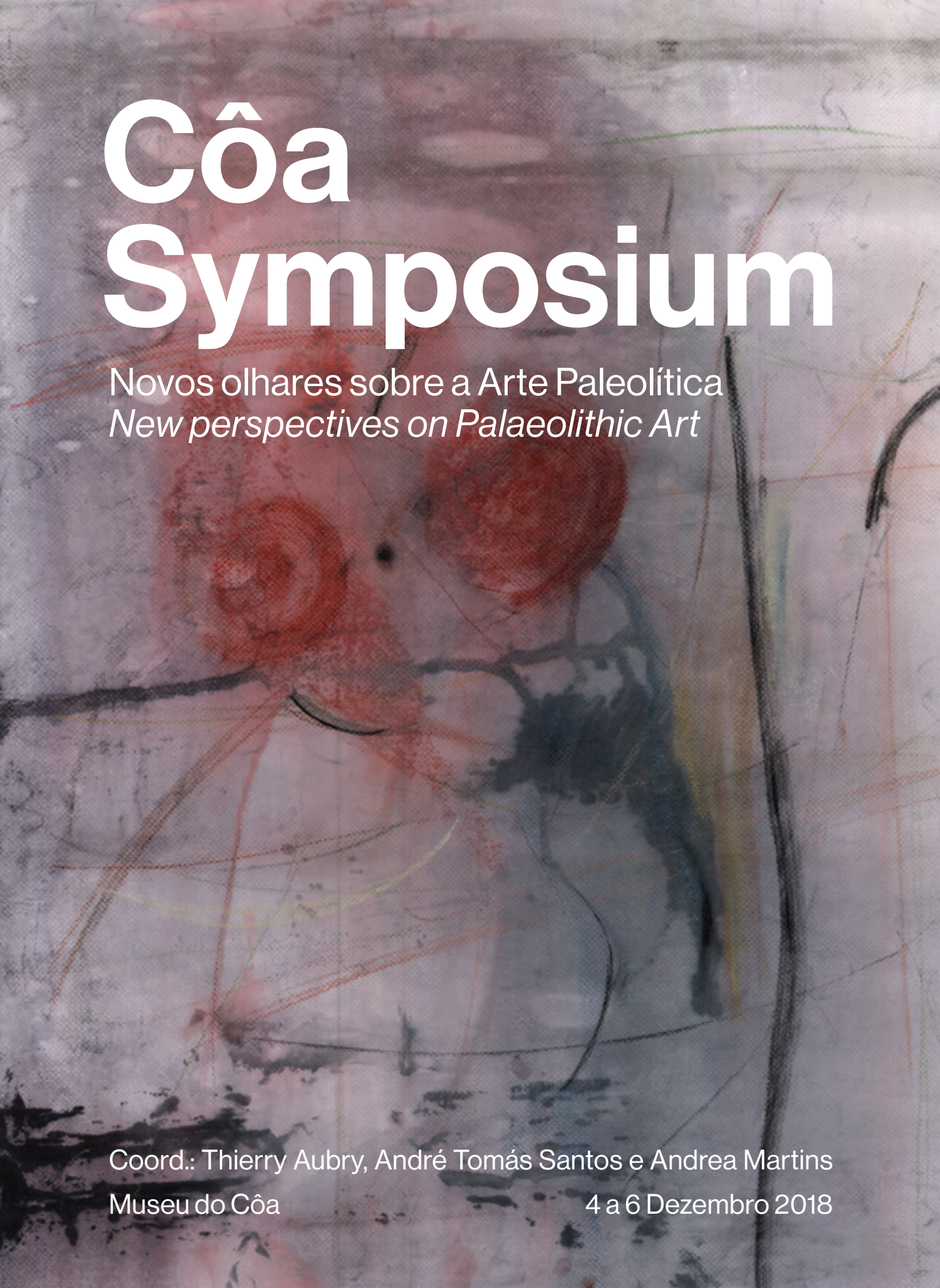




Côa Symposium

Novos olhares sobre a Arte Paleolítica
New perspectives on Palaeolithic Art

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The earliest Upper Paleolithic of Southern and Western Iberia is an Evolved, not an Early Aurignacian

João Zilhão

Institució Catalana de Recerca i Estudis Avançats (ICREA), Passeig Lluís Companys 23, 08010 Barcelona, Spain; Universitat de Barcelona, Departament d'Història i Arqueologia, Facultat de Geografia i Història, c/Montalegre 6, 08001 Barcelona, Spain; UNIARQ – Centro de Arqueologia da Universidade de Lisboa, Faculdade de Letras de Lisboa, Universidade de Lisboa, Alameda da Universidade, 1600-214 Lisboa, Portugal. E-mail: joao.zilhao@ub.edu.

Resumo: Nos últimos vinte anos, o debate sobre a transição do Paleolítico Médio ao Superior na Península Ibérica tem incidido sobre quatro questões principais: a entidade e cronologia do Castelperronense da faixa cantábrica e da Catalunha; a datação e faseamento do Aurignacense cantábrico; a existência de um Moustierense tardio nas regiões para sul e oeste da depressão do Ebro; a existência de uma fase aurignacense no Paleolítico Superior inicial dessas regiões. Os dados que temos recolhido em trabalhos arqueológicos no Sudeste espanhol (Valencia e Murcia) e centro de Portugal apontam para uma substituição do Moustierense pelo Aurignacense evoluído entre 37.100 e 36.500 calBP (calibração com a curva IntCal13). Publicações recentes sobre Cueva Bajondillo (Andaluzia) e Lapa do Picareiro (Centro de Portugal) vêm pôr em causa este modelo. Contudo, como demonstraremos, uma interpretação rigorosa do registo estratigráfico e do material arqueológico não só não permitem contestar o modelo, como ainda o reforçam.

Palavras-chave: Transição do Paleolítico Médio ao Superior; Homem de Neandertal; Homem moderno; Moustierense.

Abstract: During the last twenty years, the debate about the transition of the Middle to the Upper Palaeolithic in the Iberian Peninsula has been centered around four main questions: the entity and chronology of the Châtelperronian of the Cantabrian region and Catalonia; the existence of a Late Mousterian to the south and west of the Ebro depression; the existence of an Aurignacian phase in the Upper Palaeolithic of the later regions. Our archaeological works in the Iberian Southeast (Valencia and Murcia) and the Centre of Portugal points to the replacement of the Mousterian by the Evolved Aurignacian between 37,100 and 36,500 calBP (IntCal13 curve calibration). Recent publications about Cueva de Bajondillo (Andaluzia) and Lapa do Picareiro (Centre of Portugal) have contested the model. However, as we will show, thorough analysis of the stratigraphy of these sites and of their archaeological remains support the model rather than calling it into question.

Keywords: Middle-to-Upper Palaeolithic transition; Neandertals; Modern humans; Mousterian.

1. Introduction

In the late 1980s, two highly influential papers, Bischoff & *alii* (1989) and Cabrera-Valdés & Bischoff (1989) claimed that, in Catalonia and the Cantabrian strip, the Early Aurignacian or Aurignacian I was much older than expected. The claim was based on Accelerator Mass Spectrometry (AMS) radiocarbon dates on charcoal samples from the sites of L'Arbreda and El Castillo. Building upon previous critiques (d'Errico & *alii*, 1998; Zilhão & d'Errico, 1999), my 2006 review of the Middle-to-Upper Paleolithic transition in Iberia (henceforth, the Transition) argued that the association of those samples with the artefact assemblages they were supposed to date was spurious. I concluded that (a) “from Asturias in the west to Catalonia in the east, a well-defined, industrially characteristic Protoaurignacian appears in the archeological record above the Mousterian or the Châtelperronian,” and (b) “when reliably dated, these [Protoaurignacian] occurrences are contemporary, and their age (ca. 42 ka cal BP) is the same as elsewhere in Europe” (Zilhão, 2006, p. 66). I also argued that, at L'Arbreda, the Early Aurignacian post-dated the Protoaurignacian, based on the elevation and stratigraphic position of representative specimens of the former's index fossil, the split-based bone point. In short, this body of evidence was inconsistent with the notion that regional expressions of the Aurignacian I could be older than the Protoaurignacian, let alone date back to 45-48 ka (thousands of years ago in the calibrated radiocarbon timescale).

These conclusions have been fully vindicated by the results subsequently obtained not just for L'Arbreda and El Castillo but also for Labeko Koba and La Viña

(Maroto & *alii*, 2012; Wood & *alii*, 2013, 2018). There is now little question that the chrono-stratigraphy of the Transition in Cantabrian Spain follows the same pattern as in the neighboring French regions of Aquitaine and Languedoc. With regards to Catalonia, the existence of a Châtelperronian phase, supported by diagnostic points found at Ermitons, L'Arbreda and Reclau Viver, was disputed for long because those points came from stratigraphic contexts of questionable integrity. However, their assemblage-wide, industrial significance is now corroborated by the Châtelperron points and ornaments found in secure association at the newly discovered site of Cova Foradada, south of Barcelona (Morales & *alii*, 2019; Rodríguez-Hidalgo & *alii*, 2019).

