

First paleontological results from new karst cavities located in Prádena (Segovia, Spain)

Irene Prieto^{1*}, César Laplana², David Martín-Perea¹, Adrián Ruiz-Galván¹ y Paloma Sevilla¹

1. Departamento de Paleontología. Facultad de Ciencias Geológicas. Universidad Complutense de Madrid. 28040. Madrid, España.
2. Museo Arqueológico Regional de la Comunidad de Madrid. 28801. Alcalá de Henares. Madrid, España. Email: ire.prieto@gmail.com

INTRODUCTION

The study area is located near Prádena (Fig. 1), to the south of Segovia (Spain), bordering the north end of the Central System (Alonso, 1981). Geologically the karst cavities are framed in mesozoic materials of Late Cretaceous deposited in the area (Azor et al., 1991), more precisely in the Dolomías de Montejo Formation (Late Santonian), which in this sector are found above the Areniscas de Ituro y Lama Formation, dated as Early Santonian (previously defined as Areniscas dolomíticas de Hontoria Formation), and below the Dolomías de Valle del Tabladillo Formation (Campanian). Quaternary fillings are commonly found as the result of sedimentation within the karst cavities formed in the carbonate rocks, many of which contain a diverse record of the fauna that occupied these cavities (Sevilla, 1988; Sánchez-Marco & Jiménez-Guijarro, 2005).

Few studies have dealt with the archeological and paleontological record from the cavities present in the area, among which it is worthy to mention: "Enebralejos Cave" (Sos, 1932), "Jaspe Cave" and "Pepón Cave" (Barea, 2001).

MATERIAL AND METHODS

Access to these caves is usually difficult, but because of the extended exposure of the Dolomías de Montejo Formation, a recent survey was conducted with the aim of finding new cavities. Of all the new fissures with fossils discovered during these surveys, the most interesting one was found to the west of the town of Prádena. It consists of an unpublished fissure containing paleontological record and probably connected to other caves and galleries of the karstic system. It is found on the side of a dirt track where the dolomites are widely exposed and strongly fractured with "terra rossa" infills (Fig. 2). These were studied with a paleontological and sedimentological perspective.

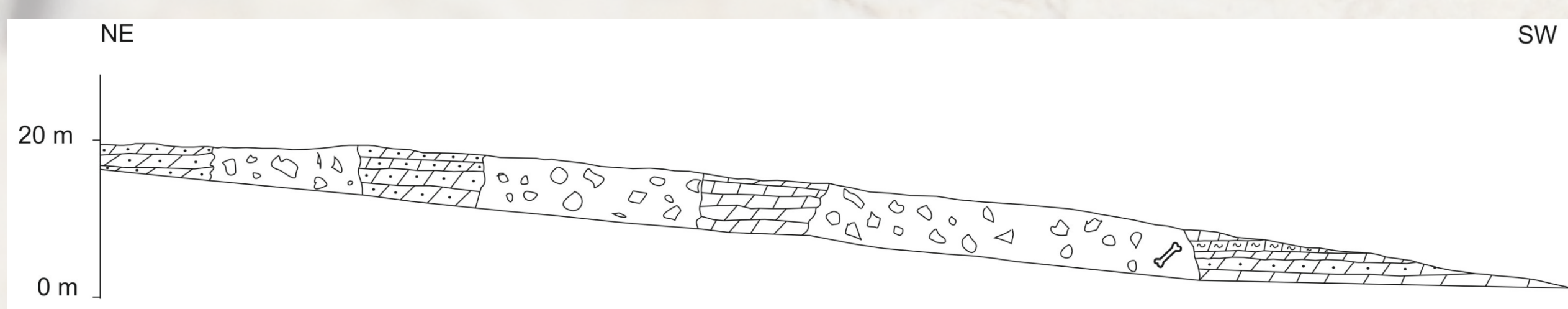
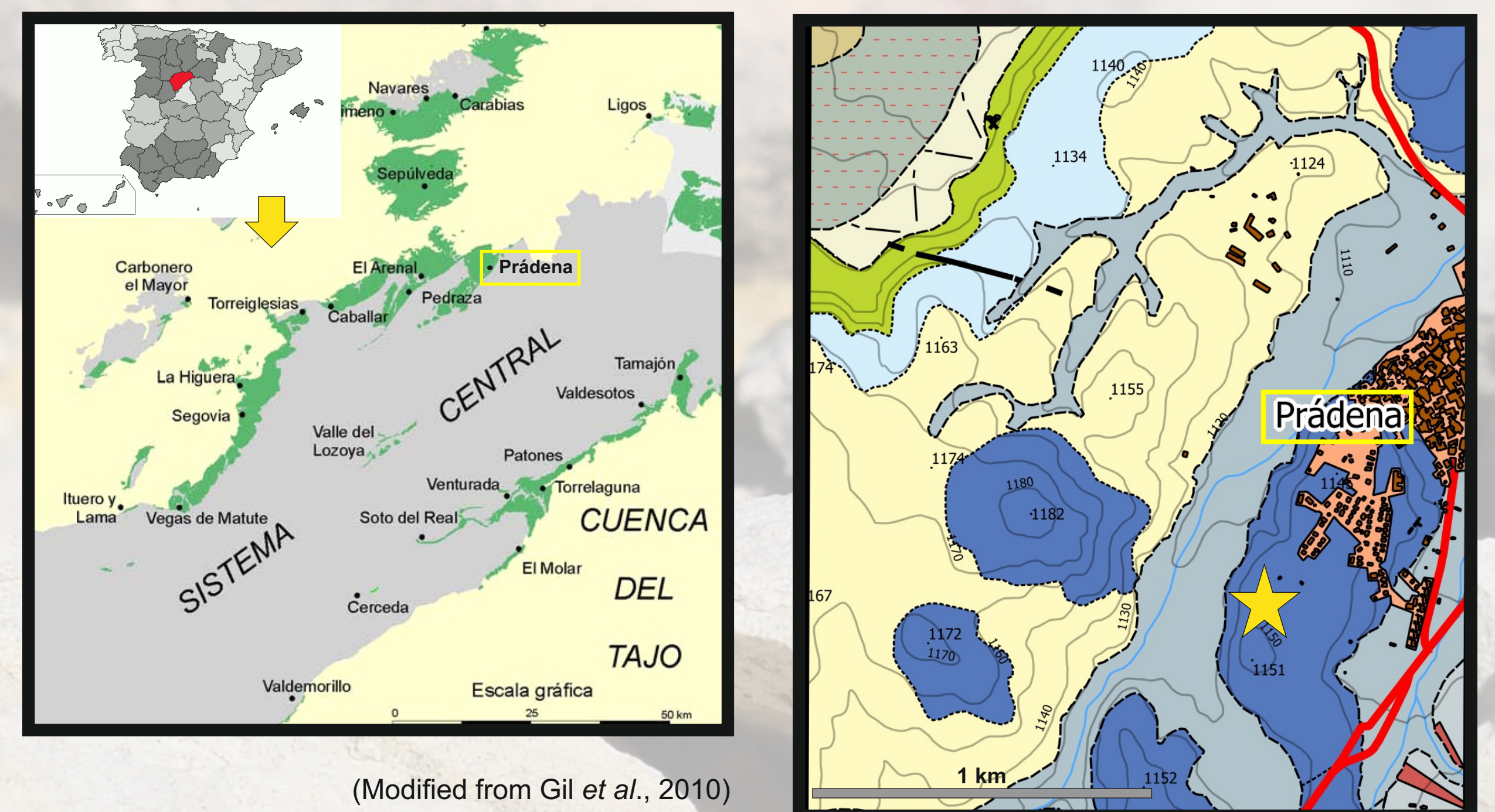


