Franchthi Cave revisited: the age of the Aurignacian in south-eastern Europe

K. Douka1∗, C. Perlès2, H. Valladas3, M. Vanhaeren4 & R.E.M. Hedges1

The Aurignacian, traditionally regarded as marking the beginnings of Sapiens in Europe, is notoriously hard to date, being almost out of reach of radiocarbon. Here the authors return to the stratified sequence in the Franchthi Cave, chronicle its lithic and shell ornament industries and, by dating humanly-modified material, show that Franchthi was occupied either side of the Campagnian Ignimbrite super-eruption around 40 000 years ago. Along with other results, this means that groups of Early Upper Palaeolithic people were active outside the Danube corridor and Western Europe, and probably in contact with each other over long distances.

Keywords: Greece, Aurignacian, Upper Palaeolithic, radiocarbon, shell ornaments, lithics

Introduction

Dating the Middle to Upper Palaeolithic transition in Europe continues to present major methodological challenges, but during the last two decades a suite of technical advances in radiocarbon dating, such as the development of new pre-treatment protocols (Higham 2011), an internationally-agreed calibration curve which spans 50 000 years BP — IntCal09 (Reimer et al. 2009) — and the application of Bayesian statistics (Bronk Ramsey 2009),

1 Research Laboratory for Archaeology and the History of Art, University of Oxford, Dyson Perrins Building, South Parks Road, Oxford OX1 3QY, UK
2 Université Paris Ouest, Maison de l’Archéologie et de l’Ethnologie, Préhistoire et Technologie, 21 Allée de l’Université, 92023, Nanterre Cedex, France
3 Laboratoire des Sciences du Climat et de l’Environnement (LSCE/IPSL), CEA-CNRS-UVSQ, Bâtiment 12, Avenue de la Terrasse, 91198, Gif-sur-Yvette Cedex, France
4 CNRS UMR 5199 PACEA, Préhistoire, Paléoenvironnement, Patrimoine, Université Bordeaux 1, CNRS, Bât. B18, Avenue des Facultés, 33405, Talence, France

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have prompted new attempts to refine the chronological framework (Bronk Ramsey 2008; Jöris & Street 2008; Higham 2011).

At the same time, the development of technological approaches on well-stratified assemblages has led to a much better characterisation and understanding of lithic production during the different phases of the Aurignacian, particularly in Western and Central Europe (Bon 2002, 2006; Bordes 2006; Nigst 2006; Teyssandier 2008; Maíllo-Fernández & de Quirós 2010).

Taken together, these new perspectives in both radiocarbon dating and lithic studies invite us to reconsider the Aurignacian at Franchthi Cave, Argolid, Greece, as one of the most easterly Aurignacian sites in Europe. Its lithic assemblages were first published when the succession of Aurignacian phases was poorly defined in terms of lithic technology (Perlès 1987), hence a re-assessment is due. In this paper we present a brief re-analysis of the lithic evidence and publish the first radiocarbon determinations for the earliest part of the sequence.

Current status of the Aurignacian

Three different Aurignacian industries are now recognised in Europe (Bon 2002, 2006; Le Brun-Ricalens 2005; Teyssandier 2008). The Protoaurignacian (Aurignacian 0), originally defined by Laplace (1966), is relatively common in the Mediterranean region (Bazile & Sicard 1999) but has also been documented in Western and Central Europe (Bon 2002, 2006; Bordes 2006; Tsanova 2006). It has affinities with the early Near Eastern Ahmarian (Mellars 2006; Zilhão 2006; Teyssandier 2007). The Protoaurignacian is characterised by the production of blades and long straight bladelets within a single reduction sequence, usually on pyramidal cores. Organic tools made of bone or ivory are very limited in range and number (Teyssandier 2008).

The Early Aurignacian (Aurignacian I) can be seen as the founding facies of the Aurignacian sensu stricto (Teyssandier et al. 2010). It is characterised by the production of blades and bladelets in two clearly separate reduction sequences. Blades are produced from large flat-faced prismatic cores, while bladelets are produced on what were classically termed carinated end-scrapers. In the Early Aurignacian, these carinated cores have a wide front and the debitage is detached towards a central ridge on the upper face. The bladelets are straight or curved, rarely or only lightly twisted, and rarely retouched. These industries are normally associated with the emblematic split-based bone point (Knecht 1991; Liolios 2006). It has recently been suggested that the Early Aurignacian was restricted to south-western Europe and the Swabian Jura (Teyssandier et al. 2010).

