15th International Congress of the Geological Society of Greece
Athens, 22-24 May, 2019 | Harokopio University of Athens, Greece
Bulletin of the Geological Society of Greece, Sp. Pub. 7 Ext. Abs. GSG2019-060

Cavernous forms in Mandres Quarry (Kilkis, Greece)

N. Kargopoulou[1], G. Lazaridis[1], A. Karakosta[1]

(1) Aristotle University of Thessaloniki, Department of Geology, Laboratory of Geology and Palaeontology, 54124, Thessaloniki, Greece, ntkargop@geo.auth.gr

A small limestone quarry (~0.4 hectares) is located in a low hill in the vicinity of Mandres village, in Kilkis Prefecture (N. Greece). It is 1.2 km east to the village, at about 180 m above sea level (N40.88426 E22.92365). A number of small cavities and cavernous forms are found during commercial works in the NE part of the quarry (Fig. 1). They are opened in carbonates (limestones and dolomite) of Middle to Upper Triassic age (Carnian-Anisian) that are overlain by quartzites. These rocks belong to the Deve Koran-Doubia Unit of the Circum-Rhodope geotectonic zone (Kockel & Ioannides, 1979; Kaufmann *et al*., 1976; Mountrakis, 2010) that is tectonically placed upon the calcareous flysch of Svoula Unit. The age of the latter is younger than Upper Triassic. These Alpine rocks crop out at higher altitudes and they are surrounded by quaternary sediments. Although the largest cave in the area, the Agios Georgios show cave (Kilkis town), is opened in these carbonates, our knowledge about caves and speleogenesis in the area is quite limited.

Methods

The cavities are surveyed according to standard cave techniques (i.e. Kalogeropoulos *et al*., 2008; Trimmis, 2018 and reference therein). Rock discontinuities were measured with CLAR compass. Terms and morphological descriptions of caves can be found in Lauritzen and Lundberg (2000), Gunn (2004) Ford and Williams (2007) White and Culver (2005).

