

The Speleologic District of Tigre – São Jerônimo da Serra, PR – Brazil

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Abstract

São Jerônimo da Serra is located on north of Paraná State, Brazil. In the geological context, the region is inserted in the central part of the Paraná Basin, occurring sedimentary lithotypes of geological formations Rio do Rasto and Piramboia/Botucatu and the vulcanians rocks of the Serra Geral Formation. These peculiarities propitiated the developement of natural cavities sculpted in the sandstones, once the contact of the sedimentary rocks with the fractured vulcanians rocks, came to favour the manifestation of the *pipping* phenomenon, which is responsible by origin of the caves in the region. This group of sandstone caves have been known by Speleologic District of Tigre, just because of the large occurrence of caves in the valley from homonym river.

Resumo

São Jerônimo da Serra, município localizado no norte do Estado do Paraná, Brasil, encontra-se geologicamente inserido na porção central da Bacia Sedimentar do Paraná. Afloram na região os litotipos sedimentares das formações Rio do Rasto e Pirambóia/Botucatu e as vulcânicas da Formação Serra Geral. Tal peculiaridade propiciou o desenvolvimento de cavidades naturais esculpidas em arenito, uma vez que o contato das rochas sedimentares com as vulcânicas diaclasadas veio a favorecer a manifestação do fenômeno de *pipping* que deu origem inúmeras grutas características da região. Esse grupo de cavernas encontradas vem a ser conhecido como Distrito Espeleológico do Tigre, dado à grande ocorrência de grutas no vale do rio homônimo.

