



ANAIS do 34º Congresso Brasileiro de Espeleologia

Ouro Preto SP, 13-18 de junho de 2017 - ISSN 2178-2113 (online)



O artigo a seguir é parte integrando dos Anais do 34º Congresso Brasileiro de Espeleologia disponível gratuitamente em www.cavernas.org.br/34cbeanais.asp

Sugerimos a seguinte citação para este artigo:

RIBEIRO, T. G. R.; *et al.*. Contexto estrutural no desenvolvimento da Caverna Tamboril, Unaí-MG. In: RASTEIRO, M.A.; TEIXEIRA-SILVA, C.M.; LACERDA, S.G. (orgs.) CONGRESSO BRASILEIRO DE ESPELEOLOGIA, 34, 2017. Ouro Preto. *Anais...* Campinas: SBE, 2017. p.297-300. Disponível em: <http://www.cavernas.org.br/anais34cbe/34cbe_297-300.pdf>. Acesso em: *data do acesso*.

A publicação dos Anais do 34º CBE contou com o apoio do Instituto Brasileiro de Mineração. Acompanhe a cooperação SBE-IBRAM em www.cavernas.org.br/sbe-ibram

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CONTEXTO ESTRUTURAL NO DESENVOLVIMENTO DA CAVERNA TAMBORIL, UNAÍ-MG

STRUCTURAL CANTEXT IN THE DEVELOPMENT OF TAMBORIL CAVE, UNAÍ-MG

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Resumo

A região de Unaí-MG encontra-se localizada no contexto geológico da Faixa de Dobramentos Brasília. É nesse contexto, sobre rochas carbonáticas do Grupo Bambuí (CPRM, 2014) que a Caverna Tamboril se estabeleceu. A estruturação NE-SW de desenvolvimento da caverna segue o mesmo padrão de lineamentos regionais. O controle da dissolução se deu principalmente ao longo de zona de charneira variando de NE a NW em uma dobra antiforme isoclinal e fraturamentos associados.

Palavras-Chave: caverna Tamboril; dobra; fratura.

Abstract

The Unaí region in the state of Minas-Gerais is located at the geological context Brasília Fold Belt, central part of Brazil. Was in this context that carbonatic rocks of Bambuí Group were dissolved generating the Tamboril Cave. The NE-SW main development of the cave follows the regional pattern of lineaments. The dissolution control occurred mainly along hinge zone of antiformal folds varying between NE to NW directions under an isoclinal antiform.

Key-words: Tamboril cave; fold; fracture.

1. INTRODUÇÃO

This study has the proposal to present a previous interpretation of how dissolution preferably dissolved the carbonatic host rock of Tamboril Cave, in Unaí region, 155 km of Brasília (Figure 1).

According with the topographic map of the cave constructed by GREGEO, is notable a curved main orientation that starts with NW-SE, changing for approximately N-S and ending with NE-SW direction (Figure 2).

Previous studies of the area emphasized the well marked NE trend of lineaments (Laranjeira, 1992; Laranjeira & Dardenne, 1990). They also suggested the presence of thrust and strike-slip faults associated with isoclinal folds verging to the east.

In the region, some authors emphasize the difficulties to make stratigraphic correlations due the complexity of the fault/folded system (Laranjeira & Dardenne, 1990). The geological mapping realized by CPRM, 2017 suggests that the dolomitic and pelitic rocks are “doubtfully” associated to the Bambuí Group.

