New Discovery of Bauxite in Serra da Prata, Center of Roraima State, Extreme North of Brazil

Gustavo Alves Guerra[1], Luiz Antonio Vessani[2]and Tadeu Veiga[3]

1. Geologist,
2. Technical Director
EDEM Ltda. and TGM Ltda., Goiânia, Brazil
3. Technical Director
GEOS, Brasília, Brazil
Corresponding author: gustavoguerra@edemprojetos.com.br

Abstract

Prospecting studies done by EDEM and TGM since 2009 in the Mucajaí region, center of Roraima State, extreme North of Brazil, revealed several promising targets for bauxite and other ores. Exploratory auger drilling done in the lateritic cover of charnockites, hypersthene-quartz syenites and associated rocks of the Serra da Prata Intrusive Suite intercepted bauxite with thickness up to 10 meters and grades (in natura, without washing) of approximately 40 % available alumina and 2 % reactive silica; similar to deposits in Venezuela, Guyana and Suriname. The discovery increases the bauxitic potential of the Brazilian Amazon. The potential of the ore body exceeds 100 million tonnes and justifies more research studies, focusing on economic evaluation.

Keywords: bauxite, new discovery, Amazon region, Roraima State, Northern Brazil.

1. Introduction

EDEM – Empresa de Desenvolvimento em Mineração e Participações Ltda. and TGM – Terra Goyana Mineradora Ltda. are partnering Brazilian companies focused on the exploration and exploitation of various ores. Since 2009 they have carried out exploration works in the state of Roraima, in the extreme north of Brazil, in search of concentrations of gold, heavy minerals, rare earths and bauxite.

More studies were carried out at regional levels in February 2018, aiming at the recognition of lateritic weathering profiles and the diagnosis of their economic possibilities. The objective was to collect guidelines for future research. The work resulted in the discovery of bauxite in Serra da Prata. Systematic investigation of the area awaits the corresponding research permits.

2. Geo-Environmental Context

Serra da Prata is situated in the Brazilian Amazon, in the Central portion of the State of Roraima. Access from the capital Boa Vista is done by road BR-174, in distance of approximately 60 km to Mucajaí. From Mucajaí, the area is reached by a secondary road toward Apiaú (Figure 1).

The region is predominantly formed by flat lands and has been heavily deforested and occupied by livestock and agriculture. It offers minimum infrastructure for mineral research: basic commerce, fuel stations, bank, medical-hospital service, communications. The headquarters of the farms provide some support to the fieldworks. Serra da Prata is marked by rugged relief and covered by dense rainforest (Figure 2).

Figure 1. Location and main accesses.

