

## Supplementary Information:

Direct evidence of the composition of a Neandertal social group:  
the hominin footprints at Le Rozel (Normandy, France)

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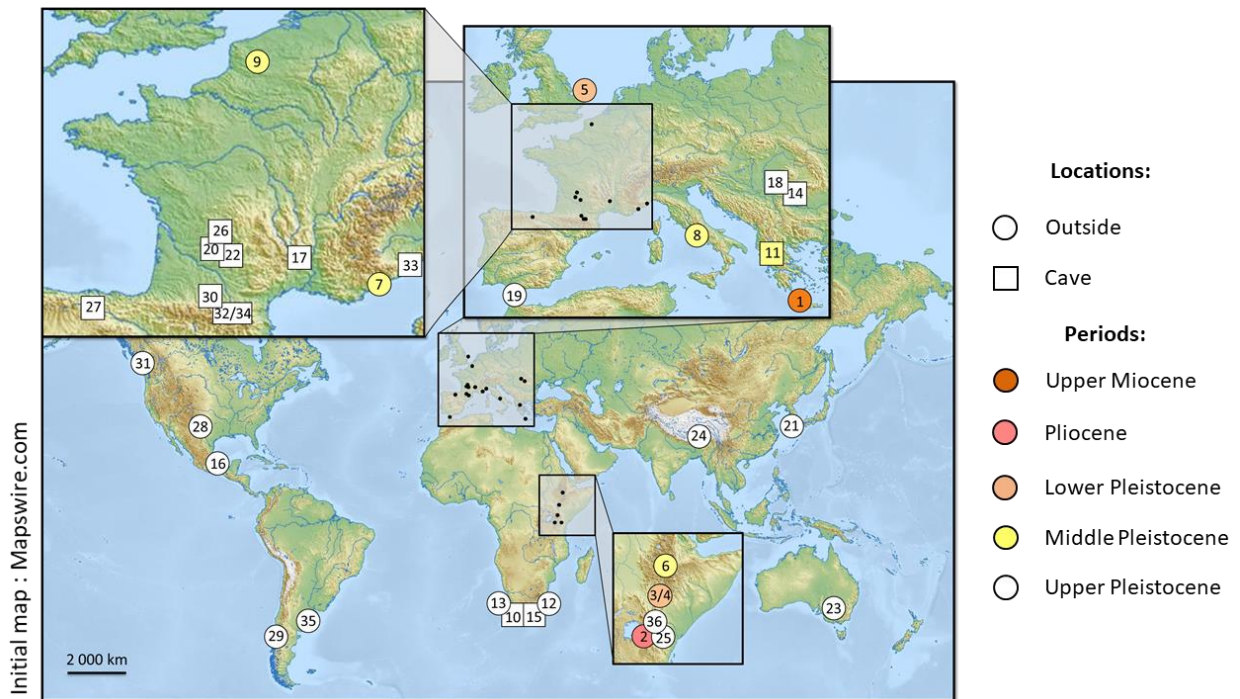
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## The hominin footprints sites:



**Fig. S1.** Geographical distribution of pre-Holocene sites with potential hominin footprints

Legends: 1-Trachilos (Greece), 2-Laetoli (Tanzania), 3-Ileret (Kenya), 4-Koobi Fora (Kenya), 5-Happisburgh (Great-Britain), 6-Gombore II-2 (Ethiopia), 7-Terra Amata (France), 8-Roccamonfina (Italia), 9-Biache-Saint-Vaast (France), 10- Still Bay (South Africa), 11-Theopetra (Greece), 12-Nahoon (South Africa), 13-Langebaan (South Africa), 14-Vârtop (Romania), 15-Brenton-on-Sea (South Africa), 16-Valsequillo (Mexico), 17-Chauvet (France), 18-Ciur-Ibuzuc (Romania), 19-Catalan Bay (Gibraltar), 20-Cussac (France), 21-Jeju Island (South Korea), 22-Pech-Merle (France), 23-Willandra Lakes (Australia), 24-Tibetan plateau (China), 25-Engare Sero (Tanzania), 26-Lascaux (France), 27-Ojo Guareña (Spain), 28-White Sands National Monument (USA), 29-Monte Verde (Chile), 30-Tuc d'Adoubert (France), 31-Calvert Island (Canada), 32-Niaux (France), 33-Tana della Basura (Italia), 34-Fontanet (France), 35-Pehuen-Co (Argentina), 36-Lake Bogoria (Kenya).

**Table S1 (1/2).** Pre-Holocene sites with potential hominin footprints

	Site	Ages	Outside/Cave	Substrate	Associated taxon	Summary description	References (e.g.)
1	Trachilos (Greece)	5.7 Ma Upper Miocene	Outside	Sand	Unknown	About 50 tracks including 2 trackways. They have a triangular shape and are relatively short. The hallux seems adducted. The identification as footprints and the association with hominins are discussed.	1-3
2	Laetoli (Tanzania)	3.7 Ma Pliocene	Outside	Tuff	<i>Au. afarensis</i>	4 trackways and an isolated footprint made by juveniles and adults with different statures. The footprints are broad with an abducted hallux. They reflect the first direct evidence of human bipedalism.	4-7
3	Ileret (Kenya)	1.5 Ma Lower Pleistocene	Outside	Sand / Silt	<i>H. erectus</i> / <i>P. boisei</i>	About one hundred footprints including isolated footprints and more than 20 trackways. The footprint morphology differs from the Laetoli footprints. They reflect a human foot function.	8-12
4	Koobi Fora (Kenya)	1.4 Ma Lower Pleistocene	Outside	Sand / Silt	<i>H. erectus</i>	A trackway of 7 weakly preserved footprints. Footprint morphology differs from the Laetoli tracks and is closer to anatomically modern footprints.	8, 13-14
5	Happisburgh (Great-Britain)	1-0.8 Ma Lower Pleistocene	Outside	Sand / Silt	<i>H. antecessor</i>	152 footprints. Most of them are isolated. Presence of possible trackways. Only one footprint presents clear toe impressions.	15
6	Gombore II-2 (Ethiopia)	700 ka Middle Pleistocene	Outside	Sand / Silt	<i>H. heidelbergensis</i>	11 footprints including a trackway of 2 footprints. Their morphology is consistent with the other footprints attributed to <i>Homo</i> genus. These footprints were made by adults and juveniles. Associated with animal tracks.	16
7	Terra Amata (France)	380 ka Middle Pleistocene	Outside	Sand	<i>H. heidelbergensis</i>	Only one footprint reflecting a slide of the foot. The impression of the hallux is visible. Ages are discussed.	17-18
8	Roccamonfina (Italia)	349 ka Middle Pleistocene	Outside	Tuff	<i>H. heidelbergensis</i>	3 trackways made going down a slope. The footprints are short and wide. They reflect few anatomical details.	19-22
9	Biache-Saint-Vaast (France)	236 ka Middle Pleistocene	Outside	Silt	<i>H. neanderthalensis</i>	1 potential footprint surrounded by animal tracks. Not studied precisely.	23-25
10	Still Bay (South Africa)	140-91 ka Middle / Upper Pleistocene	Outside	Aeolianite	<i>H. sapiens</i>	A trackway of 4 potential footprints on a slab. The second and the third footprints are the most visible. Toe impressions are not visible. This trackway could have been made by a shod individual. The identification as hominin footprints is not consensual (they could be animal tracks).	26-27
11	Theopetra (Greece)	130 ka Middle Pleistocene	Cave	Clay	<i>H. neanderthalensis</i>	4 footprints made by young individuals (2-4 years old). One of the footprints is interpreted as made by a shod foot.	28-29
12	Nahoon (South Africa)	124 ka Upper Pleistocene	Outside	Aeolianite	<i>H. sapiens</i>	A trackway of 3 anatomically modern footprints. Toe impressions are visible.	27, 30-31
13	Langebaan (South Africa)	117 ka Upper Pleistocene	Outside	Aeolianite	<i>H. sapiens</i>	A trackway of 3 anatomically modern footprints. They are less preserved than at Nahoon.	27, 30, 32
14	Vârtoș (Romania)	97-62 ka Upper Pleistocene	Cave	Calcareous mud	<i>H. neanderthalensis</i>	3 isolated footprints probably made by a single individual. The most complete footprint shows a "large space between the hallux and the second toe".	33-35
15	Brenton-on-Sea (South Africa)	90 ka Upper Pleistocene	Cave	Aeolianite	<i>H. sapiens</i>	40 footprints from 2 different layers made by going down a dune. Some footprints are part of trackways.	27, 36
16	Valsequillo (Mexico)	40 ka (?) Upper Pleistocene	Outside	Tuff	<i>H. sapiens</i>	Several possible trackways and isolated footprints. Initially described as one of the first human occurrences in America. The identification as footprints and their dating are highly contested. They would more likely be metal tool tracks made during quarrying.	37-41
17	Chauvet (France)	37-28 ka (?) Upper Pleistocene	Cave	Clay	<i>H. sapiens</i>	A trackway of about 20 footprints made by a juvenile. Dating is discussed.	42-46

**Table S1 (2/2).** Pre-Holocene sites with potential hominin footprints

	Site	Ages	Outside/Cave	Substrate	Associated taxon	Summary description	References (e.g.)
18	Ciur-Izbuc (Romania)	36.5-29 ka Upper Pleistocene	Cave	Clay	<i>H. sapiens</i>	Several hundred footprints made by different individuals. Their taxonomic attribution and their ages are discussed.	35, 47-48
19	Catalan Bay (Gibraltar)	28 ka Upper Pleistocene	Outside	Aeolianite	<i>H. neanderthalensis</i>	A single potential footprint representing the descent of a dune. It is poorly preserved but some toe impressions may be deduced. Associated with several animal tracks.	49
20	Cussac (France)	29 ka Upper Pleistocene	Cave	Clay	<i>H. sapiens</i>	Several footprints including 3 trackways. Associated with handprints.	50-51
21	Jeju Island (South Korea)	25-3.7 ka (?) Upper Pleistocene / Holocene	Outside	Tuff	<i>H. sapiens</i>	505 footprints, including at least 9 trackways, made by juveniles and adults. Dating is discussed.	52-56
22	Pech-Merle (France)	25-15 ka (?) Upper Pleistocene.	Cave	Clay	<i>H. sapiens</i>	12 footprints made by juveniles and adults. Some tracks have been identified as those of a walking stick. Dating is uncertain.	57-59
23	Willandra Lakes (Australia)	23-19 ka Upper Pleistocene	Outside	Silt / Clay	<i>H. sapiens</i>	563 footprints including 23 trackways. Speed estimates indicate that some individuals were very fast.	60-62
24	Tibetan plateau (China)	21 ka Upper Pleistocene	Outside	Travertine	<i>H. sapiens</i>	11 footprints associated with handprints. They represent one of the first human occurrences in Tibet.	63-64
25	Engare Sero (Tanzania)	19.1-5.8 ka Upper Pleistocene / Holocene	Outside	Tuff	<i>H. sapiens</i>	More than 400 footprints including 24 trackways and isolated footprints.	65-68
26	Lascaux (France)	17 ka Upper Pleistocene	Cave	Clay	<i>H. sapiens</i>	Footprints made by adolescents. Ages are discussed.	69-70
27	Ojo Guareña (Spain)	15.6 ka Upper Pleistocene	Cave	Clay	<i>H. sapiens</i>	More than 1 000 footprints including trackways and isolated footprints made by at least 8 individuals. Discussed as an exploration of the cave by prehistoric groups.	71
28	White Sands National Monument (USA)	15.6-10.0 ka Upper Pleistocene	Outside	Sand / Mud	<i>H. sapiens</i>	Nearly 100 footprints including trackways and isolated footprints associated with sloth tracks. They could reflect hunting behaviors.	72
29	Monte Verde (Chile)	14.6 ka Upper Pleistocene	Outside	Clay	<i>H. sapiens</i>	3 footprints made by an adolescent or a young individual.	73-75
30	Tuc d'Audoubert (France)	13.9 ka Upper Pleistocene	Cave	Clay	<i>H. sapiens</i>	Several trackways and isolated footprints showing toe impressions. Some footprints are attributed to juveniles.	58, 76-77
31	Calvert island (Canada)	13.3-12.6 ka Upper Pleistocene	Outside	Clay	<i>H. sapiens</i>	29 footprints made by at least 3 individuals including 1 juvenile. Toe impressions are still visible.	78
32	Niaux (France)	12.9-12.4 ka Upper Pleistocene	Cave	Clay	<i>H. sapiens</i>	About 40 footprints. Some tracks could have been made during children's game.	79-82
33	Tana della Basura (Italia)	12.3 ka Upper Pleistocene	Cave	Clay	<i>H. sapiens</i>	More than 30 footprints made by juveniles and adults. Initially attributed to Neandertals before new dating associated them with <i>Homo sapiens</i>	83-87
34	Fontanet (France)	12.0 ka Upper Pleistocene	Cave	Clay	<i>H. sapiens</i>	Several isolated footprints. One of them was interpreted as made by a shod foot. Some footprints were attributed to a child following an animal.	42, 88-90
35	Pehuen-Co (Argentina)	12.0 ka Upper Pleistocene	Outside	Sand / Silt	<i>H. sapiens</i>	15 footprints including a trackway and 2 isolated footprints. Toe impressions are visible.	91-92
36	Bogoria (Kenya)	Upper Pleistocene	Outside	Silt	<i>H. sapiens</i>	1 isolated and poorly preserved footprint.	93

### **Text S1: The footprints attributed to Neandertals:**

The footprints attributed to Neandertals are very scarce in the fossil record. As we underline in the article, only 9 footprints attributed to this taxon had been reported from 4 different sites (Fig. S2). Before describing these sites and the footprints that they yielded, it is necessary to discuss discoveries made at two other sites: the caves from Ciur-Ibuzuc (Romania) and Tana della Basura (Italy).

The researches that were undertaken in the cave from Ciur-Ibuzuc during the 1960s initially yielded 400 human footprints before three quarters of them were destroyed (47-48). Initially dated between 15,000 and 10,000 years based on the presence of cave bears, new studies realized from 2012 enabled to date them by radiocarbon between 36,500 and 29,000 years BP (35, 48). These dates place them during a transition phase in Europe characterized by the first evidences of *Homo sapiens* and the very last occurrences of Neandertals (48). Furthermore, the absence of cultural material associated with the footprints makes their taxonomic attribution even more complex. Yet, based on the discovery of *Homo sapiens* remains close to the cave from Ciur-Ibuzuc covering contemporary periods, but also on ages for the transition between the two taxa, it is more likely that these footprints were made by *Homo sapiens* (48).

The footprints discovered in the Italian site of Tana della Basura were for a long time attributed to Neandertals (84-85). Indeed, L. Pales used the presence of a Mousterian industry in a nearby cave and remains of cave bears that he considered as contemporary of Neandertals. However, radiometric dating at around 12,000 years BP makes impossible this taxonomic association (86).

#### **Biache-Saint-Vaast (France):**

The site with the oldest potential Neandertal footprint is Biache-Saint-Vaast. Discovered in 1976, it presents several occupation layers with lithic industry and remains of two human skulls dated to 236,000 years (23-25). A footprint described as poorly preserved and surrounded by ungulate tracks was found in the same layer as the human remains (23-24). It seems that this footprint has also been trampled by ungulates, making difficult its identification and its analysis (24). The presence of a Mousterian industry and the clear attribution of the human remains to Neandertals (94) allow to associate this footprint to a Neandertal individual. A cast of the track surface was realized and is kept in Arkéos Archaeological Museum (Douai, France).