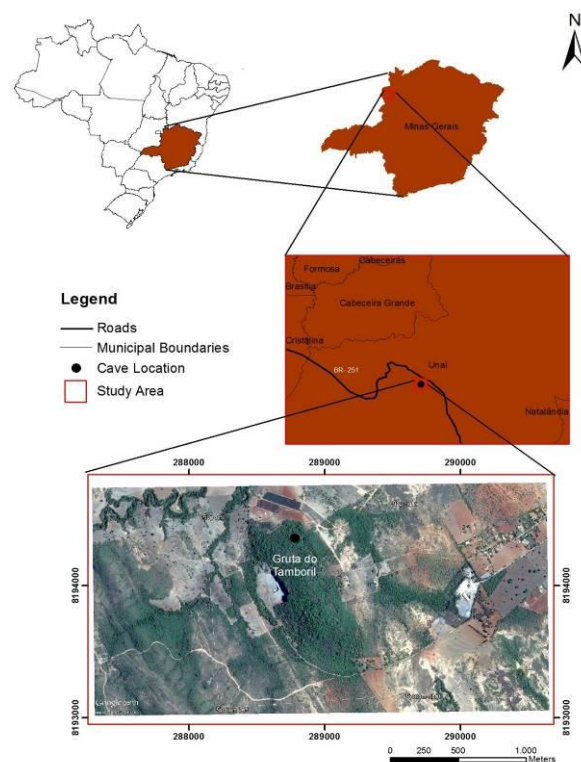


Figure 1: Schematic map showing the location of Tamboril Cave. Black point represents the entrances of the cavity.



Figure 2: Left: Some attitudes measured on the hill and abandoned mine;
Right: Tamboril Cave positioning in relation to the hill.

2. OBJECTIVES AND METHODOLOGY

The structural analysis of this project was suggested by the master degree “Geological and geochemical modeling of superficial infiltration of water in the Tamboril Cave: Implication for paleoclimatic interpretation.”, by the same author. The path taken by superficial water is important because the water can be biased by anomalous contents of isotopes, leading to misinterpretations (Wortham *et al.*, 2017). For instance, we can note

anomalous values of Sr in the dripping water collected from siltstones layers.

In first place an schematic map of lineaments utilizing Google and digital elevation model of elevation (SRTM images) (Figure 3) were made to assist in the comprehension the understanding of the structural trends. The geologic context of the area was based on the bibliographic review, field observations and mapping.

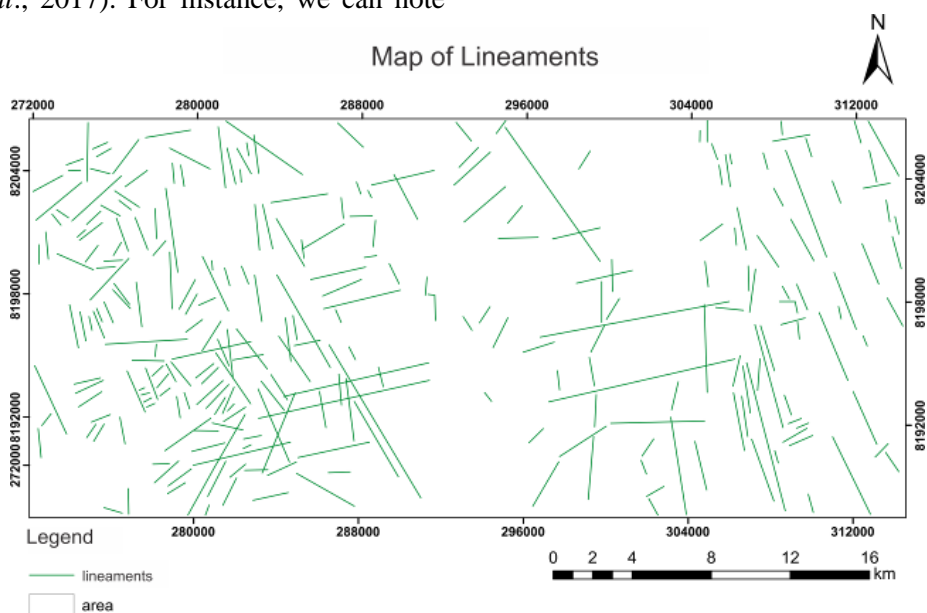


Figure 3: Map of lineaments of the region north of Unaf-MG.

The next step was to understand how the layers and fractures in general are structured, measures were made inside, outside the cave, and also in the abandoned mine in the southwest face of the hill.

