Time courses of soil radon volume activity in selected areas of Bratislava

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Abstract: In situ emanometric measurements are based on air sampling from soil environment. The soil horizon could be, in general, characterized as very loosened in comparison with deeper parts of rock environment. However, in fact, the gas permeability of weathering cover is given by its specific physical properties mainly by grain structure, grain shape and water content. These are parameters which essentially influence an interaction between pore space of soil layer and atmospheric air. Changes of physical properties of atmospheric masses during a year have their reflection in variations of radon volume activity in soil air. The goal of this work was the monitoring of this interaction in time. The presented paper brings some results of almost two years of monitoring measurements of soil radon volume activity in three study areas in Bratislava and their analysis in dependence on physical properties of weathering cover and on changes of temperature, humidity and pressure of atmospheric air. Thanks to relatively high difference in clay component contents in the studied localities, the presented results confirmed, in good agreement with former works, their inversely proportional relation to variations of soil radon volume activity values. They also confirmed some dependence of soil radon volume activity on time changes of meteorological parameters in a year climatic cycle. In case of ^{222}Rn the two-maxima shape of its volume activity course during a year with main dependence on rain precipitation intensity was measured and in case of ^{220}Rn a strong dependence on temperature in a year cycle is visible. The radon risk category assessment in study areas based on monitoring measurements results in different time periods during a year shows a category change possibility mainly in case of areas with inhomogeneous structure of their geological basement, which was the case of study area with active tectonics presence.

Key words: volume activity of ^{222}Rn and ^{220}Rn, soil air, gas permeability, radon variations, radon risk

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