Figure 2. General view from the fossil site.



(Modified from Gil et al., 2010)

Figure 1. Geographical and geological setting of the fossil site.

RESULTS

The main filling, to which we refer here, has been interpreted as a collapsed gallery in which the filling consists of heterogeneous materials: large fallen blocks mixed with mainly sandy, clayish and sometimes gravelly deposits. In the fallen blocks the typical structures formed within the cave, such as speleothems can be seen. Fine laminations and gradations can be observed in deposited detrital materials. The fossil remains preserved in these fillings belong to vertebrates. They are found in the clayish sediments found in between the fallen blocks and are very fragile, mostly fractured and concentrated near one of the walls of the cavity.

DISCUSSION

The accessibility of this cavity makes it possible to study and compare it to other active cavities present in the area. They all have been developed in the same formation and at a similar depth, which does not exceed 16 m (Barea, 2001). They also share the processes that originated the different cavities: a water supply coming from the nearby mountain range that, upon reaching these carbonated lithologies, produced the development of cavities by the gradual dissolution of its components.

The formation of the clay deposits would respond to circulation of water without much energy, which would often be stagnant in favor of small depressions within the cavity, thus depositing the clay fraction resulting from karstic decalcification phenomena. The existence of sandy passages and even of gravels, allows us to infer that these quiet conditions in which the clay deposits were formed, were occasionally affected by more energetic episodes that dragged thicker materials of very different composition. The concentrated pattern of the paleontological remains could be a consequence of water currents that were depositing and concentrating the bones in specific places in favor of some morphological agent. Alternatively, they could have been deposited in situ by some biological agent.

The paleontological content of the samples coming from this newly discovered karst filling consists of several bone fragments and dental elements of small mammals (Fig. 3), mainly rodents, as well as some macrovertebrate remains assignable to bovids. They are frequently found covered by a hard mineral coating, but the fossils within are very fragile and easily broken. This paleontological record allows us to give a first faunal list of these fillings, attributed preliminarily to the Middle Pleistocene:

- *Allocricetus* sp.
- *Apodemus* sp.
- *Microtus brecciensis*
- *Talpa* sp.
- *Myotis* gr. *myotis/blythii*
- Bovidae indet.

The presence of some key taxa in the assemblage, such as *Microtus brecciensis*, or small bovidae remains, enable to infer preliminarily the presence of an open mediterranean forest in the surroundings of the cave, although future sampling in the new site will no doubt provide a more precise environmental reconstruction.