The Evolved Aurignacian (Aurignacian II) also makes use of carinated cores for the production of bladelets but these have a narrower front and include carinated burins, carinated end-scrapers and nosed end-scrapers. The bladelets — Dufour bladelets of the Roc-de-Combe subtype — tend to be smaller and often twisted to the right when viewed from the upper surface (Chiotti 1999; Bordes & Lenoble 2002; Bordes 2006). In both Aurignacian I and Aurignacian II, the cores are extensively used and rejuvenated, producing characteristic rejuvenation flakes and bladelets (Le Brun-Ricalens 2005), which attest to the presence of this mode of debitage even in the absence of the cores.
Inherent difficulties in the dating of the time period, close to the limits of the radiocarbon method, make it difficult to establish whether the Protoaurignacian and Early Aurignacian industries were produced successively or if some chronological overlap should be expected. At sites where both technocomplexes occur, the Protoaurignacian is always found stratigraphically below the Early Aurignacian (Teysandier et al. 2010; Zilhão 2011). In absolute terms, the former is proposed to date to about 38/36.5–35 ka BP while Early and Evolved Aurignacian follow on chronologically, from 35/34 ka and 33–30 ka BP, respectively (Zilhão & d’Errico 2003a; Jöris & Street 2008; Teysandier et al. 2010; Zilhão 2011). In south-eastern Mediterranean Europe, Aurignacian industries are rare — Franchthi being one of the few exceptions — and were thought to appear 10 000 years later than in the rest of Europe (e.g. Papagianni 2009).

The archaeological context at Franchthi Cave

Franchthi Cave (37° 25′20.90″N, 23° 7′52.73″E) is a vast cavity overlooking a now-submerged coastal plain, across the bay of Koiladha in south-western Argolid (Figure 1). Excavated between 1967 and 1979 under the direction of T.W. Jacobsen of Indiana University, it yielded an exceptionally long archaeological sequence spanning the Upper Palaeolithic to the end of the Neolithic (Jacobsen & Farrand 1987). The two deepest trenches FAS and H1B (Farrand 2000) reached a maximum depth of 11.2m in FAS and 9.7m in H1B, at which point the excavated surface had become restricted to less than 2m². Excavation ended in FAS because the water table had been reached and in H1B due to the presence of large, irremovable limestone boulders. The sediment excavated in each unit was water-sieved down to a mesh of 1.5mm. The quality of the recovery, which included systematic water-sieving and flotation of the sediment, has made Franchthi a reference site for south-eastern Europe. In the present paper, only the lowest and less well-known Upper Palaeolithic levels (strata P, Q and R) are considered (Figure 2).

The deepest level (stratum P in Figure 2), at least 1.5–2m thick in FAS (FAS 227–224, plus units 223 and 222 cross-cutting P and Q), was defined as “yellowish red (5YR 4-5/6-8) clay loam with abundant gravel and rock fragments up to 25 cm across, in and around much larger limestone blocks” (Farrand 2000: 56). This stratum was only superficially reached in H1B (units 215–214). There was a poor undiagnostic lithic assemblage (Perlès 1987) and some poorly-preserved mammal bones (Farrand 2000). No carbonised seeds were present, but very small uncarbonised nutlets of Boraginaceae (Alkanna cf. orientalis, Lithodora [Lithospermum] arvense and Anchusa sp.), probably wind-blown, were found in large quantities (Hansen 1991: 104). They reflect a cold and arid climate and a steppic environment (Hansen 1991).

In both trenches, stratum P is overlain by stratum Q, a unique volcanic tephra layer, 5–9cm thick. It is best preserved in FAS (222–218) where it shows a very sharp lower contact and appears to be in primary position (Farrand 2000: 56). In H1B (213) it is scattered and laterally diffused, possibly due to reworking shortly after the initial deposition (Farrand 2000: 86). The mineral content and thickness of the ash correspond to the Campanian Ignimbrite (CI) (Vitaliano et al. 1981; Farrand 2000) most probably deriving from an eruption in the Phlegrean Fields in southern Italy. The lithic assemblage in stratum
Franchthi Cave revisited

Q is characterised as Aurignacian (Perlès 1987). *Lepus europaeus* and *Felis silvestris* were the only mammalian taxa recovered, in very small quantities (Stiner & Munro 2011). The seed assemblage in stratum Q is identical to that of stratum P.

