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A preliminary comparison between boring from Pocala Cave and an unroofle cave at Borgo Grotta Gigante, Trieste Karst

Comparación preliminar entre el sondeo de Pocala y una cueva innominada en Borgo Grotta Gigante, Karst de Trieste

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ABSTRACT

In 2000 five boring were performed in a unroofle cave at Borgo Grotta gigante, the third in particular is correlable with the boring outside Pocala Cave. The first result has been obtained by observing the absence of collapsed rocks, in particular in the unroofle cave of Borgo Grotta Gigante. Clearly limestones have dissolved.

Key words: Pocala cave, unroofle cave, Borgo Grotta Gigante, boring

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INTRODUCTION

One of the most important Karst areas is Borgo Grotta Gigante area, where different karst forms and an unroofed cave are present. In the year 2000 five borings were performed in this unroofed cave, four of which are very interesting to study stratigraphy, sediment components and datation.

One of these borings can be compared with the last year boring made in Pocala Cave, particularly with that outside the cave.

The unroofed cave is a "canyon" about 4-6 meters wide, 50 meters long and 3-4 meters high, in the part which is not filled with sediments, and is part of a still recognizable and partially existent hypogean complex.

The unroofed cave is about 250 meters above sea level, while Pocala cave is about 134 meters above sea level and the two spots are distant about 9 kilometres between them.

METHODOLOGY AND DESCRIPTION

A mechanical drill performed the borings.

The first boring in Borgo Grotta Gigante shows vegetable soil (0.00-0.50 metres), brown clay with limestone fragments (0.50-3.00) reddish brown clay and calcite (3.00-4.65), calcite and calcite in brown clay (4.65-6.90), calcite and grey rudist limestone (6.90-8.00).

The second boring in Borgo Grotta Gigante shows vegetable soil (0.00-0.30),

brown clay or reddish brown clay with fragment of limestone (0.30-3.00), calcareous and calcite fragments in brown or light brown clay (3.00-7.40), limestone (7.40-8.00) limestone in brown clay (8.00-8.55) grey limestone (8.55-9.45).

The third boring in Borgo Grotta Gigante shows vegetable soil (0.00-1.30) red clay with calcareous fragments (1.30-1.85), grey rudist limestone (1.85-2.00), red clay with calcite (2.00-2.20), rudist limestone with red clay and red clay with calcareous fragments (2.20-4.00), limestone fragments in red yellow clay (4.00-4.68), yellow ochre clay with calcareous fragments (4.68-6.00), rudist limestone (6.00-6.40) yellow ochre clay (6.40-7.10), grey rudist limestone (7.10-8.20)

The fifth boring in Borgo Grotta Gigante shows vegetable soil (0.00-0.20), brownish red clay (0.20-0.55) red clay with calcite fragment and vegetable rests (0.55-2.00) red clay with calcareous fragments and calcite crystals (2.00-2.10) different types of calcite and levels of limestone (2.10-8.00), empty space (8.00-8.15), calcite and calcite in red yellow clay (8.15-8.80) grey limestone and calcite, as stalactite, in yellowish red clay (8.15-9.10) grey limestone (9.10-9.75)

The external boring of Pocala cave shows brown clay with ash fragments, stones and ochre inclusions (0.00-4.00 metres), stones in red clay (4.00-4.10), calcareous stones in pink sand and calcite levels more or less disgregated

(4.10-4.85), red clay with calcite fragments (4.85-5:20), red and yellow laminiti (5.20-5.60), yellow clay with calcites (5.60-5.80), pink sand (5.80-6.00), calcites in clay and calcitic stratum (6.00-

6.20), brown and yellow laminita (6.20-7.00), red yellow sand levels (7.00-8.00), brown clay (8.00-9.00), ochre clay (9.00-10.15), calcite (10.15-10.60), ochre clay (10.60-0.75), calcite (10.75-11.00) grey limestone (11.00-12.40).

The Borgo Grotta Gigante sediments are very different among them and they have some correlations with sediments coming from Pocala Cave. It is very interesting to see how, at a distance of few metres, boring stratigraphy is similar but different for the presence or absence of calcite or other materials.

The correlation between the borings performed in Pocala Cave and in Borgo Grotta Gigante unroofed cave is possible for some aspects.

The most similar boring is the third one of Borgo Grotta Gigante, because it presents some parts which can be correlated with the boring made outside Pocala cave, in particular the levels where calcite and laminita are present. They coincide in the strata thickness and in the stratigraphy.

The other borings have some parts similar to Pocala cave boring: in fact, the first and the second borings of Borgo Grotta Gigante are similar at the top (0.00-3.00 m) because in all cases sediments are made of brown clay. At the bottom of both borings there aren't yellow laminita levels but the first boring presents calcite and limestone levels in red clay and the second one presents brown clay with limestone fragments.

The central part of the fifth boring in Borgo Grotta Gigante corresponds to the bottom part of the first and second

borings for the presence of calcite and red clay

DISCUSSION (FUTURE PROSPECTS)

The study started as a revisitation of Pocala Cave, with an *Ursus spelaeus* deposit, has changed rapidly into the study of the whole stratigraphical column, contained in the cave itself. Two borings 10 and 14 meters deep represent it. The study extended to other deposits in still existent or unroofed caves.

Recent paleomagnetic datation (Bosak et alii) on the near Kozina Karst (Slovenia), dated back the bottom of the yellow sediments to 5.3 million years ago.

These yellow deposits are well known and very wide in Southern Istria: we suppose they are a large quantity of filling sediments of river caves.

The geological characteristics of Southern Istria and Trieste Karst, should have carried, at present, to a different conservation of the filling sediments in the horizontal caves.

In particular the subhorizontal position of Istrian Cretaceous limestone has developed a little deep karstism.

On the contrary, the antyclinal structure of the Trieste Karst developed an easier washing away of cavities.

The events of the last millions of years could have caused the consumption of the ancient caves leaving some wide deposits on the present surface in Istria where the washing away was lower because of the almost horizontal geologic situation in the tertiary limestones.

On the Trieste Karst, in antyclinalic

situation, the water percolation and the water -bearing stratum actions have been more incisive with a consequent absorption action of the filling sediments in the wide hypogeal complexes.

If we consider an average lowering of the limestone of about 0.02 millimetres per year we can estimate that rocks consumed by 100 meters in the last 5 million years compared with the present level.

CONCLUSIONS

The first result has been obtained by observing the absence of collapsed rocks, in particular in the unroofed cave of Borgo Grotta Gigante. Clearly limestones have dissolved.

The irregularity of the stratigraphical

succession in different borings, though performed at a distance of few metres one from the other, seems to prove in the so far studied deposits the possible emptying occurred in different periods.

The strata position studied by R. Battaglia in 1929 and confirmed by our recent reexamination of the deposit (excavation of trench n° 8/1999) shows a clear phase of absorption of the cave bottom together with the possible prosecution of the cave itself according to the position of the limestone strata.

The different methods of datation (paleomagnetism, U/Th, racemization of aminoacids, C^{14}) will enable us to reconstruct the most ancient history of this Karst area.

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