### **Theopetra cave (Greece):**

In 1996, four human footprints were discovered in a Mousterian layer of the cave from Theopetra (Greece). This level was firstly radiocarbon dated to 46,300 years BP (95). However, more recent dating using thermoluminescence gave an earlier date: about 130,000 years (29). These footprints were attributed to Neandertals based on these dates and on Mousterian industries found in the same layer (28-29). They would have been made by different individuals (28). The second and third footprints are complete and are 13.8 and 15 cm long which corresponds to statures of 0.86 and 1.00 m and ages of 2 and 4 years (28). The third footprint could have been made by a shod foot representing the oldest occurrence of "footwear" (28). In addition to photographs, the footprints were cast, and the two most complete footprints were digitized in 3D (28).

### **Vârtop cave (Romania):**

In 1974, three human footprints were found in a calcareous mud layer in the Romanian cave at Vârtop. U-Th dating has shown that these footprints were made between 97,000 and 62,000 years (34). No archaeological or paleoanthropological remains were discovered in this cave, the association with Neandertals is only based on the U-Th dating. These three footprints appear to have been made by a single individual (35). Two of the three footprints are partial and represent heel or forefoot impressions. The third is relatively complete (22 cm long and 10.6 cm wide) and corresponds to a stature of 1.46 m (33). According to Onac *et al.* (34), a distinctive feature of this complete footprints is a large space (1.6 cm) between the hallux and the second toe. Its morphology would be consistent with our knowledge of Neandertal foot anatomy (34). The most complete footprint has been cast and is kept at the Institute of Speleology in Cluj (Romania).

### **Catalan Bay (Gibraltar):**

More recently, a potential Neandertal footprint was discovered in the dune complex from Catalan Bay at Gibraltar. It was made in aeolianite dating by OSL of 28,000 years (49). No archeological or paleoanthropological remains are associated with this footprint. The authors attribute it with Neandertals based on geochronological correlation using archeological and osteological findings at Gibraltar (49). This footprint, described as poorly preserved, was made by descending a slope by an individual whose height was estimated between 1.06 and 1.26 m (49). Given its late chronological age, its attribution to Neandertal remains to be demonstrated.

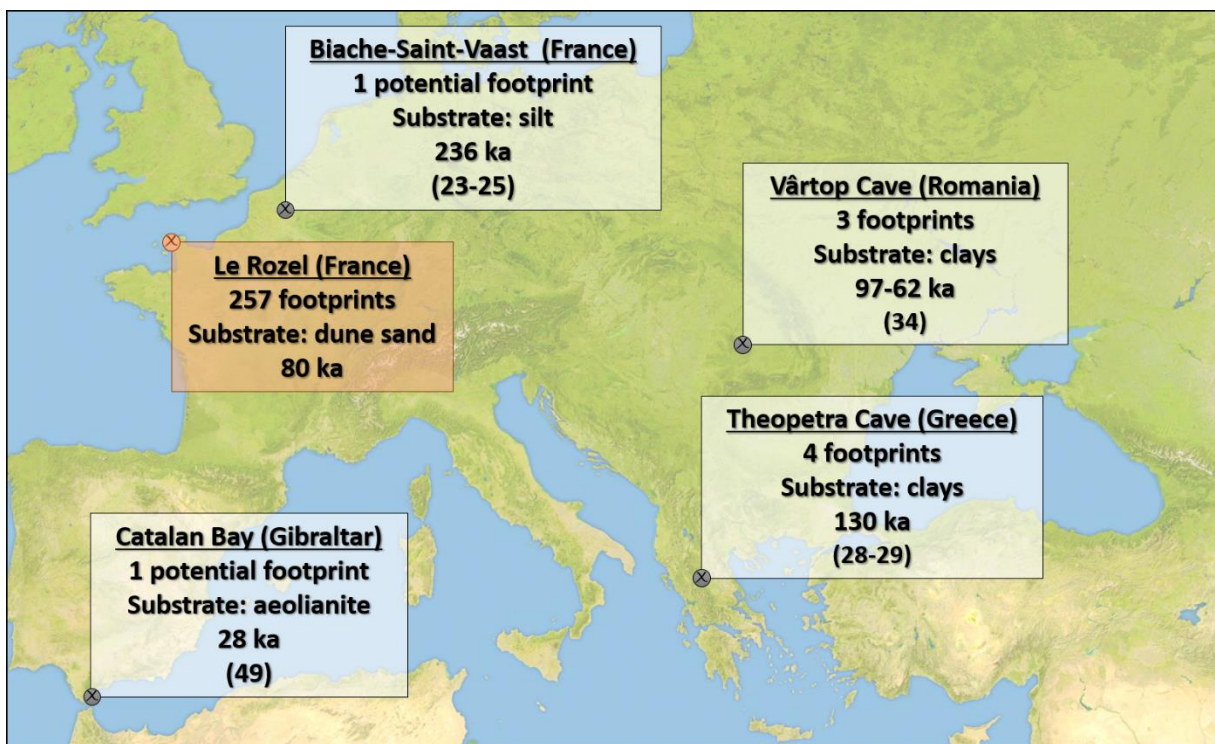
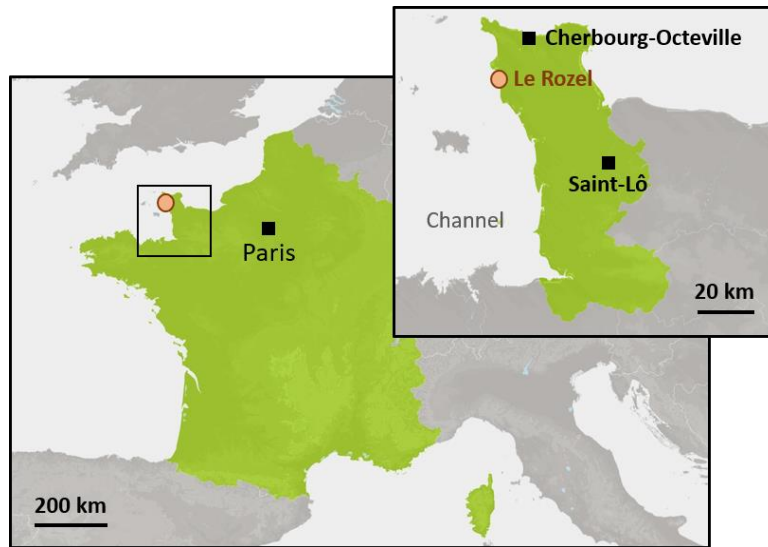


Fig. S2. Geographical distribution of sites with footprints attributed to Neandertals

### The archaeological site at Le Rozel (Normandy, France):

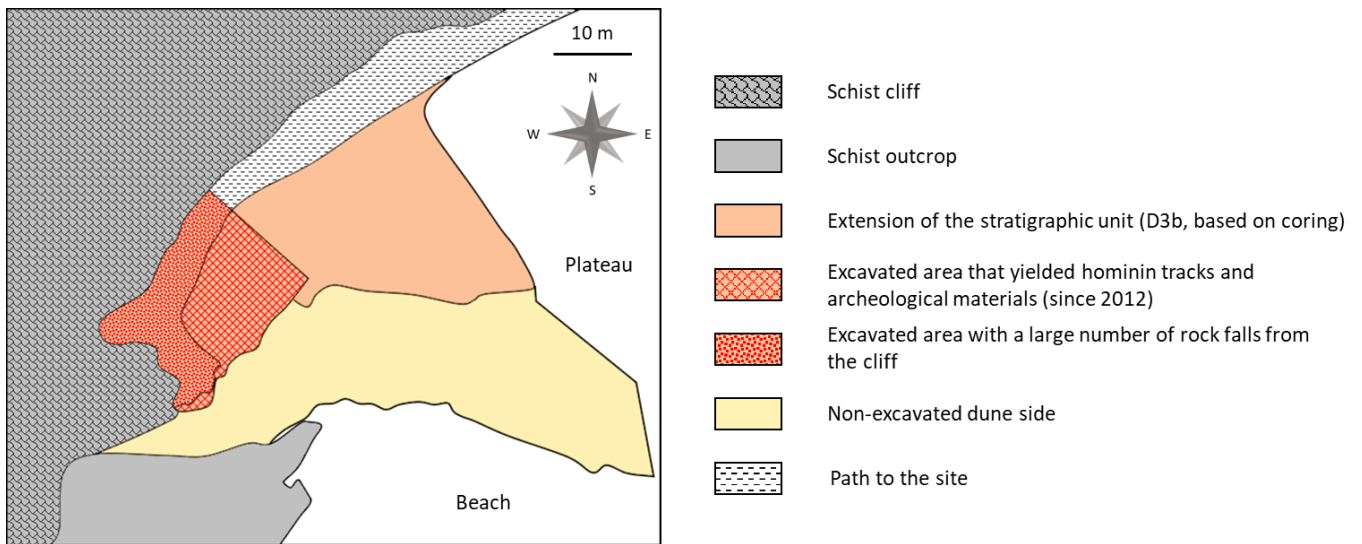


**Fig. S3.** Geographical location of the archaeological site at Le Rozel

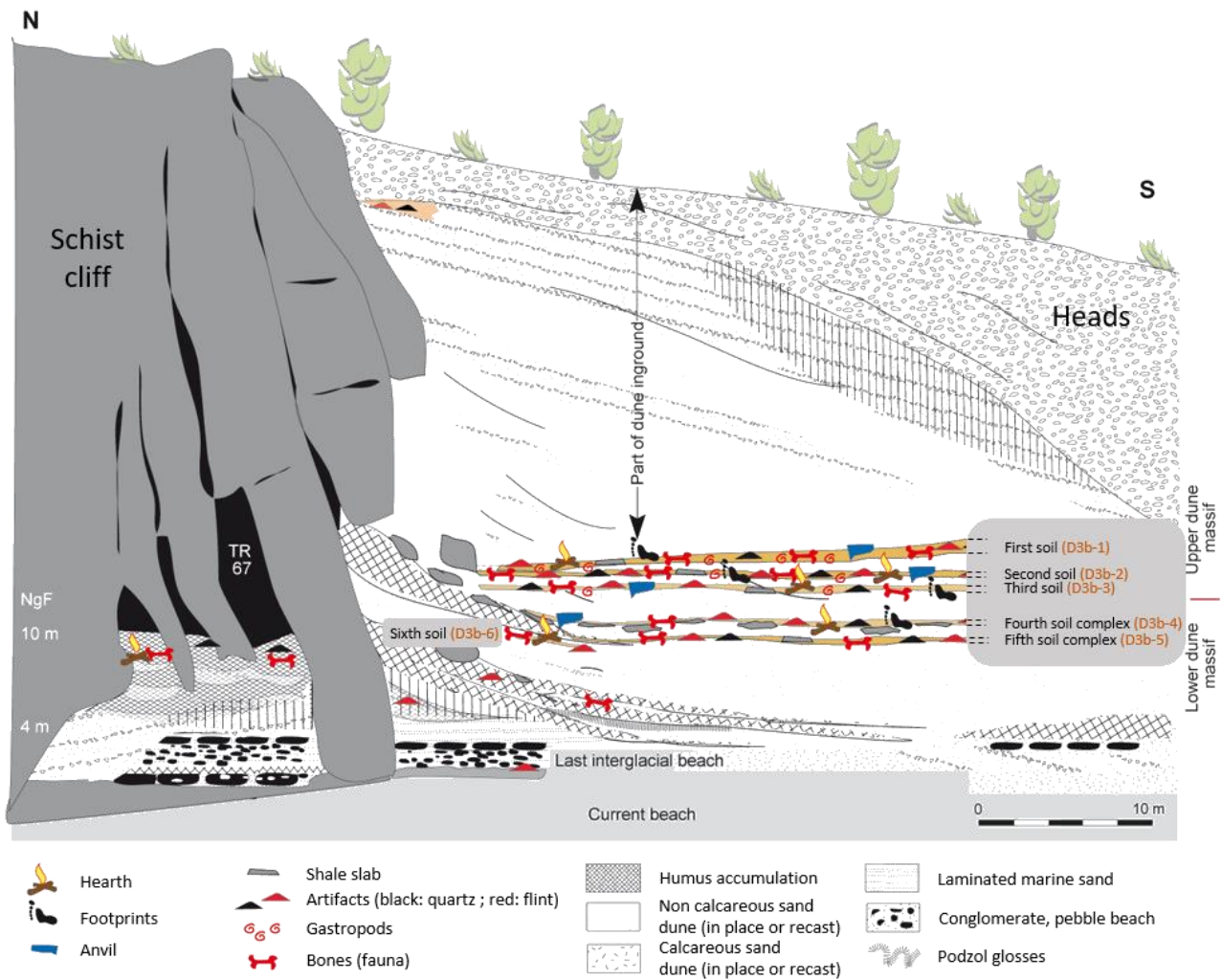


**Fig. S4.** View of Le Rozel site: during the first excavations in 1969 (left) and in 2014 (right).  
The riprap at the base of the dune was built in order to limit the tidal sapping action

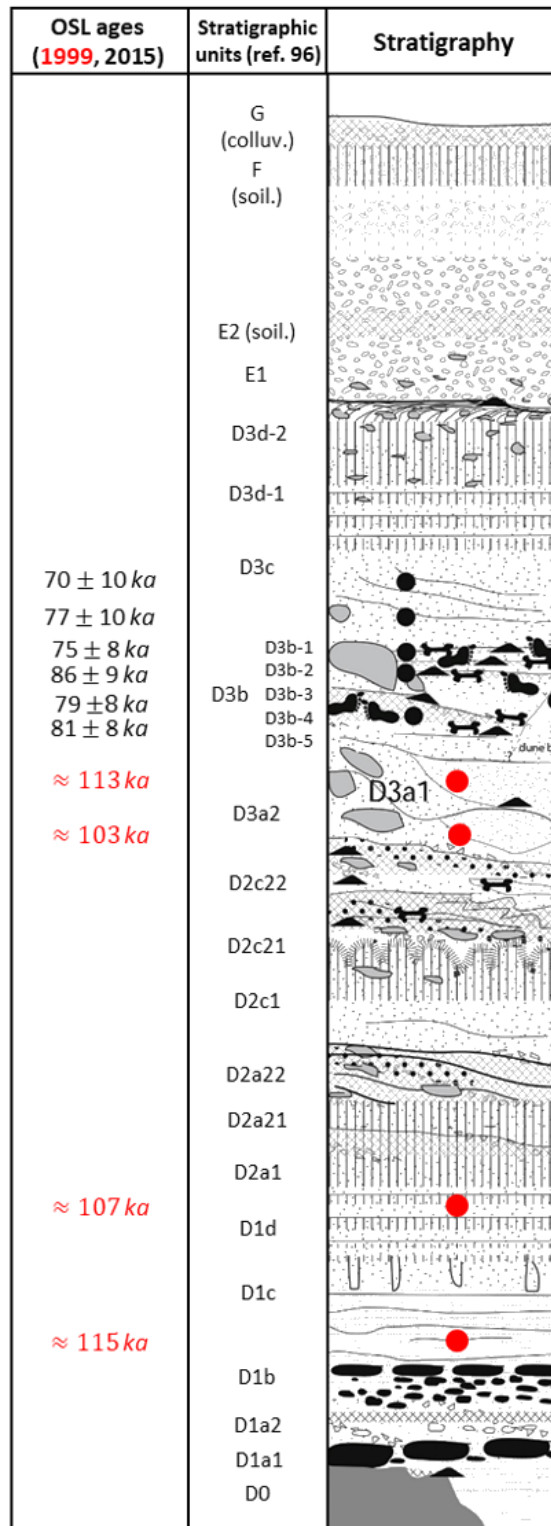
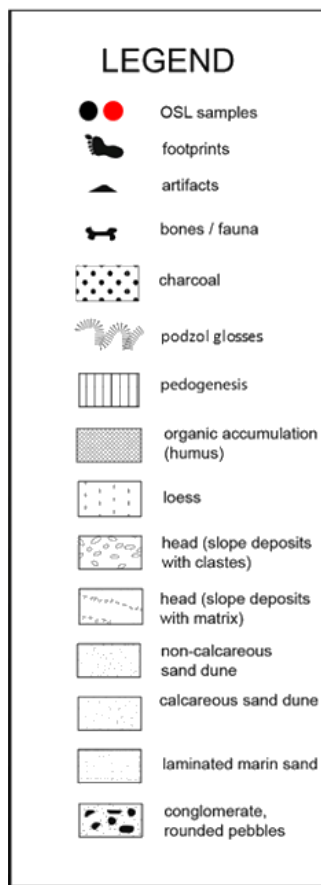




