

# The origin and evolution of sewing technologies in Eurasia and North America

## Supplementary Online Material

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## SOM Text

### S1.1 Lithics and faunal remains from SDG12

Lithics recovered in layer 11 comprise more than 9,000 pieces. Microblades and microblade cores dominate the assemblage (Gao et al., 2013; Yi et al., 2013). Retouched tools include end-scrapers, notches, points, borers, and burins. A variety of grinding tools are represented (Yi et al., 2013) among which a fragment of an axe and small discs as well as a large number (>13,000) of burnt stone fragments (Gao et al., 2013). The lithic assemblage indicates stone knapping, osseous tool shaping, plant processing, woodworking, and specialized activities involving bone tools were carried out at the site (Yi et al., 2013, 2014; Zhang et al., 2016). The lithic assemblage is typical of Chinese Late Pleistocene microlithic industries (Gao et al., 2009; Gómez Coutouly, 2011; Bar-Yosef and Wang, 2012; Pei et al., 2012; Qu et al., 2013; Yi et al., 2013, 2016).

Ten thousand faunal remains, 1,821 of which could be identified to species, were recovered. The faunal spectrum includes *Lepus* sp. (57.4%), *Procapra przewalskii* (22.2%), *Bubalus* sp. (6.8%), *Meles meles* (5.7%), *Equus przewalskii* (2.9%), and birds (2.9%). Cervidae, *Sus* sp., *Prionailurus bengalensis* (*Felis microtis*), rodents and a single remain of a reptile account for the remaining 2.1% (Zhang et al., 2013). Cut-marks are present on 5.1% of the NISP, a proportion similar to that observed at other Chinese Late Pleistocene sites in which faunal remains have been studied in detail (e.g., Ma'anshan; Zhang et al., 2010). Modifications by carnivores and rodents only occur on four pieces. The faunal assemblage is interpreted as the result of anthropogenic activities. Root etching is the main post-depositional alteration. Fluvial action was proposed to have played a role in the site formation process (Liu et al., 2008). However, no modifications were detected on the faunal remains suggesting water transport.

### S1.2 Morphometric analysis

The database compiling morphometric information comprises width and thickness data from 20 Chinese needles, blanks (bone fragments to be shaped into needles), preforms (partially shaped needles), and modified bone fragments from which blanks were extracted from four sites, 89 French needles from 10 sites, 73 Moravian needles from two sites, 14 Caucasian needles from two archaeological horizons of Mezmaiskaya, four Siberian needles from two sites, and 37 North American needles from four sites (Table 1). Width and thickness were measured with a digital calliper on the original specimens from SDG12, on casts from Xiaogushan and Zhoukoudian

Upper Cave, also curated at the IVPP, and on the French and Moravian original needles. The French specimens are curated at the Musée National de Préhistoire (MNP), Les-Eyzies-de-Tayac and the Musée d'Archéologie Nationale, Saint-Germain-en-Laye, France. Most of the needles from Moravia are curated at the Anthropos Institut of the Moravské zemské muzeum, Brno, Czech Republic. Three Moravian specimens from the Wankel Collection, curated at the Naturhistorisches Museum Wien, Vienna, Austria, were also included in this study. The remaining data were gathered from the literature, provided the authors reported that the measurements were collected on the original specimens (Golovanova et al., 2010; Lyman, 2015; Derevianko et al., 2016; Song et al., 2016; Shalagina et al., 2018).

Data on the maximum width and thickness of the SDG12 specimens were first compared with the other Chinese needles, and then with the global sample. PERMANOVA (Anderson, 2001) was used to identify significant pairwise differences between subsets of specimens associated with distinct cultural attributions and coming from different regions. PERMANOVA tests whether significant differences exist between groups based on a distance measurement, in this study Euclidean distance. The significance is computed by permutation of group membership, here 9,999 replicates. The  $F$ -statistic it generates is similar to the Fisher's  $F$ -ratio and is calculated directly from the distance matrix. The greater the  $F$ -value, the more likely  $H_0$  of no difference between groups is false. The  $p$ -value obtained under permutations for any individual pairwise comparison is exact and doesn't require correction.

Mixed models were computed to assess if the frequency distributions for the width and thickness of French and Moravian Magdalenian needles combined two or more univariate normal distributions. The values of the Akaike Information Criterion corrected for small samples (AICc) were compared for each model (Akaike, 1974; Burnham et al., 2011). The model that had the lowest AICc over 1,000 bootstraps was selected as the 'best' model (SOM Table S3).

Two morphological, 26 morphometric variables (SOM Figure S1), and the occurrence of a thinning on the perforated area were also recorded on the bone needles from SDG12, Xiaogushan, Zhoukoudian Upper Cave, and from the seven French Upper Paleolithic sites attributed to the Solutrean, Badegoulian, and Magdalenian technocomplexes (La Madeleine, Combe Saunière, Les Peyrugues, Abri Casserole, Laugerie-Haute-Est, Laugerie-Basse, Les Marseilles). The variables were chosen with the aim of quantifying the dimensional and morphological variability of needles with a focus on their proximal end and perforated area. First, correlations between pairs of variables were explored with a correlation matrix computed from the Spearman's rho values. The 26 variables show significant positive correlations between one another (SOM Figure S2). To assess stylistic variation from a morphometric approach, a second correlation matrix was

computed, this time by selecting only the variables located on the proximal end. Maximum length was discarded because this variable conflates both the original dimensional variability and that generated through the successive episodes of use, breakage, and resharpening. Maximum width and thickness were discarded because the first correlation matrix showed high correlations for the widths and thicknesses recorded at different loci on the longitudinal axis. Width and thickness at 1cm from the proximal and distal end were discarded because these loci are not necessarily homologous on every specimen owing to the number of rejuvenation events each needle went through prior to being lost or discarded. The results of the second correlation matrix (SOM Figure S3) helped target a limited number of variable to be used in a principal component analysis (PCA). When correlation was high between similar variables, e.g., between the various widths or thicknesses, only one was selected. If variables were homologous, e.g., the distance between the perforation and the left or right edge of the needle on the inferior or superior aspect, only one was selected. The goal was to find the minimum number of variables that synthesize the morphological variability. We opted for variables that could be easily recorded, for example by selecting a width and thickness that intersect at the same locus on the longitudinal axis. The main advantage conferred by this selection is that morphological variability can also be evaluated on needle proximal fragments as long as their base is intact. The PCA was performed on a sub-sample of 47 needles with the remaining six variables, i.e., the width and thickness at the proximal margin of the perforation, the distance between the left (or right) margin of the perforation and needle edge, the width and length of the perforation, and the distance between the proximal margin of the perforation and the needle edge, to quantify the morphometric variability of French and Chinese needles, and assess potential regional trends. Univariate and multivariate analyses were performed with the Software PAST 3.1 (Hammer et al., 2001).

### **S1.3 The technology of SDG12 needles**

#### ***S1.3.1 Needles***

Specimen 1207 (Figure 2a) is the only complete needle found at SDG12. It has a sub-rectangular section and a rounded proximal end. Most of its surface is covered by longitudinal scraping marks, partially obliterated by thin randomly oriented striations likely produced by polishing the needle after its manufacture (SOM Figure S4d). On the distal end this pattern is removed by deep and broad scraping marks, likely deriving from the resharpening of the tip (SOM Figure S4a). Utilisation following the resharpening polished the scraping marks and produced micro-flake scars damaging the apex. A few grinding marks are observed on a lateral

surface close to the perforation. Elongated parallel grooves, deeper and wider than scraping marks, are located alongside the needle's edges on both aspects (SOM Figure S4b). They are remnants of grooves cut into the bone during the extraction of the blank. The eye of the needle is conical, indicating that the perforation was mainly bored from one side, and retains circular striations, produced by drilling, on its inner surface and edges (SOM Figure S4c). The latter are highly smoothed and show micro-striations produced by contact with the thread.

Specimen 133 (Figure 2b) is a proximal fragment of a needle sub-rectangular in section with a rounded proximal end. Traces of scraping covering the entire surface are almost completely removed by subsequent longitudinal polishing (SOM Figure S5a). The eye is elliptical in shape and obliquely crosses the proximal end. Its surface bears no striation and displays the typical features of a natural foramen such as the presence of vascular openings (SOM Figure S5b) and a U-shaped section (d'Errico and Villa, 1997). These characteristics indicate the SDG12 artisan used a foramen as the needle eye. Two longitudinal sinuous lines were engraved with a lithic point on the needle aspect on which the foramen opening is wider. The starting point of the deepest line coincides with the distal edge of the eye (SOM Figure S5c). User wear produced by the thread is recorded on the proximal edge of the eye. The dark brown coloring of the bone indicates that it was deliberately or accidentally heated.

Specimen 1206 (Figure 2c) is a mesial fragment, sub-rectangular in section. Longitudinal scraping marks covering the entire surface are partially erased by randomly oriented striations.

Specimen 1829 (Figure 3d) is a distal fragment of a needle with a sub-rectangular section. Traces of scraping are almost completely obliterated by thin longitudinal striations produced in the last stage of manufacture by polishing the object, perhaps with a skin covered by abrasive particles (SOM Figure S5d). A groove running along one edge is the probable remnant of a cut for the extraction of the blank, as visible, more clearly, on specimen 1207.

Specimen 2851 (Figure 2e) is a distal fragment of a needle, sub-rectangular in section, with remnants of scraping marks removed by intense polishing exerted longitudinally and perpendicularly to the tool main axis (SOM Figure S6a). A groove running along one edge is the probable remnant of a cut for the extraction of the blank (see 1207 and 1829). The fact that the groove follows the curvature of the needle edge indicates that the cuts were, during the extraction of the blank, already delineating the object's final outline. The micro-flake scar damaging the tip is rounded, implying that the needle was used after the damage occurred (SOM Figure S6b).

Specimen 300 (Figure 2f) is a distal fragment of a needle, sub-rectangular in section, heavily damaged by root etching. Preserved areas bear traces of longitudinal scraping (SOM Figure S6c) and transversal polishing (SOM Figure S6d). The presence of use-wear on the tip cannot be

assessed due to root etching.

Specimen 3089 (Figure 2g) is a fragment of a needle, split longitudinally, which retain at one end a small portion of the perforation. The surface bears traces of longitudinal scraping overlaid by thin striations due to polishing, which perpendicularly cross the scraping marks. The perforation inner surface is covered by concentric striations produced by drilling with a rotating motion (SOM Figure S7a).

Specimen 1216 (Figure 3a) is a distal fragment, quadrangular in section, shaped by scraping and moderate polishing, only affecting the edges of the tool. The apex shows evidence of resharpening made by vigorously scraping both aspects of the object with a pointed tool and shaping the tip by grinding, which created small adjacent facets (SOM Figure S7b).

Specimen 3100 (Figure 3b) is the mesial-proximal fragment of a needle. The proximal portion of the object is sub-rectangular and its distal portion sub-circular in section. The latter is missing most of its original surface. The proximal portion displays on both sides the natural bone fibers slightly modified by scraping; the distal shows evidence of scraping and polishing. The perforation is biconical and was produced by rotating motions applied on both sides of the object.

Specimen 3098 (Figure 3c) is the mesial-distal part of a small needle with a circular section in the middle, which becomes flatter toward the apex. Longitudinal thin scraping marks are recorded all over the surface as well as microscopic striations due to polishing.

Specimen 3101 (Figure 3d) is the mesial portion of a needle, circular in section in its middle portion and flat close to the distal end. Scraping marks are observed all over the surface but are more intense on both flat surfaces; polishing is recorded all over the object (SOM Figure S7c).

### ***SI.3.2 Preforms and blanks***

Specimen 94 (SOM Figure S2a) is a bone splinter resulting from the fracture of a weathered limb bone. One end bears a flake scar that may have been produced by blows inflicted to detach the splinter. Transverse grinding marks produced by a coarse grindstone are detected on all aspects of the object. They affect nearly half of the cortical surface and one of the fractures. They also marginally modify the medullar surface and the other fracture (SOM Figure S7d). This pattern indicates that transversal grinding was applied to reduce the volume of the blank during the process leading to the production of the needle.

Specimen 327 (SOM Figure S2b) is a splinter of a weathered long bone split in half by a post-depositional longitudinal break. The periosteal surface and one fracture were vigorously ground on a coarse grindstone with a motion oblique to the object main axis (SOM Figure S8a).

