Geophysical Research Abstracts
Vol. 13, EGU2011-11774, 2011
EGU General Assembly 2011

Dependance of Rn-222 concentration changes in water of stream on the distance from the spring

Tadeusz Przylibski, Katarzyna Zagożdżon, and Paweł Zagożdżon

Wroclaw University of Technology, Faculty of Geoengineering, Mining and Geology, Institute of Mining, Division of Geology and Mineral Waters, Wroclaw, Poland (tadeusz.przylibski@pwr.wroc.pl)

ABSTRACT

Rn-222 isotope dissolved in water of rivers and streams may be used as a tracer of fault zones cutting the stream or river. Applying radon to this purpose it has to be defined precision of fault location on the bootom of stream or river. For this purpose one of the authors (Przylibski, 2005) has been working from 2004 on the Rn-222 activity concentration changes in water alongside with the distance from the spring to the point of stream or river water sampling. The authors continues this research in the area of crystalline rocks outcrops in the Sudetes (SW Poland). Research embrace two streams with their springs located within gneisses characterised by enriched content of parent Ra-226 isotope. Its concentration in these rocks reaches up to 244 Bq/kg (Przylibski, 2004). As a result of this big concentration of Ra-226 in reservoir rocks one may noted also increased concentration of Rn-222 in springs, being the beginning of the examined streams. Rn-222 activity concentration in the examined springs changes within 350 and 1000 Bq/L. Investigation of Rn-222 activity concentration changes in water alongside with the distance from the spring enables to find out how quickly radon is released to the atmosphere. On this ground it is possible to estimate the distance from the spring where Rn-222 activity concentration drops to the minimum, constant value. This value is characteristic for the state of equilibrium between the quantity of radon atoms released from the rocks of the bottom and the banks of the stream to the water and the quantity of radon atoms released at the same time from water to the atmosphere. In water of examined streams this value equals 0.5 Bq/L.

On the ground of continued research authors have found out, that the distance between the spring and the point on the stream, where Rn-222 activity concentration is constant (reaches minimum value), amounts at least 150 m. During this research authors identified also one fault cutting the valley of one of the invastigated streams. It has been proved, that research conducted with the applying of liquid scintillation method of Rn-222 activity concentration measurement enables localization of the tectonic fault zones with the precision of at least 20 m. Although one may expect that this precision will be better, so the research are still in progress, embraceing also next streams.

REFERENCES

Przylibski T. A., 2004 – Concentration of 226Ra in rocks of the southern part of Lower Silesia (SW Poland). Journal of Environmental Radioactivity, Vol. 75, No. 2, pp. 171-191.

Przylibski T. A., 2005 – Radon. Specific component of medicinal waters in the Sudety Mountains. Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław. (in Polish).