Stratum R, overlying Q, is 40–150cm thick. In H1B it is found in units 181–212 and in FAS in units 209–217. The lithostratigraphy of stratum R is very similar to that of stratum P and consists of very sandy clay loams with gravel and rock fragments deposited on and between large limestone blocks (Farrand 2000). At the bottom of stratum R, patches of reworked tephra from stratum Q were identified in both trenches (Farrand 2000). Analysis of lithics and botanical remains suggests that stratum R comprises two successive and quite distinct periods (Jacobsen & Farrand 1987; Perlès 1987; Hansen 1991). The lower part of stratum R yielded a lithic assemblage very similar to that from stratum Q, while the upper part of stratum R is dominated by Gravettoid backed bladelets and micropoints (Perlès 1987). Mammal remains in trench H1B include mostly *Cervus elaphus* and *Bos primigenius* with some *Equus hydruntinus* and *Sus scrofa* (Stiner & Munro 2011). Botanical remains are again dominated by species of the Boraginaceae family (Hansen 1991). In the upper units of R the dominant species shifts from *Alkanna* sp. to *Lithospermum arvense* (Hansen 1991). No bone tools were recovered from either trench in either stratum.

The lithic assemblages revisited

The lithic material is unfortunately numerically poor, mainly due to the small size of the excavations, but diachronic distinctions can now be suggested. Considering the thickness of stratum P it is unlikely that the restricted lithic assemblage (Table 1) belongs to a homogeneous archaeological phase. In the deepest level of FAS (unit 227), one flake and one side-scraper with thick faceted butts suggest that the Middle Palaeolithic had been reached. Units FAS 226–224 were almost sterile, the few pieces — small flakes under 1cm
— may have filtered down in between the roof-collapse blocks. FAS 223 and H1B 215–214 were somewhat richer (76 pieces) but the material, which consists mainly of very small retouched flakes, is non-diagnostic (Perlès 1987). Despite the now-demonstrated presence of Uluzzian levels at nearby Klissoura Cave 1 (Koumouzelis et al. 2001), it is impossible to ascertain whether the technocomplex is also present at Franchthi.

Lithic elements from stratum Q, the tephra layer, have mostly been found in FAS 222–218, with only nine undiagnostic pieces in H1B 213. The assemblage comprises straight and curved bladelets of small dimensions, sometimes slightly twisted, together with characteristic curved and twisted lateral carinated-core rejuvenation flakes (Figure 3). Most of the bladelets are typical lateral preparation bladelets, while central bladelets are rare, possibly gone from the site mounted on composite organic points. There is no indication of a distinct production of larger blades and bladelets from prismatic cores, thus no indication of a Protoaurignacian component. All of the material is compatible with an Early Aurignacian mode of production, on carinated cores with a large front, struck axially. The extreme rarity of retouched bladelets is another characteristic found in Early Aurignacian assemblages.
Table 1. Techno-typological description of the lithic assemblage of Franchthi. The identified archaeological industries are shown (nD = non diagnostic, AUR = Aurignacian, GRAV = Gravettian) as well as the lithic phases as were originally identified by Perlès (1987).