Specimen 3102 (SOM Figure S2c) is a preform for the production of a small needle, circular

in section. It consists of a long and thin splinter extracted from a metapodial. Its cortical surface has been vigorously scraped, and bears a few grinding marks. Both ends feature elongated flake scars resulting from extracting the blank by tangential percussion exerted on a weathered bone.

Specimen 2868 (SOM Figure S2d) is a thin splinter from a weathered limb bone. The cortical surface bears some longitudinal scraping marks (SOM Figure S8b). No anthropogenic modifications are observed on the medullary surface and the fractures. Elongated flake scars at both ends may result from blows inflicted on the bone core to detach the splinter or to thin its ends after detachment.

Specimen 2865 (SOM Figure S2e) is a diaphysal fragment of a *Struzio* sp. long bone bearing weathered fractures. Longitudinal scraping marks running in the middle of the periosteal surface (SOM Figure S8c) suggest that the bone was scraped after being fractured. The size of the resulting preform is consistent with its use to shape a needle.

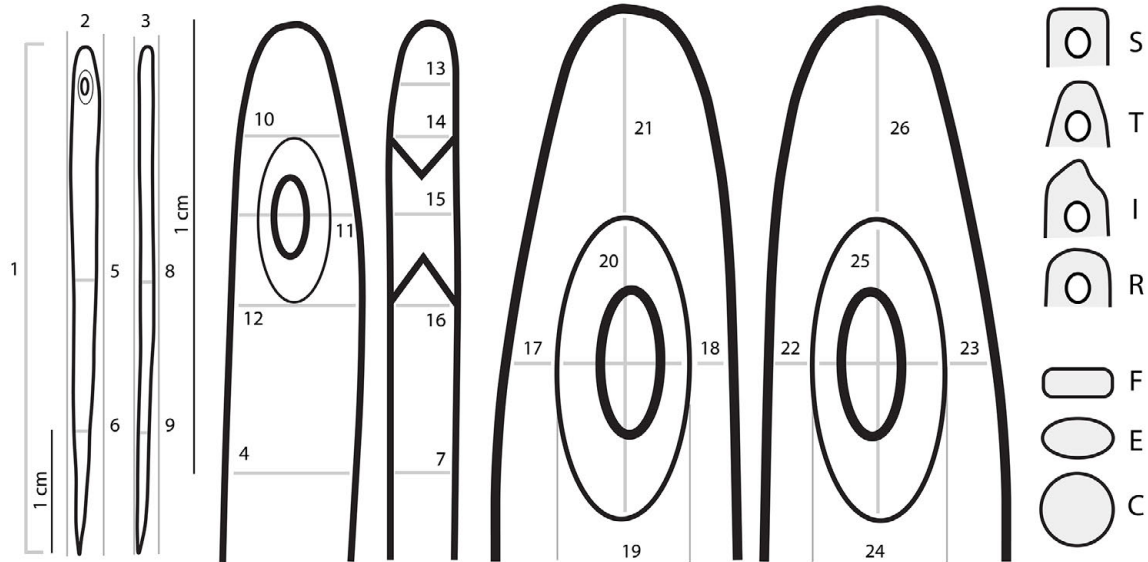
### **1.2.3 Blocks**

Specimens 3263 (SOM Figure S3a) and 3421 (SOM Figure S3b) are fragments of ribs, split in half. They belong to large herbivore, likely *Equus przewalskii*. The flatness and size of the fragments suggest they may come from the mesio-distal portion of ribs 7-12, less rounded than ribs 3-6. Although root etching has heavily damaged the cortical surface, transverse and oblique grinding marks remain visible (SOM Figure S9a). Grinding has been applied to remove the bone curvature. On the medullary surface, the trabecular bone is almost completely removed by intense grinding exerted perpendicularly to the rib axis (SOM Figure S9b).

Specimen 4003 (SOM Figure S3c) is a fragment of a rib from a large herbivore, likely *Equus przewalskii*, split in half. The edges display continuous microflake removals probably resulting from retouching to regularize their outlines (SOM Figure S9c). A few fine longitudinal scraping marks are observed on the periosteal aspect (SOM Figure S9d). On the opposite aspect, the trabecular bone is only slightly modified by grinding, applied obliquely to the rib main axis (SOM Figure S9e).

## SOM Figures

**SOM Figure S1**



**SOM Figure S1.** Morphometric and morphological variables recorded on needles. (1) Maximum length; (2) Maximum width; (3) Maximum thickness; (4) Width at 1 cm from the proximal end; (5) Width at the length midpoint; (6) Width at 1 cm from the distal end; (7) Thickness at 1 cm from the proximal end; (8) Thickness at the length midpoint; (9) Thickness at 1 cm from the distal end; (10) Width at the proximal margin of the perforation; (11) Width at the middle of the perforation; (12) Width at the distal margin of the perforation; (13) Thickness at the midpoint between the proximal margin of the perforation and the proximal end; (14) Thickness at the proximal margin of the perforation; (15) Width at the middle of the perforation; (16) Thickness at the distal margin of the perforation; (17) Distance between the left margin of the perforation and needle edge (first aspect); (18) Distance between the right margin of the perforation and needle edge (first aspect); (19) Width of the perforation (first aspect); (20) Length of the perforation (first aspect); (21) Distance between the proximal margin of the perforation and the needle edge (first aspect); (22) Distance between the left margin of the perforation and needle edge (second aspect); (23) Distance between the right margin of the perforation and needle edge (second aspect); (24) Width of the perforation (second aspect); (25) Length of the perforation (second aspect); (26) Distance between the proximal margin of the perforation and the needle edge (second aspect). Base morphology: (S) Squared; (T) Triangular; (I) Irregular; (R) Rounded. Cross-section: (F) Flat; (E) Elliptical; (C) Circular.



**SOM Figure S2**



**SOM Figure S2.** Needle preforms and blank found at SDG12. (a) Specimen SDG12-94; (b) Specimen SDG12-327; (c) Specimen SDG12-3102; (d) Specimen SDG12-2868; (e) Specimen SDG12-2865. Scale = 1 cm.

**SOM Figure S3**



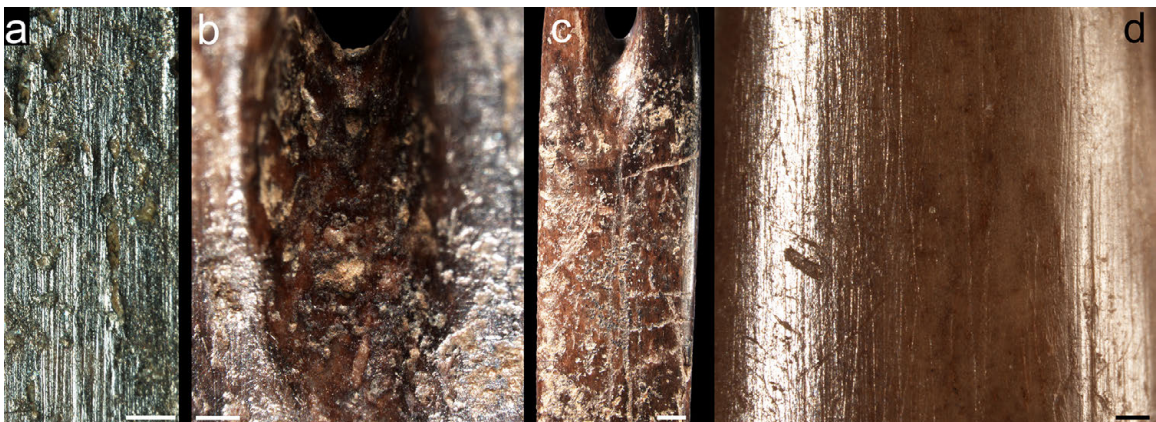
**SOM Figure S3.** Blocks found at SDG12. (a) Specimen SDG12-3263; (b) Specimen SDG12-3421; (c) Specimen SDG12-4003. Scale = 1 cm.

**SOM Figure S4**



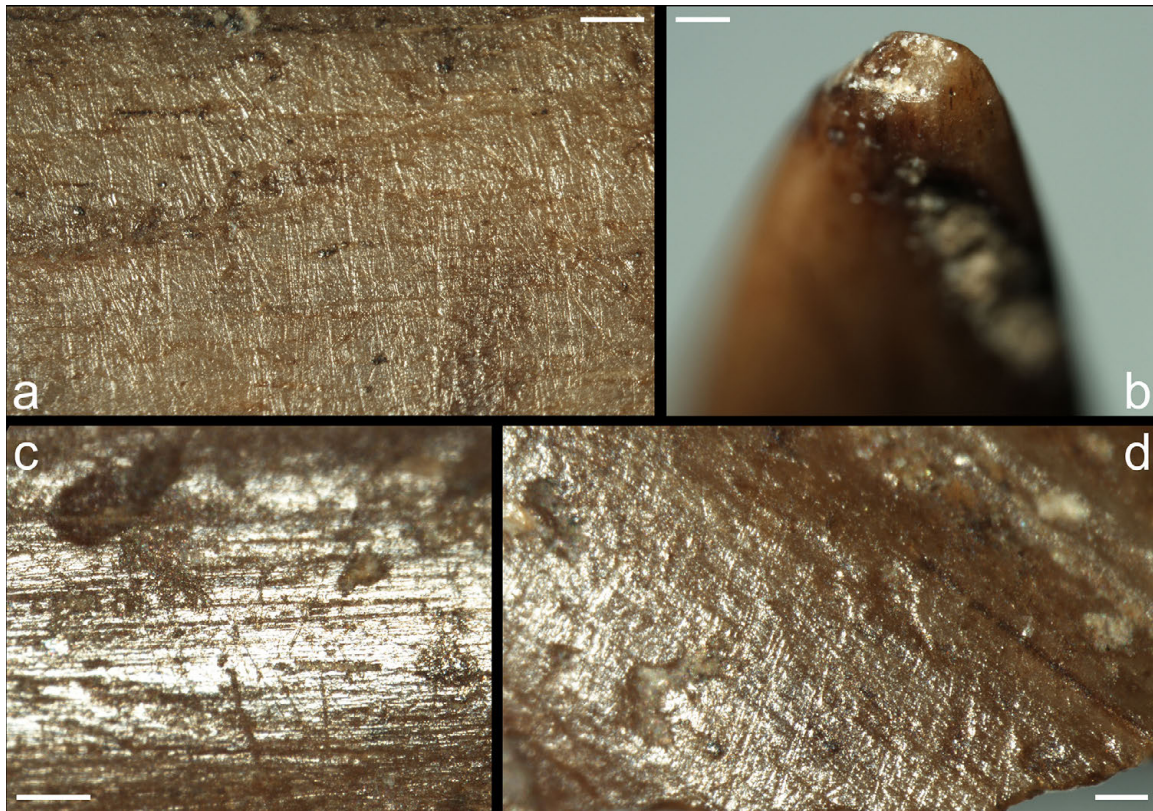
**SOM Figure S4.** Traces of manufacture and use on specimen SDG12-1207. Scales: (a-b) = 1 mm; (c-d) = 200  $\mu$ m.

**SOM Figure S5**



**SOM Figure S5.** Traces of manufacture and use on specimens (a-c) SDG12-133 and (d) SDG12-1829. Scales: (a) = 200  $\mu$ m; (b) = 250  $\mu$ m; (c) = 100  $\mu$ m; (d) = 250  $\mu$ m.