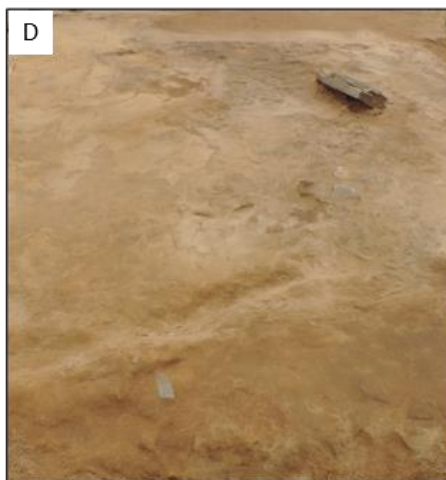
**Fig. S5.** Aerial representation of the archeological site from Le Rozel



**Fig. S6.** Geological cross-section of the dune system from Le Rozel and locations of the Paleolithic occupations

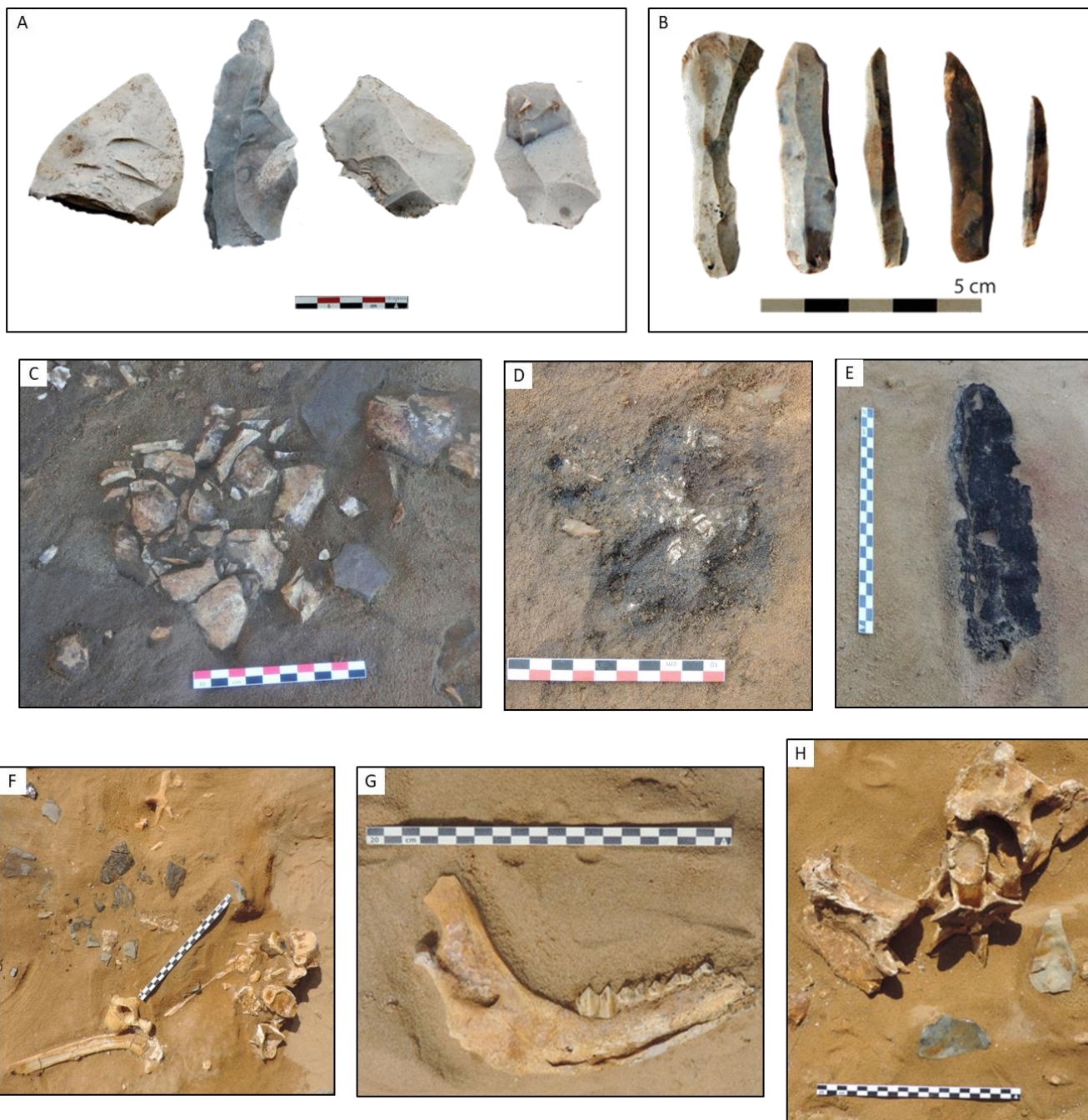


**Fig. S7.** Stratigraphic sequence at Le Rozel  
(using the stratigraphic subunits from ref.96 and the dates from ref. 97)



Photos: D. Cliquet

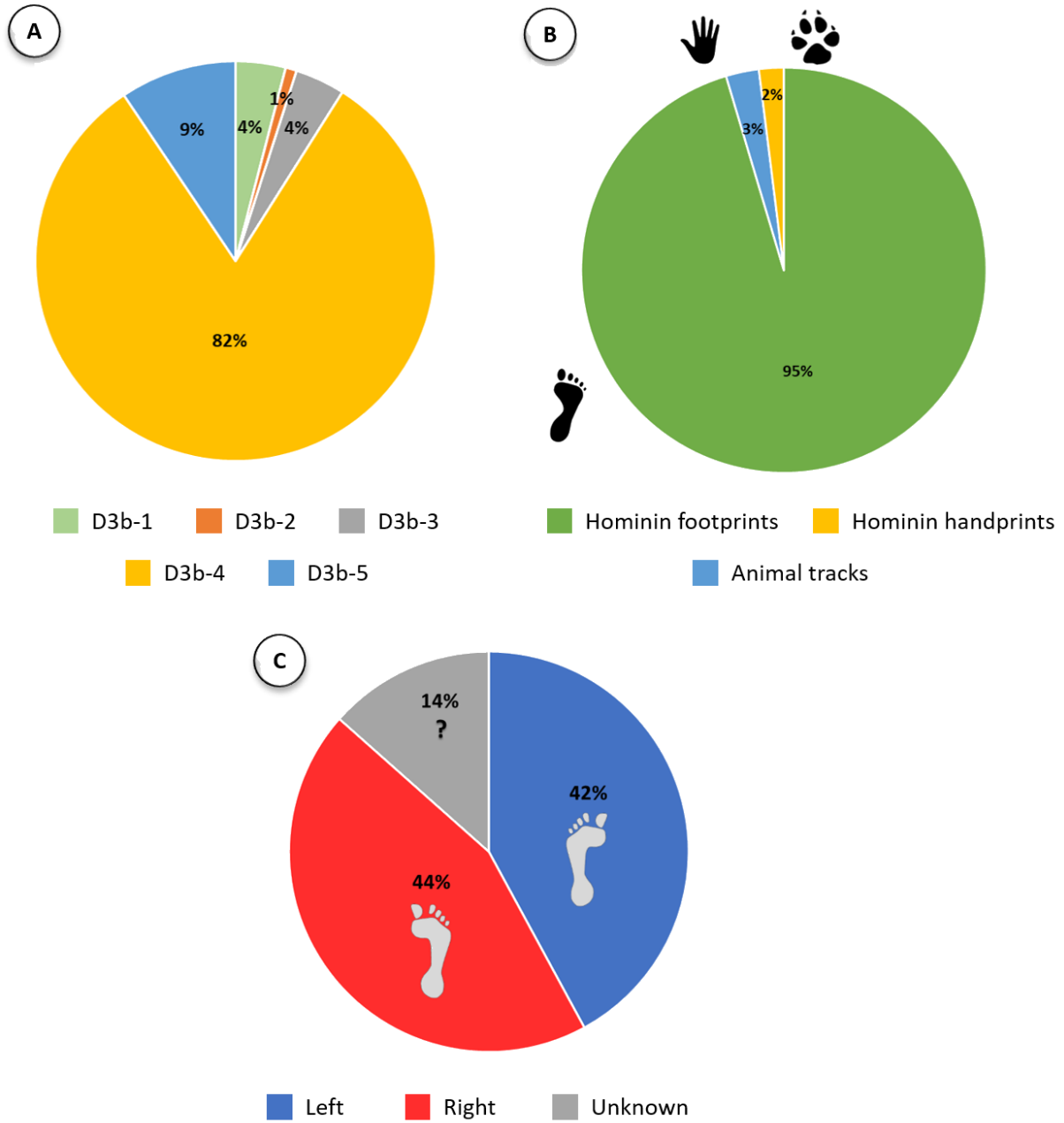
**Fig. S8.** Footprint areas. A-D3b-1, B-D3b-3, C-D3b-2, D-D3b-4, E-D3b-5



Photos: D. Cliquet

**Fig. S9.** Archeological material associated with the footprints:  
 A-Levallois flakes, B-blades, C-knapping spot, D-hearth, E-Burnt log, F-butchery area,  
 G-deer's lower jaw, H-deer's vertebrae

The tracks from Le Rozel:



**Fig. S10.** Relative frequencies of the Le Rozel tracks (n = 271) from stratigraphic subunits (A), types of tracks (B) and laterality of hominin footprints (n = 257) (C)

**Table S2 (1/5).** Inventory of the tracks discovered at Le Rozel. The maximal length ( $L_{\max}$ ) is measured along the longitudinal axis. It will be equal to the total length (L) if the track is longitudinally complete. The distal width (w) corresponds to the largest breadth of the forefoot impression and is measured along the mediolateral axis. The measurements preceded by the sign “ $\approx$ ” were realized in situ. The measurements made from 3D models are accurate to the millimeter.

Inventory number	Taxon	Anatomical part	Laterality	Recording				Measurements		
				Photos	Cast	Original extraction	3D capture	$L_{\max}$	L	w
LREI2012-01	<i>Homo</i>	foot	left	✓				$\approx$ 13 cm	$\approx$ 13 cm	$\approx$ 6 cm
LREI2012-02	<i>Homo</i>	foot	left	✓				$\approx$ 20 cm	unknown	$\approx$ 9-10 cm
LREI2012-03	<i>Homo</i>	foot	left	✓				$\approx$ 20 cm	unknown	$\approx$ 11 cm
LREI2013-01	<i>Homo</i>	foot	left	✓	✓		✓	21.9 cm	unknown	6.9 cm
LREI2013-02	<i>Homo</i>	foot	left	✓				$\approx$ 28 cm	$\approx$ 28 cm	$\approx$ 10 cm
LREI2013-03	<i>Homo</i>	foot	unknown	✓	✓		✓	16.9 cm	unknown	unknown
LREI2013-04	<i>Homo</i>	foot	left (?)	✓	✓		✓	23.6 cm	unknown	10.6 cm
LREI2013-05	<i>Homo</i>	foot	left	✓	✓		✓	21.4 cm	21.4 cm	9.4 cm
LREI2013-06	<i>Homo</i>	hand	right	✓	✓			$\approx$ 16 cm	unknown	unknown
LREI2013-07	<i>Homo</i>	foot	right	✓				$\approx$ 23 cm	unknown	$\approx$ 8 cm
LREI2013-08	<i>Homo</i>	foot	right	✓				$\approx$ 26 cm	unknown	$\approx$ 11 cm
LREI2014-01	<i>Homo</i>	foot	unknown	✓	✓			$\approx$ 24 cm	unknown	$\approx$ 11 cm
LREI2014-02	<i>Homo</i>	hand	right	✓	✓			$\approx$ 19 cm	unknown	unknown
LREI2014-03	<i>Homo</i>	foot	unknown	✓	✓		✓	26.0 cm	unknown	unknown
LREI2014-04	<i>Homo</i>	foot	right	✓	✓		✓	29.3 cm	28.7 cm	unknown
LREI2014-05	<i>Homo</i>	foot	right	✓	✓		✓	26.9 cm	26.9 cm	12.3 cm
LREI2014-06	<i>Homo</i>	foot	right	✓			✓	25.6 cm	25.6 cm	9.8 cm
LREI2014-07	<i>Homo</i>	foot	right	✓				$\approx$ 14 cm	$\approx$ 14 cm	$\approx$ 7 cm
LREI2014-08	<i>Homo</i>	foot	left	✓	✓		✓	22.6 cm	22.6 cm	8.9 cm
LREI2014-09	<i>Homo</i>	foot	left	✓				$\approx$ 11 cm	unknown	$\approx$ 7 cm
LREI2014-10	<i>Homo</i>	foot	unknown	✓				$\approx$ 6 cm	unknown	$\approx$ 5 cm
LREI2014-11	<i>Homo</i>	foot	right	✓				$\approx$ 18 cm	unknown	unknown
LREI2014-12	<i>Homo</i>	foot	left	✓	✓		✓	24.0 cm	24.0 cm	10.6 cm
LREI2014-13	<i>Homo</i>	hand	right	✓	✓			$\approx$ 18 cm	unknown	unknown
LREI2015-01	<i>Homo</i>	foot	left	✓				$\approx$ 23 cm	unknown	$\approx$ 9 cm
LREI2015-02	<i>Homo</i>	foot	right (?)	✓				$\approx$ 8 cm	unknown	unknown
LREI2015-03	<i>Homo</i>	foot	right	✓				$\approx$ 13 cm	unknown	unknown
LREI2015-04	<i>Homo</i>	foot	right	✓				11.4 cm	11.4 cm	4.5 cm
LREI2015-05	<i>Homo</i>	foot	left	✓				$\approx$ 10 cm	$\approx$ 10 cm	$\approx$ 5 cm
LREI2015-06	<i>Homo</i>	foot	unknown	✓				$\approx$ 7 cm	unknown	unknown
LREI2015-07	<i>Homo</i>	foot	right	✓	✓		✓	11.5 cm	11.5 cm	4.8 cm
LREI2015-08	<i>Homo</i>	foot	right	✓				$\approx$ 29 cm	$\approx$ 29 cm	unknown
LREI2015-09	<i>Homo</i>	foot	unknown	✓				$\approx$ 8 cm	unknown	unknown
LREI2015-10	<i>Homo</i>	foot	right	✓	✓		✓	7.1 cm	unknown	3.8 cm
LREI2015-11	<i>Homo</i>	foot	right	✓	✓		✓	12.3 cm	12.3 cm	3.9 cm
LREI2015-12	<i>Homo</i>	foot	right	✓			✓	16.2 cm	unknown	6.1 cm
LREI2015-13	<i>Homo</i>	foot	right	✓			✓	17.2 cm	17.2 cm	5.4 cm
LREI2015-14	<i>Homo</i>	foot	left	✓			✓	19.5 cm	unknown	8.5 cm
LREI2015-15	<i>Homo</i>	foot	left	✓			✓	16.4 cm	unknown	unknown
LREI2015-16	<i>Homo</i>	foot	left	✓				$\approx$ 20 cm	unknown	$\approx$ 8 cm
LREI2015-17	<i>Homo</i>	foot	left	✓			✓	25.5 cm	unknown	7.9 cm
LREI2015-18	<i>Homo</i>	foot	right	✓			✓	19.3 cm	unknown	8.0 cm
LREI2015-19	<i>Homo</i>	foot	right	✓				$\approx$ 24 cm	unknown	$\approx$ 9 cm
LREI2015-20	<i>Homo</i>	foot	right	✓			✓	13.4 cm	unknown	6.5 cm
LREI2015-21	<i>Homo</i>	foot	right	✓	✓		✓	22.3 cm	unknown	9.0 cm
LREI2015-22	<i>Homo</i>	foot	unknown	✓				$\approx$ 23 cm	unknown	$\approx$ 8 cm
LREI2015-23	<i>Homo</i>	foot	right	✓				$\approx$ 20 cm	unknown	$\approx$ 8 cm
LREI2015-24	<i>Homo</i>	foot	right	✓				$\approx$ 18 cm	unknown	unknown
LREI2015-25	<i>Homo</i>	foot	unknown	✓				unknown	unknown	unknown
LREI2015-26	<i>Homo</i>	foot	left	✓	✓		✓	21.2 cm	21.2 cm	8.9 cm
LREI2015-27	<i>Homo</i>	foot	right	✓	✓		✓	$\approx$ 17 cm	unknown	$\approx$ 8 cm
LREI2015-28	<i>Homo</i>	foot	left	✓				$\approx$ 21 cm	$\approx$ 21 cm	unknown
LREI2015-29	<i>Homo</i>	foot	unknown	✓	✓		✓	18.5 cm	unknown	unknown
LREI2015-30	<i>Homo</i>	foot	right	✓				$\approx$ 14 cm	$\approx$ 14 cm	$\approx$ 7 cm
LREI2015-31	<i>Homo</i>	foot	right	✓				$\approx$ 12 cm	unknown	unknown