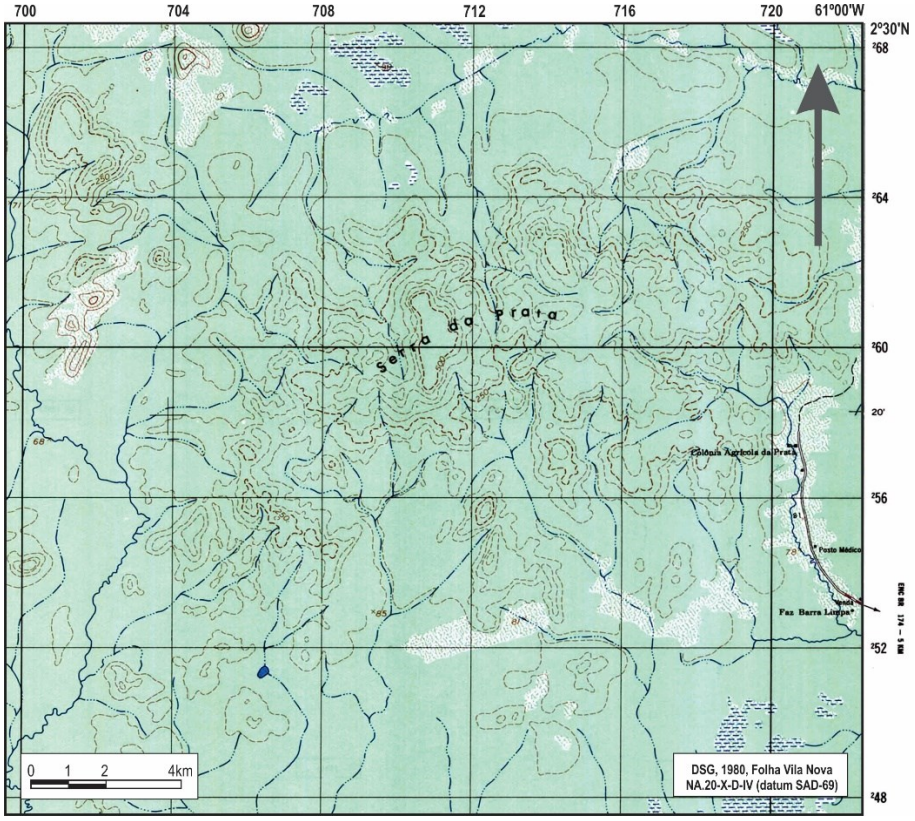


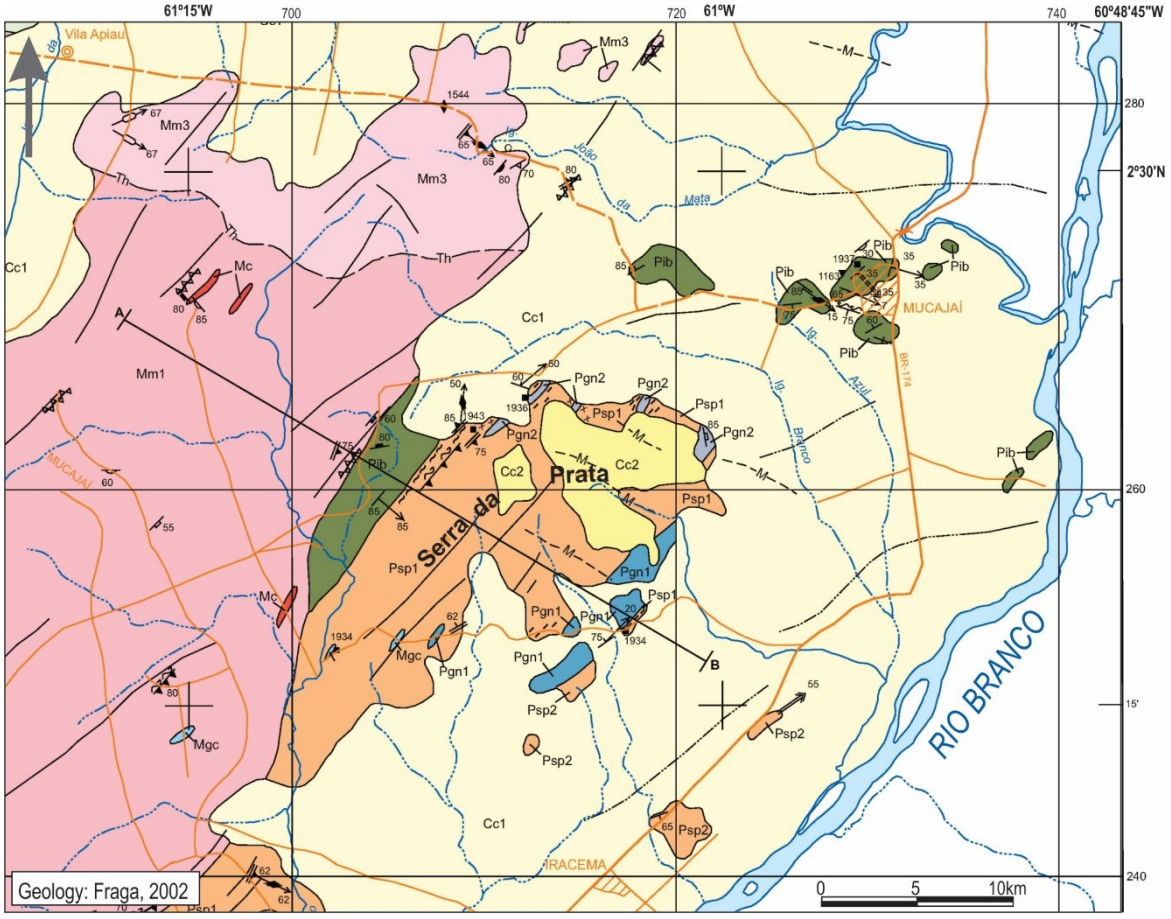
Figure 2. Serra da Prata relief map.