<table>
<thead>
<tr>
<th>Unit</th>
<th>Stratum</th>
<th>Total lithics</th>
<th>Curved bladelet</th>
<th>Right twisted bladelet</th>
<th>Asymmetric strongly twisted bladelet, right twist</th>
<th>Fragments of bladelet, indet. profile</th>
<th>Rectilinear bladelet</th>
<th>Preparation &amp; rejuvenation</th>
<th>Carinated core</th>
<th>Industry</th>
<th>Lithic phase</th>
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| H1B  |         |               |                 |                       |                                               |                                   |                   |                             |                |           |              |
| 215  | P       | 36            |                 |                       |                                               |                                   |                   |                             |                | nD        | 0            |
| 214  | P       | 6             |                 |                       |                                               |                                   |                   |                             |                | nD        | 0            |
| 213  | Q       | 9             |                 |                       |                                               |                                   |                   |                             |                | nD        | 0            |
| 212  | R       | 10            |                 |                       |                                               |                                   |                   |                             |                | AUR       | 1            |
| 211  | R       | 123           | 1               | 1                     |                                               |                                   |                   |                             |                | AUR       | 1            |
| 210  | R       | 580           | 13              | 9                     |                                               |                                   |                   |                             |                | AUR       | 1            |
| 209  | R       | 12            | 1               | 1                     |                                               |                                   |                   |                             |                | AUR       | 1            |
| 208  | R       | 105           | 1               | 1                     |                                               |                                   |                   |                             |                | AUR       | 1            |
| 207  | R       | 140           |                 |                       |                                               |                                   |                   |                             |                | GRAV      | 2            |
The assemblage from overlying unit FAS 217 in stratum R differs in the much higher proportion of straight bladelets, many of which cannot have been produced on carinated cores. However, this unit also contained a few curved and twisted bladelets, as well as a characteristic carinated core which confirms the exploitation of relatively large, semi-circular fronts (Figure 4). Contamination from the immediately overlying Gravettoid industry of lithic phase II, heavily dominated by single and double backed bladelets, cannot be ruled out. On the contrary, the assemblage from H1B 212–208 in stratum R is entirely of typical Aurignacian character (Table 1), and the upper units (H1B 210–208) suggest an evolution in the mode of production and the morphology of the bladelets (Figures 5 & 6). The occurrence of Aurignacian II elements in the upper H1B units (210–208) cannot
be definitely established in the absence of completely typical nosed-end carinated cores or carinated burins. It is suggested, however, by the presence of an atypical carinated-burin core made on a thin slab rather than a flake, of potential burin spalls from carinated burins and, especially, of several curved and strongly twisted bladelets, characterised by their asymmetrical, comma shape and all but one twisted to the right (Table 1). The latter strongly suggest the exploitation of narrow-fronted cores, typical of Aurignacian II.
Ornamental shells

The smaller fractions of the sieved residues in all three strata revealed numerous abraded microshells, predominantly *Bittium* sp. (Shackleton 1988), as well as small apical fragments of *Dentalium* sp. and fragments of other typical ornamental and non-ornamental shell species. In addition, larger fragments of *Dentalium* sp., of the usual size for Palaeolithic beads, as well as shells of *Cyclope* sp. and *Homalopoma sanguineum* were recently identified.
in all Early Upper Palaeolithic strata of the site (Perlès & Vanhaeren 2010), including the tephra layer itself (Table 2).

The eight shell samples selected for dating (Table 3, Figure 6) include four Dentalium sp., two Cyclope neritea and two Homalopoma sanguineum shells. One Dentalium sp. shell (Fra 5, stratum R) bears nine heavy longitudinal striae and could correspond to the modern Atlantic species Dentalium novemcostatum, the Mediterranean Dentalium mutabile inaequicostatum or to a fossil species (Poppe & Goto 1993). The three other Dentalium sp. shells are smooth and difficult to identify to species level. All four Dentalium sp. are tubular portions of originally larger shells. The straight regular fracture on both ends of Fra 5 and on the widest end of Fra 10 (stratum P) suggests intentional snapping to produce tubular beads (Figure 7). The remaining end morphologies are irregular and common on Dentalium sp. shells collected from the beach (Vanhaeren & d’Errico 2001). One C. neritea (Fra 1, stratum R) and one H. sanguineum (Fra 6, stratum Q) bear a perforation on their last spiral whorl. The second H. sanguineum shell (Fra 3, stratum R) is not perforated while the remaining fragmentary Cyclope sp. (Fra 8, stratum Q) could have been perforated but post-depositional damage does not allow diagnosis.

**Radiocarbon dating**

Nine new radiocarbon dates were produced from the eight shell specimens, and two from charcoal samples. The shells were dated in Oxford (UK) using the ORAU routine
Pre-treatment protocol for shell carbonates (Brock et al. 2010; Douka et al. 2010a). With the exception of Fra 6 (OxA-22270) and Fra 9 (OxA-21351), all shells were checked for post-mortem recrystallisation — one of the major hindrances in the reliable dating of marine carbonates — using high-precision X-Ray diffraction (XRD). Such mineralogical analysis revealed no recrystallisation. The two charcoal samples were dated at the Gif Laboratory (France). FRA 1 from FAS 217 was a charcoal sample dated using the routine Acid-Base-Acid protocol, while FRA 2, from FAS 221, underwent a more rigorous cleaning protocol (ABOx). The latter was a compact fragment of black matter, which was shown to be mostly composed of well-crystallised calcite grains rather than burnt organic matter. The connection of the dated sample with the human activities taken place at the site, therefore, remains uncertain.