An entirely different pattern pertains in the well-researched regions of Valencia, Andalucía and Portugal. For these parts of Iberia, my review concluded as follows: “The Châtelperronian, the Protoaurignacian and the Early Aurignacian remain unknown; although perturbation of key sequences at the Middle/Upper Paleolithic interface conceivably explains the lack of coherent assemblages, this ‘absence of evidence’ is strengthened by the fact that index fossils such as the split-based bone point have never been found, not even in the form of isolated occurrences, or of diagnostic finds made in mixed contexts. The earliest Upper Paleolithic of these regions is an Evolved Aurignacian with thick-nosed ‘scrapers’/cores and Roc-de-Combe bladelets, well defined in Beneito levels B9-B8 and Bajondillo level 11. Everywhere else in Europe, including northern Iberia (cf. La Viña’s level XII), this assemblage-type post-dates 37 ka cal BP [calibrated years before present] and, given the problems with the dating results for those two sites, an earlier age for it in southwestern Iberia cannot be supported” (Zilhão, 2006, p. 66). Following-up on a hypothesis first laid out in the 1991 Madrid conference on the Transition in Iberia (the Ebro Frontier model; Zilhão, 1993, 2000, 2009), I further concluded that the evidence continued to support the notion that, south of the Ebro drainage, a late persisting Middle Paleolithic occupied the time slots that, to the north, corresponded to the Châtelperronian, the Protoaurignacian and the Early Aurignacian.

The 2006-2019 excavation of two sites in the Mula basin (Region of Murcia, Spain) significantly advanced our understanding of these issues. Combined, the stratigraphic, dating and industrial evidence conclusively showed that, in the area, the Transition consisted indeed of the replacement of a late Middle Paleolithic by the Aurignacian II or Evolved Aurignacian (Zilhão & *alii*, 2017). At Cueva Antón, the ABOx-SC dating of charcoal samples showed that the small but diagnostically Middle Paleolithic assemblage in level I-k post-dated 37.1 ka. Less than 2 km away, samples of the same type dated by the same method showed that La Boja’s thick, well-preserved Aurignacian sequence – Occupation Horizons (OH) 15-20 (Fig. 1A-C) – must have begun no later than 36.5 ka. The Transition could therefore be constrained to the half millennium comprised between those *termini* (Fig. 1D). This interval post-dates the end of the Aurignacian I, which, across Europe, gives way to the Aurignacian II at some point between 37.2 and 36.5 ka (Banks, d’Errico & Zilhão, 2013a, 2013b). In full agreement with these regional and continental patterns, the abundant lithic assemblages associated with the hearth features found at La Boja are of “Evolved,” not “Early” Aurignacian affinities (Fig. 1E-G).

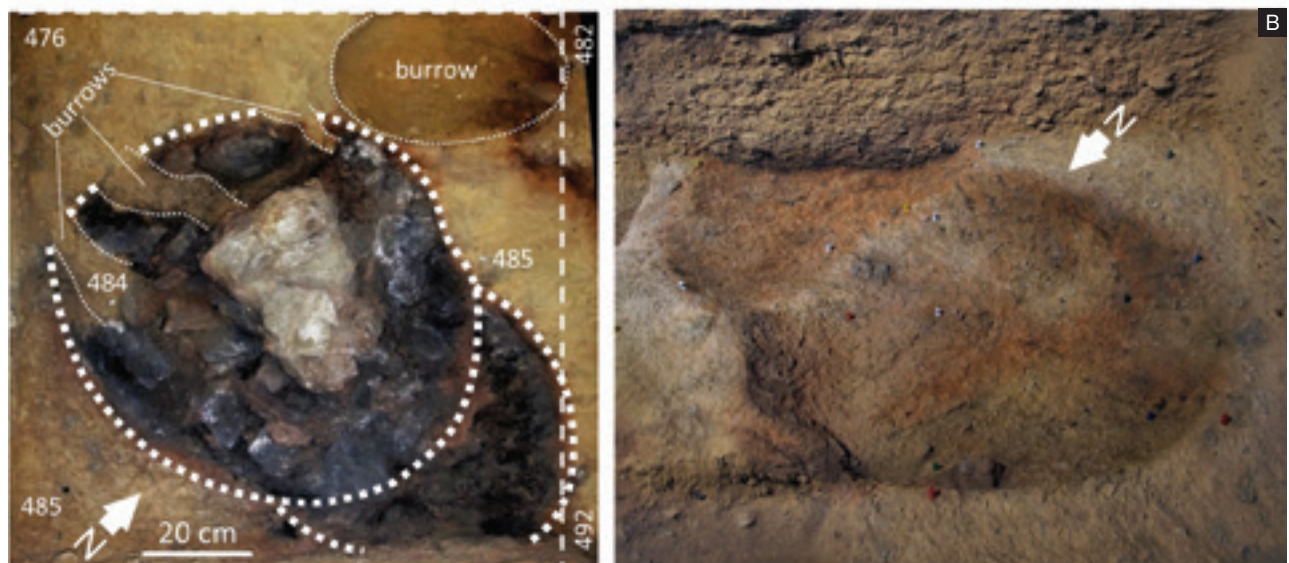
Since, however, Haws & *alii* (2018), Benedetti & *alii* (2019) and Cortés-Sánchez & *alii* (2019a, 2019b) have claimed that an Early Aurignacian is present at, respectively, Lapa do Picareiro (central Portugal) and Cueva Bajondillo (Málaga, Andalucía). Investigating the contradiction between these claims and the Murcia pattern is therefore necessary. In theory, three possibilities can be entertained. Firstly, the Mula basin data could be revealing the persistence of a Middle Paleolithic enclave whereas the Transition would have followed the Cantabrian-Aquitania pattern

→

Figure 1: The Aurignacian at La Boja (Mula, Murcia).

A. Zenithal view of the excavation trench at the end of the 2018 field season, when bedrock was reached.

B. The double hearth in OH19, grid unit T3, at exposure of the feature’s top (left, orthorectified plan view) and base (right, oblique view). Elevations are in cm below datum.



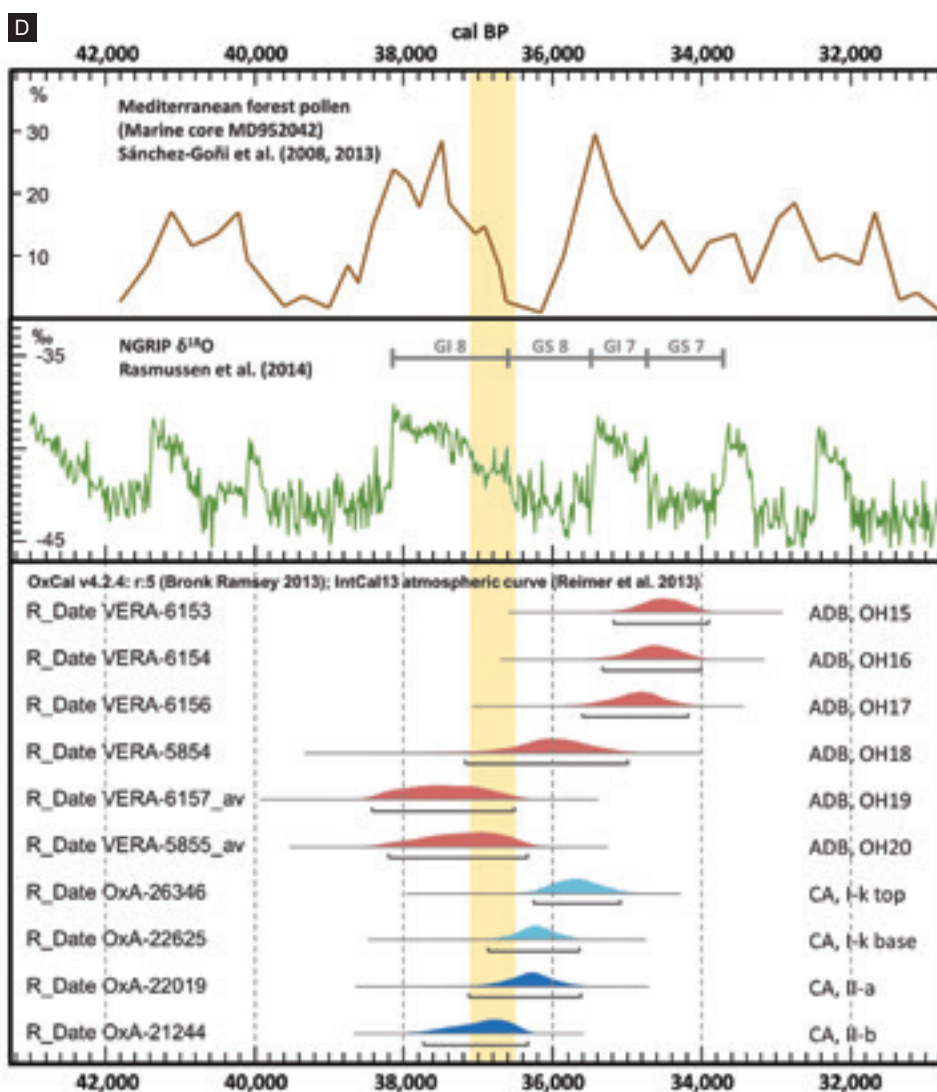
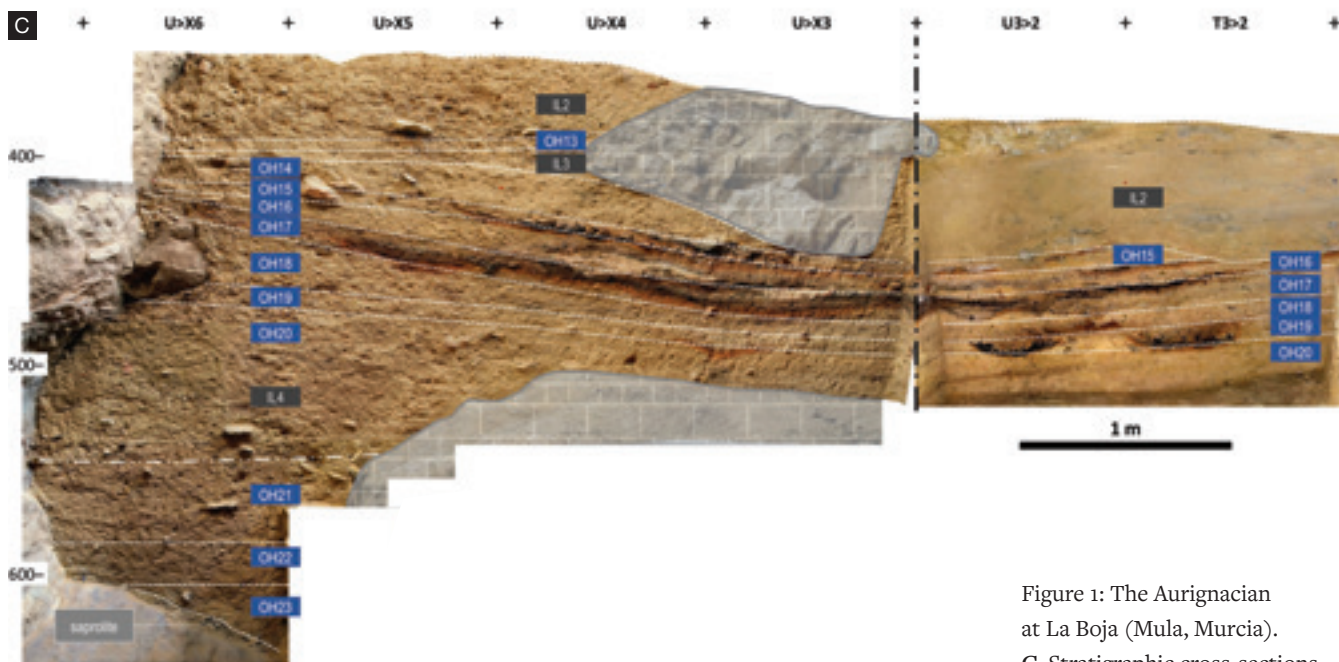


