



Human Palaeontology and Prehistory (Commentary)

Reviewing the chronology and palaeoenvironment of the early hominin occupation of Vallparadís EVT7 (Barcelona, Spain): Reply to Lozano-Fernández et al. (Quat. Int.)



Révision de la chronologie et du paléoenvironnement de l'occupation d'hominidés de Vallparadís EVT7 (Barcelone, Espagne) : réponse à Lozano-Fernández et al. (Quat. Int.)

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ABSTRACT

The article by Lozano-Fernández et al. (2015) revises the chronological range and paleoenvironmental inferences for unit EVT7 at Vallparadís, based on a micromammal sample slightly larger than the original one published in Martínez et al. (2014). However, in this new chronological and paleoenvironmental interpretation, the virtually identical results (0.95–0.98 Myr and predominant humid landscape) for the site published in Martínez et al. (2014) are omitted. Furthermore, they claim an age of ca. 1.2 Myr for unit EVT7 at Vallparadís, attributing this chronology to the archaeological team who excavated the site. However, this proposal is not in accordance with the date close to the upper boundary of the Jaramillo subchron (ca. 0.9 Myr), which this team has defended in their articles. Thus, the results and conclusions presented by Lozano-Fernández et al. (2015) do not revise previous studies, but rather confirm the interpretations drawn from the sample analyzed by Martínez et al. (2014).

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R É S U M É

L'article de Lozano-Fernández et al. (2015) révisé le cadre chronologique et les inférences paléoenvironnementales pour l'unité EVT7 de Vallparadís, basée sur un échantillon de micromammifères légèrement plus grand que l'original publié dans Martínez et al. (2014). Cependant, dans cette nouvelle interprétation chronologique et paléoenvironnementale, les résultats pratiquement identiques (0,95–0,98 Ma et paysage humide prédominant) pour le site publié dans Martínez et al. (2014) sont omis. En outre, les auteurs proposent un âge de ca. 1.2 Ma pour l'unité EVT7 de Vallparadís, attribuant ce dernier à l'équipe archéologique qui a fouillé le site. Cependant, cette proposition est non conforme à la date

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proche de la limite supérieure du subchron Jaramillo (ca. 0,9 Ma) que cette équipe a défendue dans ses articles. Ainsi, les résultats et les conclusions présentés par Lozano-Fernández et al. (2015) ne révisent pas les études précédentes, mais confirment plutôt les interprétations résultant de l'échantillon analysé par Martínez et al. (2014).

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The site of Vallparadís has been the focus of a heated debate about the early peopling of Europe for the last five years. Research at the site has been marked by the methodological and interpretative discussion proposed by the archaeological team who excavated Vallparadís, by proposing a series of hypotheses that contributed to the advance of the research on early hominin populations in the continent (Garcia et al., 2011, 2013, 2014; Martínez et al., 2010, 2013). Vallparadís is one of the best-dated Early Pleistocene sites in Europe. Magnetostratigraphic analysis place the deposit, from base to top, between the Jaramillo subchron (1.07–0.99 Myr, identified at units EVT12–EVT8), the Jaramillo and the Matuyama-Bruhnes boundary (1.07–0.99/0.78 Myr, units EVT7–EVT4), and the early Middle Pleistocene (0.78–0.6 Myr, from unit EVT3). The inclusion of the excavated units at the nearby site of Cal Guardiola would further extend the chronology for the Quaternary deposit of the Vallparadís stream to a pre-Jaramillo age (units D1–D3) (Garcia et al., 2014). Micro- and macromammal biostratigraphy, together with the new ESR age of 0.858 ± 0.087 Myr for unit EVT7 (Duval et al., 2015), which is not considered by Lozano-Fernández et al. (2015), are in full agreement with paleomagnetic and biostratigraphic results, dating unit EVT7 at 0.98–0.95 Myr (Martínez et al., 2014).