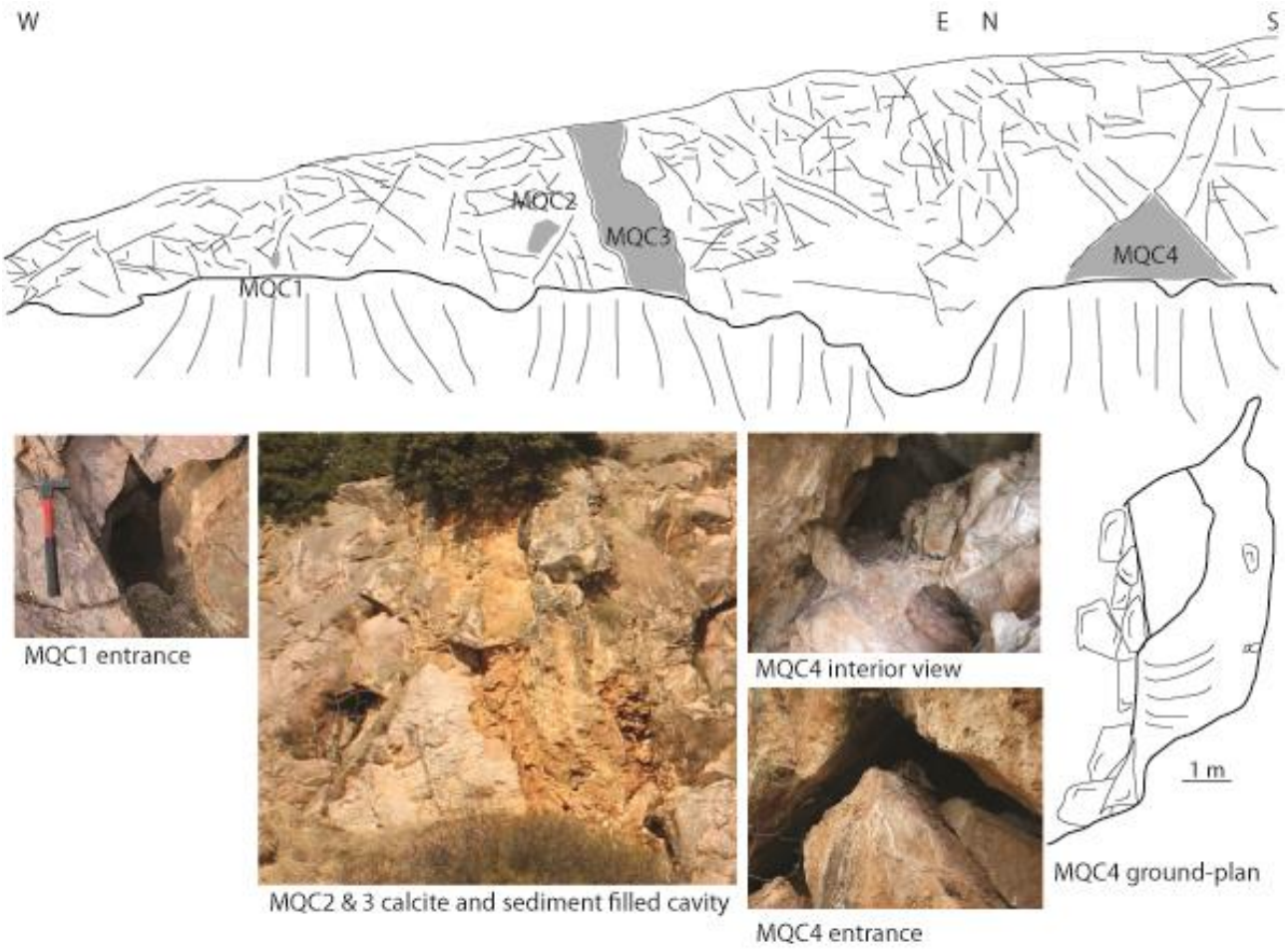

Figure 1. Sketch of the quarry escarpment in Mandres, with the cave entrances depicted and ground plan of the largest cavity.

Description and results

The cavities found in the Mandres Quarry (MQC: Mandres Quarry Cavity) are mainly fracture guided by N-S and E-W discontinuities. Their length reaches about 6m and the largest one (MQC4) is located in the eastern escarpment and covers an area of ~30 m^2. In the latter, the ceiling and the side-walls coincide with rock discontinuities and are probably related to breakdown that affects the original morphology. Its NE part, however, displays a dissolutional passage that is abruptly terminated. It is poorly decorated with few common speleothems such as stalagmites, flowstone and coralloids. This is

commonly the case in all the cavities found in the quarry that are mainly decorated with coralloids. The only exception is a fracture-guided cavity at the northern escarpment that is almost totally filled with thick calcite layers, flowstones, coralloids. The central part of the cavity is partially filled with fine-grained red sediment.

All in all the caves are characterized by minimum dissolutional forms of small-scale that means the information about speleogenesis comes from passage-scale forms. The high and narrow, symmetrical and fracture guided passages are indicative of phreatic speleogenesis. This is in agreement with the absence of vadose marks. Furthermore, the orientation, the shape and the filling of the passages in these cavities is similar to those found in the Agios Georgios cave and its surroundings (i.e. in the Quarry to the north of the cave). The latter is considered to have been developed by hypogene speleogenesis (Lazaridis, 2017).

Conclusions

- A number of small cavities with similar morphological features is investigated and recorded in detail.
- Their meso-scale morphology is phreatic and identical to the hypogene caves of the area and thus they probably have been developed under similar conditions.
- This group of cavities provides new information and expands the area that has been affected by the processes of hypogene speleogenesis in the carbonates of the Circum-Rhodope Zone.

References

Ford, D., Williams, P. D. 2007. Karst hydrogeology and geomorphology, John Wiley & and Sons IncInc.

Gunn, J. 2004. Encyclopedia of Caves and Karst Science, Taylor and& Francis Inc.

Kaufmann, G., Kockel, F., and Mollat, H., 1976. Notes on the stratigraphic and paleogeographic position of the Svoula Formation in the Innermost Zone of the Hellenides (northern Greece). Bulletin de la Societe Geologique de France 18, 225-230

Kalogeropoulos, I., Lazaridis, G., Tsekoura, A., 2008. Methodology of cave mapping: comparing routings. 4th Pancretan Speleological Symposium. Hellenic Speleological Society, Rethymnon, Crete, Greece http://ese.edu.gr/media/seminars/sem_notes/hartografisi/survey_methods.pdf

Kockel F., Ioannides K., 1979. Geological Map of Greece, Kilkis sheet. Scale 1:50.000, Institute of Geology and Mineral Exploration, Greece.

Lauritzen, S., Lundberg, J. 2000. Solutional and erosional morphology of caves. Klimchouk, A., Ford, D. C., Palmer, A. N., Dreybrodt, W. (eds.) Speleogenesis. Evolution of Karst Aquifers. Huntsville: National Speleological Society.

Lazaridis, G. 2017. Hypogene Speleogenesis in Greece. In: Klimchouk, A., Palmer, A. N., De Waele, J., Auler, A. S. & Audra, P. (eds.) Hypogene Karst Regions and Caves of the World. Springer, 225-239.

Mountrakis, D. 2010. Geology and Geotectonic Evolution of Greece. University Studio Press Inc, Greece, p. 374 (in greek)

Trimmis, K. P. 2018. Paperless mapping and cave archaeology: A review on the application of DistoX survey method in archaeological cave sites. Journal of Archaeological Science: Reports 18, 399-407.

White, W. B., Culver, D. C. 2005. Encyclopedia of caves, Elsevier Amsterdam (The Netherlands).