**SOM Figure S6**



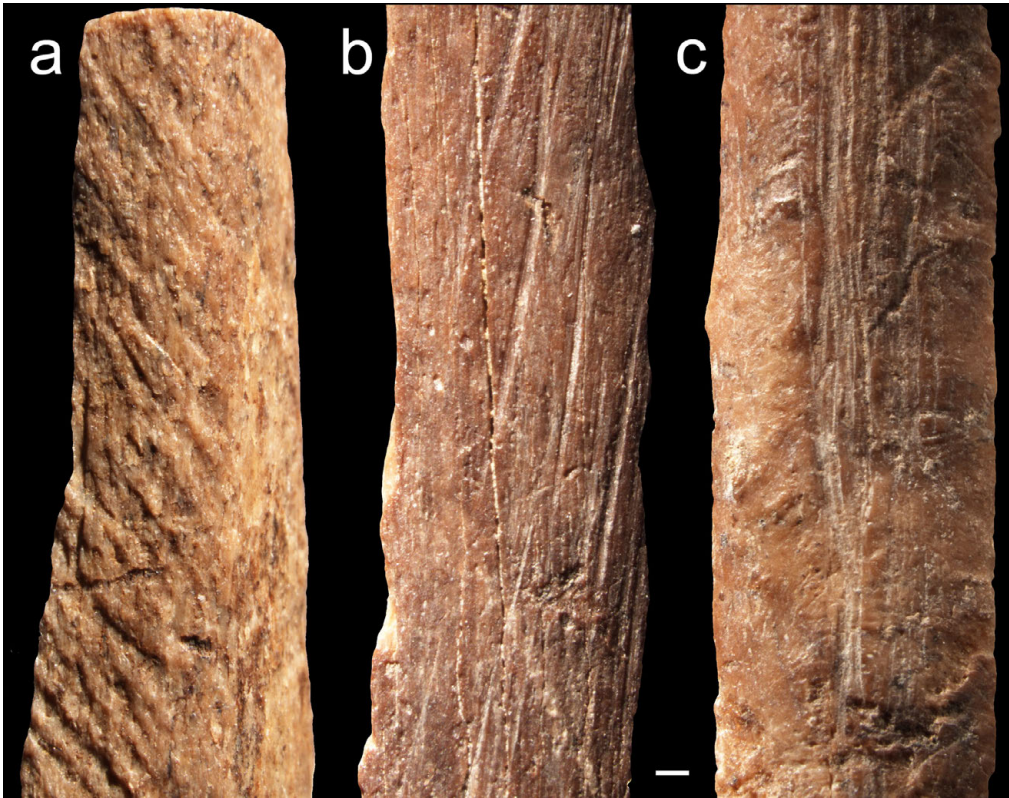
**SOM Figure S6.** Traces of manufacture and use on specimens (a-b) SDG12-2851 and (c-d) SDG12-300. Scales: (a-c) = 200  $\mu\text{m}$ ; (d) = 100  $\mu\text{m}$ .

**SOM Figure S7**



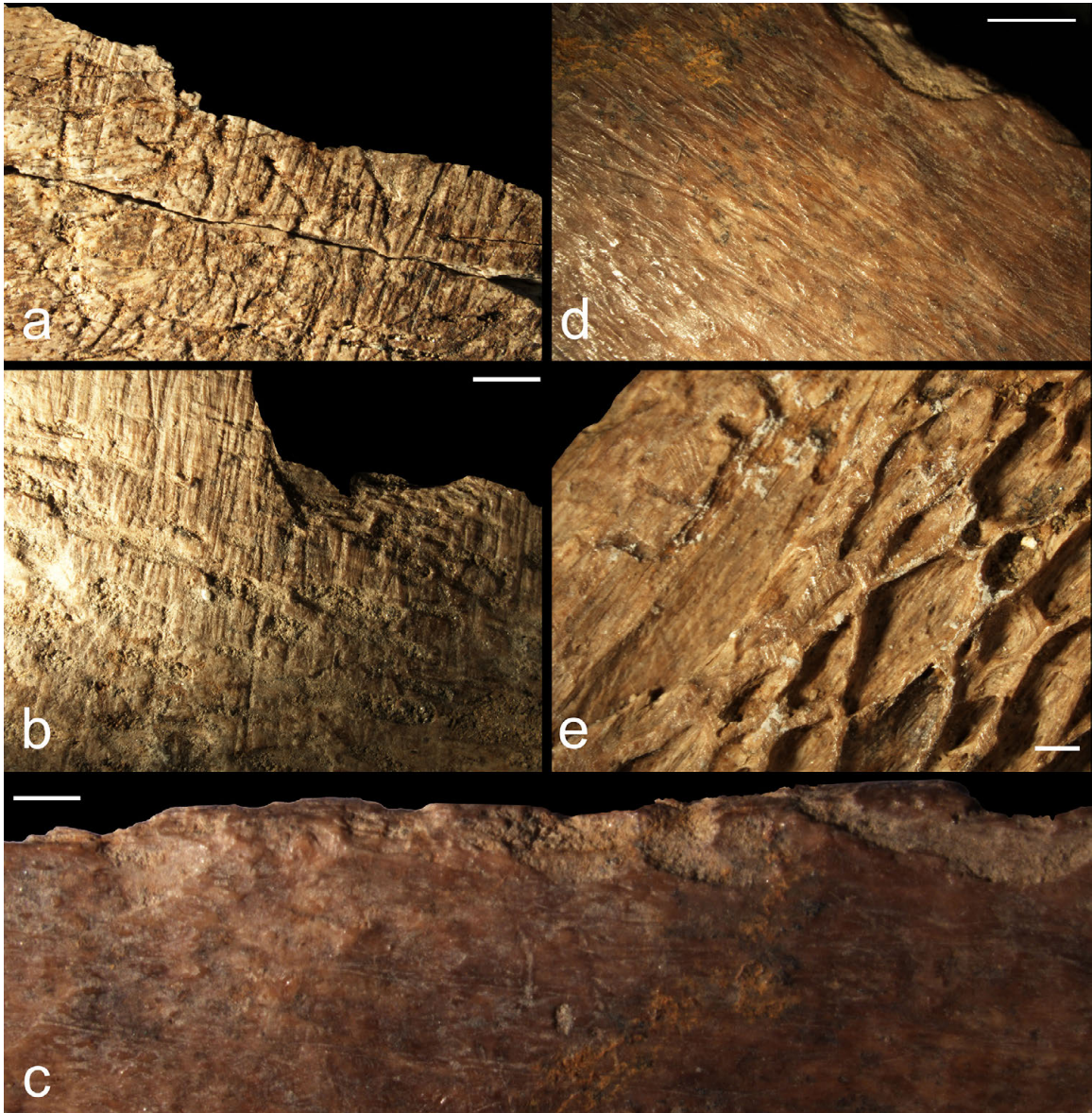
**SOM Figure S7.** Traces of manufacture and use on specimens (a) SDG12-3089, (b) SDG12-1216, (c) SDG12-3101, and (d) SDG12-94. Scales: (a) = 500  $\mu\text{m}$ ; (b) = 500  $\mu\text{m}$ ; (c) = 100  $\mu\text{m}$ ; (d) = 500  $\mu\text{m}$ .

**SOM Figure S8**



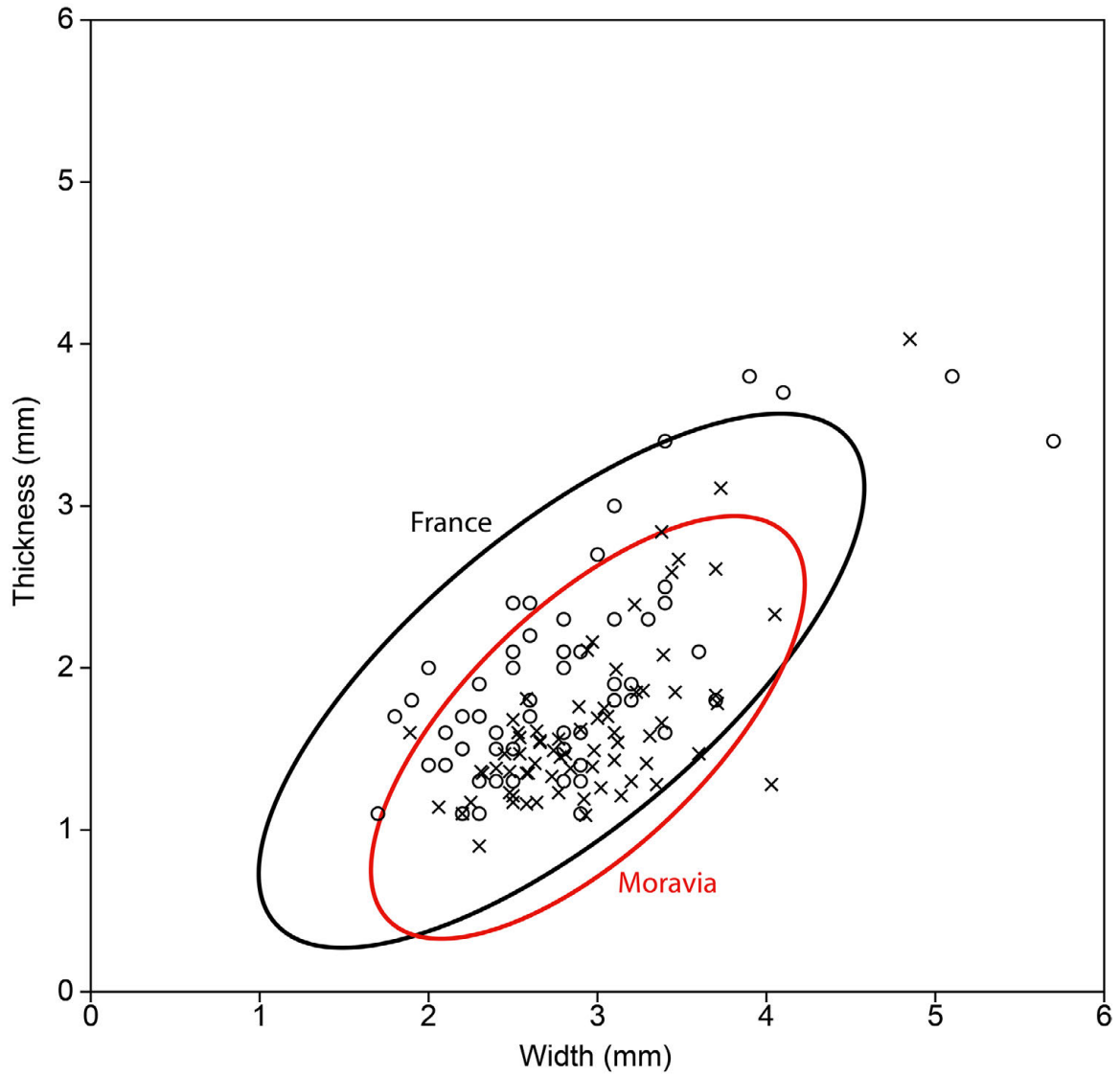
**SOM Figure S8.** Traces of manufacture on specimens (a) SDG12-327, (b) SDG12-2868, and (c) SDG12-2865. Scale = 500  $\mu\text{m}$ .

**SOM Figure S9**



**SOM Figure S9.** Traces of manufacture on specimens (a-b) SDG12-3263 and (c-e) SDG12-4003. Scales: (a-b) = 2 mm; (c) = 1 mm; (d) = 2 mm; (e) = 1 mm.

SOM Figure S10



SOM Figure S10. Width and thickness scatterplot for Magdalenian needles from France (black) and Moravia (red). Ellipse of confidence at 95%.