The results are shown in Table 3 along with the calibrated ranges obtained using IntCal09 and Marine09 calibration curves (Reimer et al. 2009). For the shell samples, in addition to the constant marine reservoir of 400 $^{14}$C years, we corrected for the local Mediterranean reservoir ($\Delta R$=58±85 $^{14}$C years; Reimer & McCormac 2002). The CI tephra, stratum Q in Franchthi, had been previously dated by $^{40}$Ar/$^{39}$Ar to 39280±55 calendar years BP.
Table 3. Contextual information of dated samples, and associated raw and calibrated radiocarbon dates at 68.2% and 95.4% probability. P = perforated, nP = not perforated, NT = natural perforation (tube morphology), ind. = indeterminate.

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<th>ID</th>
<th>OxA</th>
<th>(^{14}\text{C})</th>
<th>±</th>
<th>Stratum</th>
<th>Unit</th>
<th>Shell species (perforation)</th>
<th>Raw radiocarbon date (BP)</th>
<th>Calibrated date (cal BP)</th>
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<td>(^{14}\text{C})</td>
<td>±</td>
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(De Vivo et al. 2001), the date used in Figure 8. Nonetheless, we should note that a larger error for this determination, in the region of five per cent of the CI age, would appear more sensible.

The upper units of stratum R are also associated with two radiocarbon dates obtained in the 1970s: P–2233: 21480±350 BP on soil and carbonised matter from H1B 191–192, and I–6140: 22330±1270 BP for a sample composed of charcoal and sediment from H1A 219 (Jacobsen & Farrand 1987).

**Discussion**

The shell dates from H1B are in chronostratigraphic sequence (Figure 8). After calibration, OxA-20616, on a Dentalium sp. shell found in stratum P (H1B 215) about 10–20 cm beneath the tephra, gives an age consistent with the calendar age of the CI, pre-dating it by about 500–1500 calendar years. OxA-20615 is also in agreement with the stratigraphic position of the *H. sanguineum* shell in the lower units of stratum R (H1B 210) and about 20 cm above the tephra. The age fits the suggestion of an Evolved Aurignacian (Aurignacian II) and, from a palaeoclimatic point of view, it falls on the last part of the long and warm GI–8 (NGRIP record; Svensson et al. 2006). This also agrees well with the suggestion put forward by Stiner & Munro (2011) who, based on the dominance of red deer in units H1B 212–209, assigned their formation to relatively mild, moist conditions. OxA-21069 from stratum R (H1B 203) also agrees well with the associated backed-bladelet assemblage of Gravettoid affinities and with a previous radiocarbon date from sub-trench H1A 219 (I–6140), roughly equivalent to H1B 201 (Farrand 2000: 45). Higher up the sequence, the previous determination (P–233) from H1B 191–192, provides a rough *terminus ante quem* for the formation of stratum R and all available dates suggest a large span of at least 10,000 radiocarbon years for it. A depositional hiatus was not identified during excavation but is clearly indicated by the very rapid transformation of the lithic and botanical assemblages between H1B 208
Figure 8. Bayesian model built using OxCal v.4.1.7 including all 13 shell and charcoal radiocarbon dates for the lowermost strata of Franchthi Cave. Two are previously obtained determinations and marked with an asterisk (*). Outlier detection analysis identified four determinations as being certain outliers and these are shown in red. The age of the CI eruption, following De Vivo et al. (2001), is indicated as a light grey line. The dates are compared to the NGRIP $\delta^{18}O$ record (Svensson et al. 2006), and the Greenland interstadials are numbered.
and 207, as well as the internal span of radiocarbon dates. Overall, trench H1B reveals excellent stratigraphic consistency and coherence between sample position, tephra layer and radiocarbon determinations.

