

## Summary

In the years 2014–2015 a radiohydrogeochemical survey was carried out in the Tanvald granite body. Tanvald granite is a two-mica granite body located on the southern edge of the Krkonoše-Jizera Pluton, in the Lusatian part of the Saxony and Thuringian zone of the Variscan orogenic belt. The aim of the survey was to find radioactive water, the  $^{222}\text{Rn}$  volume activity of which exceeds 1500 Bq/l. Such water is – under the Act no. 164/2001 Coll. – considered as radioactive mineral water. The result was a found of 20 water sources meeting this condition and many other sources approaching this value.

In terms of the findings, the most important area is Dlouhý Most, where 8 of the radioactive water resources exceeding 1500 Bq/l were found. The most important of these is probably the source TGR/11 with the  $^{222}\text{Rn}$  volume activity 2449 Bq/l. A cluster of water sources with a slightly higher conductivity (exceeding 300  $\mu\text{S}/\text{cm}$ ) appears in the Dlouhý Most area. Chemical analysis of the most important of them (TG1/15) showed that it is water of the Na-Ca-Cl type, probably contaminated by a run-off from the motorway, which is salted in winter.

Another important site is the Kokonín fault area. At this important geological structure a total of four springs of radioactive water with the  $^{222}\text{Rn}$  volume activity greater than 1500 Bq/l was discovered, of which the most important source is the spring TGR/33 (max. 2446 Bq/l). An impressive flow from 0.42 to 0.45 l/s makes this spring the most important discovery of the entire survey and further use of this spring is in discussion.

Besides the 4 radioactive springs, a cluster of water with increased conductivity also occurs at this important geological structure. Conductivity higher than 1000  $\mu\text{S}/\text{cm}$  was measured in 5 water manifestations. The well TGR/35 has a conductivity even 3900  $\mu\text{S}/\text{cm}$ . The chemical analysis showed that it is the Na-Cl water type with a total mineralization of 1756 mg/l. The increased water mineralization in this area is likely due to anthropogenic pollution of these resources.

A total of 5 symptoms of radioactive water was found on the Černostudniční ridge. The most important of them are TG4/17 (max. 2125 Bq/l), which is a part of an extensive catchment area on the north-west slope of the Černostudniční ridge, and the borehole TG1/31 on the northern slope of the Černostudniční ridge in Nová Ves nad Nisou, occasionally used as a source of drinking water – max. 2185 Bq/l. Conductivity of water on the north slope of the Černostudniční ridge is slightly elevated (above 300  $\mu\text{S}/\text{cm}$ ), but chemical analysis of TG4/17 showed that it is not water of the Na-Cl type but an Na-Si-Ca-Cl-SO<sub>4</sub> water type. Mineralization in this area is probably of natural origin.

3 radioactive mineral springs were found in the area of Rádlo-Milíře. The most important source is a clean and well-kept spring TG4/13 – Voňka (max. 3128 Bq/l), which is the most radioactive source of water known in the Tanvald granite. Chemical analysis showed that the water in the well is slightly mineralized (72 mg/l) and has a low content of nitrate (11 mg/l).

This survey confirmed the assumption of radioactive mineral water occurrence in the Tanvald granite, which is geologically and geochemically different from its neighbourhood. Surface of an approximate area of 17 x 2.5 km was explored in a sufficient quality and density. The survey can be called as successful.