Mineralogical Report - Sample 5156

Brazilian Kimberlite Clay

Sao Paulo, 2016

MINERALOGICAL REPORT

SAMPLE 5156

BRAZILIAN KIMBERLITE CLAY

CORGUINHO - MS

Sao Paulo, May 2016

1. LOCAL GEOCHRONOLOGY

The beginning of the geological formation and general structure of the region in which the samples were collected was triggered in eons Proterozoic and Phanerozoic, and their orogeny dates back approximately 850 million years (Godoy, 2007).

Characteristics of the magmatic event, Neoproterozoic granitoid (between 850 and 630 million years) of Cuiaba Group, and its geological, mineralogical and geochronological features can be clearly noted from south to north by the Massif Taboco extending the municipalities of Aquidauana, Corguinho , Rio Negro, Rio Verde de Mato Grosso and Coxim. Since such features emerge in erosive foothills of Sierra Maracaju partially covered by sedimentary and volcanic rocks of the Parana basin *(op. cit*.).

The basins of Parana (BP) and the Upper Paraguay (BAP) has as its divisor Serra Maracaju. This natural boundary of the basin, west of BP and eastern BAP, is in large part related to the Meso-Cenozoic tectonic history of the continent, documenting turn about 400 million years of the Phanerozoic geologic history of the formation of these contours (Milani *et al.,* 2007).

Another important highlight of the region is the geochronological Aquidauana Formation dating from the Upper Carboniferous period (318-306 MA), represented by the Cuiaba Group and rudimentary sequences Paleozooicas of Parana Groups (Furnas and Aquidauana Formation) (Brasil, 1982). This geological formation inserted in the transition between the remaining plateaus of the Central Plateau and the Pantanal Plain, bears similarities with the Botucatu Formation, however, is originally from fluvial-lacustrine environment (Schiavo *et al.,* 2010).

In relation to aspects of land use and occupation, former slaves officially founded the sampled region, the human occupation of the area dates back to the nineteenth century, the slaveholding period. The community's history is based on orality, making it difficult to obtain accurate data.

The older residents and direct descendants of the founders report that families are originated from Minas Gerais and fixed on site, attracted by natural beauty, plenty of water and strategic position, located between hills, which make part of the Serra de Maracaju.

These geochronological and mineralogical characteristics, the history of the region's occupation and the poor access to the area are the responsible factors for these samples mismatching the soils' profile - acid and poor as rest of the Cerrado biome; which can be verified on the tables bellow.

The sample was collected in the middle region of the Midwest Mato Grosso do Sul state.

2. RESULTS

The Table 1 show the UTM coordinate of the location where the sample was collected. And Tables 2 and 3 the identification of sample and laboratory results of physical tests.

Table 1 – UTM coordinate of the sampled site.

POINT	UTM COORDENATE– ZONE 21 K	
	X	Y
B	668632.72 m E	7774594.25 m S

Table 2 – Identification of the sample.

Nº LAB	SAMPLE IDENTIFICATION
5156	Clay Cipo Turbo – Extraction 1.40

Table 3 – Results of physical analysis.

PARAMETERS	UNIT	SAMPLE
		5156
AMF	g kg·¹	25
AF	g kg·¹	16
AM	g kg·¹	7
AG	g kg·¹	3
AMG	g kg·¹	1
AT	g kg·¹	52
Clay (water)	g kg·¹	262
Clay (w/ disp)	g kg·¹	446
Silt	g kg·¹	503
Floculation	%	41
Texture class	-	arg

Methods: Buyoucos (densimeter) (SSSA Book Series 5. Methods of Soil Analysis, Part 4). Classe de diâmetros (mm) conforme USDA:
(A) Five sand fractions:
very coarse (MG) = 2-1; coarse (G) = 1-0,5; medium (M) = 0,50-0,25; fine (F) = 0,25-0,10; very fine (MF) = 0,10- 0,05;
Total Sand (AT) = 2-0,05; silt = 0,05-0,002; total clay < 0,002; water clay < 0,002.
(B) Two sand fractions:
coarse (G) = 2-0,25; fine (F) = 0,25-0,05; total sand (AT) = 2-0,05; silt = 0,05-0,002; total clay < 0,002.
Texture class = clay (w/ dispersant) up to 149 g/kg = sandy (ar); 150-249 g/kg = sandy average (md-ar); 250-349 g/kg = loamy (md-arg); 350-599 g/kg = clayey (arg); 600 g/kg or higher = very clayey (mt-arg).

Table 4 and 5 show the results obtained through chemical laboratory analysis. **Table 4 -** Results of chemical analysis.

PARAMETERS	UNIT	SAMPLE 5156
pH CaCl2	-	5,4
O.M. Colorimetric	g. dm-^{3}	6
P Resin	mg.dm-3	24
S Calcium Phosphate 0,01 mol L-i	mg.dm-3	9
K Resin	mmolc.dm-3	2,1
Ca Resin	mmolc.dm-3	55
Mg Resin	mmolc.dm^	54
Al KCl 1 mol.L-i	mmolc.dm-3	<1
H+Al SMP	mmolc.dm-3	28
SB	mmolc.dm-3	111,1
CTC	mmolc.dm-3	139,1
V	%	80
m	%	1

Methods: pH in CaCl2 0,01 mol L-^{1}; phosphorus (P) extracted colorimetric method with ion exchange resin; sulfur (S) determined by turbidimetry and extraction with calcium phosphate 0,01 mol L-i; potassium (K) extraction ion exchange resin and determination in emission spectrophotometer atomic; calcium (Ca) and magnesium (Mg) extraction ion exchange resin and determination atomic absorption spectrophotometer; exchangeable aluminum (Al) extracted colorimetric method with potassium chloride 1 mol L-i; potential acidity (H+Al) extracted with SMP buffer *(Manual de analise qufmica para avaliagao da fertilidade de solos tropicais.* IAC, 2001).
SB: Sum of exchangeable bases; CTC: Cation exchange capacity; V: CTC base Saturation; m: Saturation by Aluminum.

Table 5 - Results of chemical analysis.

PARAMETERS	UNIT	Sample 5156
B hot water	mg.dm-3	<0,2
Cu DTPA	mg.dm-3	1,6
Fe DTPA	mg.dm-3	73
Mn DTPA	mg.dm-3	36,2
Zn DTPA	mg.dm-3	1,1
Si CaCl2 0,01 mol L-i	mg.dm-3	21
Na Mehlich 1	mg.dm-3	620

Methods: Boron (B) hot water extraction and determination by colorimetry, copper (Cu), zinc (Zn), manganese (Mn) and iron (Fe) with DTPA extraction and determination by atomic absorption spectrophotometry *(Manual de analise qufmica para avaliagao da fertilidade de solos tropicais.* IAC, 2001). Sodium (Na) extraction with Mehlich 1 and determination in a flame photometer *(Manual de analises qufmicas de solo, planta e fertilizantes.* EMBRAPA, 1999). Silicon (Si) extraction using calcium chloride 0,01 mol L-i and determination by colorimetry. *(Analise de silfcio: solo, planta e fertilizante.* UFU. 1^a ed. 2004).

3. REFERENCES

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