The shell dates from trench FAS are less consistent. Only one, OxA-20253, on a fragmentary *Cyclope* sp. shell, is compatible with the position of the sample within stratum Q. This is a critical date that closely overlaps with the accepted age of the CI. If the deposition of the shell predates the ash fall, then it provides evidence that the site was indeed occupied around the time of the eruption. This is comparable to other Mediterranean sites, for example Castelcivita and Serino in southern Italy (Accorsi *et al.* 1979; Gambassini 1997). If it post-dates it, marginally as the date suggests, then it refutes scenarios for catastrophic effects of the CI super-eruption on southern Mediterranean hominid populations (Fedele *et al.* 2008), at least at Franchthi.

The five remaining shell dates from FAS do not agree with the position of the samples. OxA-21070, on a *Dentalium* sp. shell from the lowermost unit of stratum R is too old for its context just above the CI. While post-depositional incorporation into younger layers cannot be excluded, the simplest explanation is that the shell is an old, semi-fossil shell collected from local beaches or other nearby locations, where *Dentalium* sp. shells are still present today (Shackleton 1988). The two dates made on the same perforated *H. sanguineum* shell from stratum Q (OxA-22270 and its duplicate) appear statistically different ($T=12.45$, $\chi^2_{1,0.05}=3.84$) but they overlap significantly when calibrated. Both determinations, as well as the ones obtained on two *Dentalium* shells from stratum P (OxA-21351 and OxA-21115) are very young with respect to their position within or below the tephra layer, and underestimate the age of the respective layers by several thousand years.

The chrono-stratigraphic discrepancy revealed by the shell dates from FAS, although disappointing, does not come as a total surprise. The trench contained numerous large boulders in P, Q and R and it is likely that younger shell material, from the middle/upper units of stratum R, became incorporated in lower strata P and Q either as a result of post-depositional movement caused or influenced by the collapse of roof-blocks or, possibly, during excavation in the course of the removal of these large boulders to access lower levels. The sedimentation rate of strata P and R has been calculated to be remarkably low (Farrand 2000) and 10–20 cm downward displacement of small-sized shells can account for the age difference observed in our radiocarbon dates. It should be noted, however, that except for unit FAS 217, the lithic assemblages from strata Q and P do not indicate mixing with material from the Gravettoid assemblages found in the upper units of stratum R.

In support of this, the dates on terrestrial material from FAS are more coherent. The charcoal sample from FAS 217 in stratum R was dated at 32 ka BP (GifA 80104/SacA 11206), which is in agreement with an Aurignacian II attribution. The second date (GifA09381/SacA 15334) obtained on calcium carbonate grains from a black fragment collected within the tephra (FAS 221) is consistent with a slightly post-eruption CI age. However, given that the composition of the sample is uncertain, this date must be treated with extreme caution.
Conclusions

Despite the inconsistencies mentioned above, the new radiocarbon determinations, some of which directly relate to the CI tephra horizon, extend the occupation of Franchthi Cave securely back into the Early Upper Palaeolithic period. They confirm that the site was occupied sporadically before and shortly after the CI ash fall (35 ka BP or 40–39 ka cal BP) and for at least the following three millennia. Whereas the lithic assemblage below the tephra cannot be assigned to a specific technocomplex, the lithic assemblages from the tephra units indicate clear Early Aurignacian affinities. At the bottom of stratum R and slightly above the ash deposit, units H1B 212 and 211 contain identical material also of Early Aurignacian character, while in units H1B 210–208, the relative abundance of strongly twisted bladelets accords with the definition of the Evolved Aurignacian, as recently reassessed (Chiotti 1999; Bon 2002; Bordes 2006). The new determinations at 32 ka BP (c. 36 ka cal BP) also agree with this. The ornamental shell species from strata P, Q and R (Cylope sp., Homalopoma sp. and Dentalium sp.) are common ornamental taxa in Aurignacian, be it Proto-, Early or Evolved Aurignacian assemblages around the Mediterranean (Vanhaeren & d’Errico 2006, 2007).