**Table S2 (2/5).** Inventory of the tracks discovered at Le Rozel. The maximal length ( $L_{\max}$ ) is measured along the longitudinal axis. It will be equal to the total length (L) if the track is longitudinally complete. The distal width (w) corresponds to the largest breadth of the forefoot impression and is measured along the mediolateral axis. The measurements preceded by the sign “ $\approx$ ” were realized in situ. The measurements made from 3D models are accurate to the millimeter.

Inventory number	Taxon	Anatomical part	Laterality	Recording				Measurements		
				Photos	Cast	Original extraction	3D capture	$L_{\max}$	L	w
LREI2015-32	<i>Homo</i>	foot	left	✓				$\approx$ 18 cm	unknown	$\approx$ 9 cm
LREI2015-33	<i>Homo</i>	foot	right	✓				$\approx$ 20 cm	$\approx$ 20 cm	$\approx$ 8 cm
LREI2015-34	<i>Homo</i>	foot	left (?)	✓				$\approx$ 21 cm	unknown	$\approx$ 6 cm
LREI2015-35	<i>Homo</i>	foot	left	✓				$\approx$ 17 cm	$\approx$ 17 cm	$\approx$ 8 cm
LREI2015-36	<i>Homo</i>	foot	right	✓			✓	18.8 cm	18.8 cm	7.7 cm
LREI2015-37	<i>Homo</i>	foot	right	✓			✓	13.3 cm	13.3 cm	5.9 cm
LREI2015-38	<i>Homo</i>	foot	right	✓	✓		✓	14.3 cm	unknown	unknown
LREI2015-39	<i>Homo</i>	foot	unknown	✓				$\approx$ 6 cm	unknown	$\approx$ 5 cm
LREI2015-40	<i>Homo</i>	foot	left	✓				$\approx$ 21 cm	$\approx$ 21 cm	$\approx$ 7 cm
LREI2015-41	<i>Homo</i>	foot	left	✓				$\approx$ 18 cm	$\approx$ 18 cm	$\approx$ 8 cm
LREI2015-42	<i>Homo</i>	foot	unknown	✓	✓		✓	21.5 cm	unknown	7.5 cm
LREI2015-43	<i>Homo</i>	foot	left	✓	✓		✓	24.9 cm	24.9 cm	unknown
LREI2015-44	<i>Homo</i>	foot	left	✓			✓	25.2 cm	unknown	10.1 cm
LREI2015-45	<i>Homo</i>	foot	left	✓	✓		✓	21.2 cm	unknown	8.9 cm
LREI2015-46	<i>Homo</i>	foot	right	✓	✓		✓	18.5 cm	18.5 cm	unknown
LREI2015-47	<i>Homo</i>	foot	left	✓	✓		✓	18.3 cm	18.3 cm	6.9 cm
LREI2015-48	<i>Homo</i>	foot	left	✓				22.8 cm	unknown	8.9 cm
LREI2015-49	<i>Homo</i>	foot	right	✓	✓		✓	16.2 cm	16.2 cm	6.9 cm
LREI2015-50	<i>Homo</i>	foot	right	✓				$\approx$ 24 cm	$\approx$ 24 cm	$\approx$ 9 cm
LREI2015-51	<i>Homo</i>	foot	right	✓				$\approx$ 14 cm	unknown	unknown
LREI2015-52	<i>Homo</i>	foot	left	✓				$\approx$ 18 cm	unknown	$\approx$ 7 cm
LREI2015-53	<i>Homo</i>	foot	right	✓	✓		✓	18.0 cm	18.0 cm	9.6 cm
LREI2016-01	<i>Homo</i>	foot	right	✓	✓		✓	16.5 cm	unknown	6.6 cm
LREI2016-02	<i>Homo</i>	foot	left	✓				$\approx$ 21 cm	unknown	$\approx$ 8 cm
LREI2016-03	<i>Homo</i>	foot	left	✓	✓		✓	13.8 cm	13.8 cm	5.4 cm
LREI2016-04	<i>Homo</i>	foot	right	✓	✓		✓	21.3 cm	unknown	9.9 cm
LREI2016-05	<i>Homo</i>	foot	left (?)	✓	✓		✓	18.2 cm	unknown	8.4 cm
LREI2016-06	<i>Homo</i>	foot	right	✓	✓		✓	22.5 cm	unknown	10.0 cm
LREI2016-07	<i>Homo</i>	foot	left	✓			✓	16.4 cm	16.4 cm	8.3 cm
LREI2016-08	<i>Homo</i>	foot	right	✓				$\approx$ 15 cm	unknown	$\approx$ 5 cm
LREI2016-09	<i>Homo</i>	hand	right	✓	✓		✓	11.4 cm	11.4 cm	unknown
LREI2016-10	<i>Homo</i>	foot	left	✓	✓		✓	17.0 cm	unknown	8.0 cm
LREI2016-11	<i>Homo</i>	foot	left	✓	✓		✓	12.1 cm	12.1 cm	5.0 cm
LREI2016-12	<i>Homo</i>	foot	right	✓	✓		✓	12.5 cm	12.5 cm	4.9 cm
LREI2016-13	<i>Homo</i>	foot	left	✓	✓		✓	10.1 cm	unknown	unknown
LREI2016-14	<i>Homo</i>	foot	left	✓	✓		✓	13.5 cm	unknown	5.3 cm
LREI2016-15	<i>Homo</i>	foot	left	✓	✓		✓	10.9 cm	unknown	5.9 cm
LREI2016-16	<i>Homo</i>	foot	unknown	✓	✓		✓	19.6 cm	unknown	8.8 cm
LREI2016-17	<i>Homo</i>	foot	right (?)	✓	✓		✓	14.5 cm	unknown	6.7 cm
LREI2016-18	<i>Homo</i>	foot	left (?)	✓	✓		✓	17.5 cm	17.5 cm	7.2 cm
LREI2016-19	<i>Homo</i>	foot	right	✓	✓		✓	26.8 cm	26.8 cm	10.9 cm
LREI2016-20	<i>Homo</i>	foot	left	✓	✓		✓	17.4 cm	unknown	6.9 cm
LREI2016-21	<i>Homo</i>	foot	unknown	✓	✓		✓	9.7 cm	unknown	7.5 cm
LREI2016-22	<i>Homo</i>	foot	left (?)	✓	✓		✓	17.0 cm	unknown	7.3 cm
LREI2016-23	<i>Homo</i>	foot	right	✓	✓		✓	16.5 cm	unknown	6.8 cm
LREI2016-24	<i>Homo</i>	foot	unknown	✓	✓		✓	14.3 cm	unknown	5.5 cm
LREI2016-25	<i>Homo</i>	foot	left	✓			✓	16.2 cm	16.2 cm	7.2 cm
LREI2016-26	<i>Homo</i>	hand	right	✓	✓		✓	16.1 cm	16.1 cm	unknown
LREI2016-27	<i>Homo</i>	foot	right	✓				$\approx$ 13 cm	unknown	$\approx$ 5 cm
LREI2016-28	<i>Homo</i>	foot	left	✓			✓	22.0 cm	unknown	10.4 cm
LREI2016-29	<i>Homo</i>	foot	right	✓			✓	18.2 cm	unknown	6.7 cm
LREI2016-30	<i>Homo</i>	foot	left	✓			✓	18.9 cm	unknown	unknown
LREI2016-31	<i>Homo</i>	hand	right	✓			✓	8.5 cm	unknown	unknown
LREI2016-32	<i>Homo</i>	foot	right	✓			✓	24.6 cm	unknown	10.5 cm
LREI2016-33	<i>Homo</i>	foot	left	✓			✓	16.1 cm	16.1 cm	7.9 cm
LREI2016-34	<i>Homo</i>	foot	left	✓			✓	23.6 cm	unknown	7.7 cm



**Table S2 (3/5).** Inventory of the tracks discovered at Le Rozel. The maximal length ( $L_{\max}$ ) is measured along the longitudinal axis. It will be equal to the total length (L) if the track is longitudinally complete. The distal width (w) corresponds to the largest breadth of the forefoot impression and is measured along the mediolateral axis. The measurements preceded by the sign “ $\approx$ ” were realized in situ. The measurements made from 3D models are accurate to the millimeter.

Inventory number	Taxon	Anatomical part	Laterality	Recording				Measurements		
				Photos	Cast	Original extraction	3D capture	$L_{\max}$	L	w
LREI2016-35	<i>Homo</i>	foot	left (?)	✓			✓	21.5 cm	21.5 cm	8.7 cm
LREI2016-36	<i>Homo</i>	foot	right (?)	✓			✓	13.1 cm	13.1 cm	unknown
LREI2016-37	<i>Homo</i>	foot	right (?)	✓			✓	17.2 cm	unknown	10.5 cm
LREI2016-38	<i>Homo</i>	foot	unknown	✓			✓	19.1 cm	unknown	unknown
LREI2016-39	<i>Homo</i>	foot	left	✓			✓	16.9 cm	16.9 cm	6.2 cm
LREI2016-40	<i>Homo</i>	foot	right	✓			✓	11.7 cm	unknown	4.5 cm
LREI2016-41	<i>Homo</i>	foot	left	✓			✓	13.3 cm	unknown	5.3 cm
LREI2016-42	<i>Homo</i>	foot	left	✓			✓	12.1 cm	unknown	5.9 cm
LREI2016-43	<i>Homo</i>	foot	right	✓			✓	12.0 cm	unknown	4.6 cm
LREI2016-44	<i>Homo</i>	foot	left	✓	✓		✓	25.8 cm	unknown	10.2 cm
LREI2016-45	<i>Homo</i>	foot	unknown	✓			✓	17.0 cm	unknown	8.0 cm
LREI2016-46	<i>Homo</i>	foot	right	✓				$\approx$ 23 cm	unknown	unknown
LREI2016-47	<i>Homo</i>	foot	right (?)	✓			✓	12.2 cm	unknown	7.5 cm
LREI2016-48	<i>Homo</i>	foot	right	✓				$\approx$ 20 cm	$\approx$ 20 cm	$\approx$ 8 cm
LREI2016-49	<i>Homo</i>	foot	right	✓				$\approx$ 14 cm	unknown	$\approx$ 5.5 cm
LREI2016-50	<i>Homo</i>	foot	right	✓	✓			$\approx$ 14 cm	unknown	$\approx$ 6 cm
LREI2016-51	<i>Homo</i>	foot	right	✓	✓		✓	25.1 cm	unknown	9.4 cm
LREI2016-52	<i>Homo</i>	foot	left	✓			✓	23.5 cm	unknown	8.3 cm
LREI2016-53	<i>Homo</i>	foot	right	✓				$\approx$ 18 cm	unknown	$\approx$ 7 cm
LREI2016-54	<i>Homo</i>	foot	right	✓				$\approx$ 18 cm	unknown	$\approx$ 9 cm
LREI2016-55	<i>Homo</i>	foot	left	✓	✓		✓	14.1 cm	unknown	unknown
LREI2016-56	<i>Homo</i>	foot	right	✓	✓		✓	16.4 cm	16.4 cm	6.1 cm
LREI2016-57	<i>Homo</i>	foot	right	✓	✓		✓	21.3 cm	unknown	8.7 cm
LREI2016-58	<i>Homo</i>	foot	left	✓				$\approx$ 25 cm	unknown	$\approx$ 9 cm
LREI2016-59	<i>Homo</i>	foot	left	✓			✓	20.1 cm	unknown	7.3 cm
LREI2016-60	<i>Homo</i>	foot	left	✓	✓		✓	14.8 cm	14.8 cm	5.6 cm
LREI2016-61	<i>Homo</i>	foot	unknown	✓	✓		✓	17.5 cm	17.5 cm	5.9 cm
LREI2016-62	<i>Homo</i>	foot	left	✓				$\approx$ 21 cm	unknown	$\approx$ 7 cm
LREI2016-63	<i>Homo</i>	foot	left	✓				$\approx$ 20 cm	unknown	$\approx$ 9 cm
LREI2016-64	<i>Homo</i>	foot	left	✓	✓			$\approx$ 16 cm	$\approx$ 16 cm	unknown
LREI2016-65	<i>Homo</i>	foot	left	✓				$\approx$ 15 cm	unknown	$\approx$ 8 cm
LREI2016-66	<i>Homo</i>	foot	left	✓	✓		✓	19.5 cm	19.5 cm	8.8 cm
LREI2016-67	<i>Homo</i>	foot	right	✓	✓		✓	15.0 cm	15.0 cm	6.5 cm
LREI2016-68	<i>Homo</i>	foot	right	✓	✓		✓	21.7 cm	21.7 cm	6.9 cm
LREI2016-69	<i>Homo</i>	foot	unknown	✓				unknown	unknown	unknown
LREI2016-70	<i>Homo</i>	foot	left	✓				$\approx$ 16.5 cm	unknown	unknown
LREI2016-71	<i>Homo</i>	foot	left	✓			✓	23.6 cm	23.6 cm	8.7 cm
LREI2016-72	<i>Homo</i>	foot	left	✓			✓	17.5 cm	17.5 cm	7.8 cm
LREI2016-73	<i>Homo</i>	foot	left	✓			✓	22.8 cm	22.8 cm	8.1 cm
LREI2016-74	<i>Homo</i>	foot	left	✓				$\approx$ 14 cm	unknown	$\approx$ 7 cm
LREI2016-75	<i>Homo</i>	foot	right	✓			✓	6.5 cm	unknown	4.5 cm
LREI2016-76	<i>Homo</i>	foot	left	✓			✓	9.7 cm	unknown	4.6 cm
LREI2016-77	<i>Homo</i>	foot	left	✓				$\approx$ 14 cm	$\approx$ 14 cm	$\approx$ 7 cm
LREI2016-78	<i>Homo</i>	foot	right (?)	✓			✓	10.3 cm	unknown	5.4 cm
LREI2016-79	<i>Homo</i>	foot	right	✓			✓	22.1 cm	22.1 cm	9.6 cm
LREI2017-01	<i>Homo</i>	foot	left	✓		✓		$\approx$ 19 cm	unknown	unknown
LREI2017-02	<i>Homo</i>	foot	right (?)	✓				$\approx$ 19 cm	unknown	$\approx$ 7.5 cm
LREI2017-03	<i>Homo</i>	foot	left (?)	✓				$\approx$ 12.5 cm	unknown	$\approx$ 5 cm
LREI2017-04	<i>Homo</i>	foot	left (?)	✓		✓	✓	17.4 cm	unknown	7.6 cm
LREI2017-05	<i>Homo</i>	foot	unknown	✓		✓		$\approx$ 19 cm	unknown	$\approx$ 10 cm
LREI2017-06	<i>Homo</i>	foot	right (?)	✓				$\approx$ 18 cm	unknown	$\approx$ 7.5 cm
LREI2017-07	<i>Homo</i>	foot	right	✓		✓	✓	15.4 cm	15.4 cm	7.3 cm
LREI2017-08	<i>Homo</i>	foot	right	✓		✓	✓	17.5 cm	unknown	5.9 cm
LREI2017-09	<i>Homo</i>	foot	unknown	✓		✓	✓	17.8 cm	unknown	7.8 cm
LREI2017-10	<i>Homo</i>	foot	right	✓				$\approx$ 21 cm	unknown	$\approx$ 8 cm
LREI2017-11	<i>Homo</i>	foot	right (?)	✓		✓	✓	20.3 cm	unknown	7.2 cm

