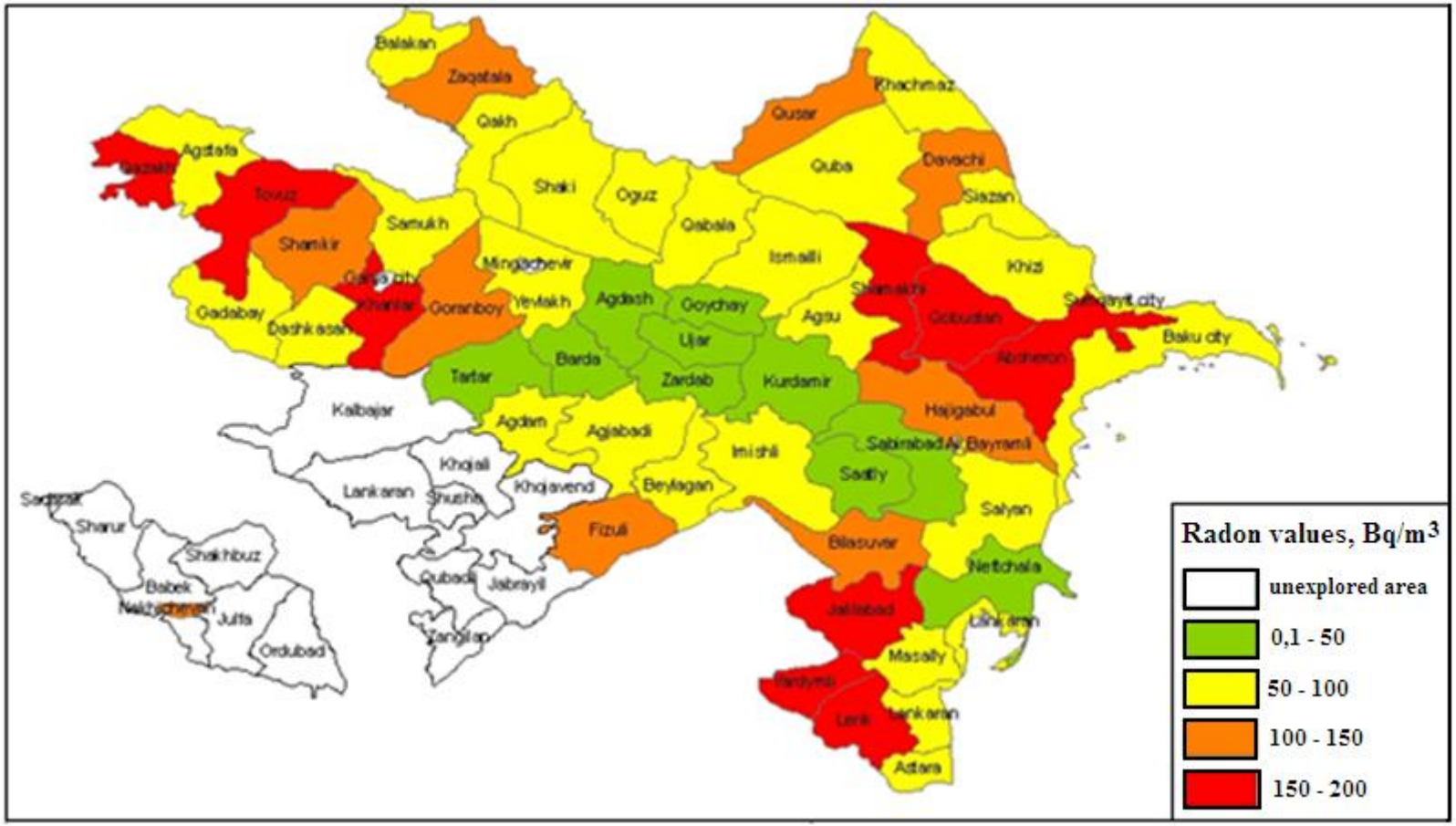


Limits of change of radon content in living space of Azerbaijan are from **10 to 1200 Bq/m^3**

The map of distribution of maximal values of radon concentrations in living spaces of Azerbaijan



The map of distribution of average values of radon concentrations in living spaces of Azerbaijan



