

## GEOHERMAL POTENTIALS OF THE BANJA LUKA REGION

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### ABSTRACT:

In the past decade, the demand for new energy sources is getting momentum, and many efforts are being made in an attempt to develop new sources of energy and their more efficient exploitation.

Several very important geothermal locations are situated in the territory of Republika Srpska. Those locations have not been, so far, properly researched, nor are they being adequately exploited. Banja Luka, as the largest city in Republika Srpska, has an extraordinary geothermal potential, which had been in part researched, but those research do not suffice for their effective exploitation.

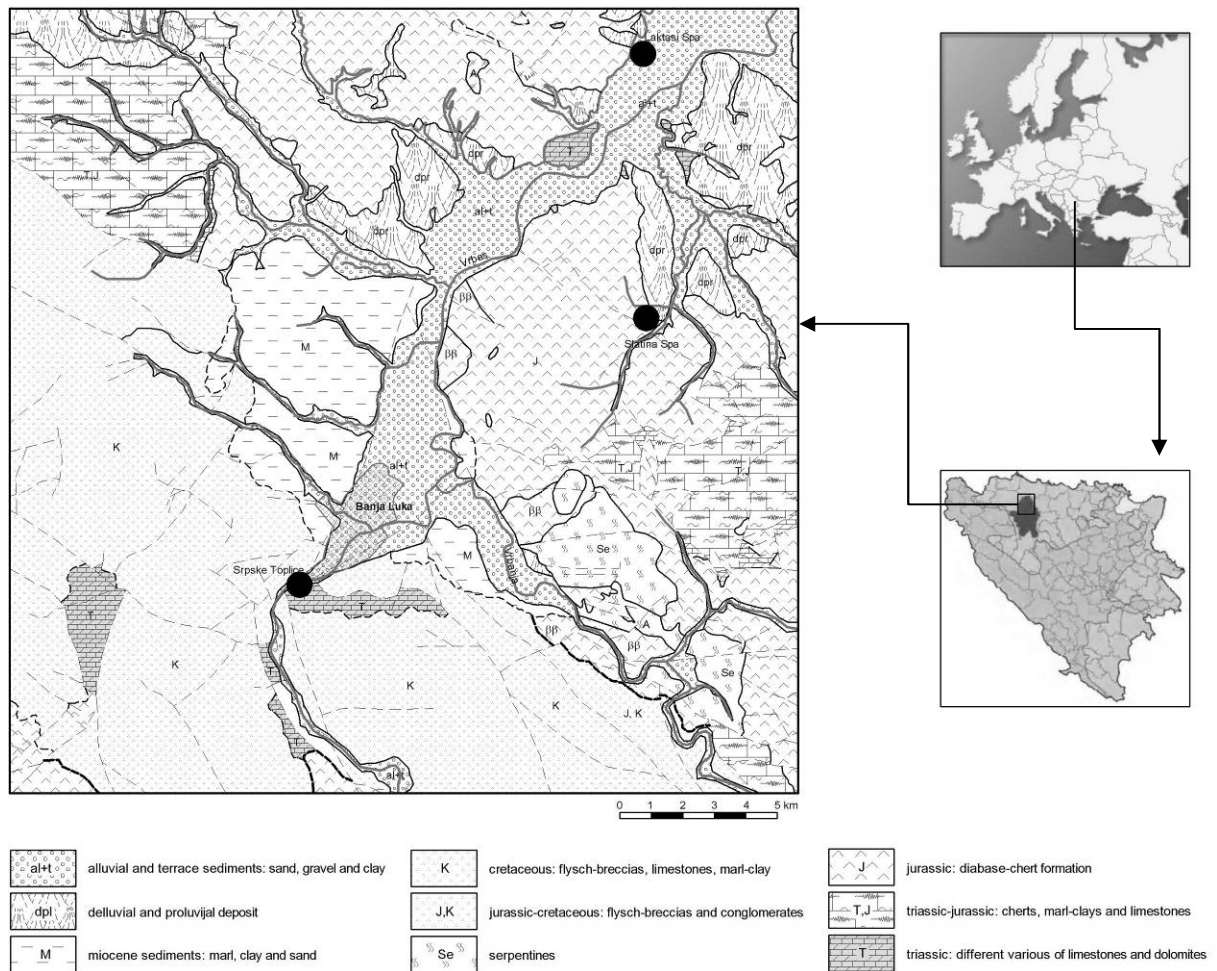


Figure 1. Geologic map of the broader research area (modified, basic geological map sheet Banja Luka)

● Appearance of thermo mineral waters

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The research area, the Banja Luka region, presents a complex geologic structure, represented by lithologic factors of various ages, from Mesozoic, i.e. Triassic limestone, and the dolomite limestone, the sediments of the diabase-chert formation and Neogenic sediments, and also the very young Quaternary formations. Regarding it as a whole, the area of research is located within the north-west area of the ofiolitic belt, which has a significant tectonic activity, and is by definition liable to the formation of the thermo mineral waters of various characteristics (figure 1).

Banja Luka is located in the west of Republika Srpska, and within a radius of 20 kilometres three zones of discharge of thermo mineral water have been detected. On these locations the drainage of aquifer with thermo mineral waters is done through wells and springs with the registered water temperatures between 30-40°C and the water capacity of approximately 250 l/s (table 1). The water resources of such significance are not adequately exploited. They are used partly for recreational and balnaeological purposes, regardless of much greater potential which they possess.

Table 1. Basic characteristics of thermo mineral waters in the Banja Luka region and their thermo energetic potential (Trkulja D, 1996; Spatial Plan of Republic of Srpska)

Location	Type of phenomenon	Purpose of exploitation	Chemical characteristics	Gas	pH	M (gr/l)	T (°C)	Q (l/s)	Power MW	Equivalent (t oil/year)
Laktaši Spa	Wells and springs	Spa and recreation	Hydrocarbon	SO <sub>2</sub>	7.0	0.7-0.9	36.5	100	7,6	5710
Slatina Spa	Wells	Spa and recreation	Calcium-sulphate	SO <sub>2</sub>	6.5	2.91	40.7	70	9,4	7200
Srpske Toplice	Wells and springs	Spa and recreation	Hydrocarbon	SO <sub>2</sub>	6.8-7.6	1.2-1.3	30.2 - 33.1	90	7,5	5700

The aim of this paper is to point out to the geothermal potential of the Banja Luka region, as well as to provide direction for further research and the possibilities of the multipurpose use of those waters.

During the background research for the paper, geologic and hydrogeological research has been organized into the cabinet and field part of the research. All the data have been collected in relation to the previous geological, hydrogeological and geophysical research conducted in the region, and subsequently, detailed geological mapping of the terrain has been conducted. These data have been interpreted in their entirety, and possibilities of use of the geothermal energy have been given for the wider Banja Luka area. Furthermore, directions are given for future research, and also for the potential zones of research of geothermal energy and the possibility of their exploitation.

At this level of research, a conclusion may be drawn that all the appearance of the thermo mineral waters are of a mutual origin, i.e. there is a single primary aquifer, while in the secondary circulation zones the final creation of chemical and gas composition of ground waters occurs.

Considering the fact that in the Banja Luka region is inhabited by around 300,000 people, those geothermal resources might provide for a significant proportion of the needs for these resources.

*Keywords: geothermal energy, Banja Luka, Republika Srpska, hydrogeology, renewable energy resources.*