Figure 1: The Aurignacian at La Boja (Mula, Murcia). C. Stratigraphic cross-sections representing the basal parts of the La Boja sequence at the end of the 2014 field season; the preservation of intact hearths and/or extensive lenses of anthropized sediment allows sub-centimeter discrimination of occupation floors (OH) separated by intermediate levels (IL); the latter are sterile or only contain post-depositionally intruded items (OH21-23 are Mousterian, OH15-20 are Aurignacian, OH13-OH14 are Early Gravettian). Elevations are in cm below datum. D. Chronology of the Transition in the Mula basin sites. Plot of calibrated radiocarbon dates (95.4% probability intervals) for the Aurignacian of La Boja and for the Mousterian (layer I-k) and immediately underlying alluvium (layers II-a and II-b) of Cueva Antón. The vertical yellow band denotes the interval during which the Transition took place, and the comparison with global proxies (Rasmussen & *alii*, 2014; Sánchez-Goni & *alii*, 2008, 2013) shows that, in the Mula basin, it coincides with the end of a long and mild temperate phase, GI 8.

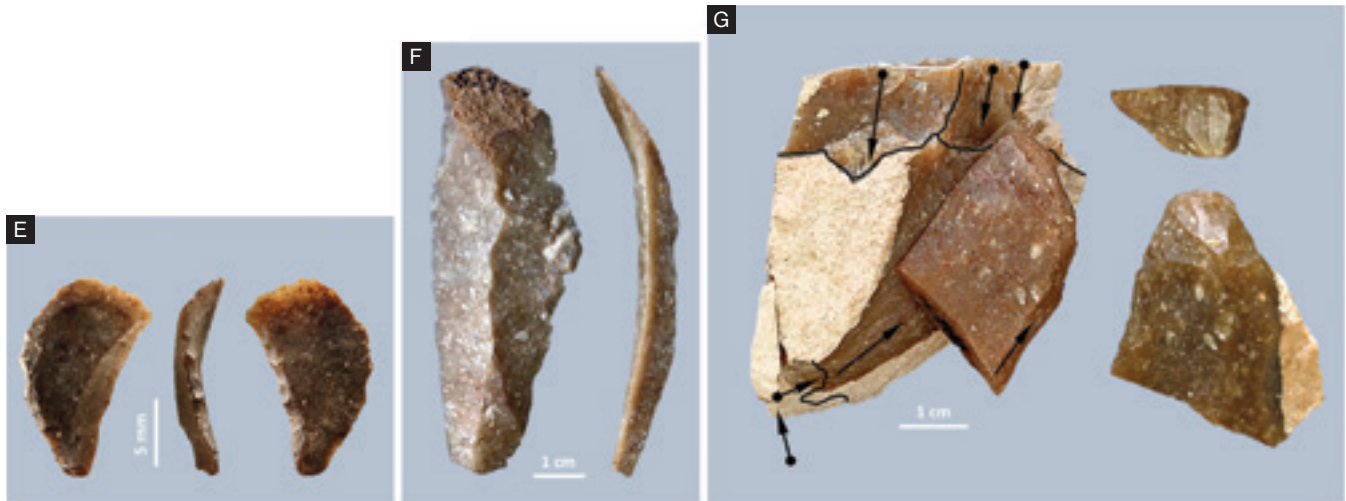


Figure 1: The Aurignacian at La Boja (Mula, Murcia).

E-G. La Boja Aurignacian diagnostics. OH17 Dufour bladelet of the Roc-de-Combe subtype (E); OH20 long blade with minor, proximal break (F); refit unit documenting the reduction sequence for the production of bladelet core blanks (left), and a nosed scraper/core (right) (G). After (Zilhão & alii, 2017).

everywhere else in Iberia. Secondly, the Cueva Antón dates could be erroneously young and thus an invalid *terminus post quem* for the end of the Middle Paleolithic; if so, the absence of the Early Aurignacian in the La Boja sequence did not necessarily contradict that it be present in the region as much as farther to the west in Andalucía or Portugal. Thirdly, it could be that the error lies in the dating or the culture-stratigraphic assignment of Bajondillo and Picareiro and that the Murcia pattern is indeed of wider chrono-stratigraphic validity for all Iberian regions situated to the south of the Ebro drainage.

As Zilhão & alii (2010, 2016, 2017) and Angelucci & alii (2013, 2018) have shown, the stratigraphic integrity of the depositional contexts that the Cueva Antón charcoal samples derive from (levels I-k, II-a and II-b) lies beyond reasonable doubt. The radiocarbon experts involved in the dating have themselves emphasized that no technical reasons exist to question the accuracy of the ABOx-SC dates obtained for those samples (Wood & alii, 2013). And the notion that a Middle Paleolithic/Neandertal enclave could persist in isolation for thousands of years in a small region of Iberia is inconsistent with the minimum territorial size required for low-demography hunter-gatherer societies to maintain the mating networks necessary to secure the reproduction and long-term persistence of the population. The alternative would be a sympatry scenario, whereby two species of humans, Middle Paleolithic Neandertals and Early Aurignacian Moderns, would have coexisted for thousands of years with no biological or cultural interaction, as once suggested for Gibraltar by Finlayson & alii (2006); however, as shown by Zilhão & Pettitt (2006), such kinds of scenarios stretch the bounds of credulity.

Over the last thirty years, claims for an older-than-expected Early Aurignacian have not been wanting. Elsewhere in Europe, the sites of Geissenklösterle (Germany) or Willendorf II (Austria) are prominent examples. However, much as at El Castillo or L'Arbreda, all such claims were eventually falsified (Zilhão, 2013; Discamps, Gravina & Teyssandier, 2015; Teyssandier & Zilhão, 2018). Against this background and given both the strength of the Murcia data and the theoretical inconsistency of alternative scenarios, there is good reason to suspect that it will be no different with Picareiro and Bajondillo. In the following, I will try to demonstrate that such is indeed the case.

2. Cueva Bajondillo

The Evolved Aurignacian affinities of the stone tool assemblage retrieved in level Bj/11 are unambiguous, and there is also no question that underlying level Bj/14 belongs in the Middle Paleolithic. In a restricted part of the site, however, these levels are separated by a lens of limited extent, level Bj/13, at the top of which a fire feature has been differentiated as level Bj/12 (Cortés-Sánchez, 2007a, 2007b) (**Fig. 2A**).

Cortés-Sánchez & *alii* (2019a) report five new radiocarbon results for Bj/13, three on mussel shell, one on land snail shell, and another on ABA-treated charcoal. Collectively, these results bracket the level's age to the 40.6–44.8 ka interval. Hence, such would be the age of the stone tool assemblage found therein. This assemblage is defined as “Early Aurignacian” and assumed to imply modern human authorship, with attendant implications for the timing of Neandertal replacement.