Radon concentration at different floors of buildings

Floor	Number of measur-ts	%	Radon concetration, Bq/m^3		
			Max	Min	Average
1	1581	78,9	1109,0	0,32	62,2
2	439	21,6	549,0	0,71	52,0
3	15	0,74	68,2	0,32	23,0
4	6	0,30	44,8	0,32	23,2
5	1	0,05	19,3	19,3	19,3
Total	2031	100	–	–	–

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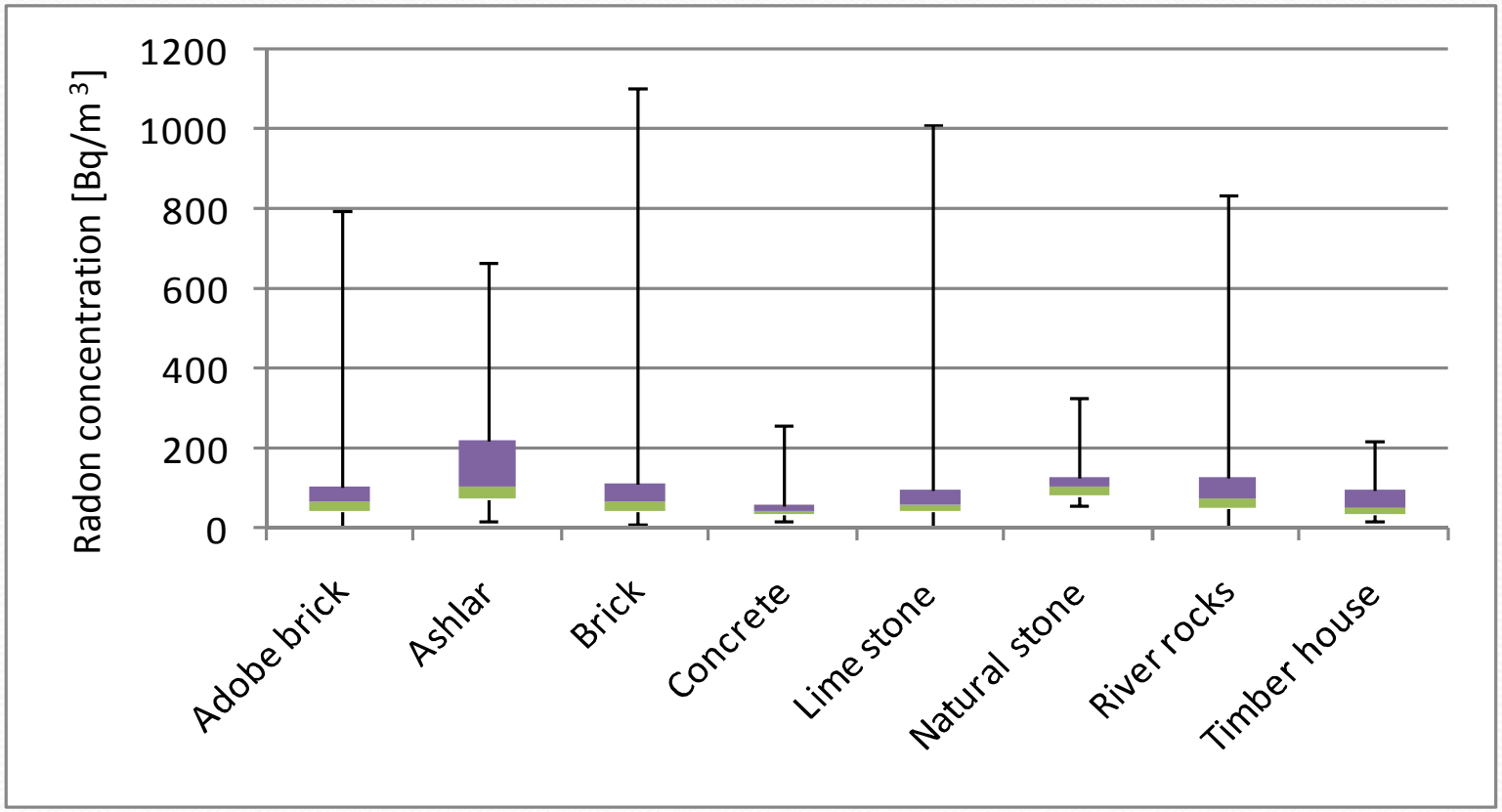
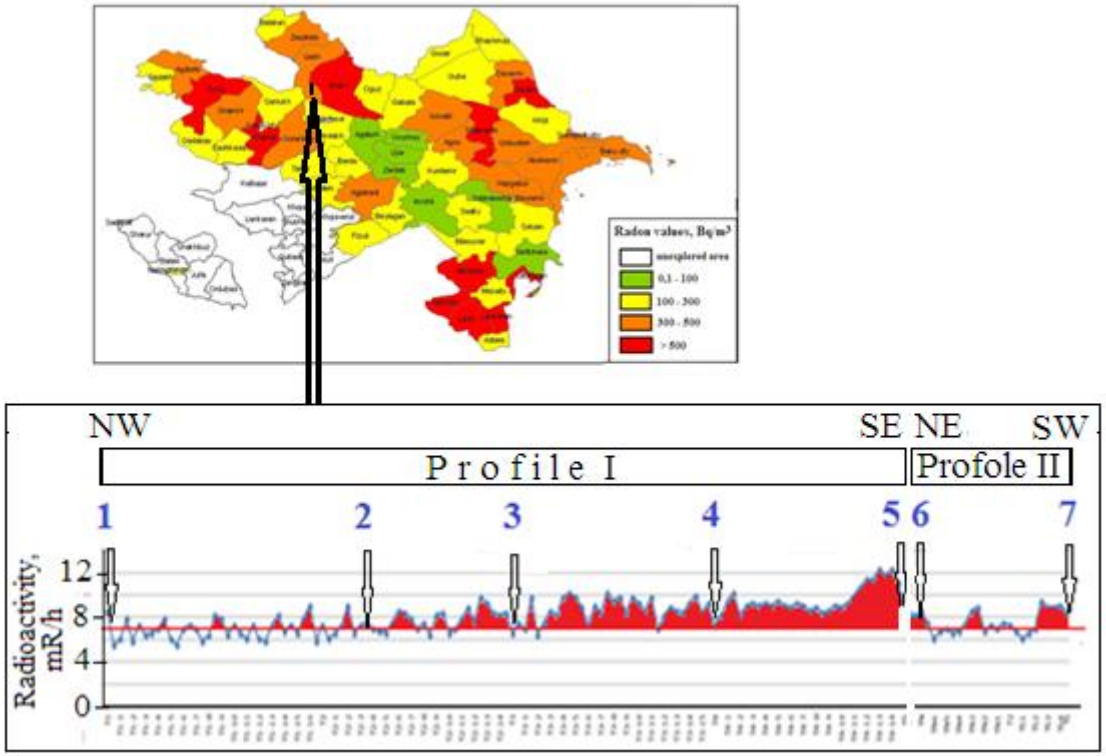
A box plot of the indoor radon concentration as a function of the building materials, Azerbaijan