## **SOM Tables**

### **SOM Table S1**

**SOM Table S1.** Database of Late Pleistocene needles from the northern hemisphere

Site	Continent	Country or Region	Layer	Broad cultural attribution	Specific cultural attribution	N	Manuf. by-prod.*	Reference
Aghitu-3	Asia	ARM	AH IIIId	Upper Paleolithic	Upper Paleolithic	1		Kandel et al., 2017
Bailiandong	Asia	CN		Cores and flakes technology with ceramic	Cores and flakes technology with ceramic	1		Jia and Qui, 1960; Lotus Cave Science Museum, 1987
Liyuzui	Asia	CN	Lower	Cores and flakes technology with ceramic	Cores and flakes technology with ceramic	1		Liuzhou Museum and Guangxi Wenwu Gongzuodui, 1983; Jiang and Liu, 2004
Nanzhuangtuo	Asia	CN	5	Cores and flakes technology with ceramic	Cores and flakes technology with ceramic	2		Li et al., 2010
Shizitan Locality 29	Asia	CN	7	Microblade technology	Microblade technology	1		Li, 2013; Song et al., 2016
Shizitan Locality 9	Asia	CN	4	Microblade technology	Microblade technology	2		Li, 2013
Shuidonggou Locality 12	Asia	CN	11	Microblade technology	Microblade technology	11		Gao et al., 2013; Zhang et al., 2016; this study
Shuidonggou Locality 2	Asia	CN	2	Cores and flakes technology	Cores and flakes technology	1		Gao et al., 2013
Xiaogushan	Asia	CN	3	Cores and flakes technology	Cores and flakes technology	3	Yes	Huang et al., 1986; this study
Zengpiyan	Asia	CN	1 & 2	Cores and flakes technology with ceramic	Cores and flakes technology with ceramic	2		Chinese Academy of Social Sciences Institute of Archaeology, 2003
Zhoukoudian Upper Cave	Asia	CN	1	Cores and flakes technology	Cores and flakes technology	1		Pei , 1939; this study
Afontova Gora II	Asia	SIB		Upper Paleolithic	Afontova culture	>1		Vasil'ev, 1992
Afontova Gora II	Asia	SIB	Kr 0	Upper Paleolithic	Afontova culture	1		Slavinskij et al., 2014
Afontova Gora II	Asia	SIB	Kr 2.1	Upper Paleolithic	Afontova culture	7		Slavinskij et al., 2014
Afontova Gora II	Asia	SIB	Kr 3.1	Upper Paleolithic	Afontova culture	2		Slavinskij et al., 2014
Afontova Gora II	Asia	SIB	Kr 3	Upper Paleolithic	Afontova culture	2		Slavinskij et al., 2014
Afontova Gora II	Asia	SIB	Kr 7	Upper Paleolithic	Afontova culture	1		Slavinskij et al., 2014
Afontova Gora II	Asia	SIB	1 to 12	Upper Paleolithic	Afontova culture	+		Drozdov and Artem'ev, 2007
Afontova Gora II	Asia	SIB	3B	Upper Paleolithic	Afontova culture	2		Drozdov and Artem'ev, 2007
Afontova Gora III	Asia	SIB		Upper Paleolithic	Afontova culture	+		Vasil'ev, 1992
Birusa I	Asia	SIB	B	Epipaleolithic	Afontova culture	+		Vasil'ev, 1992
Bolshaya Slizneva	Asia	SIB		Upper Paleolithic	Afontova culture	+		Vasil'ev, 1992
Bolshoi Yakor	Asia	SIB	4B	Upper Paleolithic	Upper Paleolithic	+		Buvit and Terry, 2011

Site	Continent	Country or Region	Layer	Broad cultural attribution	Specific cultural attribution	N	Manuf. by-prod.*	Reference
Denisova Cave	Asia	SIB	11.2 (Main Chamber)	Early Upper Paleolithic	Early Upper Paleolithic	1		Derenvianko et al., 2016
Denisova Cave	Asia	SIB	11 (Main Chamber)	Early Upper Paleolithic	Early Upper Paleolithic	6	Yes	Derevianko and Shunkov, 2004, 2009; Derevianko, 2010; Vasil'ev, 2011; Derevianko et al., 2014, 2016
Denisova Cave	Asia	SIB	9 (Main Chamber)	Upper Paleolithic	Upper Paleolithic	+		Pitulko et al., 2012; Derevianko et al., 2003; Derevianko et al., 2014
Denisova Cave	Asia	SIB	6 (Main Chamber)	Upper Paleolithic	Upper Paleolithic	+		Pitulko et al., 2012; Derevianko et al., 2003; Derevianko et al., 2014
Denisova Cave	Asia	SIB	11 (Eastern Gallery)	Early Upper Paleolithic	Early Upper Paleolithic	1		Derenvianko et al., 2016
Denisova (Entrance)	Asia	SIB	3, 5-7 (Entrance)	Early Upper Paleolithic	Early Upper Paleolithic	5		Derenvianko et al., 2016
Dvuglaska	Asia	SIB	Upper	Upper Paleolithic	Upper Paleolithic	1		Turner, 2013
Dzudzuana	Asia	SIB	C	Upper Paleolithic	Upper Paleolithic	1		Bar-Yosef et al., 2011
Igeteiskiy Log 1	Asia	SIB		Upper Paleolithic	Upper Paleolithic	1		Medvedev, 1998; Kuzmin, 2008
Igey Ravine I	Asia	SIB		Upper Paleolithic	Early Upper Paleolithic	+		Larichev, 1990
Kaminnaia Cave	Asia	SIB	lia	Epipaleolithic	Epipaleolithic	+		Vasil'ev, 2011
Kantegir	Asia	SIB	1-5	Upper Paleolithic	Afontova culture	+		Vasil'ev, 1992
Khayrgas Cave	Asia	SIB	7	Upper Paleolithic	Upper Paleolithic	+		Kuzmin, 2008; Kuzmin et al., 2017
Khayrgas Cave	Asia	SIB	6	Upper Paleolithic	Upper Paleolithic	15		Kuzmin et al., 2017
Kokorevo I	Asia	SIB	2-3	Epipaleolithic	Kokorevo culture	+		Vasil'ev, 1992
Kokorevo II	Asia	SIB		Epipaleolithic	Afontova culture	+		Vasil'ev, 1992
Kokorevo III	Asia	SIB		Upper Paleolithic	Upper Paleolithic	+		Vasil'ev, 1992
Kokorevo IVA	Asia	SIB	3-5	Upper Paleolithic	Afontova culture	+		Vasil'ev, 1992
Krasnii Yar	Asia	SIB		Upper Paleolithic	Upper Paleolithic	+		Delporte, 1965
Maina	Asia	SIB	2-9	Upper Paleolithic	Afontova culture	+		Vasilev, 1992
Mal'ta	Asia	SIB		Upper Paleolithic	Malta-Buret culture	28		Golomstok, 1933; Mongait, 1959 (cited in Stordeur-Yedid, 1979); Kuzmin, 2008; Prieto and Cardenas, 2010
Nizhnii Idzhir I	Asia	SIB	Single occupation	Upper Paleolithic	Kokorevo culture	1		Vasil'ev, 1992
Novoselovo VI	Asia	SIB		Upper Paleolithic	Upper Paleolithic	>2		Vasil'ev, 1992; Kuzmin, 2008

Site	Continent	Country or Region	Layer	Broad cultural attribution	Specific cultural attribution	N	Manuf. by-prod.*	Reference
Oshurkova	Asia	SIB	3B	Epipaleolithic	Epipaleolithic	1		Buvit and Terry, 2011
Oshurkova	Asia	Sib	6	Upper Paleolithic	Upper Paleolithic	+		Straus et al., 1996
Shestakovo	Asia	SIB	5	Upper Paleolithic	Upper Paleolithic	11		Kuzmin, 2008
Strashnaya Cave	Asia	SIB	3.3	Upper Paleolithic	Early Upper Paleolithic	1		Shalagina et al., 2018
Strashnaya Cave	Asia	SIB	3.1a	Upper Paleolithic	Upper Paleolithic	1		Shalagina et al., 2018
Studenoe II	Asia	SIB	4-5	Upper Paleolithic	Upper Paleolithic	4		Goebel et al., 2000; Buvit et al., 2003; Kuzmin, 2008
Tashtyik I	Asia	SIB		Epipaleolithic	Afontova culture	+		Vasil'ev, 1992
Tashtyik II	Asia	SIB		Epipaleolithic	Afontova culture	+		Vasil'ev, 1992
Ui 2	Asia	SIB		Epipaleolithic	Afontova culture	>3		Vasil'ev, 1993
Ust'-Kova	Asia	SIB	Middle Complex	Upper Paleolithic	Upper Paleolithic	+		Kuzmin, 2008
Ust-Kyachta 17	Asia	SIB	1	Epipaleolithic	Epipaleolithic	7		Pavlenok, 2014
Ust-Menza 1	Asia	SIB	12	Upper Paleolithic	Upper Paleolithic	5		Buvit and Terry, 2011
Verkhne-Troitskaya	Asia	SIB	3	Upper Paleolithic	Upper Paleolithic	1		Kuzmin, 2008
Yana RHS	Asia	SIB	7.5	Upper Paleolithic	Upper Paleolithic	4		Pitulko et al., 2012
Güdenus	Central Europe	AUS		Magdalenian	Upper/Final Magdalenian	+		Obermaier and Breuil, 1908, 1909 (cited in Stordeur-Yedid, 1979)
Goyet	Western Europe	BEL		Magdalenian	Upper Magdalenian	+	Yes	Dupont, 1872; Saccasyn della Santa, 1942 (cited in Stordeur-Yedid, 1979)
Grotte du Coléoptère	Western Europe	BEL	B (and 8b)	Magdalenian	Final Magdalenian with Ahrensbourgian attributes	8		Hamal-Nandrin and Servais, 1929; Dewez, 1975 (cited in Stordeur-Yedid, 1979)
Grotte Verlaine	Western Europe	BEL		Magdalenian	Final Magdalenian with Ahrensbourgian attributes	+	Yes	Stordeur-Yedid, 1979
Spy	Western Europe	BEL		Magdalenian	Upper Magdalenian	1		Stordeur-Yedid, 1979
Trou de Chaleux	Western Europe	BEL		Magdalenian	Upper Magdalenian	>30	Yes	Dupont, 1872; Saccasyn della Santa, 1942 (cited in Stordeur-Yedid, 1979)
Trou du Frontal	Western Europe	BEL		Magdalenian	Final Magdalenian	9	Yes	Dupont, 1872; Saccasyn della Santa, 1942 (cited in Stordeur-Yedid, 1979)
Byci Skaia	Central Europe	CZE		Magdalenian	Final Magdalenian	5		Stordeur-Yedid, 1979; Lázaničková-Galetová, 2010; this study
Grotte Verunčina	Central Europe	CZE		Magdalenian	Magdalenian	2		Lázaničková-Galetová, 2010

Site	Continent	Country or Region	Layer	Broad cultural attribution	Specific cultural attribution	N	Manuf. by-prod.*	Reference
Pékarma	Central Europe	CZE		Magdalenian	Final Magdalenian	121	Yes	Schirmausen, 1925; Delporte, 1959 (cited in Stordeur-Yedid, 1979); Láznickova-Galetová, 2010; Bignon-Lau and Láznickova-Galetová, 2016; this study
Křížová	Central Europe	CZE		Magdalenian	Final Magdalenian	1		Stordeur-Yedid, 1979; Láznickova-Galetová, 2010
Kůlna	Central Europe	CZE		Magdalenian	Final Magdalenian	3		Skutil, 1938-39 (cited in Stordeur-Yedid, 1979); Láznickova-Galetová, 2010
Predmostí	Central Europe	CZE		Upper Paleolithic	Upper Paleolithic	1		Soffer, 2000; Kuzmin, 2008
Žitného jeskyně	Central Europe	CZE		Magdalenian	Final Magdalenian	9		Stordeur-Yedid, 1979; Láznickova-Galetová, 2010
Abrigo de Las Forcas	Southern Europe	ES	14	Magdalenian	Middle or Upper Magdalenian	3		Utrilla and Mazo, 1991; Tejero Cáceres, 2004
Aitzbitarte IV	Southern Europe	ES	III (or i, j, k)	Magdalenian	Upper Magdalenian	+		Barandiaran, 1962, 1963, 1964, 1965, 1967 (cited in Stordeur-Yedid, 1979)
Aitzbitarte IV	Southern Europe	ES	II (or g, y, h)	Magdalenian	Final Magdalenian	+		Barandiaran, 1962, 1963, 1964, 1965, 1967 (cited in Stordeur-Yedid, 1979)
Allamira	Southern Europe	ES		Magdalenian	Middle Magdalenian	+		Barandiaran, 1967 (cited in Stordeur-Yedid, 1979)
Balmori	Southern Europe	ES		Magdalenian	Final Magdalenian	+		Vega de la Sella, 1930 (cited in Stordeur-Yedid, 1979)
Bora Gran	Southern Europe	ES		Magdalenian	Upper Magdalenian	20		Corominas, 1943; Cazarro sd. (cited in Stordeur-Yedid, 1979); Tejero Cáceres, 2004
Cova de Les Cendres	Southern Europe	ES	IX to XII	Magdalenian	Upper/Final Magdalenian	9	Yes	Borao Álvarez, 2012
Cueto de la Miña	Southern Europe	ES	E	Solutrean	Upper Solutrean	+		Vega de la Sella, 1916 (cited in Stordeur-Yedid, 1979)
Cueto de la Miña	Southern Europe	ES	B	Magdalenian	Upper Magdalenian	+		Vega de la Sella, 1916 (cited in Stordeur-Yedid, 1979)
Cueva de Abauntz	Southern Europe	ES	D	Magdalenian	Upper Magdalenian	12		Utrilla Miranda, 1979; Tejero Cáceres, 2004
Cueva de Arlanpe	Southern Europe	ES	II	Solutrean	Upper Solutrean	1		Rios-Garaizar et al., 2013
Cueva de Chaves	Southern Europe	ES	2b	Magdalenian	Middle or Upper Magdalenian	7		Utrilla and Mazo, 1991; Tejero Cáceres, 2004
Cueva de El Cierro	Southern Europe	ES		Magdalenian	Early Magdalenian	+		Álvarez-Fernández et al., 2016
Cueva de Joyo	Southern Europe	ES	Trench 1, IV	Magdalenian	Magdalenian III	1		Janssens and Echeagaray, 1958 (cited in Stordeur-Yedid, 1979)
Cueva de Joyo	Southern Europe	ES	Trench 1, VI	Magdalenian	Magdalenian III	+		Janssens and Echeagaray, 1958 (cited in Stordeur-Yedid, 1979)
Cueva de Joyo	Southern Europe	ES	Trench 2, III-IV-V	Magdalenian	Magdalenian III	1		Janssens and Echeagaray, 1958 (cited in Stordeur-Yedid, 1979)
Cueva de Joyo	Southern Europe	ES	Trench 2, VI	Magdalenian	Magdalenian II or III	1		Janssens and Echeagaray, 1958 (cited in Stordeur-Yedid, 1979)
Cueva de la Güelga	Southern Europe	ES	Zona A - 3c	Magdalenian	Magdalenian	+		Menéndez and García, 1998