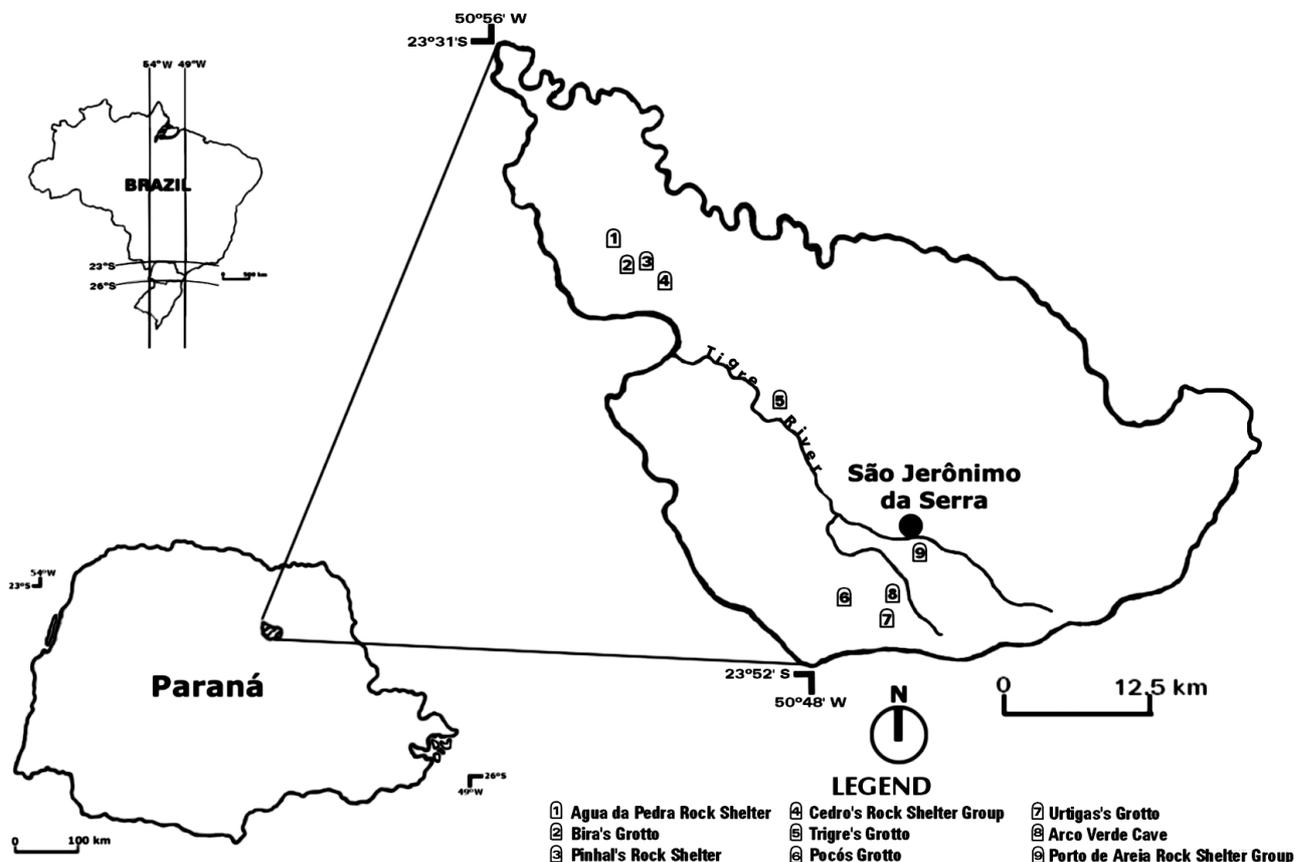


Figure 1 – Localization of São Jerônimo da Serra in Parana State, Brazil and some cavities of Tigre's Speleological District

Introduction

In the north Paraná State, from Brazil, the speleology science isn't a very discuss theme. However, in this region, São Jerônimo da Serra is a locality privileged with peculiarities geological/geomorphical, which propiated a rich group of sandstone's caves.

This speleological patrimony is very few known, and the majority of the caves found, heve been very little or nothing studied.

This paper presents a brief report about studies realized about the sandstone's caves of São Jerônimo da Serra region, and it mean a contribution to insert this locality in a ample speleological context.

Localization

The Speleological District of Tigre is located in the municipal district of São Jerônimo da Serra, in the central north region of Paraná State, Brazil (figure 1), under coordinates 23°31'S to 23°52'S and 50°32' W to 50°57'W.

Regional Geology

According with BENITEZ *et al* (1999), the area from studies is inserted in the central part of the Paraná Basin. The local stratigraphy is constituted by Rio do Rasto Formation, of Passa Dois Group; Piramboia/Botucatu Formations and Serra Geral Formation of São Bento Group (figure 2).

The Rio do Rasto Formation, by Permian age, is represented by its Morro Pelado Member, and characterized for whitish shales, greenish siltstones, and purplish claystone, interpolated by lenticular sandstones, showing bedding plans crossed-arched and plain-parallel.

The Piramboia/Botucatu formations from Triassic age, both are associated. Composing by redish sandstones, interpolated by claystone, siltstone, ferric concretions and conglomerate levels. The sandstone can presents silicification, just because itscontact with the vulcanian rocks of Cretaceous Inferior. The bedding plan are crossed, crossed-arched and plain-parallel.

The Serra Geral Formation is constituted by basalt dated from Juro-Cretaceous, however, in some parts of the area, the efusive rocks outcropping are rhyodacites, classified by MINEROPAR (1989), as Nova Prata Member, or according with PINESE (1989), by Acid Vulcanians Type Chapecó.

Regional Geomorphology

According with the classification of MAACK (1981), the Paraná State is distributed on five great natural regions. The

Speleologic disctrict of Tigre finding inserted on a adjacent area between the Segundo and Terceiro Planalto Paranaense.

According with MARQUES (1995), the specific area, is located on beginning of the reverse of Esperança's Scarp, on the labed São Jeronimo's Block or Araiporanga's or São Jeronimo's Plateau.

In the immediate reverse's top of scarp, occuring altiudes relatively high to this region, where there are quotas between 1100 and 1200 meters. These altimetries are decurrent of raised slightly of central scarp's axis, associated with the efusive acid rocks, creating, according MARQUES (1995), a spot of doorjamb's resistant to erosion.

The lithology influences the parts E, NE and N of municipal district, by presence of ridges prolonged with medium declivities and altitudes between 700 and 800 meters.

The central east and south region of the studied area are characterized by flattened tops and abrupt valleys, decurrents of differential erosion of rocks. The cornice are composite by basalt, and the sandstones form the talus.

Tectonic structures, faults and freactures, in its most part are founded aligned to NW.

Among the valleys, the Tigre's river valley is considered to show most expression. It presents abrupt scaps with different levels, between 200 meters, and the association of lithologies, what permit the actuation of "pipping" phenomenon, developing numberless natural cavities.

