

Summary of PhD Thesis

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HYDROGEOLOGY OF MEDICINAL WATERS IN ŚWIERADÓW-ZDRÓJ AREA

Medicinal waters are special type of groundwaters, containing specific components with therapeutic influence on human body. In Świeradów-Zdrój area, located on Iżera Mountains occur three types of medicinal waters – acidulous waters, acidulous waters with radon and radon waters. Background for medicinal waters are fresh groundwaters.

The aim of the study was to create hydrogeological model of occurrence of medicinal waters in Świeradów-Zdrój area with special consideration of fresh groundwaters.

Field works included hydrogeological mapping in spa area, water sampling for chemical analysis, estimation of radon and tritium concentration and periodic observations of selected parameters in 16 intakes. Field works were carried out during the period of 2014-2015 in the area of 29 km². Created data base including 60 000 data. During the data interpretation it was used hydrogeochemical and isotopic modelling as well.

Density spring index, calculated on the base of hydrogeological mapping is equal 2.15 spring/km². Modulus of spring runoff is 0.23 dm³/s km². Fresh groundwaters in Świeradów-Zdrój area are characterise by low mineralization, chemical type SO₄-HCO₃-(Cl)-(Ca)-(Mg)-(Na) and low discharge (VIII-VI Meinzer's class). Similar chemical composition to fresh waters have radon waters, making radon anomaly. Different chemical type represent acidulous waters (HCO₃-Ca-Mg i HCO₃-Mg-Ca). They have higher mineralization and CO₂ concentration average 2400 mg/dm³. They are visible fluctuations of physico-chemical parameters in time. Their average parameters related to the one year cycle show stability. It confirm the stability work of water deposit. It is observed the evolution of the chemical composition of groundwaters, visible in the case of radon waters, showing three-times increase of mineralization and domination of Cl⁻ ion. It is the effect of home made activity. Groundwaters in Świeradów-Zdrój area have different age and create few circulation systems. The shallow waters related to local system are the youngest (few years). The age of deeper groundwaters was estimated to few hundred years. The deepest circulation represent acidulous waters with high mineralization without tritium.