**Table S2 (4/5).** Inventory of the tracks discovered at Le Rozel. The maximal length ( $L_{\max}$ ) is measured along the longitudinal axis. It will be equal to the total length (L) if the track is longitudinally complete. The distal width (w) corresponds to the largest breadth of the forefoot impression and is measured along the mediolateral axis. The measurements preceded by the sign “ $\approx$ ” were realized in situ. The measurements made from 3D models are accurate to the millimeter.

Inventory number	Taxon	Anatomical part	Laterality	Recording				Measurements		
				Photos	Cast	Original extraction	3D capture	$L_{\max}$	L	w
LREI2017-12	<i>Homo</i>	foot	left	✓		✓		$\approx$ 15 cm	$\approx$ 15 cm	$\approx$ 7 cm
LREI2017-13	<i>Homo</i>	foot	left	✓		✓	✓	17.9 cm	17.9 cm	unknown
LREI2017-14	<i>Homo</i>	foot	unknown	✓		✓	✓	15.0 cm	unknown	6.3 cm
LREI2017-15	<i>Homo</i>	foot	right (?)	✓				$\approx$ 19 cm	unknown	$\approx$ 5 cm
LREI2017-16	<i>Homo</i>	foot	right (?)	✓				$\approx$ 18 cm	unknown	$\approx$ 7 cm
LREI2017-17	<i>Homo</i>	foot	left	✓		✓	✓	24.3 cm	unknown	9.8 cm
LREI2017-18	<i>Homo</i>	foot	left	✓		✓	✓	19.2 cm	19.2 cm	8.6 cm
LREI2017-19	<i>Homo</i>	foot	right	✓			✓	21.7 cm	unknown	9.3 cm
LREI2017-20	<i>Homo</i>	foot	left (?)	✓		✓	✓	20.1 cm	unknown	10.6 cm
LREI2017-21	<i>Homo</i>	foot	unknown	✓			✓	12.2 cm	unknown	unknown
LREI2017-22	<i>Homo</i>	foot	left	✓		✓	✓	20.5 cm	20.5 cm	8.1 cm
LREI2017-23	<i>Homo</i>	foot	left	✓				$\approx$ 17 cm	unknown	$\approx$ 9 cm
LREI2017-24	<i>Homo</i>	foot	left	✓		✓	✓	20.7 cm	unknown	9.5 cm
LREI2017-25	<i>Homo</i>	foot	left	✓		✓	✓	22.0 cm	unknown	9.8 cm
LREI2017-26	<i>Homo</i>	foot	right	✓			✓	19.5 cm	unknown	unknown
LREI2017-27	<i>Homo</i>	foot	left	✓		✓	✓	25.9 cm	unknown	11.2 cm
LREI2017-28	<i>Homo</i>	hand	right	✓		✓	✓	15.7 cm	15.7 cm	9.1 cm
LREI2017-29	<i>Homo</i>	foot	left	✓			✓	22.9 cm	unknown	9.0 cm
LREI2017-30	<i>Homo</i>	foot	right	✓		✓	✓	26.4 cm	unknown	12.8 cm
LREI2017-31	<i>Homo</i>	foot	right	✓			✓	18.4 cm	unknown	7.8 cm
LREI2017-32	<i>Homo</i>	foot	right (?)	✓		✓	✓	21.3 cm	21.3 cm	10.3 cm
LREI2017-33	<i>Homo</i>	foot	left	✓		✓	✓	18.7 cm	unknown	7.8 cm
LREI2017-34	<i>Homo</i>	foot	right (?)	✓				$\approx$ 17 cm	unknown	$\approx$ 9 cm
LREI2017-35	<i>Homo</i>	foot	right (?)	✓				$\approx$ 24.5 cm	unknown	$\approx$ 9 cm
LREI2017-36	<i>Homo</i>	foot	unknown	✓		✓	✓	24.0 cm	unknown	9.5 cm
LREI2017-37	<i>Homo</i>	foot	right	✓			✓	20.8 cm	unknown	9.2 cm
LREI2017-38	<i>Homo</i>	foot	right	✓				$\approx$ 23 cm	unknown	$\approx$ 9 cm
LREI2017-39	<i>Homo</i>	foot	right	✓				$\approx$ 23 cm	unknown	$\approx$ 12.5 cm
LREI2017-40	<i>Homo</i>	foot	unknown	✓				$\approx$ 15 cm	$\approx$ 15 cm	$\approx$ 7 cm
LREI2017-41	<i>Homo</i>	foot	left	✓		✓	✓	18.1 cm	18.1 cm	7.6 cm
LREI2017-42	<i>Homo</i>	foot	right	✓				22.0 cm	unknown	9.9 cm
LREI2017-43	<i>Homo</i>	foot	right	✓				$\approx$ 16 cm	unknown	$\approx$ 8 cm
LREI2017-44	<i>Animalia</i> ( <i>Carnivora</i> )	paw	unknown	✓		✓	✓	7.6 cm	unknown	4.8 cm
LREI2017-45	<i>Homo</i>	foot	right	✓		✓	✓	22.6 cm	unknown	9.4 cm
LREI2017-46	<i>Animalia</i> ( <i>Carnivora</i> )	paw	unknown	✓		✓	✓	11.2 cm	unknown	9.0 cm
LREI2017-47	<i>Homo</i>	foot	right	✓		✓	✓	24.7 cm	24.7 cm	12.3 cm
LREI2017-48	<i>Homo</i>	foot	left	✓		✓	✓	17.2 cm	unknown	9.2 cm
LREI2017-49	<i>Homo</i>	foot	left	✓		✓	✓	21.4 cm	21.4 cm	9.2 cm
LREI2017-50	<i>Animalia</i> ( <i>Ruminantia</i> . <i>Cervidae</i> )	paw	unknown	✓		✓	✓	8.1 cm	unknown	3.3 cm
LREI2017-51	<i>Homo</i>	foot	right	✓		✓	✓	29.1 cm	unknown	10.5 cm
LREI2017-52	<i>Homo</i>	foot	right	✓		✓		23.2 cm	23.2 cm	9.4 cm
LREI2017-53	<i>Homo</i>	foot	right (?)	✓			✓	22.1 cm	unknown	10.1 cm
LREI2017-54	<i>Homo</i>	foot	unknown	✓		✓	✓	15.2 cm	unknown	unknown
LREI2017-55	<i>Homo</i>	foot	unknown	✓		✓	✓	13.4 cm	unknown	unknown
LREI2017-56	<i>Homo</i>	foot	right	✓				22.9 cm	22.9 cm	8.7 cm
LREI2017-57	<i>Homo</i>	foot	left	✓			✓	19.4 cm	19.4 cm	7.8 cm
LREI2017-58	<i>Homo</i>	foot	left	✓				$\approx$ 18 cm	unknown	$\approx$ 7 cm
LREI2017-59	<i>Homo</i>	foot	left (?)	✓				$\approx$ 16 cm	unknown	$\approx$ 7 cm
LREI2017-60	<i>Homo</i>	foot	unknown	✓				$\approx$ 14 cm	unknown	$\approx$ 8 cm
LREI2017-61	<i>Homo</i>	foot	right	✓		✓	✓	18.3 cm	unknown	6.4 cm
LREI2017-62	<i>Homo</i>	foot	left (?)	✓		✓	✓	17.7 cm	unknown	6.5 cm
LREI2017-63	<i>Homo</i>	foot	right	✓		✓	✓	23.8 cm	unknown	9.2 cm

**Table S2 (5/5).** Inventory of the tracks discovered at Le Rozel. The maximal length ( $L_{\max}$ ) is measured along the longitudinal axis. It will be equal to the total length (L) if the track is longitudinally complete. The distal width (w) corresponds to the largest breadth of the forefoot impression and is measured along the mediolateral axis. The measurements preceded by the sign “ $\approx$ ” were realized in situ. The measurements made from 3D models are accurate to the millimeter.

Inventory number	Taxon	Anatomical part	Laterality	Recording				Measurements		
				Photos	Cast	Original extraction	3D capture	$L_{\max}$	L	w
LREI2017-64	<i>Homo</i>	foot	left	✓			✓	23.4 cm	23.4 cm	8.9 cm
LREI2017-65	<i>Animalia</i> ( <i>Carnivora</i> )	paw	unknown	✓		✓	✓	3.8 cm	unknown	6.6 cm
LREI2017-66	<i>Homo</i>	foot	left	✓			✓	21.6 cm	unknown	11.2 cm
LREI2017-67	<i>Animalia</i> ( <i>Carnivora</i> , <i>Canidae</i> )	paw	unknown	✓		✓	✓	7.4 cm	7.4 cm	5.7 cm
LREI2017-68	<i>Homo</i>	foot	left	✓		✓	✓	23.8 cm	unknown	11.2 cm
LREI2017-69	<i>Homo</i>	hand	right	✓		✓	✓	14.1 cm	14.1 cm	13.7 cm
LREI2017-70	<i>Homo</i>	foot	left (?)	✓				$\approx$ 20 cm	unknown	$\approx$ 10 cm
LREI2017-71	<i>Homo</i>	foot	right	✓			✓	23.4 cm	23.4 cm	11.1 cm
LREI2017-72	<i>Homo</i>	foot	left	✓		✓	✓	20.4 cm	unknown	9.5 cm
LREI2017-73	<i>Homo</i>	foot	left	✓		✓	✓	22.1 cm	22.1 cm	10.2 cm
LREI2017-74	<i>Homo</i>	foot	right	✓		✓		$\approx$ 15.5 cm	unknown	$\approx$ 9 cm
LREI2017-75	<i>Homo</i>	foot	left	✓		✓	✓	17.3 cm	17.3 cm	8.6 cm
LREI2017-76	<i>Homo</i>	foot	right	✓		✓	✓	20.9 cm	unknown	9.4 cm
LREI2017-77	<i>Homo</i>	foot	right	✓				$\approx$ 14 cm	unknown	$\approx$ 6 cm
LREI2017-78	<i>Homo</i>	foot	right (?)	✓		✓	✓	22.3 cm	unknown	8.7 cm
LREI2017-79	<i>Homo</i>	foot	left (?)	✓				$\approx$ 19 cm	$\approx$ 19 cm	$\approx$ 10 cm
LREI2017-80	<i>Animalia</i> ( <i>Carnivora</i> )	paw	unknown	✓		✓	✓	7.3 cm	unknown	8.9 cm
LREI2017-81	<i>Homo</i>	foot	left (?)	✓			✓	19.7 cm	unknown	8.0 cm
LREI2017-82	<i>Homo</i>	foot	left	✓		✓		$\approx$ 23.5 cm	unknown	$\approx$ 10 cm
LREI2017-83	<i>Homo</i>	foot	right	✓		✓		$\approx$ 22 cm	unknown	$\approx$ 9 cm
LREI2017-84	<i>Homo</i>	foot	right	✓		✓		$\approx$ 28 cm	$\approx$ 28 cm	$\approx$ 12 cm
LREI2017-85	<i>Homo</i>	foot	right	✓				$\approx$ 23 cm	unknown	$\approx$ 9 cm
LREI2017-86	<i>Homo</i>	foot	right	✓		✓	✓	28.4 cm	28.4 cm	12.2 cm
LREI2017-87	<i>Homo</i>	foot	left	✓		✓	✓	27.5 cm	27.5 cm	9.9 cm
LREI2017-88	<i>Homo</i>	foot	left (?)	✓				$\approx$ 16 cm	unknown	$\approx$ 5 cm
LREI2017-89	<i>Homo</i>	foot	left	✓		✓	✓	20.2 cm	unknown	unknown
LREI2017-90	<i>Homo</i>	foot	left	✓			✓	13.8 cm	unknown	8.9 cm
LREI2017-91	<i>Homo</i>	foot	right	✓		✓	✓	16.2 cm	unknown	8.8 cm
LREI2017-92	<i>Homo</i>	foot	left	✓			✓	22.1 cm	unknown	10.1 cm
LREI2017-93	<i>Homo</i>	foot	right (?)	✓				$\approx$ 20 cm	unknown	$\approx$ 7 cm
LREI2017-94	<i>Homo</i>	foot	right	✓				$\approx$ 18 cm	unknown	$\approx$ 9 cm
LREI2017-95	<i>Homo</i>	foot	right	✓		✓	✓	18.8 cm	18.8 cm	7.6 cm
LREI2017-96	<i>Homo</i>	foot	left	✓		✓	✓	15.1 cm	unknown	7.0 cm
LREI2017-97	<i>Homo</i>	foot	left	✓			✓	19.9 cm	unknown	9.3 cm
LREI2017-98	<i>Homo</i>	foot	right	✓		✓	✓	24.9 cm	unknown	11.4 cm
LREI2017-99	<i>Homo</i>	foot	left	✓		✓	✓	17.4 cm	unknown	7.9 cm
LREI2017-100	<i>Homo</i>	foot	right	✓		✓		$\approx$ 15 cm	unknown	$\approx$ 8 cm
LREI2017-101	<i>Homo</i>	foot	right	✓		✓	✓	15.8 cm	15.8 cm	7.0 cm
LREI2017-102	<i>Homo</i>	foot	right	✓			✓	16.4 cm	16.4 cm	7.2 cm
LREI2017-103	<i>Homo</i>	foot	right (?)	✓			✓	22.1 cm	22.1 cm	12.5 cm
LREI2017-104	<i>Homo</i>	foot	right	✓		✓	✓	17.0 cm	17.0 cm	9.2 cm
LREI2017-105	<i>Homo</i>	foot	left	✓		✓	✓	21.7 cm	21.7 cm	8.8 cm
LREI2017-106	<i>Homo</i>	foot	left	✓		✓		$\approx$ 26 cm	unknown	$\approx$ 9 cm
LREI2017-107	<i>Homo</i>	foot	left	✓		✓	✓	16.1 cm	unknown	9.2 cm
LREI2017-108	<i>Homo</i>	foot	right (?)	✓		✓	✓	16.5 cm	unknown	8.5 cm
LREI2017-109	<i>Homo</i>	foot	left (?)	✓			✓	19.5 cm	unknown	8.9 cm
LREI2017-110	<i>Homo</i>	foot	right	✓			✓	19.3 cm	19.3 cm	10.0 cm
LREI2017-111	<i>Homo</i>	foot	unknown	✓			✓	16.9 cm	16.9 cm	unknown
LREI2017-112	<i>Homo</i>	foot	left	✓		✓	✓	15.6 cm	15.6 cm	7.1 cm
LREI2017-113	<i>Homo</i>	foot	unknown	✓		✓	✓	14.6 cm	unknown	8.2 cm
LREI2017-114	<i>Homo</i>	foot	right (?)	✓		✓	✓	34.0 cm	unknown	12.2 cm
LREI2017-115	<i>Homo</i>	foot	right	✓		✓	✓	16.1 cm	unknown	$\approx$ 9 cm

