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Sedimentological, taphonomical and palaeoecological aspects of the late early Pleistocene vertebrate fauna from the Somssich Hill 2 site (South Hungary)

Aspects sédimentologiques, taphonomiques et paléoécologiques de la faune de vertébrés de la fin du Pléistocène inférieur du site de Somssich Hill 2 (Sud de la Hongrie)

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ABSTRACT

The Somssich Hill 2 site (Villány Mts., South Hungary) yielded one of the richest late Early Pleistocene vertebrate assemblages within the Carpathian Basin. The present paper provides a summary of all former and new taxonomical results, as well as biostratigraphical and palaeoecological conclusions, which is completed with previously unpublished sedimentological and taphonomical observations on the locality. The bulk of the fauna can be referred to the *Mimomys savini–Mimomys pusillus* Biozone in the Biharian (MQ1), whereas a few specimens suggest an older age, namely the *Mimomys pliocaenicus* Biozone in the late Villanyian (MN17). The bones were affected by only a short-distance aquatic transport, thus they represent a parautochtonous and relatively unaltered assemblage. Consequently, the material was considered here as a reliable base for reconstructing the direct palaeoenvironment of the cavity. The entire section was divided here to five different palaeoecological units based on the small vertebrate fauna.

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RÉSUMÉ

Le site de Somssich Hill 2 (monts Villany, Sud de la Hongrie) a fourni l'un des assemblages de vertébrés les plus riches de la fin du Pléistocène inférieur, dans le bassin des Carpates. Le présent article présente un résumé de tous les résultats taxonomiques anciens et nouveaux, ainsi que les conclusions biostratigraphiques et paléoécologiques, qui sont complétés par les observations sédimentologiques et taphonomiques non publiées antérieurement sur la localité. L'ensemble de la faune peut être rapporté à la biozone à *Mimomys savini–Mimomys pusillus* du Biharien–MQ1), tandis que quelques spécimens suggèrent un âge plus ancien, plus exactement la biozone à *Mimomys pliocaenicus* de la fin du Villanyien (MN17). Les os n'ont été affectés que par un transport aquatique sur une courte distance, et ils représentent donc un assemblage parautochtone et relativement non altéré. Par conséquent, le matériel a été considéré ici comme un élément de base fiable pour la reconstitution du paléoenvironnement précis de la cavité. La section entière a été divisée en cinq unités paléoécologiques sur la base d'une faune de petits vertébrés.

1. Introduction

The karst cavity of the Somssich Hill 2 site (situated near the town of Villány, southern Hungary) is one of the richest late early Pleistocene vertebrate localities of central Europe (Fig. 1). It was rediscovered by Dénes Jánossy and György Topál in 1974, but was already mentioned by Kormos (1937) and Kretzoi (1956). The excavation led by them between 1975 and 1984 yielded a rich Pleistocene fauna, of which preliminary lists were given by Jánossy (1983, 1986, 1990). The continental snail fauna of the locality was described by Krolopp (2000), and some mammal groups (namely cricetids and arvicolids) were published by Jánossy (1983, 1990) and Hír (1998).

A new project (NKFI K 104506) was started in 2013 by the cooperative research group of the Hungarian Academy of Sciences, the Hungarian Natural History Museum and the Eötvös University, which aimed to review and elaborate on the taxonomy, taphonomy and palaeoecology of the material. Within the framework of this project, some articles were already published (Botka and Mészáros, 2014, 2015a, b, 2016; Striczky and Pazonyi, 2014; Szentesi, 2014, 2016), but these contain primarily taxonomical and palaeoecological conclusions. However, some questions about the locality remained unanswered up to now. The present study aimed to achieve the following goals:

- Jánossy (1986, 1990) divided the sequence into 50 "layers", each of them 20–30 cm in thickness. However, his "layers" not always represented sedimentary strata; they were rather sampling units according to depth. In order to fill this gap, here we present a new and complex sedimentological investigation for the locality;
- according to Jánossy (1983, 1986, 1990), the site provided a typical early–middle Pleistocene fauna. However, this concept was never tested by a more exact method; therefore, this paper presents the results of an electron spin resonance (ESR) dating, accompanied by a more complex biostratigraphic interpretation of the revised fauna.

Although it is not clear how far the remains were transported from their original biocoenosis, how many distorting factors were they subjected to during the process, or how long it took for the cavity to fill up, several abundance based palaeoecological conclusions were made in the previous studies (see, e.g., Hír, 1997; Jánossy, 1983; Krolopp, 2000; Mészáros, 2015; Striczky and Pazonyi, 2014; Szentesi, 2016). Thus, it seemed necessary to perform a detailed taphonomical analysis for the site.

2. Material and methods

The bulk of the studied material (approximately 950,000 remains) was collected by Dénes Jánossy and is now stored in the Vertebrate Palaeontological Collection of the Hungarian Natural History Museum. The present revision revealed a remarkably diverse vertebrate fauna with 109 identified taxa (Table 1). Considering the number of bones, the material is dominated by herpetofaunal elements (around 910,000 remains), but small mammals are taxonomically the most diverse group (with 45 species). The herpetofauna is discussed in detail by Szentesi (2014, 2016). Amongst the small mammals, shrews are presented in Botka and Mészáros (2014, 2015a,b, 2016) and Mészáros (2015), whereas dormice were revised in Striczky and Pazonyi (2014).

For the sedimentological, taphonomical and ESR analyses, new sampling was carried out during the excavations in 2014 and 2015, which yielded more than 4,000 new remains. Fifteen samples of 1.0 kg were taken at depth intervals of 0.5 meters between 7.5–0.5 m in the entire section. The sediment was washed and sieved to three different size fractions (0.5–1.0 mm, 1.0–2.0 mm, > 2.0 mm). Both qualitative and quantitative observations were carried out on the found remains. The 15 new samples were correlated with the original numbering of Jánossy (1986, 1990) based on their depth and faunal composition (Fig. 1).

Electron paramagnetic resonance (EPR) spectroscopy was used for gathering information on the age of the samples. The spectra were recorded with a BRUKER EleXsys E500 spectrometer (microwave frequency 9.51 GHz,

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