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Cueva de La Pila	Southern Europe	ES	IV-1	Magdalenian	Final Magdalenian	6		Gutiérrez, 1998
Cueva de La Pila	Southern Europe	ES	IV-2	Magdalenian	Final Magdalenian	5	Yes	Gutiérrez, 1998
Cueva de La Pila	Southern Europe	ES	IV-3	Magdalenian	Upper Magdalenian	+	Yes	Gutiérrez, 1998
Cueva de La Pila	Southern Europe	ES	IV-4	Magdalenian	Upper Magdalenian	+	Yes	Gutiérrez, 1998
Cueva de Las Caldas	Southern Europe	ES	Sala I	Solutrean	Upper Solutrean	1	Yes	Corchón Rodríguez and Garrido Pimentel, 2007
Cueva de Las Caldas	Southern Europe	ES	Sala II - IV	Magdalenian	Late Middle Magdalenian	>2	Yes	Corchón Rodríguez, 1992; Corchón Rodríguez and Garrido Pimentel, 2007
Cueva de Las Caldas	Southern Europe	ES	Sala II - V	Magdalenian	Late Middle Magdalenian	+	Yes	Corchón Rodríguez, 1992; Corchón Rodríguez and Garrido Pimentel, 2007
Cueva de Las Caldas	Southern Europe	ES	Sala II - VI	Magdalenian	Middle Magdalenian	>10	Yes	Corchón Rodríguez, 1992; Corchón Rodríguez and Garrido Pimentel, 2007
Cueva de Las Caldas	Southern Europe	ES	Sala II - VII	Magdalenian	Middle Magdalenian	>10	Yes	Corchón Rodríguez, 1992; Corchón Rodríguez and Garrido Pimentel, 2007
Cueva de Las Caldas	Southern Europe	ES	Sala II - VIII	Magdalenian	Middle Magdalenian	>10	Yes	Corchón Rodríguez, 1992; Corchón Rodríguez and Garrido Pimentel, 2007
Cueva de Las Caldas	Southern Europe	ES	Sala II - IX	Magdalenian	Middle Magdalenian	+	Yes	Corchón Rodríguez, 1992; Corchón Rodríguez and Garrido Pimentel, 2007
Cueva Oscura de Ania	Southern Europe	ES	3	Magdalenian	Upper Magdalenian	2	Yes	Adán Álvarez et al., 2002
Cueva Oscura de Ania	Southern Europe	ES	3a	Magdalenian	Upper Magdalenian	6	Yes	Adán Álvarez et al., 2002
Cueva Oscura de Ania	Southern Europe	ES	3b	Magdalenian	Upper Magdalenian	5	Yes	Adán Álvarez et al., 2002
El Parpalló	Southern Europe	ES		Solutrean	Solutrean	2		Péricot-García, 1952 (cited in Stordeur-Yedid, 1979)
El Parpalló	Southern Europe	ES		Badegoulian	Badegoulian	2		Péricot-García, 1942 (cited in Stordeur-Yedid, 1979)
El Parpalló	Southern Europe	ES		Magdalenian	Magdalenian III or IV	+		Péricot-García, 1942 (cited in Stordeur-Yedid, 1979)
El Pendo	Southern Europe	ES		Magdalenian	Upper Magdalenian	+	Yes	Carballo and Larin, 1933 (cited in Stordeur-Yedid, 1979)
Ermittia	Southern Europe	ES		Solutrean	Solutrean	1		Aranzadi and Barandiaran, 1928 (cited in Stordeur-Yedid, 1979)
Ermittia	Southern Europe	ES		Magdalenian	Upper Magdalenian	+		Aranzadi and Barandiaran, 1928 (cited in Stordeur-Yedid, 1979)
Grotte du Parco	Southern Europe	ES	II	Magdalenian	Upper and Final Magdalenian	11		Tejero Cáceres, 2004; Tejero Cáceres and Fullola i Pericot, 2008
Gruta Peñajorao	Southern Europe	ES	2	Magdalenian	Upper Magdalenian	1		Moure Romanillo, 1970
La Gama A	Southern Europe	ES	L3	Magdalenian	Middle Magdalenian	2		Arias Cabal et al., 2005

Site	Continent	Country or Region	Layer	Broad cultural attribution	Specific cultural attribution	N	Manuf. by-prod.*	Reference
La Peña de Estebanvela	Southern Europe	ES	I-II	Magdalenian	Final Magdalenian	7	Yes	Tejero et al., 2013
La Peña de Estebanvela	Southern Europe	ES	III	Magdalenian	Upper Magdalenian	2		Tejero et al., 2013
Riera	Southern Europe	ES		Solutrean	Upper Solutrean	+		Vega de la Sella, 1930 (cited in Stordeur-Yedid, 1979)
Santíamamine	Southern Europe	ES	VI	Magdalenian	Upper Magdalenian	1	Yes	Barandiaran, 1967 (cited in Stordeur-Yedid, 1979); Mujika, 1990
Uriaga	Southern Europe	ES	D	Magdalenian	Final Magdalenian	+		Barandiaran, 1948, 1967, sd. (cited in Stordeur-Yedid, 1979)
Uriaga	Southern Europe	ES	F	Magdalenian	Final Magdalenian	+		Barandiaran, 1948, 1967, sd. (cited in Stordeur-Yedid, 1979)
Valle	Southern Europe	ES		Magdalenian	Upper Magdalenian	+		Cheyrier and Echegary, 1964 (cited in Stordeur-Yedid, 1979)
Abri André Ragout	Western Europe	FR	C	Solutrean	Evolved Solutrean	1		Balout, 1958 (cited in Stordeur-Yedid, 1979)
Abri Casserole	Western Europe	FR		Badegoulian	Badegoulian	1		This study
Abri de La Métairie à Belcayre	Western Europe	FR		Magdalenian	Magdalenian III	+		Delage, 1949 (cited in Stordeur-Yedid, 1979)
Abri de Monifort	Western Europe	FR	2nd Hearth	Magdalenian	Final Magdalenian	+		Regnault, 1893 (cited in Stordeur-Yedid, 1979)
Abri du Château des Eyzies	Western Europe	FR	1	Magdalenian	Magdalenian V	+		Peyrony, 1946 (cited in Stordeur-Yedid, 1979)
Abri du Château des Eyzies	Western Europe	FR	2	Magdalenian	Magdalenian VI	+		Peyrony, 1946 (cited in Stordeur-Yedid, 1979)
Abri du Moulin-de-Laussel	Western Europe	FR		Magdalenian	Magdalenian V	+		Sonneville-Bordes, 1960 (cited in Stordeur-Yedid, 1979)
Abri du Rocher-de-la-Peine	Western Europe	FR		Magdalenian	Upper Magdalenian	+		Sonneville-Bordes, 1960 (cited in Stordeur-Yedid, 1979)
Abri Fritsch	Western Europe	FR		Badegoulian	Badegoulian	+		Allain, 1972, 1974 (cited in Stordeur-Yedid, 1979)
Abri Lachaud à Terrasson	Western Europe	FR		Solutrean	Upper/Final Solutrean	1		Cheyrier, 1965 (cited in Stordeur-Yedid, 1979)
Abri Mège	Western Europe	FR		Magdalenian	Magdalenian VI	14		Capitan et al., 1906 (cited in Stordeur-Yedid, 1979)
Abri Pagès au Ruth	Western Europe	FR	H	Solutrean	Upper Solutrean	1		Peyrony, 1909 (cited in Stordeur-Yedid, 1979)
Abri Reverdit	Western Europe	FR		Magdalenian	Magdalenian III	+		Delage, 1935 (cited in Stordeur-Yedid, 1979)
Abri sous-roche de la rivière de Tulle (Souillac)	Western Europe	FR		Magdalenian	Final Magdalenian	24		Viré, 1909 (cited in Stordeur-Yedid, 1979)
Angles-sur-l'Anglin	Western Europe	FR		Magdalenian	Magdalenian III	4		Rousseau, 1933 (cited in Stordeur-Yedid, 1979)
Arlay	Western Europe	FR		Magdalenian	Magdalenian IV	2		Viré, 1897 (cited in Stordeur-Yedid, 1979)

Site	Continent	Country or Region	Layer	Broad cultural attribution	Specific cultural attribution	N	Manuf. by-prod.*	Reference
Grotte Grappin (Arlay)	Western Europe	FR		Magdalenian	Middle Magdalenian	>6		Schroeder, 2000; Cupillard and Welte, 2006
Aurensan	Western Europe	FR	moyenne	Magdalenian	Upper and middle Magdalenian	10	Yes	Frossard, 1870 (cited in Stordeur-Yedid, 1979); DBA_MB
Badegoule	Western Europe	FR	S. IV - V	Solutrean	Upper Solutrean	2	Yes	Cheyrier, 1949 (cited in Stordeur-Yedid, 1979); Baumann, 2014; DBA_MB
Badegoule	Western Europe	FR	S. III	Solutrean	Middle Solutrean	4	Yes	Cheyrier, 1949 (cited in Stordeur-Yedid, 1979); Baumann, 2014; DBA_MB
Badegoule	Western Europe	FR	Ind.	Solutrean	Middle - Upper Solutrean	10	Yes	Cheyrier, 1949 (cited in Stordeur-Yedid, 1979); Baumann, 2014; DBA_MB
Badegoule	Western Europe	FR		Badegoulian	Badegoulian	3		Cheyrier, 1939; Peyrony, 1908 (cited in Stordeur-Yedid, 1979)
Bédeilhac	Western Europe	FR	E	Magdalenian	Magdalenian VI	+		Bégouen, 1920; Robert, 1943, 1949 (cited in Stordeur-Yedid, 1979)
Béraud	Western Europe	FR	Inf	Magdalenian	Final Magdalenian	6		Delporte, 1968; Chauvière, 2012
Bize	Western Europe	FR		Badegoulian	Badegoulian	1		Genson, 1932 (cited in Stordeur-Yedid, 1979)
Blot	Western Europe	FR	Chantier I	Magdalenian	Final Magdalenian	1		Delporte, 1968 (cited in Stordeur-Yedid, 1979)
Cap Blanc	Western Europe	FR		Magdalenian	Magdalenian III	+		Sonneville-Bordes, 1960 (cited in Stordeur-Yedid, 1979)
Combe Saunière I	Western Europe	FR	Ivb - Ivc	Solutrean	Upper Solutrean	10	Yes	Geneste and Plisson, 1986; DBA_MB; this study
Cottier	Western Europe	FR		Badegoulian	Badegoulian	1		Bouchud, 1953 (cited in Stordeur-Yedid, 1979)
Cottier 1	Western Europe	FR		Magdalenian	Middle or Upper Magdalenian	3		Virmont, 1972; Virmont and Virmont, 1973; Chauvière, 2012
Cottier 2	Western Europe	FR		Magdalenian	Early Magdalenian	2		Philibert, 1982; Virmont, 1972; Chauvière, 2012
Cottier D.1	Western Europe	FR		Magdalenian	Middle or Upper Magdalenian	1		Philibert, 1982; Chauvière, 2012
Crozo de Gentillo (Combe Cullier)	Western Europe	FR		Magdalenian	Middle Magdalenian	+		Viré, 1908 (cited in Stordeur-Yedid, 1979)
Cuzoul-de-Vers	Western Europe	FR	8 to 12	Badegoulian	Badegoulian	>30		Castel et al., 2007; Ducasse et al., 2012
Durif	Western Europe	FR		Magdalenian	Upper Magdalenian	>3		Canque et al., 1929; Perreau, 1943; Delporte, 1970; Chauvière, 2012
Enval II Vic-le-Comte	Western Europe	FR		Magdalenian	Upper and Final Magdalenian	>2		Surmely et al., 1997; Chauvière, 2012
Fontalès ou Cuzoul-des-Blondes	Western Europe	FR		Magdalenian	Magdalenian IV, V, VI	250		Darasse, 1936 (cited in Stordeur-Yedid, 1979)
Fontarnaud	Western Europe	FR		Magdalenian	Magdalenian V and VI	+		Labrié, 1928 (cited in Stordeur-Yedid, 1979)
Gandil	Western Europe	FR		Magdalenian	Middle Magdalenian	3		Pajot, 1970 (cited in Stordeur-Yedid, 1979)



