

## Drinking water resources investigation in Papaïchton Village (French Guiana)

### Content

The village center of Papaïchton, located on the bank of the Maroni River in French Guiana, had about 3500 inhabitants in 2015, with a marked population growth. The demand for drinking water has increased by more than 5% over the last 5 years and the needs were estimated at 200m<sup>3</sup>/day in 2015. The supply was not sufficient, especially in the dry season where water cuts were necessary during the night. If demographic trends continue, drinking water requirements will reach 500m<sup>3</sup>/day in the next 15 years. Considering that the potabilisation of the Maroni River requires heavy and energy-intensive treatment processes, the supply of drinking water by groundwater remains the best option for this type of village isolated from the infrastructures of the coastal strip.

The geology of this sector is mainly composed of metavolcanic and tuffs rocks, intruded by quartz veins and a dolerite dyke. A combination of several prospecting methods were used to determine fracture zones and drilling targets. First, field investigations were conducted to clarify the existing geological map and to characterize the geomorphology of the site as well as the springs dynamics. Then, a vegetation lineaments study by stereoscopy, based on old and recent aerial photographs, was carried out. These lines frequently reflect corridor faults. Within the most interesting areas, a prospection by radon emanometry was conducted, with 202 gas samples in the ground subsurface. This method also gives clues on the location of the fractured zones. Finally, a geophysical prospection with eight electrical resistivity tomography, corresponding to 4345 linear meters enabled to highlight hydrogeological targets.

Following these investigations, four small-diameter exploration drill holes were carried out on more interesting hydrogeological targets in order to evaluate the potential at lower cost. Finally, two boreholes designed for the exploitation were drilled near the two most productive boreholes.

While most of the water wells from hard rock aquifer in French Guiana produce between 2 and 6 m<sup>3</sup>/h, the two operational boreholes can produce respectively 30m<sup>3</sup>/h (a record for French Guiana) and 5 m<sup>3</sup>/h. These results take into account the safety margins necessary for sustainable management of the resource, particularly in the event of a marked rainfall deficit.

This work demonstrates the importance of groundwater resources in the drinking water supply of isolated sites in French Guiana, in order to meet the demographic and development challenges of the territory.

In addition, the production results show how a combination of prospecting methods enables to find interesting and productive hydrogeological targets in hard rock aquifers.

**Primary author(s) :** Mr BRISSET, Nicolas (BRGM); Mr MATHIEU, Francis (BRGM); Mr GANDOLFI, Jean-Marie (BRGM); Mr DEWANDEL, Benoit (BRGM); Mr BOURBON, Pierre (BRGM); Mr AERTGEERTS, Geoffrey (BRGM); Mr JOSEPH, Bernard (BRGM)

**Presenter(s) :** Mr BRISSET, Nicolas (BRGM)

**Track Classification :** Topic 9 - Groundwater and socio-economic development in Latin-America

**Contribution Type :** Oral

Submitted by **BRISSET, Nicolas** on **Tuesday 30 April 2019**