Wherever else in Europe an Early Aurignacian exists, however, the 40.6–44.8 ka range corresponds to the Protoaurignacian and the preceding, so-called “transitional” industries (Châtelperronian, Szeletian, etc.). Indeed, as shown by Banks, d’Errico & Zilhão’s (2013a, 2013b) Bayesian modeling of all available results, the emergence of the Early Aurignacian can be constrained to the 39.2–40.0 ka interval. In addition, as pointed out by de la Peña (2019) and Anderson, Reynolds & Teyssandier (2019), there is nothing in the lithic assemblage retrieved in Bj/13 that can be considered diagnostically Upper Paleolithic, let alone Early Aurignacian or even Aurignacian *sensu lato*. These critiques of Cortés-Sánchez & *alii* (2019a) have also pointed out that (a) previously, Bj/13 had been described as a potentially heterogeneous and potentially reworked deposit and (b) consequently, the evidence it provided was not suited for debates about population interaction reliant on the presumed association between lithic assemblages and the taxonomic units of Human Paleontology.

Cortés-Sánchez & *alii*’s (2019b) response was that the critics were ill-informed about Bajondillo. The culprit would be my 2006 review paper, from which they critics would have derived their assessments of site formation process; in short, the argument was that I would have misrepresented the sequence and ought to be blamed for the ensuing confusion. Literally, the response stated that (a) “Zilhão re-interpreted the stratigraphic profile of the cave, filling the gaps on his own and incorrectly placing the old radiocarbon dates within his newly interpreted profile;” (b) “papers claiming a putative mixed nature for levels Bj/11 and Bj/13, based on sources before the 2007 monograph, simply do not reflect the fullest information about the site;” (c) “the lithics from Bj/13 were never identified as Mousterian, but consistently as Upper Paleolithic.” All of this is either false or absurd:

- In Fig. 2, my 2006 illustration of the Bajondillo sequence (**Fig. 2A**) is compared with the 2005 sources that I used (**Fig. 2B–C**), proving that I made no error in the assignment of dating results to their layer of provenience.
- The issues of site formation raised by my 2006 review concerned the homogeneity of the bulk “carbonaceous sediment” samples used for the dating of Bj/11, not the dating of levels Bj/12–13; following the excavators’ own descriptions of their composition and formation, the latter’s mixed nature was assumed rather than argued for.
- Prior to Cortés-Sánchez & *alii* (2019a), the lithics from Bj/13 were never “consistently” identified as Upper Paleolithic or Aurignacian.
- The information given in the 2007 monograph (Cortés-Sánchez, 2007b) and in the excavator’s doctoral dissertation published the same year (Cortés-Sánchez, 2007a) is the same and both assess the Bj/11–Bj/14 sequence exactly as before.
- Even if it were true that the interpretation of the sequence changed after 2007,

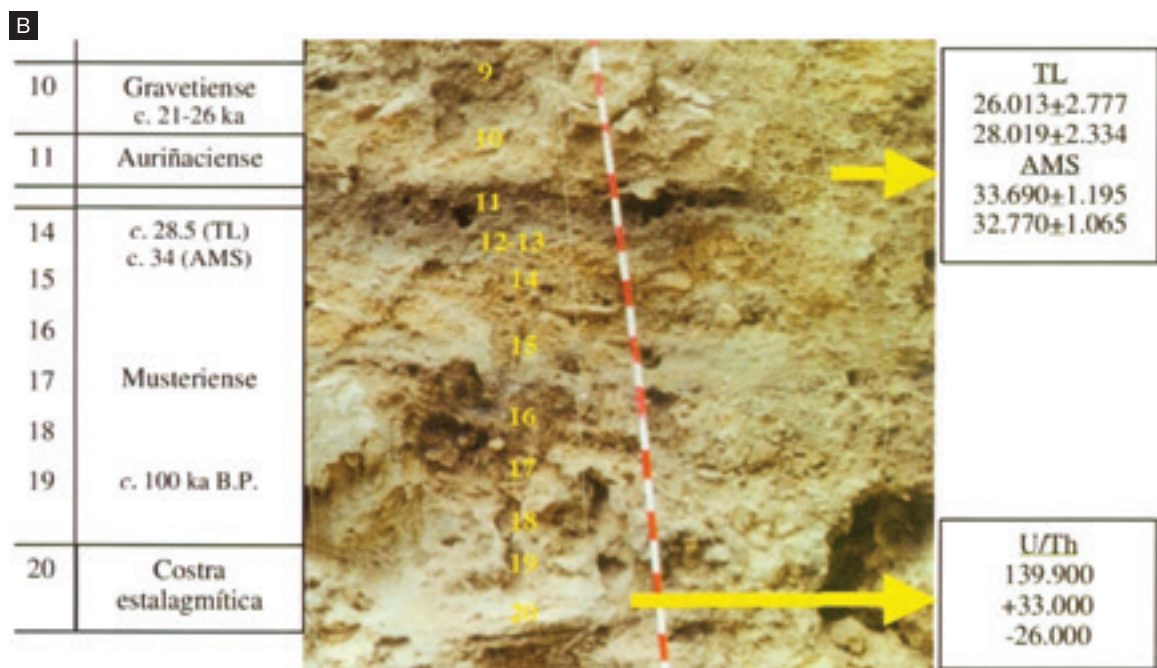
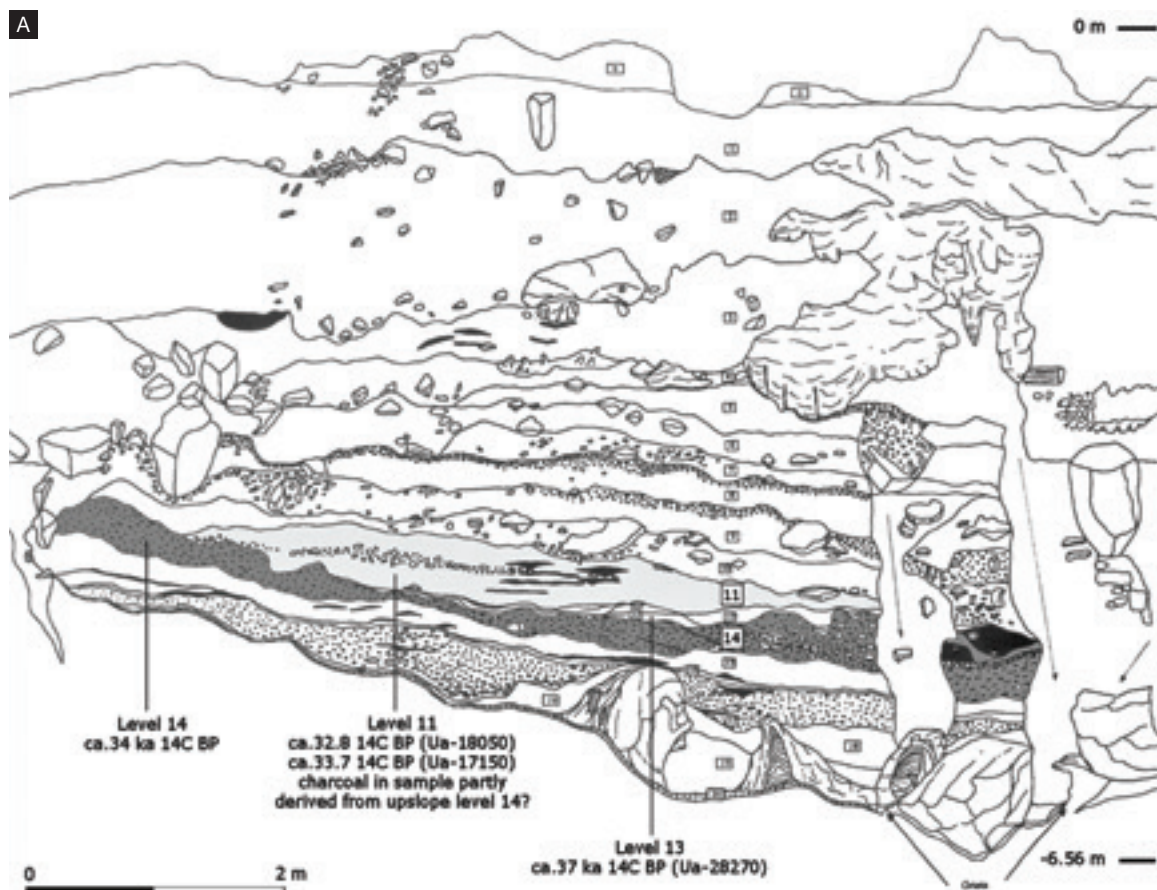
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Figure 2: The Bajondillo sequence.

A. The stratigraphic profile of Bajondillo reproduced in Fig. 11 of Zilhão (2006) after Fig. 4 of Cortés-Sánchez & *alii* (2005), with no modifications other than the grey-filling of levels 11 and 14 (for clearer identification of their position in the sequence); the dating results were also added, together with lines that link them to the layers of provenience.

B. The dating of levels 10–20 as given in Fig. 5 of Cortés-Sánchez & *alii* (2005).

C. The Bj/13 radiocarbon date as given in Table 2 of Cortés-Sánchez (2005).



C

Yacimiento	Unidad/nivel	AMS	C14	TL	U/Th	OSL	ESR	RAA	Tipo Muestra	Nº Lab.
Cueva Bajondillo (Torremolinos, Málaga): Cortés et al., 2004 (*) inéditas										
Bj/13		37.005±1.79*							Sedimento carbonoso	Ua-28270

it is evident that my review of 2006 could not have considered an interpretation published afterwards and, therefore, that the misrepresentations I am accused of would be the responsibility of the Bajondillo authors alone, nobody else.