After collecting the structural data, an simplistic model was constructed utilizing the software *3D-Move* (Figure 4).

3. DISCUSSIONS AND RESULTS

Measures done on the surface (outside the hill) suggest that the mean attitude of the layers is approximately 260°/45°. Is important to emphasize

that high dip layers like 235°/82° sometimes are inverted, defined by upside down stromatolites.

This model indicates that the bedding is folded in isoclinal system (Figure 5). Inside the cave is notable that the preferential direction southward is aligned with the hinge zone (in the lake hall the azimuth is 185°) of an anticlinal tight fold. In the ceiling of the same hall was observed a big fracture with azimuth direction of 280°-100°. This fracture in special present great amount of dissolution speleothems like stalactites and curtains, which may represent a good vector of percolation. Normal faults were also seen (Figure 6) in the walls of the cave, probably associated with late phase of relaxation of the main tension.

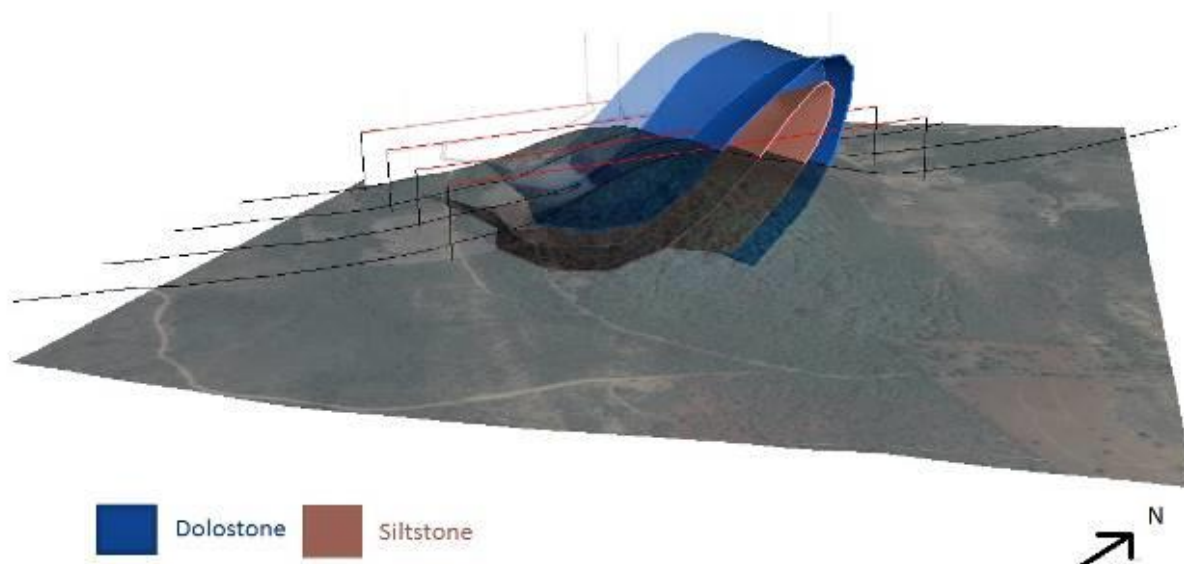


Figure 4: Geological model of the layers. Note isoclinal pattern with inverted bedding.

