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HYDROCHEMICAL AND HYDROGEOLOGICAL FEATURES OF MINERAL WATERS OF THE NORTHERN REGION OF PARANA STATE – BRAZIL.

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Abstract

For the past years, the northern Paraná State has suffered a great populational and economic growth. Such situation has led the population to use mineral waters as a source of their supply. This region lies on the basaltic rocks of Serra Geral Formation. Due to the lithologic features of these rocks, the circulation and storage of the groundwater are confined to the discontinuities that are concerned to the aquifer zones. Such discontinuities are lithological and structural features of volcanic flows, such as horizontal and vertical fracturings, vesicular structures, and also fracturing or faulting as result of tectonic activities that affected this region.

A survey of yield data of 17 producers of mineral waters was carried out (Figure 1). Wells and springs data were compiled aiming at a general view about the localization pattern and evaluation of the trend for the flow rates and specific capacities, as well as their hydrochemical characteristics. The arrangement of the wells and their respective yield data indicated that when drilled near large structural lineaments they presented discharge rate up to 140.0 m^3/h, while the average in this region is 17.5 m^3/h. This shows that higher yield can be achieved when hydrogeological studies and planned drilling are carried out.

Hydrogeochemical studies were also done aiming the main physical and chemical characteristics. The results allow classifying mineral waters in this region as calcium and calcium-magnesium bicarbonate types with a good quality for drinking waters, according to the chemical typology for Serra Geral Aquifer (Figure 2). The calcium ion outweighs sodium, revealing the fact that calcium is an element of great solubility and is present in a large number of minerals of basaltic rocks, like augites and pigeonites as well as calcic and sub-calcic plagioclases. Some waters have calcium sodium bicarbonate type composition with levels of fluoride between 0.02 and 0.78 mg/L, indicating possible interconnection with the Guarani Aquifer, since this aquifer has high levels of this ion in the region.

Moderate levels of total dissolved solids are due to the short time of travel of groundwater in the alteration layers as well as rock fracturing, since Serra Geral Formation is outcropping and, for the most part, phreatic to semi-confined aquifer. This characteristic confers to these waters a standard high acceptance for the consumers.

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