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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A B S T R A C T

The article by Lozano-Fernández et al. (2015) revises the chronological range and palaeoenvironmental 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 palaeoenvironmental interpretation, the virtually identical results (0.95–0.98 Ma and predominant humid landscape) for the site published in Martínez et al. (2014) are omitted. Furthermore, they claim an age of ca. 1.2 Ma 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) révise 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
The site of Vallparadis 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 Vallparadis, 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). Vallparadis 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 Vallparadis 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 Vallparadis 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 Vallparadis (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 Vallparadis, 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 Vallparadis, 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 Vallparadis EVT7 and Gran Dolina TD6 (Garcia et al., 2014).

Quite different is the debate brought on by the paleontological team at Vallparadis 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 Vallparadis 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 Vallparadis, 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. Agusti’s (IPHES) analysis of the I. huescarensis lower molars recovered in Vallparadis. This author concludes that due to their ‘less derived morphology than those from the lower layers at Gran Dolina (TD3–TD6), Vallparadis 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 Vallparadis site remains at present probably the best magnetostratigraphically constrained site in Spain with the archeological levels.


<table>
<thead>
<tr>
<th>Sites</th>
<th>Barranco León D</th>
<th>Fuente Nueva 3</th>
<th>Sima del Elefante</th>
<th>Gran Dolina TD3/4</th>
<th>Gran Dolina TD5</th>
<th>Gran Dolina 10</th>
<th>Gran Dolina TD6</th>
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</thead>
<tbody>
<tr>
<td>Chronology (Myr)</td>
<td>1.4–1.2</td>
<td>1.4–1.2</td>
<td>~1.2</td>
<td>~1</td>
<td>~0.9</td>
<td>~0.9</td>
<td>~0.8</td>
</tr>
</tbody>
</table>

- *Mimomys savini*
- *Arvicola jacobus*
- *Iberomys huecarensis*
- *Allophaiomys lavocati*
- *Allophaiomys burgondiae*
- *Victorianys chalinei*
- *Allophaiomys sp.*
- *Ungaromys nanus*
- *Ungaromys sp.*
- *Pliomys simplicior*
- *Pliomys episcopalis*
- *Stenocranius gregaloides*
- *Terricola arvaldens*
- *Eliomys querinus*
- *Micronas sesaeae*
- *Micromys minutus*
- *Allocricetus bursae*
- *Castillomys rivas*
- *Hystrix refoasa*
- *Hystrix sp.*
- *Apodemus flavicollis*
- *Apodemus sp.*
- *Apodemus mystacinus*
- *Apodemus silvaticus*
- *Castor fiber*
- *Marmota sp.*
- *Glis 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. huescaensis 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. huescaensis (Cuenca-Bescós et al., 2010), having initially been identified as I. huescaensis (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 Iberomyces 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. huescaensis 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.

References


Mosquera, M., Olle, Á., Rodríguez, X.P., 2013. From Atapuerca to Europe: tracing the earliest peopling of Europe. Quatern. Int. 295, 130–137.