3. Local Geology

The Mucajaí region is dominated by intrusive and high-grade metamorphic rocks of the Proterozoic age [1]. The flattened elevations are covered by lateritic crusts. Large unconsolidated deposits are developed in the flat lowlands, favoring the accumulation of heavy minerals (Figure 3).

Serra da Prata is a local denomination of an oval plateau with about 15 000 ha. The base has an altitude of about 100 meters above sea level. The top reaches 537 meters. The deep soils and the forest cover make the visibility of the substrate difficult.

On the flanks there are blocks and outcrops of basic granulites and charnockites, belonging to the Serra da Prata Intrusive Suite, of Paleoproterozoic age [1]. Dismantled blocks of ferruginous laterite occur as well. At the top there are blocks and outcrops of bauxite, in metric dimension.



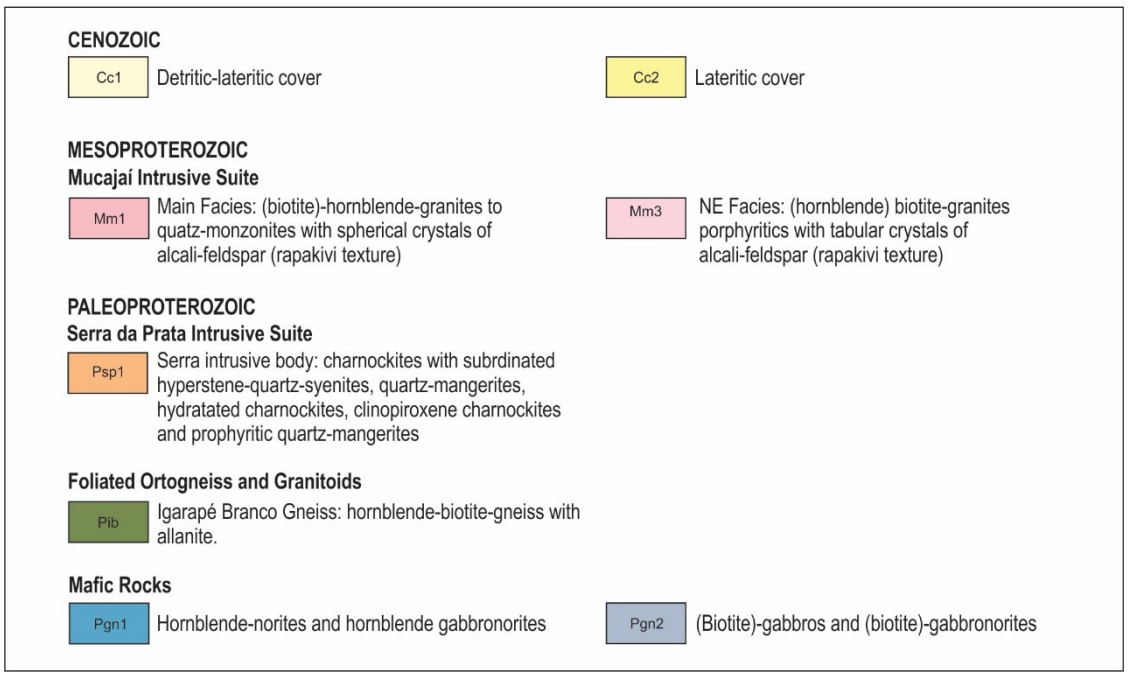


Figure 3. Geology of the region.

4. Exploratory Works and Results

The discovery of bauxite on the surface stimulated the investigation of the weathered profile, in order to guide future research. In February 2018, ten pioneer holes were made using motorized auger drill (4" diameter and depth of 10 m).

Working conditions are severe, due to the absence of access, dense vegetation and the rugged relief, under humid and hot climate. A hard and thick ferruginous crust is found (with thickness up to 3 m), which makes drilling difficult and results in low productivity and premature wear of equipment.