Site	Continent	Country or Region	Layer	Broad cultural attribution	Specific cultural attribution	N	Manuf. by-prod.*	Reference
Gourdan	Western Europe	FR		Magdalenian	Magdalenian IV	+		Piette, 1871, 1873, 1875; Delporte, 1965 (cited in Stordeur-Yedid, 1979)
Gourdan	Western Europe	FR		Magdalenian	Final Magdalenian	42		Sonneville-Bordes, 1960 (cited in Stordeur-Yedid, 1979)
Grotte de Conduché	Western Europe	FR		Magdalenian	Magdalenian V and Via	+		Lorblanchet, 1969 (cited in Stordeur-Yedid, 1979)
Grotte de Coual	Western Europe	FR		Magdalenian	Magdalenian IV or IV	+		Lorblanchet, 1972 (cited in Stordeur-Yedid, 1979)
Grotte de Courbel/Trou des Forges/Caverne de Bruniquet	Western Europe	FR		Magdalenian	Middle or Upper Magdalenian	+		Pajot, 1970 (cited in Stordeur-Yedid, 1979)
Grotte de Couze : Lalinde	Western Europe	FR	0,1-0,2 m	Magdalenian	Magdalenian VI	1		Fitte and Sonneville-Bordes, 1962 (cited in Stordeur-Yedid, 1979)
Grotte de l'Adaouste	Western Europe	FR	17	Magdalenian	Magdalenian V	+		Escalou de Fonton, 1952a, 1952b, 1966 (cited in Stordeur-Yedid, 1979)
Grotte de l'Ammonite	Western Europe	FR		Magdalenian	Final Magdalenian	8		Ragout, 1934 (cited in Stordeur-Yedid, 1979)
Grotte de La Bergerie (Ganias)	Western Europe	FR		Magdalenian	Final Magdalenian with Azilian attributes	+		Stordeur-Yedid, 1979
Grotte de la Gare de Conduché	Western Europe	FR		Magdalenian	Upper Magdalenian	+		Lorblanchet, 1969 (cited in Stordeur-Yedid, 1979)
Grotte de La Mairie	Western Europe	FR	inf	Magdalenian	Magdalenian VI	3		Stordeur-Yedid, 1979
Grotte de Montastruc	Western Europe	FR	IV	Magdalenian	Magdalenian V and VI	+		Pajot, 1970 (cited in Stordeur-Yedid, 1979)
Grotte de Veyrier	Western Europe	FR		Magdalenian	Upper Magdalenian	12		Reber, 1908; Pittard and Reverdin, 1929 (cited in Stordeur-Yedid, 1979)
Grotte des Bœufs (Lespugue)	Western Europe	FR		Magdalenian	Magdalenian III or IV	1		Saint-Périer, 1912 (cited in Stordeur-Yedid, 1979)
Grotte des Espéludues (Lourdes)	Western Europe	FR		Magdalenian	Magdalenian IV	2		Edwards, 1862 (cited in Stordeur-Yedid, 1979)
Grotte des Fées	Western Europe	FR		Magdalenian	Magdalenian	+	Yes	Daleau, 1875 (cited in Stordeur-Yedid, 1979)
Grotte des Harpons (Cabrerets)	Western Europe	FR		Magdalenian	Final Magdalenian with Azilian attributes	1		Lorblanchet, 1969 (cited in Stordeur-Yedid, 1979)
Grotte des Harpons (Lespugue)	Western Europe	FR	B	Magdalenian	Magdalenian III or IV	+		Saint-Périer, 1920 (cited in Stordeur-Yedid, 1979)
Grotte des Harpons (Lespugue)	Western Europe	FR	A	Magdalenian	Final Magdalenian with Azilian attributes	+		Saint-Périer, 1920 (cited in Stordeur-Yedid, 1979)
Grotte des Harpons (Lespugue)	Western Europe	FR	D	Solutrean	Upper Solutrean	6		San Juan-Foucher, 2005
Grotte des Hôteaux	Western Europe	FR	6th Hearth	Magdalenian	Magdalenian	1		Tournier, 1924 (cited in Stordeur-Yedid, 1979)
Grotte des Hôteaux	Western Europe	FR	4th & 5th Hearth	Magdalenian	Magdalenian	6	Yes	Tournier, 1924 (cited in Stordeur-Yedid, 1979)
Grotte des Scilles (Lespugue)	Western Europe	FR	B	Magdalenian	Magdalenian III or IV	9	Yes	Saint-Périer, 1926 (cited in Stordeur-Yedid, 1979); Pétilion et al., 2008

Site	Continent	Country or Region	Layer	Broad cultural attribution	Specific cultural attribution	N	Manuf. by-prod.*	Reference
Grotte du Bois-Ragot	Western Europe	FR	5b	Magdalenian	Final Magdalenian	+		Chollet et al., 1974 (cited in Stordeur-Yedid, 1979); Célérier et al., 1997
Grotte du Bois-Ragot	Western Europe	FR	6	Magdalenian	Final Magdalenian	+		Chollet et al., 1974 (cited in Stordeur-Yedid, 1979)
Grotte du Bois-Ragot	Western Europe	FR	3	Azilian	Late Azilian	1		Chollet et al., 1974 (cited in Stordeur-Yedid, 1979); Célérier et al., 1997; Seddas, 2012
Grotte du Bourrouilla	Western Europe	FR	B	Magdalenian	Upper and Final Magdalenian	3		Bonnissent and Chauvière, 1999
Grotte du Bourrouilla	Western Europe	FR	C	Magdalenian	Upper Magdalenian or IV	1		Bonnissent and Chauvière, 1999
Grotte du Bourrouilla	Western Europe	FR	Backdirt	Magdalenian	Upper Magdalenian or IV	95	Yes	Bonnissent and Chauvière, 1999
Grotte du Colombier	Western Europe	FR		Magdalenian	Final Magdalenian	5		Bayle des Hermens, 1973 (cited in Stordeur-Yedid, 1979)
Grotte du Pis-de-la-Vache (Souillac)	Western Europe	FR		Magdalenian	Final Magdalenian with Azilian attributes	3		Bouyssonie and Couchard, 1955 (cited in Stordeur-Yedid, 1979)
Grotte du Roussignol	Western Europe	FR		Magdalenian	Middle or Upper Magdalenian	+		Boule et Cartailhac, 1889 (cited in Stordeur-Yedid, 1979)
Grotte Gouëris (Lespugue)	Western Europe	FR		Magdalenian	Magdalenian III or IV	+		Saint-Périer, 1927 (cited in Stordeur-Yedid, 1979)
Grotte Gouëris (Lespugue)	Western Europe	FR	B	Magdalenian	Final Magdalenian with Azilian attributes	+		Saint-Périer, 1927 (cited in Stordeur-Yedid, 1979)
Isturitz	Western Europe	FR	Passemard: E	Magdalenian	Magdalenian	+		Passemard, 1922 (cited in Stordeur-Yedid, 1979)
Isturitz	Western Europe	FR	St-Périer: E	Magdalenian	Magdalenian	4		Saint-Périer, 1930, 1936, 1950 (cited in Stordeur-Yedid, 1979)
Isturitz	Western Europe	FR		Magdalenian	Magdalenian III, IV or V	+		Saint-Périer, 1930 (cited in Stordeur-Yedid, 1979)
Isturitz	Western Europe	FR	Grande salle, niv. I	Magdalenian	Magdalenian V and VI	20	Yes	Saint-Périer, 1930, 1936 (cited in Stordeur-Yedid, 1979)
Izeste	Western Europe	FR		Magdalenian	Magdalenian	1		Roseville-des-Grottes, 1908 (cited in Stordeur-Yedid, 1979)
Jamblancs	Western Europe	FR		Badegoulian	Badegoulian	+		Taborin, 2007
Jardek II	Western Europe	FR	inf	Magdalenian	Magdalenian VI	+		Sonneville-Bordes, 1960 (cited in Stordeur-Yedid, 1979)
Jolivet	Western Europe	FR	C	Magdalenian	Final Magdalenian	+		Sonneville-Bordes, 1960 (cited in Stordeur-Yedid, 1979)
Jolivet	Western Europe	FR	C'	Magdalenian	Final Magdalenian	+		Sonneville-Bordes, 1960 (cited in Stordeur-Yedid, 1979)
Jurias	Western Europe	FR		Magdalenian	Middle or Upper Magdalenian	+		Couste, 1951 (cited in Stordeur-Yedid, 1979)
L'abri de Cambou (Bouzies)	Western Europe	FR		Magdalenian	Middle Magdalenian or VI	+		Lorblanchet, 1969 (cited in Stordeur-Yedid, 1979)
L'abri Murat (Rocamadour)	Western Europe	FR	F	Magdalenian	Magdalenian Via	12		Lemozi, 1924 (cited in Stordeur-Yedid, 1979)