On August 18, 2009 near village Dzhabany in Shamakhy region appearance of a small local landslip was happened.

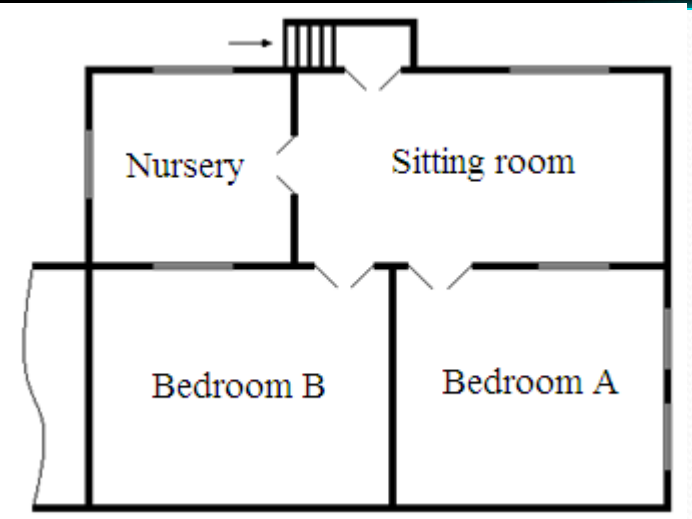
The site where the temperature 182°ч on depth about 0,2 m on eastern marginal part of a landslip has been revealed. The radiometric measurements carried out here during 2009-2014 have shown high values of a radioactivity – from 30 to 80 mR/h (on outcrop near this site radioactivity is not exceeded 12-15 mR/h). Measurements of concentration of radon in soil also have shown high values – from **11800 to 69100** Bq/m^3.

