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Small vertebrates (Amphibia, Squamata, Mammalia) from the late Pleistocene-Holocene of the Valdavara-1 cave (Galicia, northwestern Spain)☆

Petits vertébrés (Amphibia, Squamata, Mammalia) du Pléistocène supérieur – Holocène de la grotte Valdavara-1 (Galice, Espagne nord-occidentale)

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Abstract

The Valdavara-1 cave, located in the westernmost part of the Iberian Peninsula, is an archaeological site that has been excavated since 2007. At least two main sedimentary units have been identified: an upper one, 30 cm-thick, that has yielded many fragments of ceramic characteristic of the Recent Prehistory (with a radiocarbon age of 4.490 ± 40 years BP), and a lower one, 90 cm-thick, separated from the upper one by an erosive discontinuity and late Pleistocene in age (radiocarbon ages between 13.770 ± 70 and 15.120 ± 70 years BP). The small-vertebrate assemblages recovered from the sieving-washing of all the sediment from the excavation campaigns include a total of at least 34 taxa (six amphibians, nine squamate reptiles, five insectivores, two chiropterans and 12 rodents). The materials from this locality constitutes the first mention in northwestern Spain for *Microtus (Iberomys) cabrerae* and *Micromys minutus*, currently absent from this area, as well as the first mention in the fossil record for *Chioglossa lusitanica*, *Discoglossus galganoi* and *Chalcides striatus*. In both layers, such small-vertebrate associations suggest a patchy landscape dominated by humid meadows and woodland areas, with the existence of water areas in the vicinity of the cave. The climate shows a more continental pattern during the late Pleistocene, as evidenced by the presence of *Microtus arvalis*, *Sorex minutus* and *Rana temporaria*, and was milder during the Recent Prehistory, with the occurrence of typically Mediterranean taxa such as *Crocidura russula*, *Chioglossa lusitanica*, *Discoglossus galganoi*, *Rana iberica*, *Chalcides striatus* and *Timon lepidus*. The amphibian and squamate associations suggest that the climate change recorded at the Valdavara-1 cave between the latest Pleistocene and Holocene levels may correspond to a difference of 0.8 °C in terms of mean annual temperature, although the difference is 2.8 °C for the mean temperature of the coldest month.

Keywords: Micromammals; Herpetofauna; Palaeobiogeography; Palaeoenvironment; Palaeoclimate

Résumé

La grotte Valdavara-1, située dans la partie la plus occidentale de la Péninsule ibérique, est un site archéologique fouillé depuis 2007. Au moins deux unités sédimentaires principales ont été identifiées : une supérieure, de 30 cm d'épaisseur, qui a livré de nombreux fragments de céramique caractéristique de la Préhistoire récente (avec un âge radiocarbone de 4,490 ± 40 ans BP), et une inférieure, de 90 cm d'épaisseur, séparée de la supérieure par une discontinuité d'érosion, et d'âge Pléistocène supérieur (âges radiocarbones entre 13,770 ± 70 et 15,120 ± 70 ans BP). Les assemblages de petits vertébrés trouvés par lavage-tamisage de la totalité du sédiment fouillé incluent un total d'au moins 34 taxons (six amphibiens, neuf squamates, cinq insectivores, deux chiroptères et 12 rongeurs). Le matériel de cette localité permet d'identifier pour la première

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fois en Espagne nord-occidentale *Microtus (Iberomys) cabrerae* et *Micromys minutus*, actuellement absents de cette zone ; il permet également d'illustrer pour la première fois dans le registre fossile les espèces *Chioglossa lusitanica*, *Discoglossus galganoi* et *Chalcides striatus*. Dans les deux niveaux, ces associations de petits vertébrés suggèrent un paysage mosaïque dominé par des prairies humides et des zones boisées, ainsi que l'existence de surfaces d'eau à proximité de la grotte. Le climat apparaît plus continental durant le Pléistocène supérieur, comme en atteste la présence de *Microtus arvalis*, *Sorex minutus* et *Rana temporaria*, et était plus clément durant la Préhistoire récente, d'après la présence de taxons typiquement méditerranéens comme *Crocidura russula*, *Chioglossa lusitanica*, *Discoglossus galganoi*, *Rana iberica*, *Chalcides striatus* et *Timon lepidus*. Les associations d'amphibiens et de squamates suggèrent que le changement climatique enregistré à Valdavara-1 entre les niveaux Pléistocène supérieur et Holocène correspond à une différence de température annuelle moyenne de 0,8 °C, cette différence étant de 2,8 °C pour la température moyenne du mois le plus froid.