The holes were conveniently distributed in the lateritic plateaus (Figure 4). The samples were sent *in natura* (without washing) for chemical analysis in a specialized laboratory.

The results confirmed the favorable perspectives. Bauxite was intercepted in 80 % of the holes, with thicknesses up to 10 m (Figure 5). Two basic types are distinguished: a) rich ore with 40 % Available Alumina (AA) and 2 % Reactive Silica (RS); b) clayey ore with 30 % AA and 10 % RS, useful after washing.

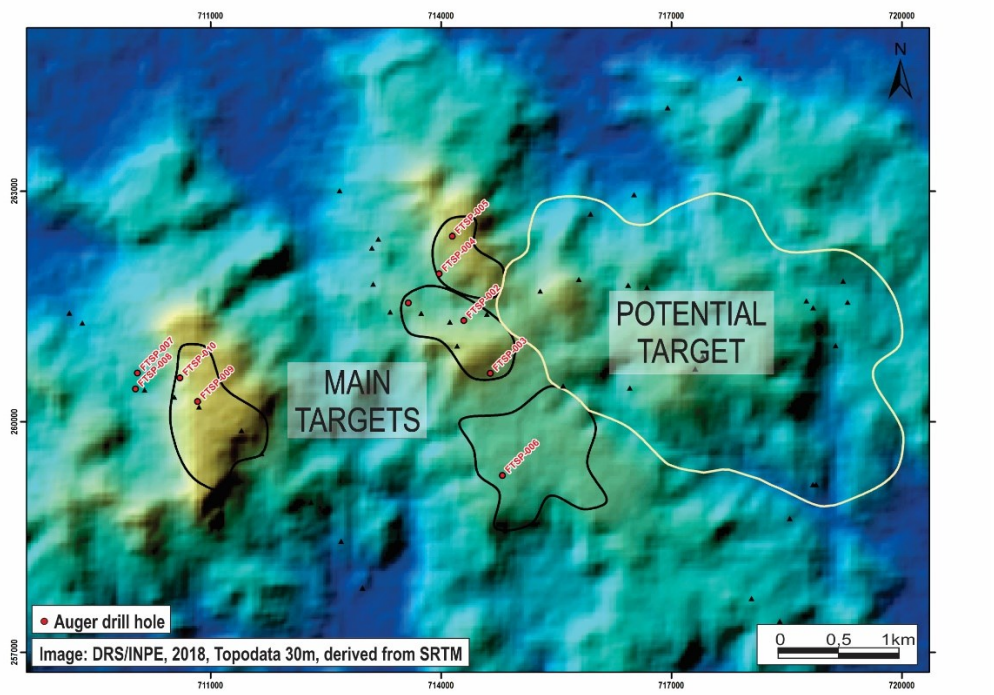


Figure 4. Location of Auger drill holes.

5. Final Considerations

The exploratory campaign held in February 2018 confirmed the geological potential of Serra da Prata. Bauxite is predominantly outcropping, but largely masked by the soil and organic matter, which makes identification difficult on the surface.

The pioneer drilling campaign intercepted bauxite in 80 % of the holes. The results have stimulated systematic drilling, aiming to evaluate resources. This campaign will require a complete camp site, equipped with infrastructure and workers accommodations compatible with a long stay. The work is planned to be done after the research permits have been obtained.