Radioactivity and content of radon in soil along of profile on the South slope of Great Caucasus



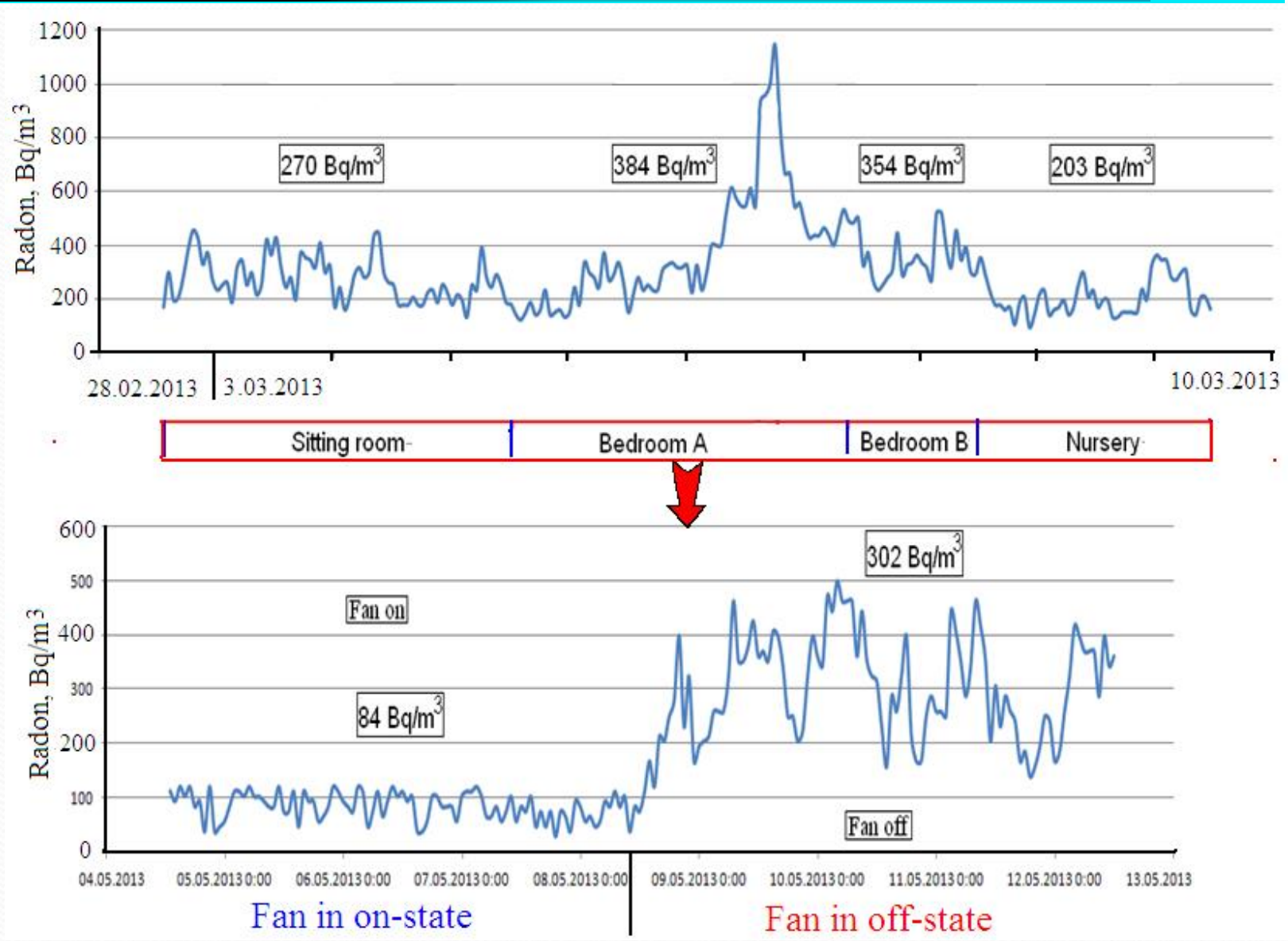
Number on profile	Radon concentration in soil, Bq/m³		
	Min.	Max.	Average
1	0	55,9	21
2	0	55,6	13,9
3	28,0	56,0	48,9
4	55,9	197	126
5	336	647	491
6	55,8	224	105
7	140	336	252