**The hominin footprints from Le Rozel:**



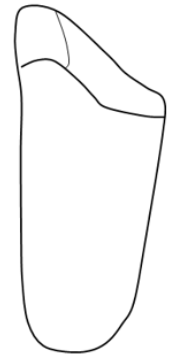
Forefoot  
↕  
Heel



**LREI2014-12**



Forefoot  
↕  
Heel



**LREI2015-04**



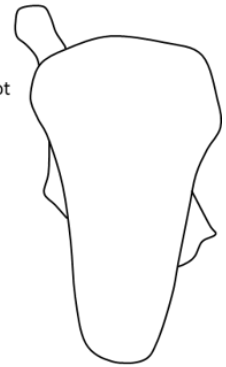
Forefoot  
↕  
Heel



**LREI2015-07**



Forefoot  
↕  
Heel



**LREI2015-30**



Forefoot  
↕  
Heel



**LREI2015-33**



Forefoot  
↕  
Heel



**LREI2015-36**

**Fig. S11 (1/6).** Views and associated outlines of the footprints from Le Rozel (scale bar: 2 cm)  
(Photos: D. Cliquet)



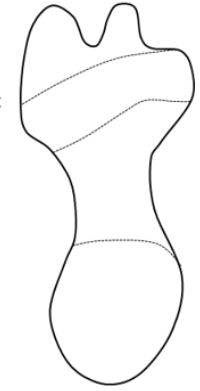
Forefoot  
↑  
↓  
Heel



LREI2015-48



Forefoot  
↑  
↓  
Heel



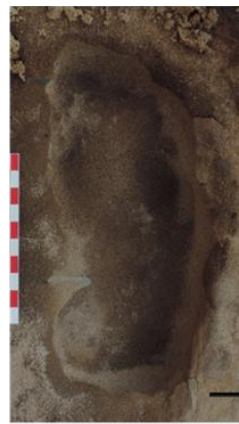
LREI2015-49



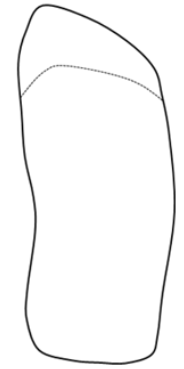
Forefoot  
↑  
↓  
Heel



LREI2015-52



Forefoot  
↑  
↓  
Heel



LREI2016-06



Forefoot  
↑  
↓  
Heel



LREI2016-08



Forefoot  
↑  
↓  
Heel

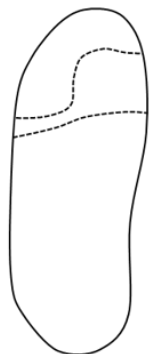


LREI2016-25

**Fig. S11 (2/6).** Views and associated outlines of the footprints from Le Rozel (scale bar: 2 cm)  
(Photos: D. Cliquet)



Forefoot  
↕  
Heel



LREI2016-60



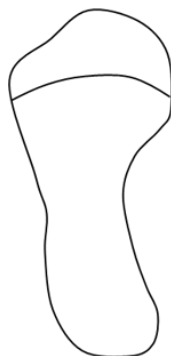
Forefoot  
↕  
Heel



LREI2016-66



Forefoot  
↕  
Heel



LREI2016-68



Forefoot  
↕  
Heel



LREI2016-72



Forefoot  
↕  
Heel



LREI2016-73



Forefoot  
↕  
Heel



LREI2016-79

**Fig. S11 (3/6).** Views and associated outlines of the footprints from Le Rozel (scale bar: 2 cm)  
(Photos: D. Cliquet)



Forefoot  
↑  
↓  
Heel



LREI2017-07



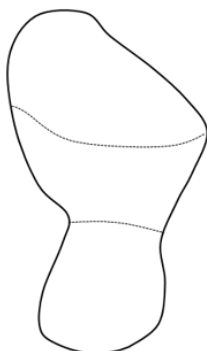
Forefoot  
↑  
↓  
Heel



LREI2017-18



Forefoot  
↑  
↓  
Heel



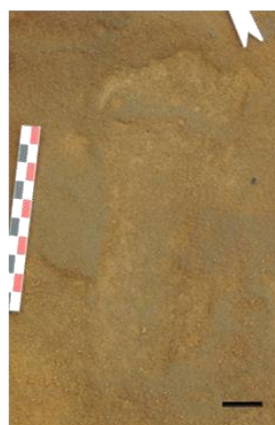
LREI2017-30



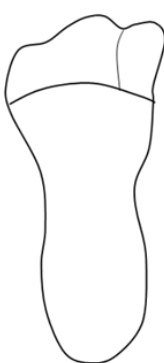
Forefoot  
↑  
↓  
Heel



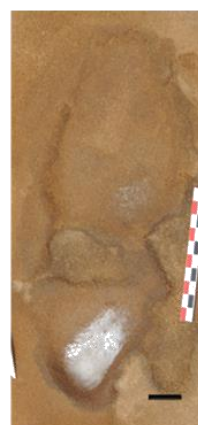
LREI2017-37



Forefoot  
↑  
↓  
Heel



LREI2017-41

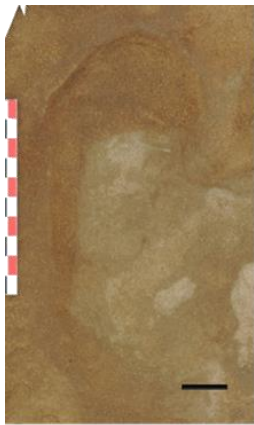


Forefoot  
↑  
↓  
Heel



LREI2017-51

**Fig. S11 (4/6).** Views and associated outlines of the footprints from Le Rozel (scale bar: 2 cm)  
(Photos: D. Cliquet)



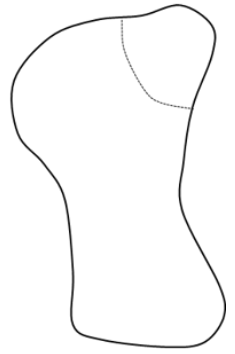
Forefoot  
↑  
↓  
Heel



LREI2017-57



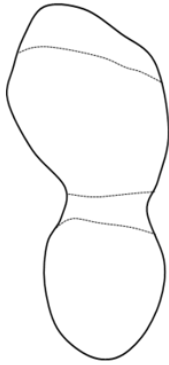
Forefoot  
↑  
↓  
Heel



LREI2017-66



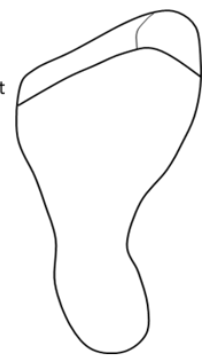
Forefoot  
↑  
↓  
Heel



LREI2017-71



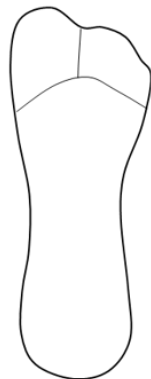
Forefoot  
↑  
↓  
Heel



LREI2017-73



Forefoot  
↑  
↓  
Heel



LREI2017-86



Forefoot  
↑  
↓  
Heel



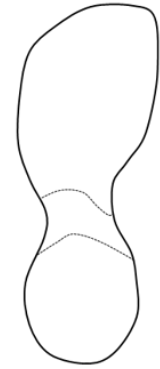
LREI2017-87

**Fig. S11 (5/6).** Views and associated outlines of the footprints from Le Rozel (scale bar: 2 cm)  
(Photos: D. Cliquet)





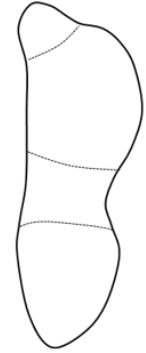
Forefoot  
↕  
Heel



LREI2017-88



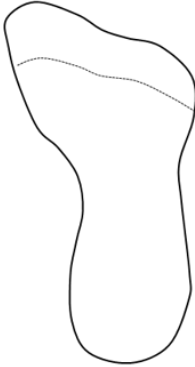
Forefoot  
↕  
Heel



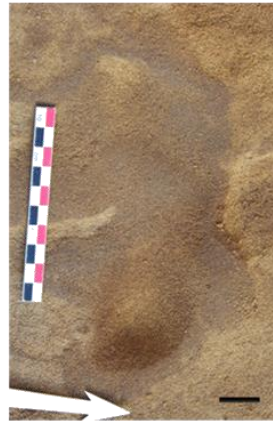
LREI2017-95



Forefoot  
↕  
Heel



LREI2017-101



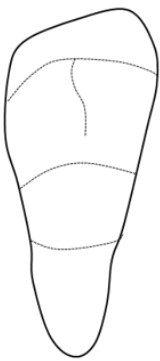
Forefoot  
↕  
Heel



LREI2017-102



Forefoot  
↕  
Heel



LREI2017-105



Forefoot  
↕  
Heel

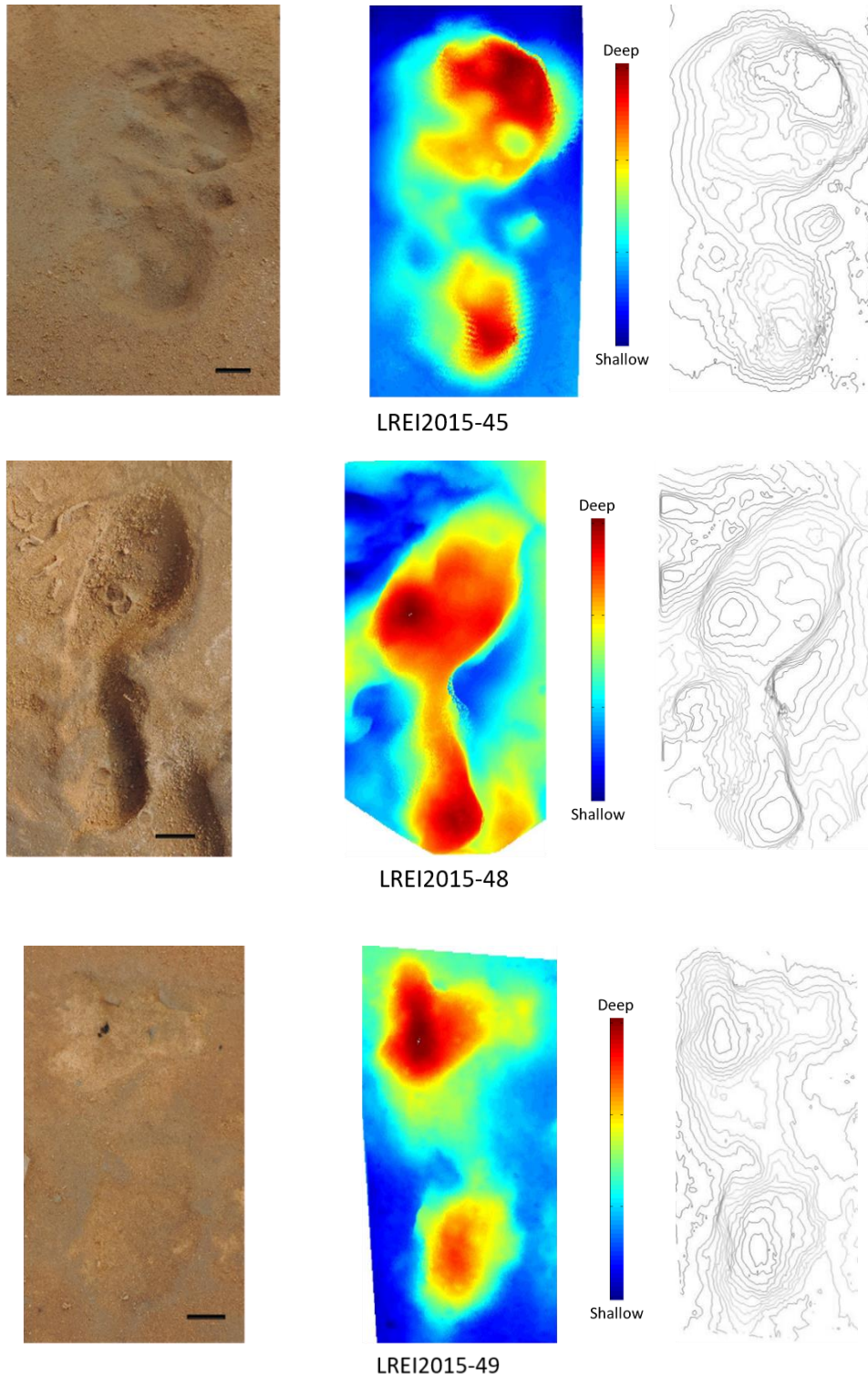


LREI2017-110

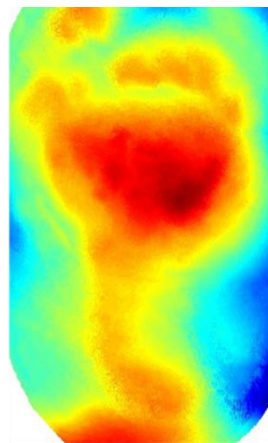
**Fig. S11 (6/6).** Views and associated outlines of the footprints from Le Rozel (scale bar: 2 cm)  
(Photos: D. Cliquet)

**Text S2: Depth distribution of the footprints from Le Rozel:**

The “depth maps” below were obtained thanks to the *Foot Processor* software. This software, running in *Mathworks Runtime Compiler 7.11*, was written by M. Budka (Bournemouth University). It is available for download (<http://footprints.bournemouth.ac.uk/>).