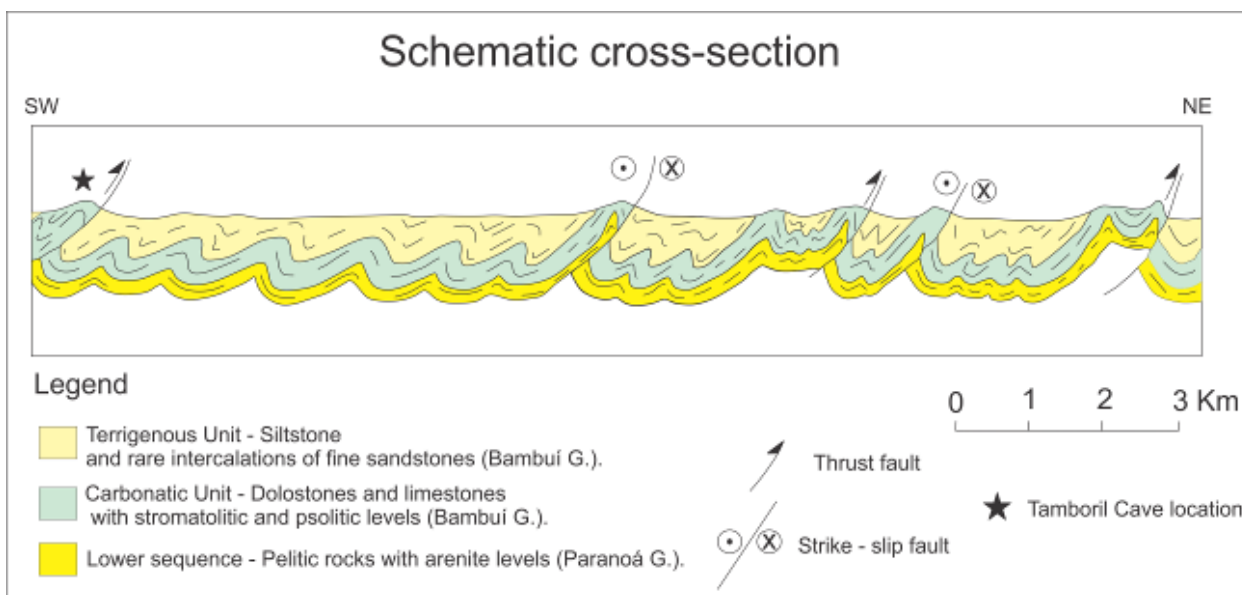


Figure 5: Schematic cross-section adapted from Laranjeira & Dardenne, 1990. Note the structural setting of isoclinal folds where Tamboril Cave is located.

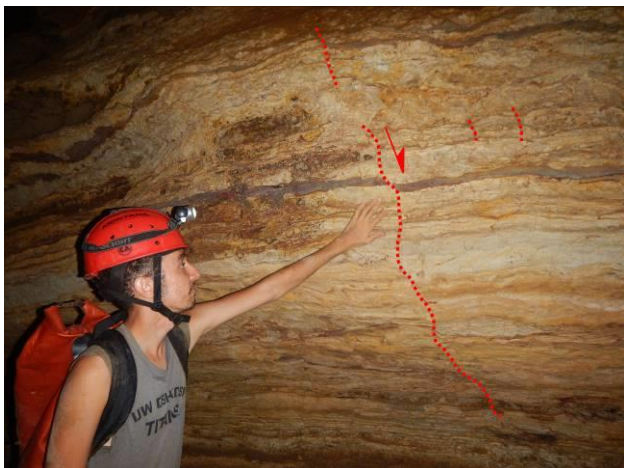


Figure 6: Normal fault cutting intercalated layers of siltstone with dolostone.

Inside the cave, field analysis showed that in some halls the preferential direction of the ceiling is oriented with the hinge of anticlinal fold, with the axis dipping southwards. It is also possible to note the formation of curtains and stalactites along joints and other fractures from centimetric to decametric scale.

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4. CONCLUSIONS

This work is still in progress as part of the master degree project cited before. Nevertheless the first field analysis proved that the compressional system of isoclinal folds associated with fractures of different natures was decisive for the southward preferential direction of dissolution and speleogenesis of Tamboril Cave.

The authors are still improving and advancing with respect the modeling of the cave. The next step of the research will be an attempt to define how the siltstone is structured along the hill, and try to understand what is its role in the water reservoir responsible for development of the cave.

ACKNOWLEDGMENTS

The authors of this work would like to thank in first place the speleology group GREGEO for all the company, friendship in field and technical support. All the financial support by NSF project “Assessing climate-biosphere linkages using Late Holocene records of climate variability and vegetation dynamics from the Brazilian Amazon and Savanna” and PETROBRÁS/REPSOL.