Table 1 contains a compilation of relevant citations, in their original Spanish, of the key statements on the site formation process of levels Bj/12-13 and the techno-typological characteristics of the lithic assemblages they contain. For the benefit of a wider readership, I provide below translations of key passages extracted from Cortés-Sánchez (2007a, pp. 142-143):

“The Bj/13-12 assemblage is very small (353 items), and a reliable techno-typological analysis is therefore nonviable. However, by comparison with the Bj/19-14 series, substantial change is apparent in connection with the presence of various products indicative of Upper Paleolithic-like flaking (the odd core, blades/bladelets and retouched tools). That said, these latter elements are associated with a not inconsiderable industrial component of Mousterian affinities.”

“The contact between Bj/11 and Bj/12-13 is highly irregular due to solifluction processes, as is typical for a cold and humid environment ... In this context, the mix of Mousterian and/or Aurignacian techno-typological attributes shown by the scarce material available to us, the limited size of the study area and the available AMS date (...) are of difficult interpretation; therefore, rather than making an intuitive chrono-cultural assignment, it seems logical to regard the available information as allowing us to go no further than to acknowledge the possibility of mixing, as inferred from the analysis of the flaked stone tools.”

Much the same is repeated in pages 172-173. Here, a synthesis of the sequence provided in Table 85 defines levels Bj/12-13 as “?,” while the comparisons in Table 86 define them, “probably,” as “Mousterian+Aurignacian” (as does Table 2 of the “Synthesis and conclusions” section of the site monograph). The associated text says:

“the identification of solifluction processes affecting this part of the sequence could also perhaps explain the presence of Upper Paleolithic-like items in Bj/12-13.”

Thus, over the thirty years elapsed since the 1989 excavation of Cueva Bajondillo (the operations of 2000 and 2002 were limited to sampling the exposed stratigraphic section for the purposes of paleoenvironmental, sedimentological and dating studies), levels Bj/12-13 and their artefact contents were consistently described as potentially reworked and potentially mixed. It is not until 2010 that a paper is published where Bj/12-13 appears subsumed with Bj/11 under the label “Aurignacian” (Cortés-Sánchez, 2010). However, this is done in a three-line description of the entire sequence with no additional justification or explanation (**Table 1**).

There is no question that one is entitled to change one’s opinion about evidence and interpretations. But there is no question either that one is not allowed to omit and misrepresent facts, or to rewrite history, at least not within the rules of Science. Regrettably, that’s what Cortés-Sánchez & *alii*’s (2019b) response does, and their conduct is aggravated by the false accusations levelled against others. Why these authors chose to behave in this way is easy to understand in light of their failure to address the substance of de la Peña’s (2019) and Anderson, Reynolds & Teyssandier’s (2019) points.

→

Table 1: Past assessments of the chrono-stratigraphic significance of Bajondillo levels Bj/12-13.

Year	Reference	Citation
1997	Cortés-Sánchez & Simón-Vallejo (1997)	“Auriñaciense s. l. (Estrato 11) (...) Paleolítico Medio (Estratos 12 a 17) – El resto de la secuencia de Cueva Bajondillo está constituida por una serie de seis niveles que han otorgado diferentes tecnocomplejos musterienses.”
2003	Cortés-Sánchez (2003)	“En el caso de Bj/13-12, se trata de un depósito sedimentario de unos pocos centímetros de espesor y escasa distribución espacial, además ha entregado una pobre colección lítica, aspectos que requieren un tratamiento pormenorizado que escapa de este trabajo.”
2005	Baldomero-Navarro & alii (2005)	“Los niveles Bj13 y Bj/12 fueron aislados en una zona muy restringida del yacimiento, de modo que apenas si contamos para ambos con unos cientos de piezas; de las cuales, una parte marcan una clara filiación con los conjuntos infrayacentes, esto es, se trataría de artefactos de neta raigambre musteriense, mientras otro lote presenta rasgos que apuntan al nivel suprayacente (Bj/11).”
	Cortés-Sánchez & alii (2005)	“Existen por último otros estratos, muy pobres en materiales arqueológicos y que son de más difícil asignación crono-cultural (Bj/13-12 y Bj/5 a Bj/3).”
2007	Cortés-Sánchez & alii (2007)	“Existen por último otros estratos, muy pobres en materiales arqueológicos y que son de más difícil asignación crono-cultural (Bj/13-12 y Bj/5 a Bj/3).”
	Cortés-Sánchez (2007a)	“La colección industrial de Bj/13-12 es ínfima (353 piezas), por lo que se hace inviable un análisis tecno-tipológico fiable. Sin embargo, respecto a la serie Bj/19 a 14 aparecen cambios sustanciales ligados a la presencia de diversos productos indicadores de un lascado de tipo Paleolítico Superior (algún núcleo, láminas/laminillas y utillaje) – Ahora bien, estos últimos elementos aparecen asociados a un nada desdeñable componente industrial de afinidad musteriense y, en este sentido, no cabe asimilar arbitrariamente unos objetos a Bj/12 y otros a Bj/13. Por otra parte, aunque durante el muestreo de 2000 y 2002 se recuperaron algunos artefactos líticos tallados en Bj/12 y Bj/13, estos no presentan elementos diagnósticos suficientes como para dilucidar el problema. Así pues, lo único que puede esbozarse es la presencia de indicios que ponen de manifiesto el desarrollo testimonial de procesos de talla de tipo musteriense y más generalizados de estilo Paleolítico Superior” (p. 141-142). “En este contexto, la mezcla de atributos tecno-tipológicos musterienses y/o auriñacienses que muestran los escasos vestigios disponibles, el restringido sector estudiado o la fecha AMS disponible (vid. infra) resultan de difícil interpretación, por lo que, más que asignar una atribución cronocultural de carácter intuitivo, nos parece más coherente considerar que la información disponible no permite ir más allá de reconocer la posibilidad de una mezcla de materiales, según deducimos del estudio del material lítico tallado analizado” (p. 142). “Nivel 13 - Paleolítico Superior Inicial o Musteriense s.l.” (Tabla 84, p. 171). “En este marco, el tramo estratigráfico 13 a 12 de Bajondillo aporta pruebas sobre el acceso de las novedades del Paleolítico Superior Inicial a nuestro contexto meridional. Así, Bajondillo 13- 12 suministra los primeros indicios industriales netamente diferenciados de los del Paleolítico Medio del yacimiento. Ahora bien, con los datos disponibles este depósito es de difícil interpretación, pues los artefactos líticos recuperados muestran rasgos tecno-tipológicos mixtos: unos predominantes de aspecto auriñaciense (algún núcleo, hojitas y útiles) y otros marginales de clara filiación musteriense (núcleos, productos y algún útil) – Sin embargo, la pobreza de la colección recuperada, la escasa distribución espacial de este depósito sedimentario o la fuerte antropización del estrato superpuesto (Bj/11) impiden valorar de forma adecuada y objetiva su valor en la secuencia. Además, la identificación de procesos de soliflucción afectando a este tramo de la secuencia (Bergadà et al., 2001) podrían quizás explicar también la presencia de materiales de tipo Paleolítico Superior en el tramo Bj/12-13” (p. 172-173).
	Cortés-Sánchez (2007b)	“Bj/12-13, Auriñaciense + Paleolítico Medio” (Tabla 2, p. 507) “Las industrias presentan unos atributos que concuerdan, desde un punto de vista tecnotipológico, con el Auriñaciense. No obstante, la presencia de algunos elementos tipológicos propios de los conjuntos musterienses y la pequeña entidad de la colección nos hace ser cautos a la hora de formalizar firmemente su adscripción. Así pues, el primer conjunto clasificable como Auriñaciense sería la colección procedente del estrato Bj/11.” (p. 511)
2008	Cortés-Sánchez & alii (2008)	“Bajondillo Bj/13-12, Middle-Upper Palaeolithic transition” [the Aurignacian beginning in Bj/11].
2010	Cortés-Sánchez (2010)	“El yacimiento cuenta con una serie arqueológica de 20 estratos fértiles, distribuidos entre seis con industria de Paleolítico medio (Bj/19-14), tres auriñacienses (Bj/13-11), uno gravetiense, cuatro solutrenses (Bj/9-6), uno ímagdalenense? (Bj/5), dos epipaleolíticos (Bj/4-3) y tres neolíticos (Bj/2-0)” (p. 174).

3. Lapa do Picareiro

Haws & *alii* (2018) briefly describe the most recent results obtained by their excavation of this site (Fig. 3A-C). They would have revealed “an Upper Paleolithic occupation stratigraphically positioned between a Middle Paleolithic occupation dated 47-45 ka cal BP and an undiagnostic archaeological level dated 36-38 ka cal BP,” one whose lithic assemblage features “a carinated endscraper or bladelet core and a dozen unretouched bladelets all made on chert.” They conclude that “the occurrence of these elements indicates a previously unknown Early Aurignacian presence in central Portugal.”

As at Bajondillo, the rationale for the claim comes from the dating, not from the characteristics of the lithic assemblage. In the case of Picareiro, however, the stratigraphic position (level GG of the sequence) and the technological features of the flint items recovered are indeed fully supportive of assignment to the Aurignacian of the human occupation they stand for – but only to the Aurignacian *sensu lato*, not to one of its phases specifically. This is because the composition of that small assemblage also befits the Evolved, or even the Late phases of the Aurignacian (for extensive discussions of these phases’ definitions, with implications for the Iberian record, see Zilhão, 2006; Zilhão & *alii*, 2010, 2017; Teyssandier & Zilhão, 2018).