First in-house test of radon level mitigation in Azerbaijan

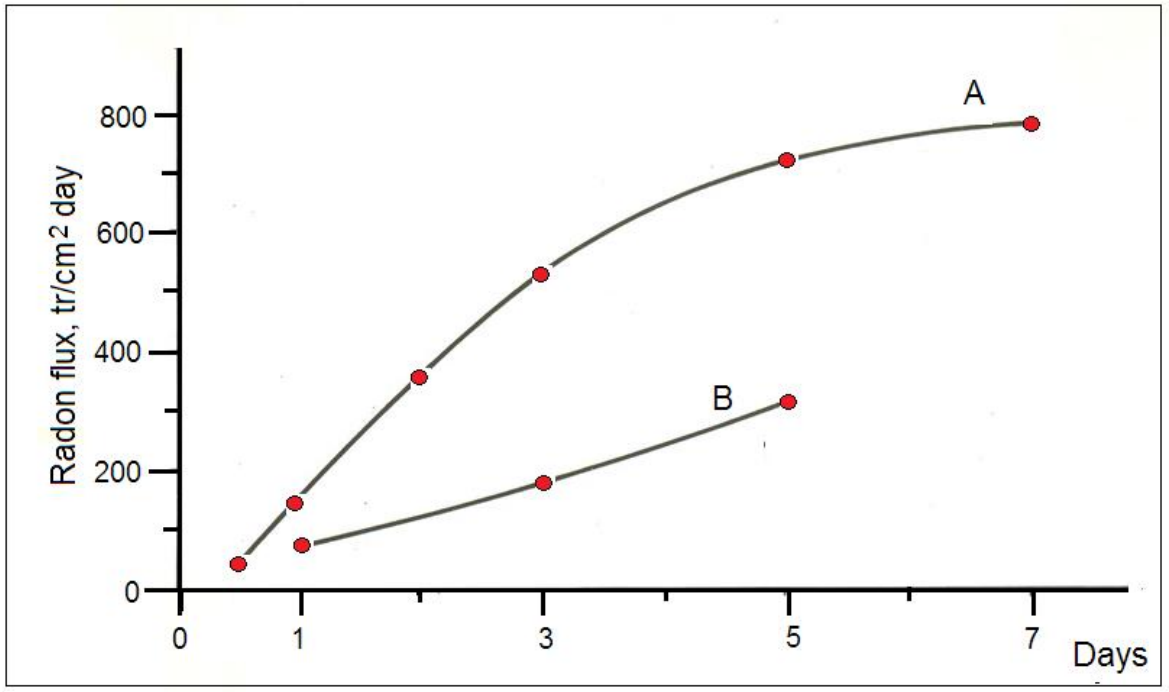


The house view in plan and position of ventilation system

Diagrams of change of radon concentration in rooms



Results of experiment on mitigation of indoor concentration of radon are well agreed with results of the test of radon emanation in soil (in shallow 1,2 m well) with use alpha-track method. Measurements during the same time intervals in closed and open conditions have shown, that in the closed well (*closed gas-dynamic system*, like a room during winter time at the switched off fan) concentration of radon higher, than in the open well (*open gas-dynamic system*, like a room in summer time or when the fan is on-site).



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

About Radon State Program, Azerbaijan (2014-2019)

- After completion of this stage of works we informed the government of Azerbaijani republic on the received results and recommended to take a radon problem under the state control. The government has supported our initiative and has charged to prepare the State program. After all necessary coordination the program prepared by us has been approved by the government of republic on July, 31st 2014 (¯ 236).
- In implementation will be take part: National Academy of Sciences (Institute of Geology and Geophysics; Institute of Radiation Problems), Ministry of Emergencies, Ministry of Health, the Ministry of Ecology and Natural resources.

- **Main Objective** of Program: ***Investigation and decrease of radon risk in Azerbaijan***

THANKS FOR ATTENTION!