Site	Continent	Country or Region	Layer	Broad cultural attribution	Specific cultural attribution	N	Manuf. by-prod.*	Reference
L'abri Murat (Rocamadour)	Western Europe	FR	E	Magdalenian	Magdalenian Via	3		Lemozi, 1924 (cited in Stordeur-Yedid, 1979)
La Chaire-à-Calvin	Western Europe	FR		Magdalenian	Upper/Final Magdalenian	+		Trémeau de Rochebrune, 1865; Bouvier, 1971 (cited in Stordeur-Yedid, 1979)
La Faurélie	Western Europe	FR		Magdalenian	Magdalenian V	+		Stordeur-Yedid, 1979
La Garenne	Western Europe	FR	1,2,4	Magdalenian	Magdalenian IV	+		Breuil, 1902; Allain, 1961 (cited in Stordeur-Yedid, 1979)
La Grotte Bâtie [Crozo Bastido]	Western Europe	FR		Magdalenian	Final Magdalenian	6		Viré, 1927 (cited in Stordeur-Yedid, 1979)
La Madeleine	Western Europe	FR		Magdalenian	Magdalenian IV	+	Yes	Peyrony, 1928 (cited in Stordeur-Yedid, 1979); this study
La Madeleine	Western Europe	FR	moyenne B	Magdalenian	Magdalenian V	+		Capitan and Peyrony, 1928 (cited in Stordeur-Yedid, 1979); this study
La Madeleine	Western Europe	FR	supérieure	Magdalenian	Magdalenian VI	+		Capitan and Peyrony, 1928 (cited in Stordeur-Yedid, 1979); this study
La Madeleine	Western Europe	FR	supérieure	Magdalenian	Magdalenian IV to VI	>213	Yes	Vanhaeren and d'Errico, 2001; Treuil, 2012; this study
La Marche	Western Europe	FR		Magdalenian	Magdalenian III	6		Lwoff and Péricard, 1940 (cited in Stordeur-Yedid, 1979)
La Roque	Western Europe	FR	2nd	Magdalenian	Magdalenian V	+		Cazedessus, 1928; Trombe and Dubuc, 1936 (cited in Stordeur-Yedid, 1979)
La Souquette	Western Europe	FR		Magdalenian	Middle Magdalenian	+		Sonneville-Bordes, 1960 (cited in Stordeur-Yedid, 1979)
La Vache	Western Europe	FR		Magdalenian	Magdalenian V and VI	+		Garrigou, 1867 (cited in Stordeur-Yedid, 1979)
Labouiche	Western Europe	FR		Magdalenian	Magdalenian IV	+		Méroc, 1959 (cited in Stordeur-Yedid, 1979)
Lacave	Western Europe	FR	3	Solutrean	Solutrean	31		Viré, 1904b, 1904c (cited in Stordeur-Yedid, 1979)
Lachaud	Western Europe	FR	B	Badegoulian	Badegoulian	3		Cheyrier, 1953, 1965 (cited in Stordeur-Yedid, 1979)
Lachaud	Western Europe	FR	C2-3	Badegoulian	Badegoulian	9		Cheyrier, 1953, 1965 (cited in Stordeur-Yedid, 1979)
Lachaud	Western Europe	FR	C2	Badegoulian	Badegoulian	10		Cheyrier, 1953, 1965 (cited in Stordeur-Yedid, 1979)
Lachaud	Western Europe	FR	C1	Badegoulian	Badegoulian	+		Cheyrier, 1953, 1965 (cited in Stordeur-Yedid, 1979)
Lafaye	Western Europe	FR		Magdalenian	Middle Magdalenian	+		Brun, 1865 (cited in Stordeur-Yedid, 1979)
Langueroche	Western Europe	FR		Magdalenian	Middle Magdalenian	+		Peyrony, 1934 (cited in Stordeur-Yedid, 1979)
Lartet	Western Europe	FR		Magdalenian	Magdalenian IV	+		Piette, 1874 (cited in Stordeur-Yedid, 1979)
Laugerie-Basse	Western Europe	FR		Magdalenian	Middle Magdalenian	>2	Yes	Sonneville-Bordes, 1960 (cited in Stordeur-Yedid, 1979); this study

Site	Continent	Country or Region	Layer	Broad cultural attribution	Specific cultural attribution	N	Manuf. by-prod.*	Reference
Laugerie-Haute	Western Europe	FR	H*	Solutrean	Upper Solutrean	1		Peyrony, 1938 (cited in Stordeur-Yedid, 1979)
Laugerie-Haute-Est	Western Europe	FR	27	Solutrean	Upper Solutrean	1		Bordes, 1958 (cited in Stordeur-Yedid, 1979); this study
Laugerie-Haute-Est	Western Europe	FR		Badegoulian	Badegoulian	+		Peyrony, 1938 (cited in Stordeur-Yedid, 1979)
Laugerie-Haute-Est	Western Europe	FR		Magdalenian	Magdalenian III	+	Yes	Peyrony, 1938; Bordes, 1958 (cited in Stordeur-Yedid, 1979)
Laugerie-Haute Ouest	Western Europe	FR	Ind.	Solutrean	Solutrean	1		Baumann, 2014; DBA_MB
Laugerie-Haute Ouest	Western Europe	FR	Augniacian V	Gravettian/Solutrean	Final Gravettian / Protosolutrean	7		Baumann, 2014; DBA_MB
Le Chaffaud : grotte du Puits	Western Europe	FR		Magdalenian	Upper Magdalenian	+		Longuemar, 1866, 1867, 1868; Chauvet, 1919 (cited in Stordeur-Yedid, 1979)
Le Fourneau du Diable : Bourdeilles	Western Europe	FR		Magdalenian	Magdalenian VI	3		Sonneville-Bordes, 1960 (cited in Stordeur-Yedid, 1979); this study
Le Fourneau du Diable : Bourdeilles	Western Europe	FR	S.S.III	Solutrean	Upper Solutrean	5		Baumann, 2014; DBA_MB
Le Fourneau du Diable : Bourdeilles	Western Europe	FR	S.S	Solutrean	Upper Solutrean	1		Baumann, 2014; DBA_MB
Le Mas-d'Azil	Western Europe	FR		Magdalenian	Magdalenian IV	>100	Yes	Piette, 1895; Breuil, 1902 (cited in Stordeur-Yedid, 1979)
Le Mas-d'Azil	Western Europe	FR		Magdalenian	Final Magdalenian	>20		Piette, 1875, 1907; Breuil, 1902, 1903 (cited in Stordeur-Yedid, 1979)
Le Mas-d'Azil	Western Europe	FR		Proto-Azilian	Proto-Azilian	2		Malvesin-Fabre et al., 1950 (cited in Stordeur-Yedid, 1979)
Le Placard	Western Europe	FR		Badegoulian	Badegoulian	82		Breuil and Mortillet, sd. (cited in Stordeur-Yedid, 1979)
Le Placard	Western Europe	FR		Magdalenian	Magdalenian I	+	Yes	Stordeur-Yedid, 1979
Le Placard	Western Europe	FR		Magdalenian	Magdalenian II	+	Yes	Stordeur-Yedid, 1979
Le Placard	Western Europe	FR		Magdalenian	Magdalenian III	+	Yes	Stordeur-Yedid, 1979
Le Placard	Western Europe	FR	16-17	Magdalenian	Magdalenian V and IV (with Magdalenian IV or III)	51	Yes	Maret, 1879; Mortillet, 1906 (cited in Stordeur-Yedid, 1979)
Le Portel	Western Europe	FR		Magdalenian	Magdalenian IV	1		Stordeur-Yedid, 1979
Le Roc de Marcamps 2	Western Europe	FR		Magdalenian	Ancient Middle Magdalenian	4	yes	Kuntz et al., 2015
Le Rond-du-Barry	Western Europe	FR	E	Magdalenian	Upper Magdalenian	12		de Bayle des Hermens, 1969, 1971, 1972, 1979 (cited in Stordeur-Yedid, 1979); Taborin, 1993; Chauvière, 2012
Le Rond-du-Barry	Western Europe	FR	E3	Magdalenian	Early Magdalenian	1		de Bayle des Hermens, 1979, 1981; Chauvière, 2012
Le Rond-du-Barry	Western Europe	FR	F2	Magdalenian	Early Magdalenian	6		de Bayles des Hermens, 1974; Mazière, 1986; Taborin, 1993; Chauvière, 2012

Site	Continent	Country or Region	Layer	Broad cultural attribution	Specific cultural attribution	N	Manuf. by-prod.*	Reference
Le Ruth	Western Europe	FR		Magdalenian	Magdalenian IV	1		Peyrony, 1909 (cited in Stordeur-Yedid, 1979)
Le Souci : Lalande	Western Europe	FR		Magdalenian	Final Magdalenian	+	Yes	Sonneville-Bordes, 1960 (cited in Stordeur-Yedid, 1979)
Les Furtins	Western Europe	FR		Magdalenian	Magdalenian	1		Leroi-Gourhan, 1950 (cited in Stordeur-Yedid, 1979)
Les Grands Rochers	Western Europe	FR		Magdalenian	Magdalenian III	5		Blanc, 1934 (cited in Stordeur-Yedid, 1979)
Les Jean-Blancs (Champs-Blancs)	Western Europe	FR	F	Solutrean	Solutrean	1		Peyrony, 1934; Smith, 1966 (cited in Stordeur-Yedid, 1979)
Les Marseilles	Western Europe	FR		Magdalenian	Magdalenian	10		This study
Les Petits-Guinards	Western Europe	FR		Magdalenian	Magdalenian	5		Fontana et al., 2003a, 2003b; Fontana and Chauvière, 2009; Chauvière, 2012
Les Peyrugues	Western Europe	FR		Solutrean	Solutrean	14		This study
Limeuil	Western Europe	FR		Magdalenian	Final Magdalenian	+		Sonneville-Bordes, 1960 (cited in Stordeur-Yedid, 1979)
Liveyre	Western Europe	FR		Magdalenian	Upper Magdalenian or VI	+		Daniel, 1969 (cited in Stordeur-Yedid, 1979)
Longueroche	Western Europe	FR	Trench 1, A inf.	Magdalenian	Magdalenian VI	+		Peyrony, 1934 (cited in Stordeur-Yedid, 1979)
Longueroche	Western Europe	FR	Trench 2, II	Magdalenian	Magdalenian VI	+		Peyrony, 1934 (cited in Stordeur-Yedid, 1979)
Longueroche	Western Europe	FR	Trench 1, B	Magdalenian	Final Magdalenian	+		Peyrony, 1934 (cited in Stordeur-Yedid, 1979)
Longueroche	Western Europe	FR	Trench 2, III	Magdalenian	Final Magdalenian	+		Peyrony, 1934 (cited in Stordeur-Yedid, 1979)
Lortet	Western Europe	FR		Magdalenian	Final Magdalenian	>40	Yes	Piette, 1874 (cited in Stordeur-Yedid, 1979)
Marsoulas	Western Europe	FR		Magdalenian	Magdalenian III or IV	+	Yes	Cau Durban, 1886; Méroc, 1947 (cited in Stordeur-Yedid, 1979)
Marsoulas	Western Europe	FR	foyer moyen	Magdalenian	Upper Magdalenian	+	Yes	Sonneville-Bordes, 1960 (cited in Stordeur-Yedid, 1979)
Massat : Grotte inférieure	Western Europe	FR		Magdalenian	Magdalenian IV, V, VI	1		Lartet, 1861; Regnault, 1881 (cited in Stordeur-Yedid, 1979)
Montastruc	Western Europe	FR	2	Magdalenian	Magdalenian IV	+		Pajot, 1970 (cited in Stordeur-Yedid, 1979)
Montmorillon	Western Europe	FR		Magdalenian	Magdalenian	28		Gallia Préhistoire, 1967 (cited in Stordeur-Yedid, 1979)
Moulin-sous-Chirel	Western Europe	FR		Magdalenian	Middle or Upper Magdalenian	+		Biélawski, 1887; Chauvière, 2012
Neschers	Western Europe	FR		Magdalenian	Final Magdalenian	+		Perreau, 1943 (cited in Stordeur-Yedid, 1979)
Pech-de-la-Boissière	Western Europe	FR		Solutrean	Solutrean	+		Peyrony, 1934 (cited in Stordeur-Yedid, 1979)

Site	Continent	Country or Region	Layer	Broad cultural attribution	Specific cultural attribution	N	Manuf. by-prod.*	Reference
Pech-de-la-Boissière	Western Europe	FR		Badegoulian	Badegoulian	7		Peyrony, 1934 (cited in Stordeur-Yedid, 1979); this study
Pech-de-la-Boissière	Western Europe	FR		Solutrean	Upper Solutrean	10		DBA_MB; this study
Pégourié	Western Europe	FR		Badegoulian	Badegoulian	+		Castel et al., 2007
Pégourié	Western Europe	FR		Azilian	Azilian	+		Seddas, 2012
Petit Cloup Barrat	Western Europe	FR	4	Magdalenian	Magdalenian	+	Yes	Castel et al., 2006
Peyrazet	Western Europe	FR	4	Magdalenian	Upper Magdalenian	23	Yes	Langlais et al., 2010; Pétilion (in prep.)
Pincevent	Western Europe	FR	Section 36	Magdalenian	Final Magdalenian	3		Leroi-Gourhan and Brézillon, 1972 (cited in Stordeur-Yedid, 1979)
Plantade	Western Europe	FR		Magdalenian	Middle Magdalenian	+		Brun, 1865 (cited in Stordeur-Yedid, 1979)
Ponts-de-Longue	Western Europe	FR	6	Magdalenian	Final Magdalenian	>9		Perreau, 1947 (cited in Stordeur-Yedid, 1979)
Raymonden (abri inf.)	Western Europe	FR	4	Magdalenian	Magdalenian III	+		Sonneville-Bordes, 1960 (cited in Stordeur-Yedid, 1979)
Raymonden (abri sup.)	Western Europe	FR		Magdalenian	Magdalenian	+	Yes	Stordeur-Yedid, 1979
Roc-de-Sers	Western Europe	FR	T.G.V	Solutrean	Upper Solutrean	2	Yes	DBA_MB; this study
Roc-Saint-Cirq	Western Europe	FR		Magdalenian	Middle Magdalenian	+		Peyrony and Sonneville-Bordes, 1959 (cited in Stordeur-Yedid, 1979)
Rochereil	Western Europe	FR	inf	Magdalenian	Final Magdalenian	84		Jude, 1960 (cited in Stordeur-Yedid, 1979)
Rochereil	Western Europe	FR	sup	Magdalenian	Magdalenian or Proto-Azilian	+		Jude, 1960 (cited in Stordeur-Yedid, 1979)
Saint-Michel-d'Arudy	Western Europe	FR		Magdalenian	Middle Magdalenian	+		Mascaroux, 1910 (cited in Stordeur-Yedid, 1979)
Sainte-Anne 2	Western Europe	FR		Magdalenian	Final Magdalenian or Epipaleolithic	1		Seguy and Seguy, 1972; Chauvière, 2012
Sainte-Eulalie	Western Europe	FR		Magdalenian	Magdalenian III	+		Stordeur-Yedid, 1979
Solutré	Western Europe	FR		Magdalenian	Magdalenian	+	Yes	Turner, 2002
Tourasse	Western Europe	FR		Azilian	Azilian	+		Seddas, 2012
Trilobite	Western Europe	FR	5th	Magdalenian	Magdalenian III or IV	+		Parat, 1902, 1903 (cited in Stordeur-Yedid, 1979)
Troubat	Western Europe	FR		Azilian	Azilian	+		Seddas, 2012
Verberie	Western Europe	FR	III	Magdalenian	Magdalenian	+		Audouze, 2006