The temporal extension of the Upper Palaeolithic assemblage in Franchthi Cave is all the more important given that a recently excavated neighbouring site, Klissoura Cave 1 (Figure 1), yielded a rich Early Upper Palaeolithic sequence and is associated with a large number of dates. Unfortunately many of these are problematic (Koumouzelis et al. 2001; Kuhn et al. 2010). At this site, the earliest Upper Palaeolithic stratum, layer V, has been dated between 40 and 34.5 ka BP (Koumouzelis et al. 2001; Douka unpublished data) and is considered to have Uluzzian affinities, a transitional industry of south-western Europe that has been traditionally considered the product of Neanderthals (Palma di Cesnola 1989; Peresani 2008) although based on very limited and questionable data. Interestingly enough, in Klissoura Cave 1, just as in Cavallo Cave (Italy), the Uluzzian disappears around the time of the CI eruption when it is directly capped by a macro/micro-tephra layer (Palma di Cesnola 1963; Stiner et al. 2010), most likely to be the CI. In other cases, however, the CI seals industries described as Protoaurignacian, for example at Serino and Castelcivita (Italy) (Accorsi et al. 1979; Gambassini 1997). The earliest Aurignacian at Klissoura Cave 1 follows in layers IV–IIIg–a (Koumouzelis et al. 2001; Kuhn et al. 2010) starting at around 33 ka BP (c. 37–38 ka cal BP), a couple of millennia later than in Franchthi.

Greece is no longer a terra incognita during the Aurignacian and the addition of Franchthi and Klissoura Cave 1 essentially allows the Greek sites to be brought into the wider discussion regarding the transition from the Middle to Upper Palaeolithic. The re-analyses of the lithic component and the direct dating of perforated shells and charcoals at Franchthi suggest that the succession of Aurignacian I and II industries at the site echoes that previously identified in other parts of Europe. Greece, therefore, can no longer be viewed as a backwater, isolated from the main Danubian corridor (Mellars 2006) and where the Aurignacian appeared with a ten millennia delay (Papagianni 2009). Instead, our results indicate that the Early Aurignacian is of comparable antiquity in Eastern and in Western Europe (contra Bar-Yosef et al. 2006; Teyssandier 2008) suggesting that its occurrence in stratified contexts may not be as “sparse and equivocal” outside south-west Europe and the Swabia Jura as recently.
proposed (Teyssandier et al. 2010: 216). This is further supported by the presence of Aurignacian-like assemblages at the Kostenki-Borschevo sites in Russia, embedded in the CI (Sinitsyn 2003) — as they are at Franchthi — also dated at c. 35 ka BP (Douka et al. 2010b). The new chronometric evidence for the Early and Evolved Aurignacian at the key site of Abri Pataud, Dordogne, France, is also comparable to that from Franchthi (Higham et al. in press). Similarly, in Isturitz (south-western French Pyrenees), a radiocarbon determination (GifA 98237: 34630±560 BP) most likely related to the Early Aurignacian layer C4b, is identical to ours from Franchthi. Dates of c. 37 ka BP obtained recently from layer C4c in Isturitz almost certainly relate to a pre-Early Aurignacian phase at the site (Szmidt et al. 2010). Nonetheless, some determinations for the Early Aurignacian layers AH III in Geißenklösterle (Conard & Bolus 2003) and cultural layer 3 in Willendorf II (Nigst 2006) may indeed give a hint of a pre-35 ka BP manifestation of the Early Aurignacian along the Danube fluvial corridor. This remains to be proved (see discussions in Zilhão & d’Errico 2003b and Jóris & Street 2008).

Taken together, this tight range of dates for the earliest Early Aurignacian, in areas from Western Europe to the Don Valley and southern Greece, implies that the search for a centre of emergence for the Early Aurignacian might be in vain (Zilhão & d’Errico 2003b) or difficult to achieve. New modes of technological adaptation, such as the production from carinated cores of thin bladelets probably used as lateral inserts on organic points (Bon 2009), appear to have spread rapidly on the basis of these dates. Whether this was achieved by direct contact between groups over wide-ranging exchange networks, now well-identified through the study of Aurignacian raw materials (Féblot-Augustins 1997, 2009) and personal ornaments (Vanhaeren & d’Errico 2006), or was mainly the result of demic diffusion, is difficult to ascertain. In the former case, bladelet production on carinated cores as well as the correlated split-base organic point, the hallmarks of traditional definitions of the Aurignacian, would actually appear as poor ethnic or cultural markers and reflect, above all, a shared idea of weaponry, well-adapted to an increased mobility among hunter-gatherer groups.

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