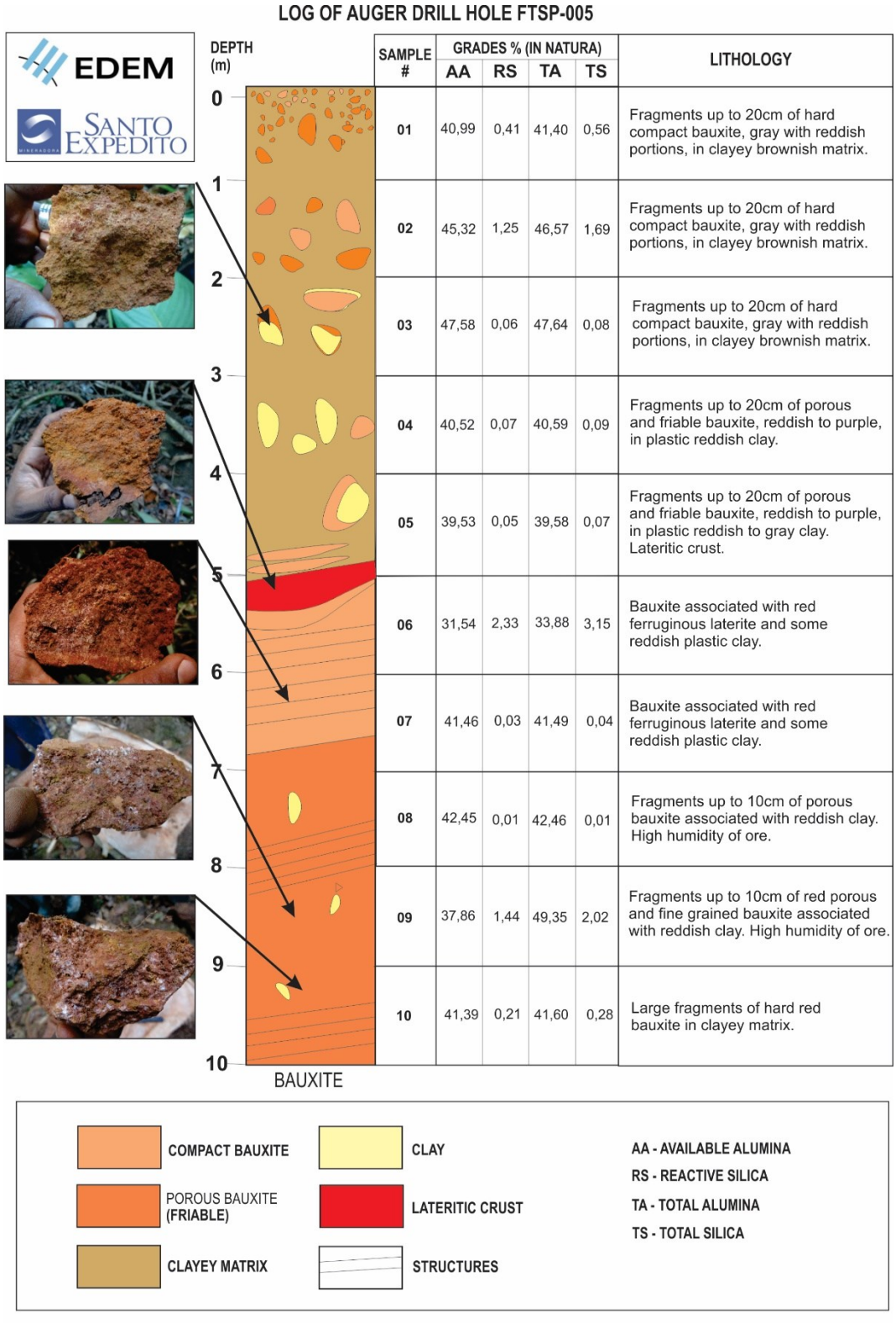


Figure 5. Typical bauxite profile.

The discovery increases the bauxitic potential of the Brazilian Amazon. The ore potential of the main targets exceeds 100 million tons. A neighbor plateau perhaps adds 110 million tons more (Figure 4). The bauxite is similar to deposits in Venezuela, Guyana and Suriname [2], [3].

6. References

1. Fraga, L. M. A associação anortosito-mangerito-granito rapakivi (AMG) do Cinturão Guiana Central, Roraima e suas encaixantes paleoproterozóicas: evolução estrutural, geocronologia e petrologia. UFPA, *tese de doutorado*. Belém, 2002, 363 p.il., mapas.
2. Aleva, G. J. J. Essential differences between the bauxite deposits along the Southern and Northern edges of the Guiana Shield, South America. 1981. *Econ. Geol*. 76: 1142-1152.
3. Grubb. P. L. C. Genesis of bauxite deposits in the lower Amazon basin and Guianas coastal plain. 1979. *Econ. Geol*. 74: 735-750.