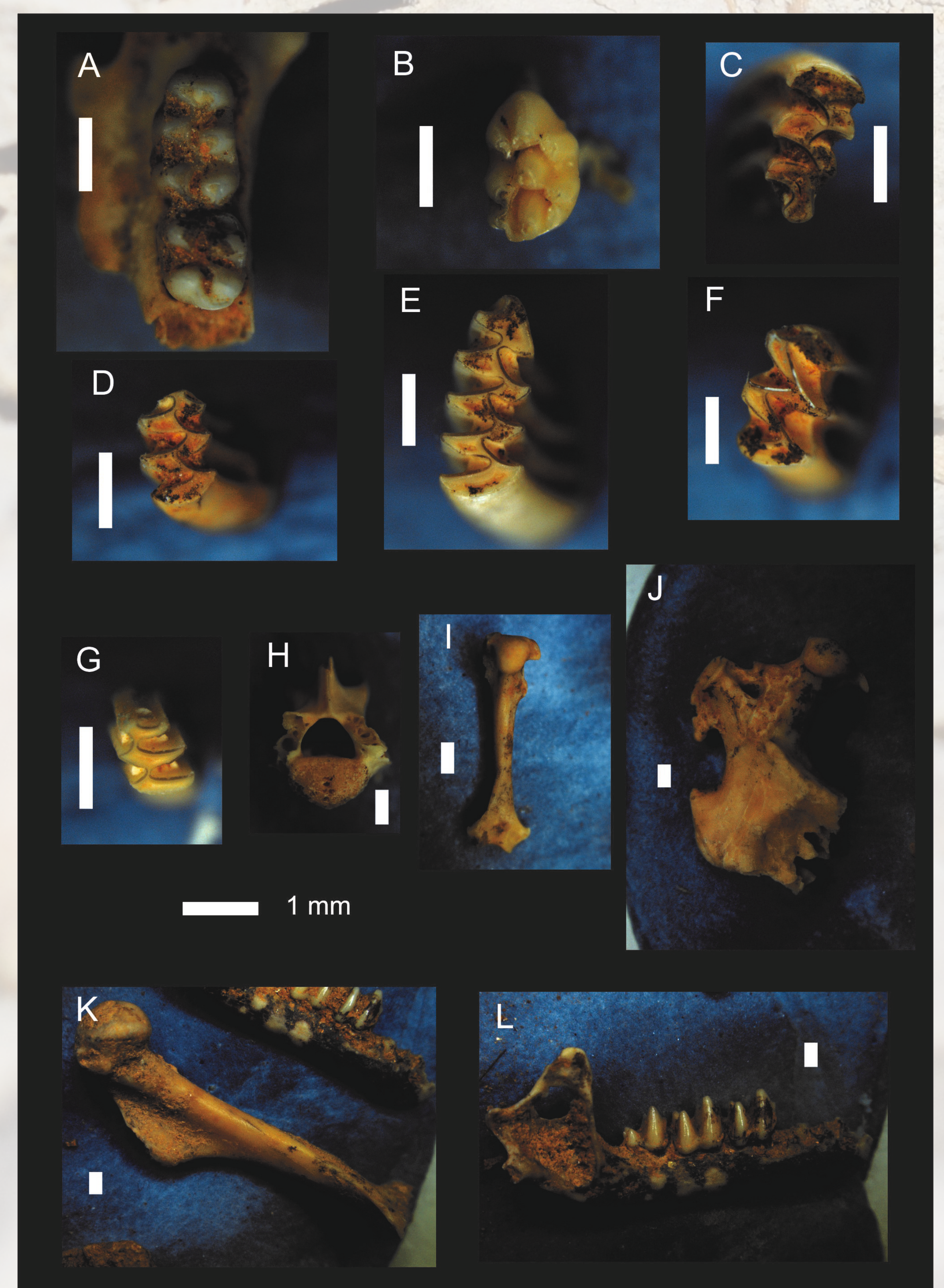


Figure 3. A: Left maxillary fragment of *Allocricetus* sp. with M1 and M2. B: M1 left of *Apodemus* sp. C: Left M3 *Microtus brecciensis*. D: Right m2 *Microtus brecciensis*. E: Right m1 *Microtus brecciensis*. F: Right M1 *Microtus brecciensis*. G: Left m3 of *Microtus brecciensis*. H: Thoracic vertebra of a small mammal indet. I: Micromammal humerus indet. J: Right humerus of *Talpa* sp. K: Micromammal humerus fragment. L: Right mandible of *Myotis* gr. *myotis* / *blythii*, with m1-m3.

CONCLUSIONS

It can be concluded that a new collapsed cavity filled with different sediments has been found near Prádena (Segovia) that can be added to the wide list of cavities with Quaternary fossil record known in the area. The fossil site shows an interesting potential and further studies will be conducted in the near future in order to obtain more material which will enable to give a more precise dating for the assemblage and to reconstruct more in detail the paleoecological context in which the assemblage was formed.

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