This chronology situates Vallparadís in an intermediate position between the pre-Jaramillo sites of Fuente Nueva 3 and Barranco León D (Orce) as well as Sima del Elefante (Atapuerca), on the one hand, and TD6 level at Gran Dolina (Atapuerca), next to the Matuyama-Bruhnes boundary, on the other. This chronological position accounts for the continuity hypothesis in the peopling of Europe – at least in the refuge area of the Iberian Peninsula – between 1.2 and 0.78 Myr (Garcia et al., 2011). Even though the lithic record recovered in the upper units at Vallparadís (EVT6–EVT3) is rather limited, it further testifies to a hominin presence in Europe between the Matuyama-Bruhnes boundary and the early Middle Pleistocene (Martínez et al., 2013). This evidence contradicts the hypotheses that propose the existence of a population gap in Europe before the emergence of Mode 2 technology at ca. 0.65 Myr (Mosquera et al., 2013). Neither is the record recovered at Vallparadís, which agrees with the hypothesis defended by Muttoni et al. (2013, 2015) for the arrival of the first peopling of Europe after the Jaramillo subchron. This approach implies discarding the pre-Jaramillo age of the Fuente Nueva 3, Barranco León D and Sima del Elefante sites. Nevertheless, the micro- and macromammal biostratigraphy at Vallparadís, as well as the associations and correlations with the other Spanish sites, support the inference of a hominin presence in Europe at a pre-Jaramillo period. It is supported by the faunal evolution between the Orce and Atapuerca

pre-Jaramillo sites and the post-Jaramillo unit of Vallparadís EVT7 and Gran Dolina TD6 (Garcia et al., 2014).

Quite different is the debate brought on by the paleontological team at Vallparadís about the chronology of unit EVT7. Lozano-Fernández et al. (2015) present as a novel data a supposed chronological accuracy for unit EVT7, presenting a date between 0.94–0.99 Myr as opposed to the 0.95–0.98 Myr previously proposed by Martínez et al. (2014). This supposed difference cannot be considered a proper data review, nor does the fact of increasing from 22 to 24 the minimum number of individuals of *Mimomys savini*, because these data do not alter the biochronological values or conclusions presented in both articles. Moreover, the archaeological team at Vallparadís has never proposed in their articles 'an older age, preceding the Jaramillo magnetostratigraphic subchron (ca. 1.2 Ma)' (Lozano-Fernández et al., 2015: 6) for unit EVT7. The presence of *Iberomys huescarensis* at unit EVT7 of Vallparadís, together with the absence of its ancestor *Allophaiomys*, cannot situate this unit at such an old age, as evidenced by the distribution of both species in the Mediterranean area (Chaline et al., 1999: 249) (Fig. 1). Specifically, Martínez et al. (2010: 5763) stated that 'the age of layers 10 and 10c (EVT7) can thus be set at ca. 0.98 Ma'.

Hence, Lozano-Fernández et al. (2015) are misinterpreting our discussion by asserting that we propose an age of ca. 1.2 Ma from J. Agustí's (IPHES) analysis of the *I. huescarensis* lower molars recovered in Vallparadís. This author concludes that due to their 'less derived morphology than those from the lower layers at Gran Dolina (TD3–TD6), Vallparadís is closer to Sima del Elefante and Huéscar 1' (Martínez et al., 2010: 5763). Lozano-Fernández et al. (2015) omit the bibliography where we conclude that: 'Paleomagnetic analysis placed level 10 directly above the Jaramillo subchron and the entire stratigraphic sequence between the Jaramillo subchron and Early-Middle Pleistocene. Biostratigraphic analysis of micromammals dates level 10 closer to Sima del Elefante than TD6. According to these data, an approximate age would be ca. 0.85–0.9 Ma for level 10 (EVT7)' (Garcia et al., 2012: 570–572). Likewise, 'the lower molars of *I. huescarensis* have a less derived morphology than those from the lower levels at Gran Dolina (e.g. a less prominent BSA3), and are thus closer to the sample from Huéscar 1 and Sima del Elefante. Given that archaeological level 10 (EVT7) is located in the reverse polarity phase, these results push the site's age toward the upper limit of the Jaramillo subchron (0.98 Ma)' (Martínez et al., 2014: 139). Actually, other scholars rightly quote this chronological attribution: 'The Vallparadís site remains at present probably the best magnetostratigraphically constrained site in Spain with the archeological levels