To assess whether Haws & *alii*’s (2018) claim can be supported on the strength of the dating alone, we need to turn to Benedetti & *alii* (2019), where a detailed geological study of site stratigraphy and a compilation of radiocarbon dates, 56 in all, is provided. With regards to level GG, a single result, obtained on an ultrafiltrated bone sample with %C and C:N values within acceptable ranges, is available: $32,060 \pm 340$ BP (Wk-41258). This date places level GG in the 35.2-36.7 ka interval, i.e., fully within the range of the Evolved Aurignacian as dated elsewhere in Europe, namely at La Boja (Fig. 1). Surprisingly, however, these authors fail to rectify Haws & *alii* (2018); instead, they insist that, at the site, “the earliest Upper Paleolithic is a chert bladelet industry in levels GG-HH-II from the back of the cave that reveals a previously unknown Early Aurignacian presence in central Portugal” (Benedetti & *alii*, 2019, p. 22).

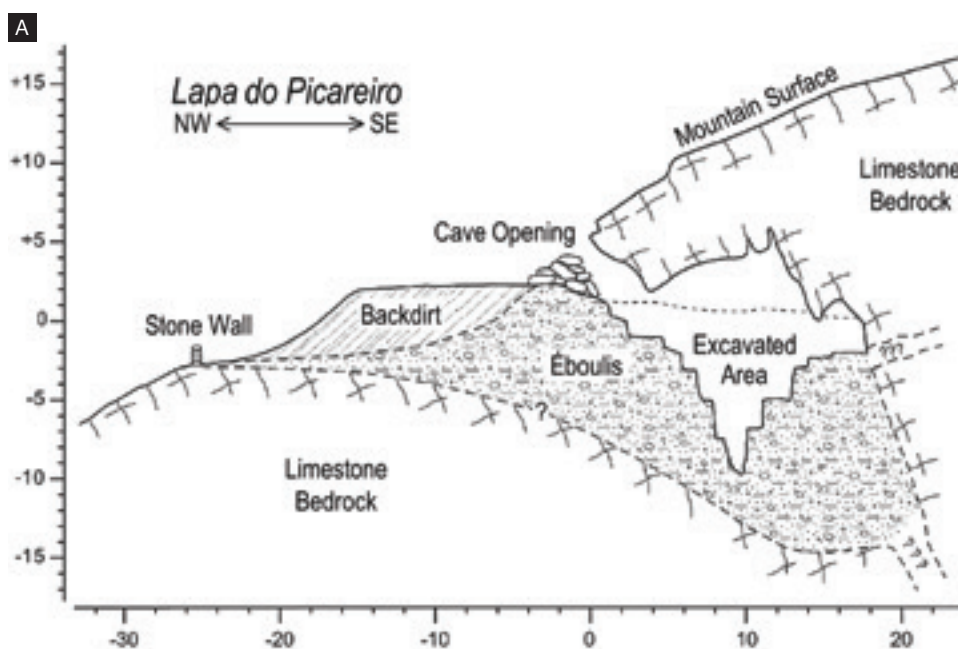
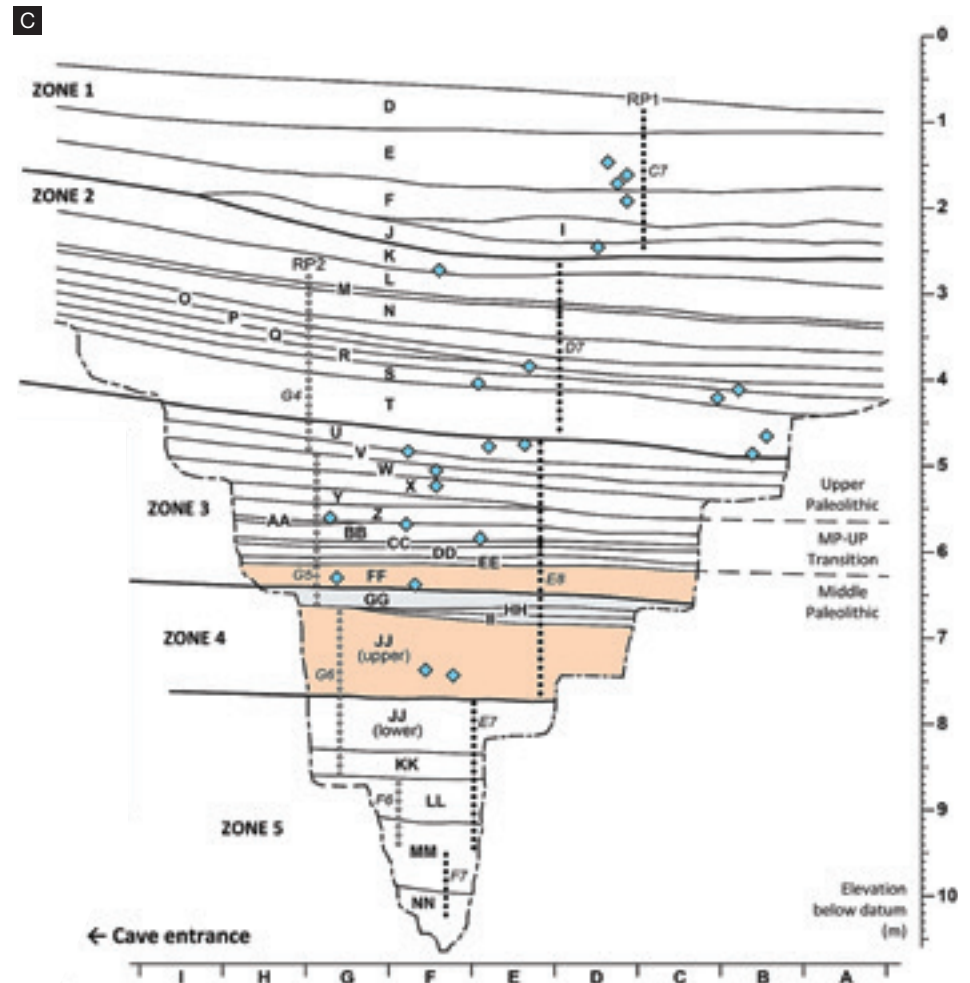
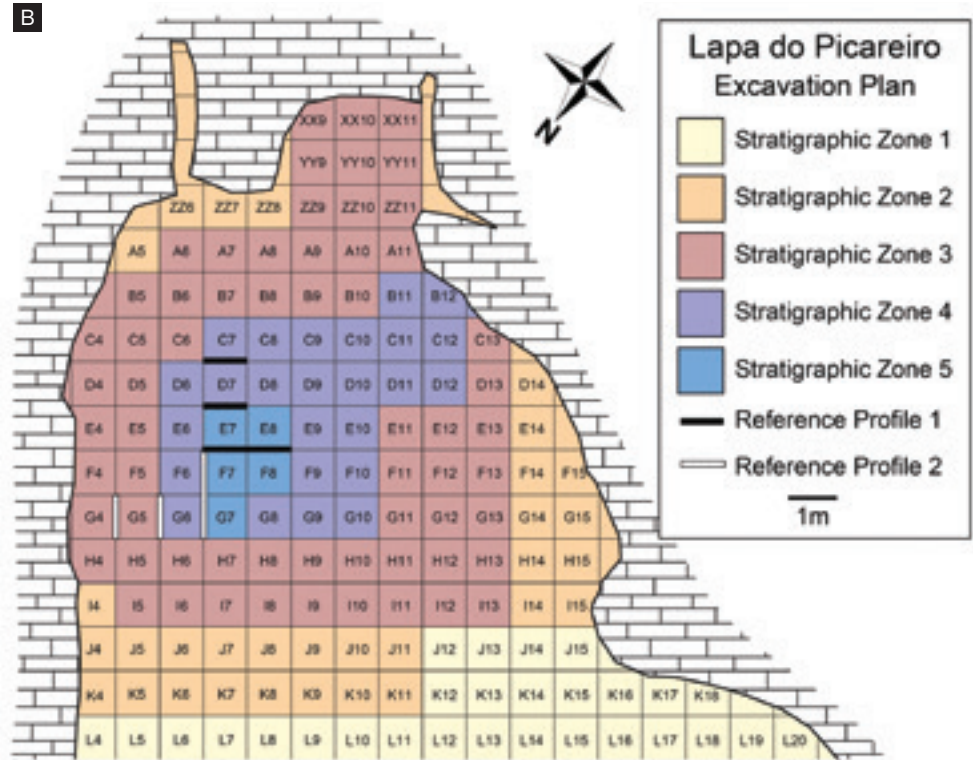


Figure 3: The Lapa do Picareiro sequence.

A. Generalized cross section of the cave.

Figure 3: The Lapa do Picareiro sequence.

B. Site plan and excavation grid.
C. Stratigraphic profile of levels D to NN, exposed in stepped profiles along rows 5, 6, and 7 of the grid; levels FF, GG-HH-II and JJ have been colored for emphasis; the blue diamonds represent the location of dated samples.



Benedetti & *alii*'s claim is based on their correlation of the site's magnetic susceptibility curve with global climate proxies. That correlation places level GG in Heinrich Stadial (HS) 4, ca.38-40 ka, but this is because it is based on an age-depth model, not on the radiocarbon dates themselves. In that model, the level GG date appears as an outlier, and the chronology of levels GG-HH-II is derived from a linear regression of age on depth through the interval represented by the oldest results for level FF above and level JJ below. But is such an age-depth model correct? This is the key question to which I now turn.