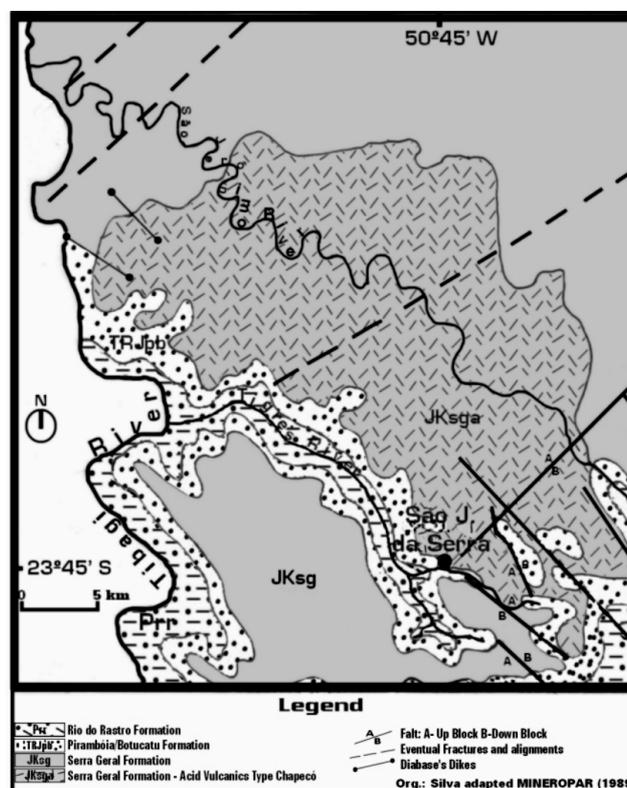


Figure 2 – Regional Geology Map

The Natural Cavities of The Speleologic District of Tigre

Considering informal reports, can be estimate the occurrence by more than 60 natural cavities, in the São Jeronimo da Serra region. These caves are developed in the lithotypes of Piramboia/Botucatu formations, and the majority of these structures are located in the Tigre's valley. It's the reason by which, we attributed this denomination to referred speleologic district.

The genesis these cavities are associated to "pipping" phenomenon. This process suggest the dissolution of the limit among quartz grain, followed of a posterior mechanics remotion. In this case, the dissolution occurring in insignificant rate, however it's enough to open the space, where the water act removing mechanically the sand's grain, resulting in a primary opening. The erosive water action further graduating the widen of cavities, according with straightness plan of rocks.

The working this process in the differentiated stratum of sandstone Piramboia/botucatu, allied with the water infiltration and the fracture's plan, conditioning the beginning of development of the cavities, considering still, the modifications on the relief and the lowering of ground water.

According with VERÍSSIMO & SPOLADORE (1991), the sandstone's caves are associated to tectonic process, creating reactivation of fracture's plans of transcurrent character, entailed to a process of mechanics arrangement, what result in abatement of blocks.

The caves and rock shelters are characterized to be of small dimensions, once that the bigger cavity found, the Arco Verde Cave, has approximatting 40 meters of development, however, it has great opening.

The entrances with its large dimensions, permitting the penetration of natural illumination in the interior of the grot, propitiating conditions to, in a remot past, happened human occupations. Some vestiges of these occupations were found in the Group of Rock Shelter's Porto de Areia, Bira's Cave, Urtiga's Cave and in the Group of Rock Shelter's Cedro, where besides fragments and lithic instruments, there are rupestrian pictures.

The ornaments found in this caves are characterized by speleothems and speleogens. In some cavities, the water infiltration, permitted the dissolution of silica and ferric oxid. The concentration of these elements in the pores and fractures of rock, form by dripping, small stalactits, whose developments are inferior to 15 mm. Ornamentes types as cauliflower can be found on the cover of some grotts, too.

The concentration of ferric oxid, horizontally ordered on different beds of rock, origin the occurrence of desuniform shelf structures.

Speleogens are frequently found, it result by clay's nodules existent in the rocks. These nodules just finish attacked by erosion, because its resistance is smaller than the material where it's aggregated. The aspect resultant on the rock's wall is a concavity hole, whose the borders are delimited by ferric oxid.

Final Considerations

According with the observations, we can consider that the Speleological District of Tigre, gone to be resultant of association by geological/geomorphical process accompanied by erosives process.

However, this paper presents some considerations above the area, it mean previous studies, and this subject about characterization and genesis of these natural cavities isn't conclude.

Prevailing the necessity of this studies continue being developed and can produce more informations bringing a deepen knowledge about this area, once that, the Speleological District of tigre has a very ample potential to be investigated.

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