Sites	Barranco	Fuente	Sima del	Gran Dolina		Vallparadís	Gran
	León D	Nueva 3	Elefante	TD3/4	TD5	10	Dolina
Levels			TE9	TD3/4	TD5	10	TD6
Chronology (Myr)	1.4–1.2	1.4–1.2	~1.2	~1	~0.9	~0.9	~0.8
<i>Mimomys savini</i>	■			■			
<i>Arvicola jacobeus</i>			■	■			
<i>Iberomys huescarensis</i>				■			
<i>Allophaiomys lavocati</i>	■ aff.	■ aff.		■			
<i>Allophaiomys burgondiae</i>	■		■	■			
<i>Victoriamys chalinei</i>				■			■
<i>Allophaiomys</i> sp.	■			■			
<i>Ungaromys nanus</i>			■	■			
<i>Ungaromys</i> sp.						■	
<i>Pliomys simplicior</i>			■	■			
<i>Pliomys episcopalis</i>				■			■
<i>Stenocranium gregaloides</i>				■		■	
<i>Terricola arvalidens</i>				■			■
<i>Eliomys quercinus</i>				■			■
<i>Microtus seseae</i>				■			■
<i>Micromys minutus</i>				■			■
<i>Allocricetus bursae</i>				■			■
<i>Castillomys rivas</i>	■			■			
<i>Hystrix refossa</i>				■			
<i>Hystrix</i> sp.	■			■			
<i>Apodemus flavicollis</i>	■			■			
<i>Apodemus</i> sp.			■	■			
<i>Apodemus mystacinus</i>		■		■			
<i>Apodemus silvaticus</i>				■ cf.	■ cf.		■ cf.
<i>Castor fiber</i>			■	■			
<i>Marmota</i> sp.				■			
<i>Glis</i> sp.			■	■			

Fig. 1. Microfauna species documented at the Early Pleistocene sites of the Iberian Peninsula.
Fig. 1. Espèces de microfaune documentées dans les premiers sites pléistocènes de la péninsule Ibérique.

Modified from Garcia et al., 2014: 90–91.

falling between the top of the Jaramillo (0.99 Ma) and the base of the Brunhes (0.78 Ma)' (Muttoni et al., 2014: 353). Lozano-Fernández et al. (2015) also omit one of the previous articles by the same paleontological team, where

unit EVT7 is attributed a more recent age: 'Overall, these data indicate that EVT7 is quite close in age to TD6 of Gran Dolina (ca. 0.78 Ma)' (Madurell-Malapeira et al., 2012: 171).

Furthermore, the statement that ‘unlike Martínez et al. (2010). . . we rely on the comparison of the remains of *M. savini* with those from other, similarly-aged localities from the Iberian Peninsula: Fuente Nueva 3 and Barranco León D, in the Guadix-Baza Basin’ (Lozano-Fernández et al., 2015: 2) is remarkable, as Lozano-Fernández himself specifically carried out this study and presented it in Martínez et al. (2014). On the other hand, Lozano-Fernández et al. (2015) argue that *I. huescarensis* is not present at Sima de los Huesos, and use this information to raise doubts about their own chronological interpretation of unit EVT7 in Martínez et al. (2014), based on the biometric study of *M. savini*. In any case, the taxonomic assignment of the microtine species present at Sima de los Huesos was modified to *I. cf. huescarensis* (Cuenca-Bescós et al., 2010), having initially been identified as *I. huescarensis* (Cuenca-Bescós et al., 2001). In any case, the published information indicates that the form present at Sima del Elefante is quite close to the initial *Iberomys* lineage common to the Iberian Peninsula and, therefore, the biochronological analysis of Vallparadís remains unchanged (García et al., 2014). Thus, the comparison between the metric values of *I. huescarensis* teeth and those from the lower levels at Gran Dolina, Sima del Elefante or Huéscar 1 brings the site’s age toward the upper limit of the Jaramillo subchron (0.98 Ma) (Martínez et al., 2014: 139).

Also inconsistent is the statement that ‘the authors did not use all the remains of *Mimomys savini* from EVT7’ (Lozano-Fernández et al., 2015: 2) when increasing the sample from 23 total number of remains (22 minimum number of individuals; mesiodistal length mean = 3.48; maximum = 3.73; minimum = 3.14; standard deviation = 0.152) in Martínez et al. (2014) to 36 total number of remains (24 minimum number of individuals; mesiodistal length mean = 3.47; maximum = 3.73; minimum = 3.14; standard deviation = 0.15) in Lozano-Fernández et al. (2015). This difference does not imply any change in the results or interpretations between these articles. It is rather insubstantial as well to present their comparison with Martínez et al.’s (2014) proposals regarding paleoenvironmental inferences as a remarkable novelty that the representation of woodland landscape – deduced from the minimum number of individuals of small mammal taxa – is 24.08% (Lozano-Fernández et al., 2015) rather than 13.95%, as previously stated. In sum, both articles coincide in the description of a predominantly humid paleoenvironment with abundant water masses and more or less wooded areas. Hence, the results and conclusions presented in Lozano-Fernández et al. (2015) do not represent a data review, but rather a confirmation of Martínez et al.’s (2014) interpretations.

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