As it is easy to see by comparison with the results for the same levels obtained either on charcoal or on ultrafiltrated bone, Picareiro's non-ultrafiltrated bone results are erroneously young. They have therefore been excluded from Table 2, which lists all the other radiocarbon results for the site that fall in the 30-45 ka interval. A good age-depth correlation is apparent, but so it is that problems exist at the elevation of levels FF-GG. Therefore, there can be little question that some of the results for levels FF-GG that are technically reliable must be treated as outliers. But which? The younger result for level FF and the result for level GG (henceforth, Alternative 1; Fig. 3D)? Or the whole set of level FF results (henceforth, Alternative 2; Fig. 3E)?

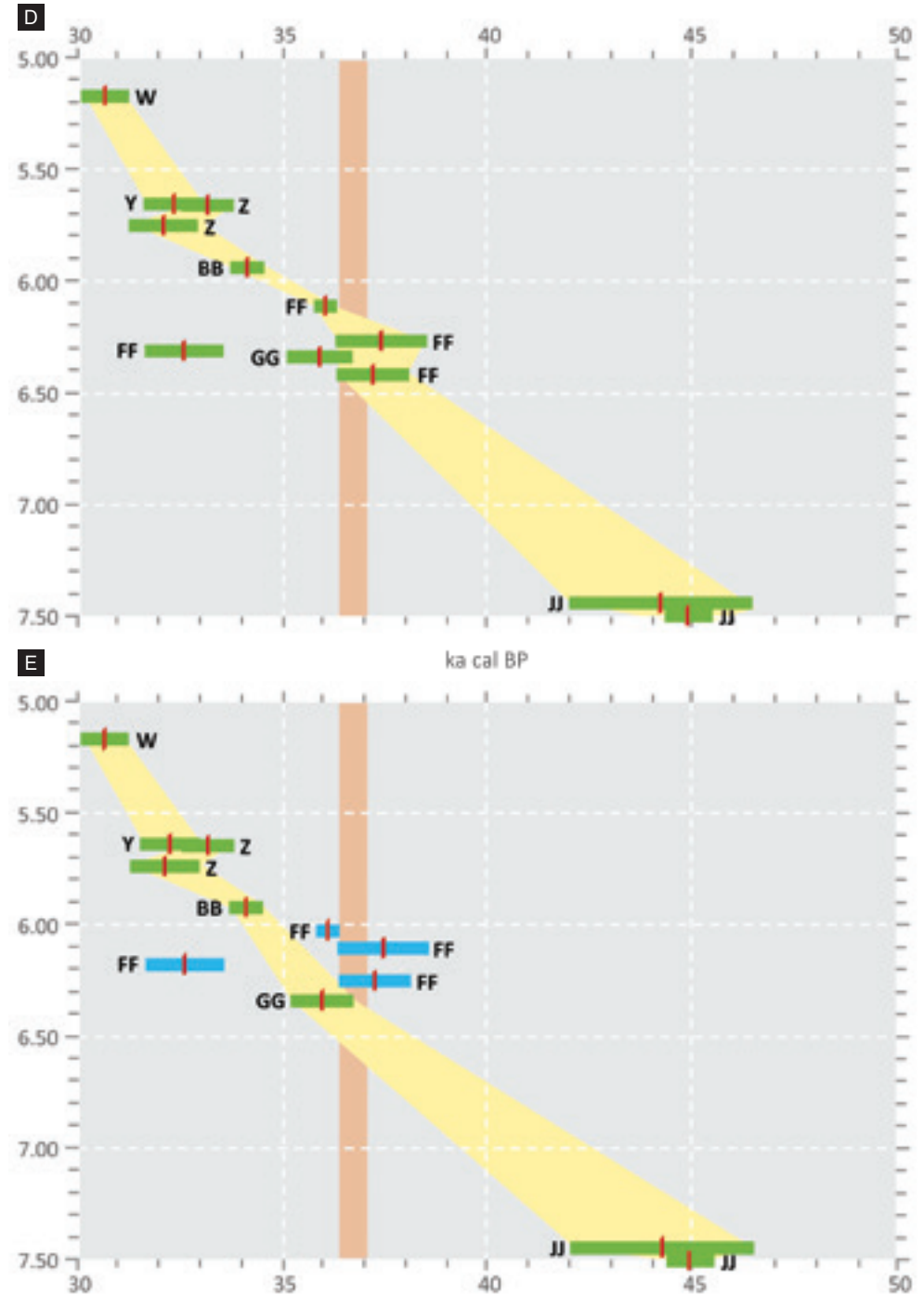
Level	Unit	Depth (m)	Lab #	Sample	¹⁴ C age (BP)	cal BP	δ ¹³ C (‰)	%C	C:N
W	F6	5.25	Wk-31353	Bone	25,580 ± 170	30,320-29,254	-20.2	44.27	3.31
Y	E9	5.63	Wk-41389	Bone	28,430 ± 210	33,041-31,633	-19.0	41.04	3.29
Z	G6	5.64	Wk-32280	Bone	29,050 ± 220	33,769-32,690	-19.4	43.48	3.24
Z	F6, F7	5.73	Wk-30538	Bone	28,160 ± 330	32,984-31,307	-19.6	43.50	3.30
BB	E7	5.92	Wk-32281	Bone	30,030 ± 210	34,512-33,745	-19.4	42.93	3.24
FF	F9	6.10	UGAMS-20479	Charcoal	32,200 ± 90	36,355-35,800	-24.0	57.04	–
FF	E9	6.25	Wk-41259	Charcoal	33,240 ± 420	38,524-36,381	–	–	–
FF	F7	6.25-6.35	Beta-247964	Charcoal	28,610 ± 300	33,485-31,705	-22.3	–	–
FF	F7	6.40	Wk-32219	Bone	33,000 ± 260	38,086-36,355	-19.3	43.02	3.25
GG	G6	6.33	Wk-41258	Bone	32,060 ± 340	36,726-35,173	-19.0	38.74	3.44
JJ	F7	7.44	Wk-28844	Bone	40,100 ± 1200	46,381-42,094	-19.9	39.53	3.40
JJ	F7	7.50	UGAMS-07769	Charcoal	41,480 ± 220	45,420-44,451	-25.1	55.54	–

Alternative 1 is that embedded in Benedetti & *alii*'s chronological model. The rationale might be that the date for level GG is somewhat underestimated due to the presence of younger carbon – incorporated through the cementation of the GG-HH-II hardpan and incompletely removed despite the ultrafiltration pretreatment. If we assume this and additionally reject the younger FF result (28,610 ± 300 BP; Beta-247964) – which could reflect percolation from above or excavation error (this is the only sample in Table 2 that comes from the sieved sediment and thus one cannot exclude that it represents accidental mixing) – an age-depth sequence with no other outliers can be obtained. However, as modeled by Benedetti & *alii*, Alternative 1 generates two anomalies: it puts Picareiro at odds with the wider Iberian pattern; and it produces a mismatch between the dates for level JJ (which fall in the 42.0-46.4 ka interval) and the model's correlation of this level with HS 5 (which dates to 47-50 ka) (Fig. 3F-H).

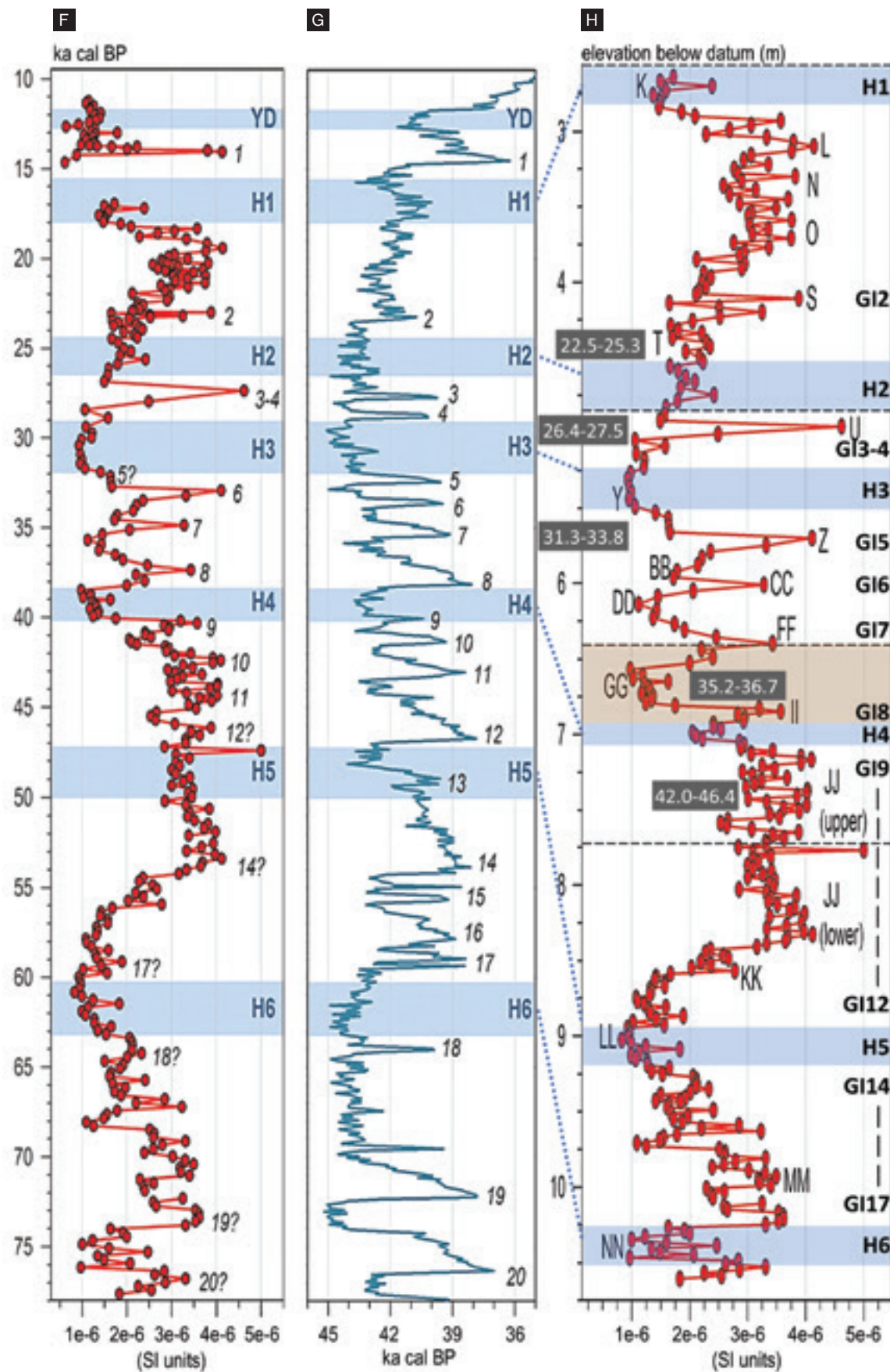
Table 2: Radiocarbon dates for Lapa do Picareiro older than 30 ka (charcoal and ultrafiltrated bone samples only). Elevations are below datum. After Benedetti & *alii* (2019).