Site	Continent	Country or Region	Layer	Broad cultural attribution	Specific cultural attribution	N	Manuf. by-prod.*	Reference
Vidon	Western Europe	FR	C	Magdalenian	Upper Magdalenian	>2		Prot and Couste, 1960 (cited in Stordeur-Yedid, 1979)
Villepin	Western Europe	FR	A	Magdalenian	Magdalenian VI	+		Peyrony, 1936 (cited in Stordeur-Yedid, 1979)
Villepin	Western Europe	FR	B	Magdalenian	Final Magdalenian	+		Peyrony, 1936 (cited in Stordeur-Yedid, 1979)
Andernach	Central Europe	GER		Magdalenian	Late Magdalenian	3		Stordeur-Yedid, 1979
Gönnersdorf	Central Europe	GER		Magdalenian	Magdalenian V	5	Yes	Bosinki, 1969 (cited in Stordeur-Yedid, 1979); Bignon-Lau and Lázaničková-Galetová, 2016
Petersfels	Central Europe	GER		Magdalenian	Final Magdalenian	+		Peters and Toepfer, 1932; Mauser, 1970 (cited in Stordeur-Yedid, 1979)
Probsfels	Central Europe	GER		Magdalenian	Final Magdalenian	+		Schwabedissen, 1954 (cited in Stordeur-Yedid, 1979)
Steinkirke	Central Europe	GER		Magdalenian	Final Magdalenian	1		Schwabedissen, 1954 (cited in Stordeur-Yedid, 1979)
Jankovics	Central Europe	HUN		Magdalenian	Late Magdalenian	+		Breuil, 1923 (cited in Stordeur-Yedid, 1979)
Grottes de Grimaldi	Southern Europe	ITA		Upper Paleolithic	Upper Paleolithic	1		Mochi, 1913
Nietoperzowa-Jermanovice	Central Europe	POL		Magdalenian	Upper Magdalenian	>4		Kozłowski, 1962; Kozłowski and Kozłowski, 1977 (cited in Stordeur-Yedid, 1979)
Wilczyce 10	Central Europe	POL		Magdalenian	Magdalenian	24	Yes	Boro'n, 2010
Casa de Moura	Southern Europe	POR		Magdalenian	Upper Magdalenian	1		Roche, 1951 (cited in Stordeur-Yedid, 1979)
Bistricioara-Lutârie III	Eastern Europe	ROM	Trench II/2015 70-100 cm	Epigravettian	Epigravettian	1		Anghelinu et al, 2017
Borchevo II	Eastern Europe	RUS		Upper Paleolithic		1		Stordeur-Yedid, 1979
Gagarino	Eastern Europe	RUS		Gravettian	Late Gravettian	+		Golomstok, 1933 (cited in Stordeur-Yedid, 1979)
Ivanovskoye 7	Eastern Europe	RUS	IV	Boreal Mesolithic	Butovo	+		Zhilin, 2009
Kostenki 15	Eastern Europe	RUS		Gorodtsovian	Gorodtsovian	>4		Praslov and Rogachev, 1982; Anikovich, 2003, 2007; Sinitsyn and Praslov, 1997
Kostenki 21	Eastern Europe	RUS		Gravettian	Late Gravettian	+		comm. pers. LD - Natasha Reynolds
Kostienki : Gorodosovskaya	Eastern Europe	RUS	2nd terrasse	Upper Paleolithic		10		Stordeur-Yedid, 1979
Kostienki I	Eastern Europe	RUS	I	Gravettian	Late Gravettian	+		Stordeur-Yedid, 1979
Markina Gora : Kostienki XIV	Eastern Europe	RUS	II	Upper Paleolithic		+		Stordeur-Yedid, 1979
Mezmaiskaya	Eastern Europe	RUS	1C	Early Upper Paleolithic	Early Upper Paleolithic	11		Golovanova et al., 2010

Site	Continent	Country or Region	Layer	Broad cultural attribution	Specific cultural attribution	N	Manuf. by-prod.*	Reference
Mezmaiskaya	Eastern Europe	RUS	1B	Early Upper Paleolithic	Early Upper Paleolithic	4		Golovanova et al., 2010
Mezmaiskaya	Eastern Europe	RUS	1A	Upper Paleolithic	Upper Paleolithic	5		Golovanova et al., 2010
Mezmaiskaya	Eastern Europe	RUS	1-4	Epipaleolithic	Epipaleolithic	6		Golovanova et al., 2010
Mezmaiskaya	Eastern Europe	RUS	1-3	Epipaleolithic	Epipaleolithic	5		Golovanova et al., 2010
Sungir	Eastern Europe	RUS	Burial 2	Upper Paleolithic	Upper Paleolithic	+		Baden, 1970
Freudenthal	Central Europe	SWI		Magdalenian	Final Magdalenian	+		Bandi, 1947 (cited in Stordeur-Yedid, 1979)
Höhle Birseck	Central Europe	SWI	Trench IV, 40-60 cm	Magdalenian	Final Magdalenian	1	Yes	Sarazin, 1918 (cited in Stordeur-Yedid, 1979)
Kastelhöhle	Central Europe	SWI		Magdalenian	Final Magdalenian	>2		Stordeur-Yedid, 1979
Kesslerloch	Central Europe	SWI		Magdalenian	Final Magdalenian	2		Bandi, 1947 (cited in Stordeur-Yedid, 1979)
Kohlerhöhle	Central Europe	SWI		Magdalenian	Magdalenian	+		Braun, 2005
Mühleloch	Central Europe	SWI		Magdalenian	Final Magdalenian	+		Bandi, 1947 (cited in Stordeur-Yedid, 1979)
Risliberghöhle	Central Europe	SWI		Magdalenian	Final Magdalenian	>2		Barr, 1977 (cited in Stordeur-Yedid, 1979)
Schweizerbild	Central Europe	SWI		Magdalenian	Final Magdalenian	60		Nuesch, 1896 (cited in Stordeur-Yedid, 1979)
Church Hole	Western Europe	UK		Creswellian	Creswellian	1		Garrod, 1926; Schwabedissen, 1954 (cited in Stordeur-Yedid, 1979)
Kent's Cavern	Western Europe	UK		Creswellian	Creswellian	1		Evans, 1878 (cited in Stordeur-Yedid, 1979)
Buran-Kaya 3	Eastern Europe	UKR	5-2, 6-1, 6-2	Epigravettian	Epigravettian	+	Yes	Yanevich et al., 2009
Eliseevitchi	Eastern Europe	UKR		Upper Paleolithic		+		Delporte, 1964; Rogačev, 1956 (cited in Stordeur-Yedid, 1979)
Mézine	Eastern Europe	UKR		Upper Paleolithic		1		Efimienko, 1953; Delporte, 1964; Bordes, 1968 (cited in Stordeur-Yedid, 1979)
Mézirič	Eastern Europe	UKR		Upper Paleolithic		+		Rogačev, 1956 (cited in Stordeur-Yedid, 1979)
Moldova V	Eastern Europe	UKR	V	Upper Paleolithic		+		Tchernych, 1961 (cited in Stordeur-Yedid, 1979)
Agate Basin	North America	USA		Paleoindian	Folsom	16	Yes	Frison, 1991; Osborn, 2014; Lyman, 2015
Allen Site	North America	USA		Paleoindian	Paleoindian	5		Bamforth, 2007; Osborn, 2014; Lyman, 2015
Barton Gulch	North America	USA		Paleoindian	Paleoindian	+		Davis, 1993; Osborn, 2014



Site	Continent	Country or Region	Layer	Broad cultural attribution	Specific cultural attribution	N	Manuf. by-prod.*	Reference
Bonneville Estates	North America	USA		Paleoindian		1		Goebel et al., 2011; Osborn, 2014; Lyman, 2015
Broken Mammoth	North America	USA		Paleoindian	Paleoindian	1		Holmes, 1996; Osborn, 2014; Lyman, 2015
Buhl Burial	North America	USA		Paleoindian	Paleoindian	1		Green et al., 1998; Osborn, 2014; Lyman, 2015
Hanson	North America	USA		Paleoindian	Paleoindian	1		Lyman, 2015
Hell Gap	North America	USA		Paleoindian	Paleoindian	1		Stordeur-Yedid, 1979; Lyman, 2015
Horn Shelter	North America	USA		Paleoindian	Paleoindian	+		Young et al., 1987; Osborn, 2014
Lind Coulee	North America	USA		Paleoindian		20		Irwin and Moody, 1978; Osborn, 2014; Lyman, 2015
Lindenmeier	North America	USA		Paleoindian	Folsom	25		Stordeur-Yedid, 1979; Wilmsen and Roberts Jr., 1984; Osborn, 2014; Lyman, 2015
Marmes	North America	USA		Paleoindian		10		Fryxell et al., 1968 (cited in Stordeur-Yedid, 1979); Lyman, 2015
O.V. Clary	North America	USA		Paleoindian		2		Lyman, 2015
Sentinel Gap	North America	USA		Paleoindian	Paleoindian	1		Lyman, 2015
Winkler-1	North America	USA		Paleoindian	Paleoindian	1		Blaine and Wendorf, 1972; Osborn, 2014; Lyman, 2015

**Country:** ARM = Armenia; AUS = Austria; BEL = Belgium; CN = China; CZE = Czech Republic; ES = Spain; FR = France; GER = Germany; HUN = Hungary; ITA = Italy; POL = Poland; POR = Portugal; ROM = Romania; RUS = Russia; SIB = Siberia; SWI = Switzerland; UK = United Kingdom; UKR = Ukraine; USA = United States of America

+: number of needles not specified but written in plural form in the literature

>: minimum number of needles reported in the literature

\* Manuf. by-prod.: Presence of manufacturing by-products reported in the literature

**References:** the references (s) followed by "(cited in Stordeur-Yedid 1979)" are available in this latter publication and are not provided here; DBA\_MB = unpublished data provided by Malvina Baumann.

## SOM Table S2

**SOM Table S2.** Mixed model summary of Magdalenian needles' width and thickness by region ("best" model in red).

Region	Variable	Number of distributions	Log likelihood	AICc
France	Width	1	-9.099	22.4
		<b>2</b>	<b>1.669</b>	<b>5.364</b>
		3	3.396	6.735
	Thickness	1	-3.92	12.04
		<b>2</b>	<b>9.927</b>	<b>-11.15</b>
		3	12	-10.47
Moravia	Width	1	13.17	-22.18
		<b>2</b>	<b>16.19</b>	<b>-23.79</b>
		3	17.34	6.735
	Thickness	1	12.02	-19.87
		<b>2</b>	<b>33.86</b>	<b>-59.13</b>
		3	36.15	-59.02

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