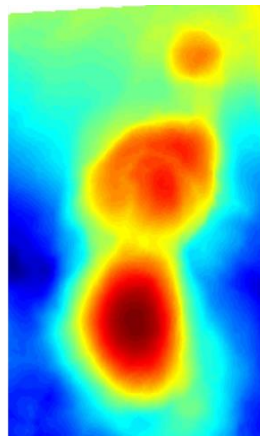
**Fig. S12 (1/4).** Views and shaded 3D elevation models of the footprints from Le Rozel (scale bar: 2 cm) (Photos: D. Cliquet)



Deep  
Shallow



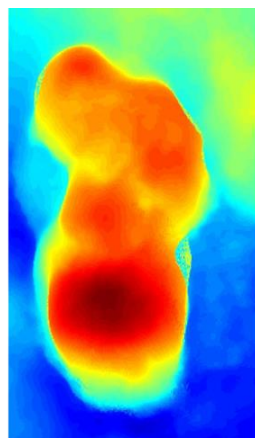
LREI2016-68



Deep  
Shallow



LREI2016-73

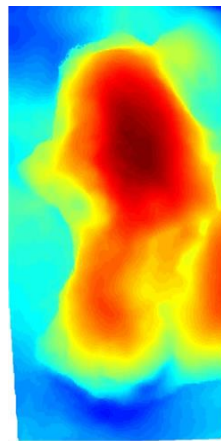


Deep  
Shallow



LREI2017-07

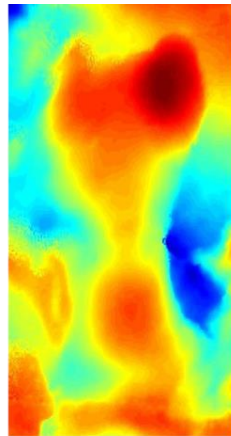
**Fig. S12 (2/4).** Views and shaded 3D elevation models of the footprints from Le Rozel (scale bar: 2 cm) (Photos: D. Cliquet)



Deep  
Shallow



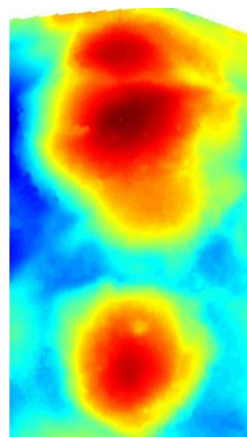
LREI2017-37



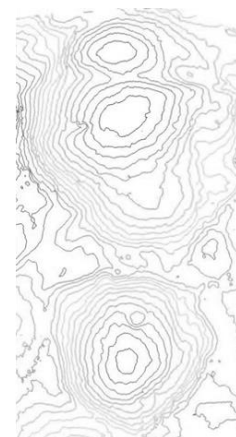
Deep  
Shallow



LREI2017-66

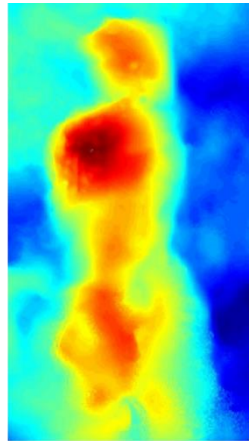


Deep  
Shallow

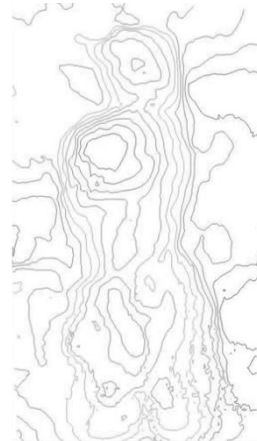


LREI2017-71

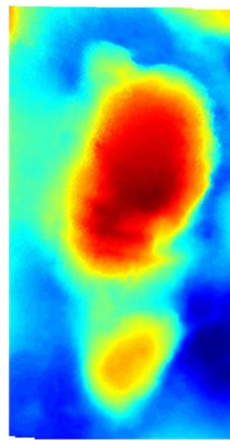
**Fig. S12 (3/4).** Views and shaded 3D elevation models of the footprints from Le Rozel (scale bar: 2 cm) (Photos: D. Cliquet)



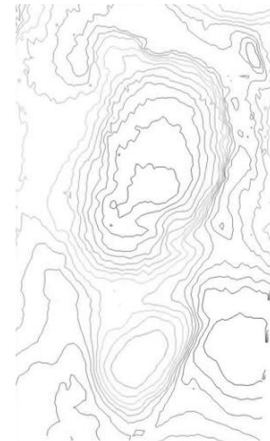
Deep  
Shallow



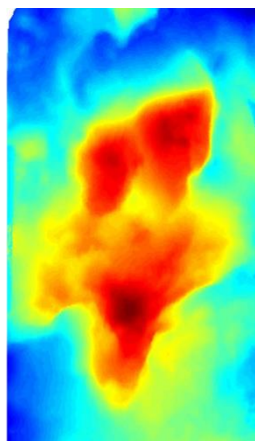
LREI2017-87



Deep  
Shallow



LREI2017-95



Deep  
Shallow



LREI2017-105

**Fig. S12 (4/4).** Views and shaded 3D elevation models of the footprints from Le Rozel (scale bar: 2 cm) (Photos: D. Cliquet)

### **Text S3: Experimental footprints:**

An experimental study was carried out in 2017. 192 footprints were (Fig. S13) made by 21 individuals, from 1 to 36 years old, under deposition conditions similar to the fossil footprints.

- **Experimental area:**

An experimental trackway (Fig. S13) was built from sediments, a fine and medium brown to black sand, extracted from the footprint areas during the excavations. This trackway is composed of a flat part, 6 meters long and 2 meters wide, where the experimental sequences described below took place. In order to respect the non-uniform moisture conditions in which the fossil footprints were made, the experimental sequences were carried out under different weather conditions, ranging from dry periods to important rainfalls that brought mud flows comparable to those observed on the archeological site.

- **Participants:**

The participants were born in France and lived near the site during the excavations in 2017. They were recruited after volunteering and signed a charter to give their consent after being informed of the purpose and the conduct of the study. Their date of birth was informed as well as their stature and the length of their feet which were measured on the same day as the experimental sequence (Tables S3-S4).

- **Experimental sequence:**

Each participant was asked to move barefoot and in a straight line by walking and slow running. The length and width of each footprint were measured *in situ* by several observers (Tables S3-S4). For each sequence, a right and a left footprint were also 3D digitized in *Agisoft Photoscan* (v.1.4.0) using a Canon EOS 1300D. These 3D models allowed to control the measurements realized *in situ* and they were studied in the morphometric analyses (Texts S5-S6).



**Fig. S13.** Experimental footprints (A) and trackway (B)

**Table S3.** Summary of the experimental biological data

	Number of individuals	Min.	Mean	Max.
Age (years)	21	1	21	36
Stature (cm)	21	87.0	162.2	182.3
Average foot length (cm)	20	20.4	23.4	26.6
Number of measurable footprints	21	2	9.1	19
Footprint length (cm)	21	13.1	23.7	29.2

**Table S4.** Experimental data

Individuals	Age (years)	Stature (cm)	Average foot length (cm)	Number of measurable footprints	Footprint length (cm)			
					Min.	Mean	Max.	Maximum deviation from the mean (m.d.)
#1	11	153.9	22.4	11	22.7	25.3	28.5	12.8%
#2	22	177.1	24.5	9	23.6	25.7	28.2	9.7%
#3	22	166.9	21.8	15	21.6	23.1	25.1	8.6%
#4	13	153.8	20.5	8	21.5	23.0	25.2	9.8%
#5	31	171.2	23.7	15	23.2	25.4	27.9	9.7%
#6	22	175.8	24.1	19	23.6	25.5	28.2	10.4%
#7	34	160.0	23.2	10	22.1	23.3	24.5	5.3%
#8	36	171.8	25.5	7	24.5	25.0	25.3	2.1%
#9	23	182.3	23.3	11	22.2	24.7	27.1	10.2%
#10	23	170.8	25.3	15	24.6	25.9	27.5	6.1%
#11	1	87.0		2	13.1	14.1	15.0	6.8%
#12	28	172.9	26.6	7	24.2	25.3	26.5	4.6%
#13	19	173.5	26.2	9	24.1	26.9	29.2	10.3%
#14	10	146.0	21.5	4	20.5	21.7	23.5	8.3%
#15	21	169.0	22.7	9	22.6	23.7	25.8	8.8%
#16	21	178.5	25.1	10	24.3	25.5	26.8	5.1%
#17	34	172.0	24.0	6	22.3	23.4	24.5	4.8%
#18	24	157.0	20.7	6	21.2	22.3	23.5	5.6%
#19	25	162.0	22.6	4	22.2	22.9	23.5	2.8%
#20	21	156.0	20.4	5	20.1	21.3	22.5	5.7%
#21	22	171.8	24.3	10	23.1	24.4	25.5	5.2%

#### Text S4: Comparative materials

For both the identification of the Le Rozel tracks as human footprints and for morphometric analyses, we used several 3D models of footprints from different sites and ages made by barefoot individuals. Most of them were made by *Homo sapiens* in soft ground comparable to the sedimentary deposit conditions at Le Rozel. Furthermore, in order to consider the impact of the habitual wearing of footwear on the pedal morphology, particularly on the longitudinal arch (e.g. 98-99), footprints made by both habitually shod (experimental footprints) and presumably unshod individuals (Holocene archeological footprints) were used.

This comparative material includes 52 footprints from our experimental study (see Text S3) as well as 3D models available online and in particular the database of Professor M. Bennett (<http://footprints.bournemouth.ac.uk/>) that we would like to acknowledge. These comparative samples are:

- 21 Holocene footprints from the Formby Point site (Great-Britain) made between 3.6 and 3.2 Ka BP in a soft and wet ground composed of silt to fine sand in a dune context (100-101). <http://footprints.bournemouth.ac.uk>
- 22 Pleistocene footprints from the White Sands National Monument site (USA) made probably between 15.6 and 10.0 Ka BP in muds and sands located in a paleolake context by several individuals that presumably hunted sloth (72). <http://footprints.bournemouth.ac.uk>
- 18 Pliocene footprints from the Laetoli site, which were made in 3.66 Ma old volcanic ash and are attributed to *Australopithecus*. 11 of them compose the G1 trackway (5). <http://footprints.bournemouth.ac.uk>

They are completed by 6 footprints from the S1 trackway and a footprint from the S2 trackway (7) whose 3D models are available at:

[https://www.morphosource.org/Detail/ProjectDetail/Show/project\\_id/298](https://www.morphosource.org/Detail/ProjectDetail/Show/project_id/298) (morphometric data acquired by S. Menconero, access provided by M. Cherin, Università di Perugia, Italy).



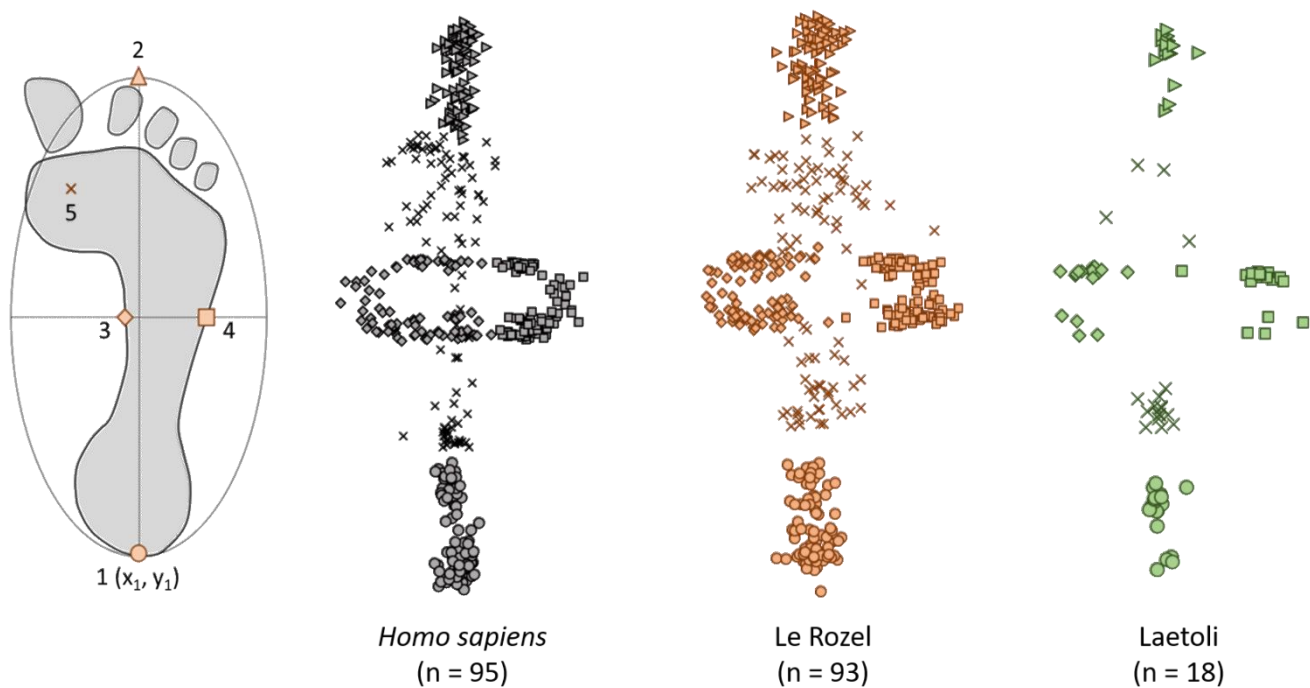
### **Text S5: Identification as human footprints:**

Identification criteria of the footprints from Le Rozel as hominin footprints are the following: a rounded heel, a longitudinal arch, relatively short toes, a mediolateral decrease of the length of the toes, an adducted hallux and maximum depth beneath the heel and the forefoot (41, 102-105).

We also tested the diagnosis through the morphometric method of Morse et al. (41, 106). Five geometric landmarks (Fig. S14) were placed using *Geomagic Studio 2013* and their 2D coordinates were subjected to a Generalized Procrustes Analysis using *PAST* (v.3.0; refs. 107-108). These landmarks were placed on 93 footprints from Le Rozel that meet all the following criteria: the footprint must (a) be digitized in 3D, (b) be complete enough to place the landmarks, (c) be made on a flat ground and (d) show no evidence of slide.