Mots clés : Micromammifères ; Herpétofaune ; Paléobiogéographie ; Paléoenvironnement ; Paléoclimat

1. Introduction

Ever since their beginnings in the first half of the 1970s, studies of the microvertebrates of the late Pleistocene-Holocene of the Iberian Peninsula have traditionally focused on three clearly-defined geographical areas (Fig. 1; see compilation in López-García, 2008):

- Z1: the south and east of the Peninsula (the Levante), which incorporates the entire Mediterranean coast from Andalusia to Catalonia;
- Z2: the north of the Peninsula, which includes the Cantabrian Range, the Basque Country and Burgos
- Z3: the centre of the Peninsula, which encompasses sites in and around the area of Madrid.

In spite of the great number of papers that have appeared on microvertebrates in the above-mentioned areas over the last three decades, there are certain areas of the Iberian Peninsula where such studies are still notable by their absence. This is the case of Galicia, where the systematic study of micromammals from the late Pleistocene site of A Valiña in the province of Lugo is the only one known (Fernández Rodriguez et al., 1993). The main aim of this paper is to bring to light the association of microvertebrates (amphibians, squamates and micromammals) from the site of Valdavara-1, which is located in an area that has so far remained virtually bereft of studies of this sort. As well as providing a palaeobiogeographical interpretation for certain taxa that are not currently represented in the region, the objective is also to comment on the changes in fauna and biodiversity in relation to the climate change that took place between the latest Pleistocene and the Holocene, and to produce a palaeoenvironmental and climatic reconstruction of the site on the basis of this microvertebrate association.

2. The locality

The cave of Valdavara-1 is located in the westernmost part of Spain, in the province of Lugo (UTM X: 5241085, Y: 474533126), at approximately 600 m above sea level (Fig. 1). From a geological point of view, the cave belongs to the domain of Manto de Mondoñedo, one of the units making up the Western Astur – Leonese Zone, which in turn forms part of the Iberian Massif. This area is made up of formations from the

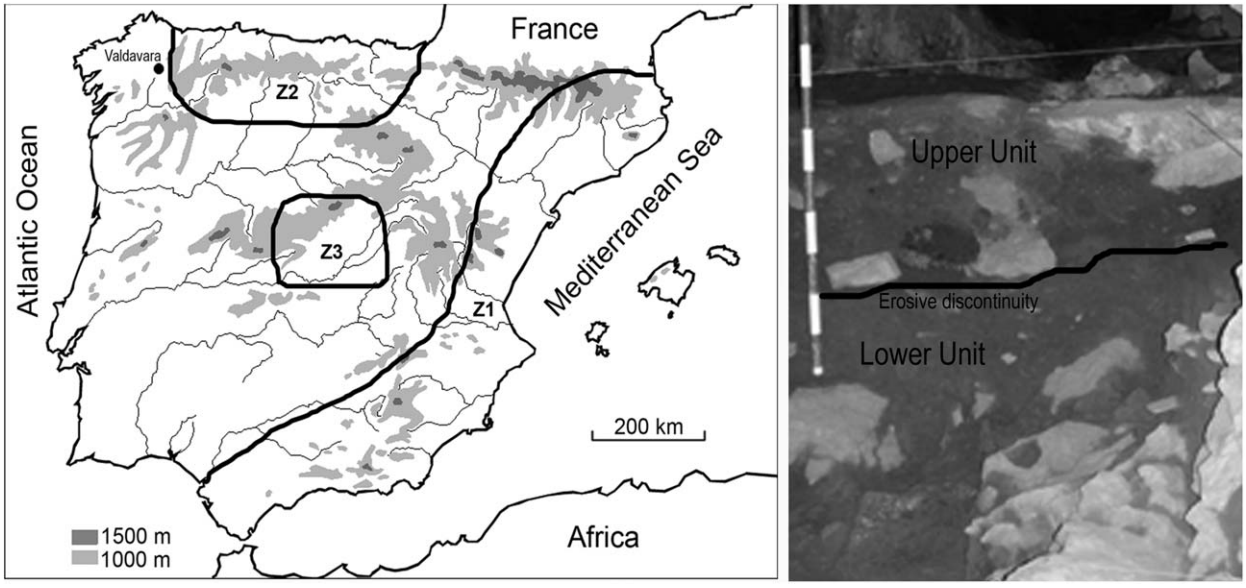

Fig. 1. **Left**: Location of the Valdavara-1 cave in the Iberian Peninsula. **Z**: zones delimited by scientific tradition; **Z1**: Levante region; **Z2**: Cantabrian region; **Z3**: central region. **Right**: Stratigraphy from excavated part of Valdavara-1 cave.