Figure 3: The Lapa do Picareiro sequence.

D-E. Depth vs age plots of the radiocarbon dates in Table 2 (in E, the results for level FF are plotted in relative elevation order but according to stratigraphic position, between BB and GG, not depth); the yellow band denotes the expected age range derived from the correlation when outliers are excluded, and the vertical band denotes the 36-5-37.1 ka interval during which the Transition took place in the Mula basin (Murcia, Spain).



These anomalies result from the model, not from Alternative 1's assumptions: as shown in Fig. 3D, Alternative 1 is not inconsistent with the notion that the Aurignacian of Picareiro and La Boja are of broadly the same age. Indeed, (a) the oldest FF results – $33,240 \pm 420$ BP (Wk-41259) and $33,000 \pm 260$ BP (Wk-32219) – are statistically identical to those for the basal Aurignacian of La Boja in OH19 (e.g., VERA-6157ABOxSC; $33,179/+482/-455$ BP) and OH20 (e.g., VERA-5855; $32,890/+430/-410$ BP) (Zilhão & *alii*, 2017), and (b) given sedimentation rates, the precision of radiocarbon results, and the plateau that exists in this part of the calibration curve, indistinguishable ages are to be expected for levels FF and GG anyway. Moreover,



←

Figure 3: The Lapa do Picareiro sequence.

F. The site's magnetic susceptibility curve (SI units) adjusted to Benedetti & *alii*'s (2019) age model. G. The NGRIP $\delta^{18}\text{O}$ data. H. The site's magnetic susceptibility curve plotted against depth below datum with indication of the levels of sample provenience, associated calibrated age ranges, and alternative correlations; the light-brown band denotes the GG-HH-II hardpan. In F-H, the blue bands indicate Heinrich Stadials. In F-G, the numbers denote Greenland Interstadials. A-C and F-H are after Benedetti & *alii* (2019), modified.

according to Haws & *alii* (2018), the deepest artefacts piece-plotted in level GG lie above 6.40 m and the time range returned by the age-depth correlation in Fig. 3D for the 6.30–6.40 m depth interval is entirely consistent with the notion that the Aurignacian of Picareiro dates to the 36.5–37.1 ka at the earliest.

Alternative 2 is consistent with the Murcia pattern, makes for better correlation between the site's magnetic susceptibility curve and global climate proxies (Fig. 3H), and generates a single anomaly: it only requires explanation of why the dates for level FF would have come out of stratigraphic order. Under Occam's razor, this alternative is therefore to be preferred. Within this framework, I would suggest for level FF an interpretation based on the observation that, uniquely in the sequence, the GG-HH-II package is heavily indurated. This is how Benedetti & *alii* (2019, p. 11) describe it: "Level GG, an extremely hard bed of large éboulis clasts and mud cemented by sparry calcite, (...) extends across the center of the main chamber. This level has a gentle dip of about 2–3° to the east and a variable thickness of approximately 15–40 cm where it is exposed in the deeper parts of the excavation. Levels HH-II represent the irregular lower parts of the hardpan, with HH an uncemented lens of muddy éboulis in between the firmly cemented levels GG and II."

This pattern implies a hiatus in sedimentation coinciding with a wet and warmer period responsible for intensive dripping and attendant surface and subsurface precipitation of carbonates. At the end of such a period, the resumption of sedimentary dynamics would have favored the reworking by small-scale debris flows of material exposed upslope, towards the cave entrance, and its eventual redeposition atop the hardpan at the back of the cave. Benedetti & *alii* (2019) acknowledge that such mechanisms played a significant role at Picareiro, and three out of the four dates for level FF are on charcoal (Table 2), which is highly susceptible to remobilization by such processes. Based on the correlation that I propose in Fig. 3H, the wet period responsible for the induration of the GG-HH-II package would have been Greenland Interstadial (GI) 7, which lasted between 35.5 and 34.9 ka (Rasmussen & *alii*, 2014). This proposition is consistent with the radiocarbon age and the stone tool content of those levels, as it implies dating the deposition of the package to Greenland Stadial (GS) 8. This stadial lasted between 36.6 and 35.5 ka, which is precisely the age range indicated by the level GG result.

It is also possible that level FF itself, including the stone tools associated with the components, animal bone and charcoal, that have been sampled, represents in its entirety a remobilized pre-Aurignacian, Middle Paleolithic deposit. This would be in keeping with Benedetti & *alii*'s (2019, p. 22) description of the finds made therein: "A separate artifact concentration of uncertain cultural affiliation in Level FF of the main excavation area includes a flake core, sidescraper, and several undiagnostic flakes (...). It is as yet unclear whether this small assemblage is part of the Early Upper Paleolithic, or possibly represents an additional Mousterian occupation."

This description of the level FF lithics is consistent with the Mousterian, and so is their illustration in Haws & *alii* (2018). Strikingly, the level GG assemblage is entirely made on chert, as are the assemblages retrieved in levels DD and above, while the lithics in level FF are all quartzite, as are those in level JJ. Benedetti & *alii* (2019) entertain the possibility that such a pattern represents a Mousterian-Aurignacian-Mousterian interstratification, which brings to mind the Châtelperronian-Aurignacian interstratifications once proposed for the sites of Le Pige, Roc-de-Combe and Grotte des Fées, in France, or El Pendo, in Spain. This notion has since been altogether abandoned, subsequent to the demonstration that it resulted from excavation error, post-depositional disturbance and site taphonomy rather than from the true contemporaneity of the technocomplexes (e.g., Zilhão & *alii*, 2006). If further

work shows that the lithics in level FF are of Middle Paleolithic affinities indeed, I have no doubt that an explanation based on the same kinds of mechanisms will benefit the Picareiro evidence too.

Whether (a) level FF contains significant amounts of residual material, (b) level FF is itself a package of remobilized Mousterian, or (c) the date for level GG has been somewhat underestimated thus remains to be clarified. That a complicated depositional history exists at the elevation of levels FF to JJ and that their interpretation is far from straightforward is, however, indisputable, and indeed otherwise revealed by Benedetti & *alii*'s (2019) other interpretative hesitations. For instance, in contradiction with the text, their stratigraphic profile places levels FF and GG-HH-II in the Middle Paleolithic, considers that level X is the basal Upper Paleolithic, and describes levels Y-EE in between as representing the Transition (Fig. 3C). I take this as additional evidence that “residuality” is indeed a major issue at Picareiro: Much as the dated samples from level FF may well represent residual depositional material derived from earlier occupations, so the stratigraphic profile probably represents residual interpretative material derived from the Picareiro authors' past rejection of the notion that an Aurignacian phase existed at the onset of the Portuguese Early Upper Paleolithic (Bicho, 2005; Haws, 2012).

4. Conclusion

The issues raised by Bajondillo concern not the Transition in Iberia but the ethics of research; they simply serve to illustrate that there is no replacement for proper scholarship. The claims for an Early Aurignacian being present at this site are devoid of empirical basis and deserve no further consideration.

The evidence from Picareiro adds another occurrence to the corpus of the Aurignacian in Western Iberia. Stratigraphy and dating, however, concur in placing that occurrence in the Evolved rather than the Early Aurignacian, in agreement with the evidence from elsewhere in Portugal and Southern and Southeastern Spain. The alternative age-depth models that I propose in Fig. 3D-E additionally imply that the Middle Paleolithic finds reported by Haws & *alii* (2018) from the upper part of level JJ probably date to the 38-42 ka interval. If this is confirmed, Picareiro will also have provided evidence supporting the validity in Portugal of the other side of the Ebro Frontier argument – the persistence of the Mousterian into the chrono-stratigraphic time slot of the Protoaurignacian and the Aurignacian I of Catalonia and the Franco-Cantabrian region.

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