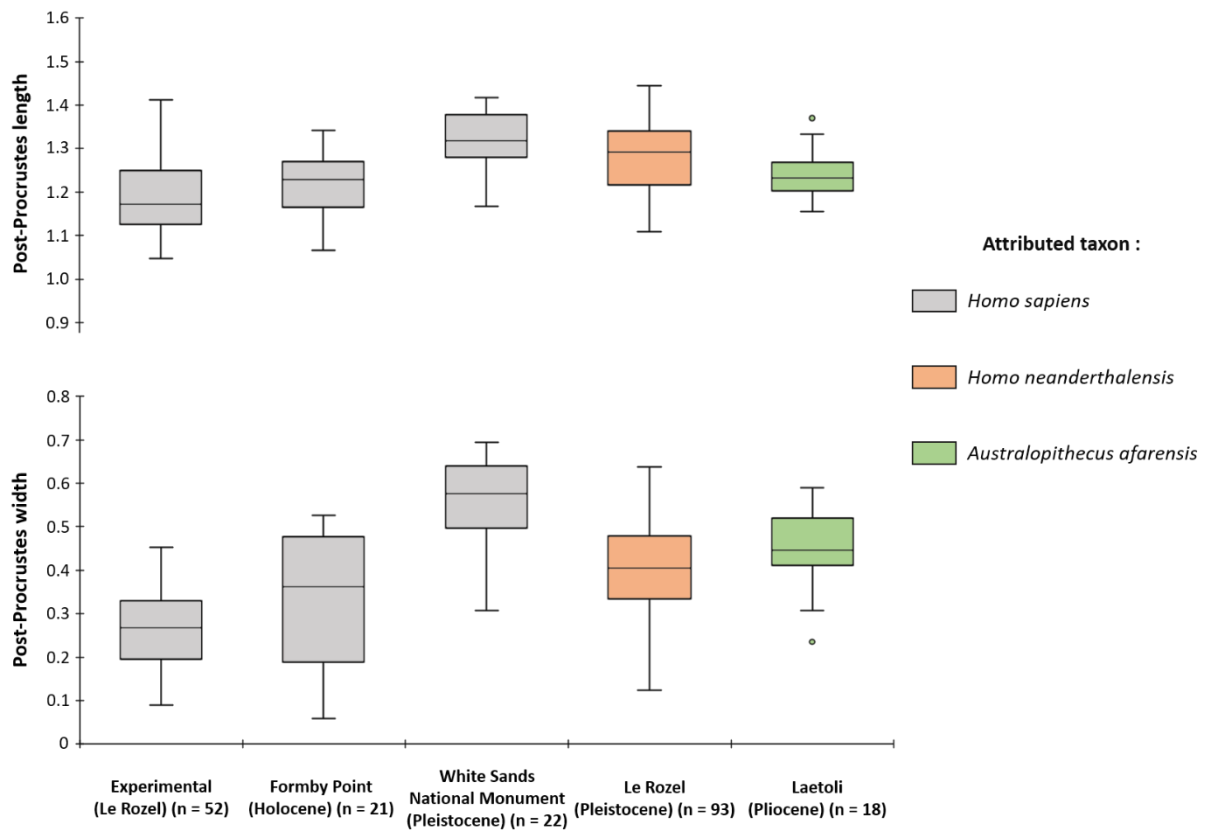
This method focuses on geometry rather than on the conservation of anatomical details, which is useful for footprints whose conservation is variable, as it is the case in dune context. For Le Rozel, we applied it to 36 footprints showing detailed anatomical traits, such as clear toe impressions, and to 57 less well-preserved footprints but that showed sufficient details to allow placing the 5 landmarks. Statistical comparisons were carried out between these two sub-samples for post-Procrustes lengths (interlandmark distance along the longitudinal axis) and widths (interlandmark distance along the longitudinal axis). No statistical difference was observed (ANOVA:  $P \gg 0.05$ ).

The positions of the landmarks were then compared with those of other footprints from our comparative materials (for more details see Texts S3-S4). The spatial distribution of the landmarks differs little from the other hominin footprints (Fig. S14). The maximum depth points are located either at the heel or at the forefoot, which is a characteristic for hominin footprints (41, 106). However, one footprint from Le Rozel (LREI2016-23) has a maximum depth located at the midfoot. This is however more probably linked to an irregularity of the ground rather than to anatomical differences or an erroneous identification. Such a midfoot position is also found in a few instances in the *H. sapiens* comparative samples (Fig. S14).

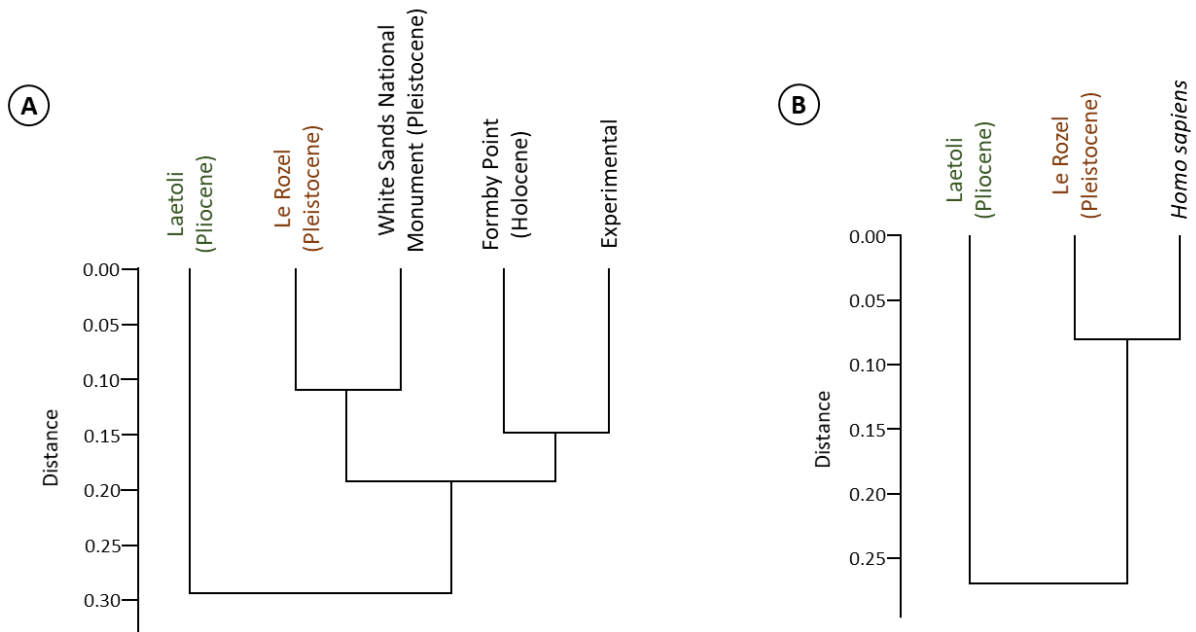


**Fig. S14.** Post-Procrustes landmark positions of the footprints from Le Rozel compared with other hominin footprints. The first four landmarks are placed on the axes of an ellipse enclosing the footprint. 1, 2: ends of the longitudinal axis; 3-4: ends of the footprints along the small axis of the ellipse; 5: position where the depth of the footprint is maximum (41, 106)

Both post-Procrustes lengths and widths of Le Rozel footprints fall within the distribution range of the other hominin footprints (Fig. S15). On average, they are longer than other hominin footprints except those from the Pleistocene White Sands National Monument footprints. They are less wide than the footprints from Laetoli and White Sands National Monument. They are close to the widths of the Holocene footprints from Formby Point. Finally, we grouped the footprints by sites and by attributed taxa and we applied cluster analysis (UPGMA), using PAST to the mean coordinates of each footprint group. The footprints from Le Rozel are included in the same group as the other hominin footprints. They are grouped with the footprints attributed to *Homo sapiens* and differ more from the Laetoli footprints. They are closer to the Pleistocene footprints from White Sands National Monument, their sister-group, than to the Holocene archaeological footprints and the experimental footprints (Fig. S16). Therefore, the spatial distribution of the landmarks is consistent with their identification as hominin footprints.



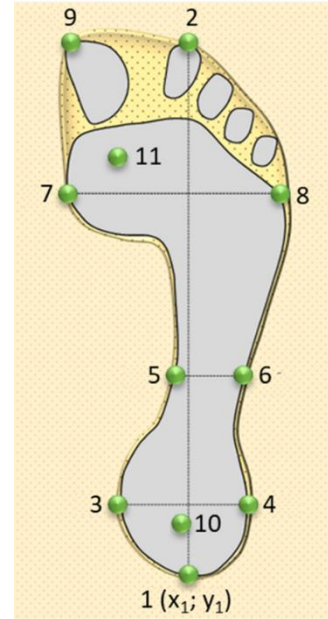
**Fig. S15.** Post-Procrustes length and width



**Fig. S16.** UPGMA-tree obtained from the mean coordinates of footprints grouped by sites (A) and attributed taxon (B)

### Text S6: Geometric morphometrics:

We studied the locations of 11 landmarks based on those used by Bennett *et al.* (Fig. S17; ref. 8). Nine of them informed on footprint outline. The first two (#1-2) are located at the ends of the longitudinal axis. The following six are placed two by two along mediolateral axes and represent the maximum heel impression width (#3-4), the minimum midfoot impression width (#5-6) and the maximum forefoot impression width (#7-8). The ninth landmark is located at the hallux tip impression (#9). The last two landmarks represent the deepest points of the heel (#10) and the forefoot (#11) that inform on weight transfer during human walking (ref. 8).



**Fig. S17.** Landmarks used during the geometric morphometric analysis.

The landmarks were placed on 3D models of the footprints that comply with all of the following conditions: each footprint must be longer than 18 cm to avoid ontogenetic biases; its outline must be complete without discontinuity; there must be no apparent evidence of sedimentary reworking or alteration that occurred after track formation; it must have been made on a flat ground and does not show any evidence of slide.

Each landmark was placed in *Geomagic studio 2013* on 14 footprints from Le Rozel (1 from the D3b-3 stratigraphic subunit, 12 from the D3b-4, 1 from the D3b-5), as well as on 48 of our experimental footprints (Text S3). Additionally, they were placed on 10 Holocene archaeological footprints, made by individuals presumed to be habitually unshod and on 17 Laetoli footprints as an outgroup (Text S4 and Table S5). Once the landmarks were placed, their 2D coordinates were subjected to a Generalized Procrustes Analysis in PAST (v.3.0; refs. 107-108) removing the effects of size and orientation. The mean 2D coordinates of the footprints made by a same individual were calculated and subsequently used to avoid biases caused by statistical replication. The 2D coordinates were then used within a Principal Component Analysis (PCA) in PAST.

**Table S5.** 3D models used during the geometric morphometric analysis.

<sup>1</sup>3D surfaces digitized in situ. <sup>2</sup>3D surfaces from freely accessible databases  
(<http://footprints.bournemouth.ac.uk/>; <https://www.morphosource.org/>)

Site	Period	Attributed taxon	Ground properties	Number of individuals	Number of footprints
Experimental <sup>1</sup>		<i>H. sapiens</i>	Nearby the site in a similar sediment	18	46
Formby Point <sup>2</sup>	Holocene	<i>H. sapiens</i>	Silt and sand	10	10
Le Rozel <sup>2</sup>	Upper Pleistocene	<i>H. neanderthalensis</i>	Dune sand/Sandy mud	Unknown	14
Laetoli <sup>2</sup>	Pliocene	<i>Au. afarensis</i>	Volcanic tuff	3 (G1, S1, S2)	17

## Biometry of the footprints from the D3b-4 stratigraphic subunit

**Table S6 (1/2).** Dimensions and estimated statures for 104 footprints from the D3b-4 subunit

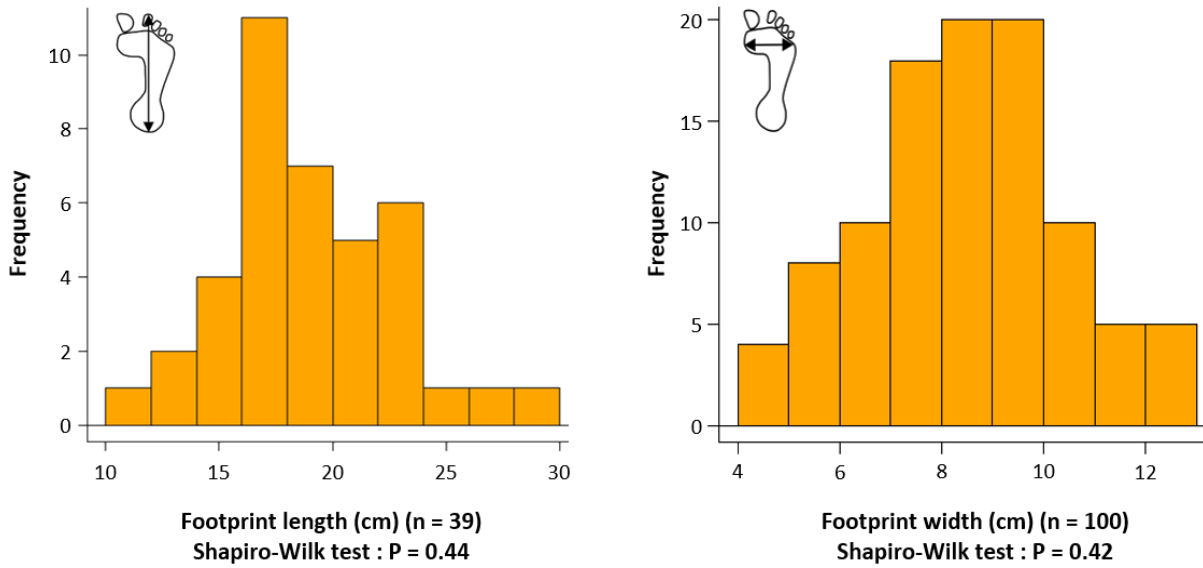
Footprints	Length (cm)	Longitudinal completeness	Width (cm)	Estimated stature (cm)	
				from footprint length	from footprint width
LREI2015-04	11.4	complete	4.5	73.8	65.8
LREI2015-12	16.2	uncertain	6.1		90.2
LREI2015-45	21.2	uncertain	8.9		130.9
LREI2015-46	18.5	complete		120.0	
LREI2015-47	18.3	complete	6.9	119.1	102.0
LREI2015-48	22.8	uncertain	8.9		131.6
LREI2015-49	16.2	complete	6.9	105.4	101.3
LREI2015-53	18.0	complete	9.6	117.1	141.2
LREI2016-01	16.5	uncertain	6.6		97.6
LREI2016-03	13.8	complete	5.4	89.8	79.8
LREI2016-14	13.5	uncertain	5.3		78.4
LREI2016-15	10.9	uncertain	5.9		87.2
LREI2016-16	19.6	uncertain	8.8		130.1
LREI2016-23	16.5	uncertain	6.8		100.6
LREI2016-24	14.3	uncertain	5.5		81.3
LREI2016-25	16.2	complete	7.2	105.4	106.5
LREI2016-28	22.0	uncertain	10.4		153.8
LREI2016-32	24.6	uncertain	10.5		155.3
LREI2016-33	16.1	complete	7.9	104.7	116.8
LREI2016-34	23.6	uncertain	7.7		113.9
LREI2016-35	21.5	complete	8.7	139.9	128.6
LREI2016-36	13.1	complete		85.2	
LREI2016-37	17.2	uncertain	10.5		154.5
LREI2016-39	16.9	complete	6.2	110.0	91.7
LREI2016-40	12.5	uncertain	4.9		72.5
LREI2016-42	12.1	uncertain	5.9		86.5
LREI2016-43	12.0	uncertain	4.6		68.0
LREI2016-44	25.8	uncertain	10.2		150.8
LREI2016-45	17.0	uncertain	8.0		117.6
LREI2016-47	12.2	uncertain	7.5		110.2
LREI2016-51	25.1	uncertain	9.4		139.0
LREI2016-52	23.5	uncertain	8.3		122.7
LREI2016-56	16.4	complete	6.1	106.7	90.2
LREI2016-59	20.1	uncertain	7.3		107.9
LREI2016-60	14.8	complete	5.6	96.0	82.8
LREI2016-75	8.1	uncertain	4.6		67.3
LREI2016-78	10.3	uncertain	5.4		79.8
LREI2017-04	17.4	uncertain	7.6		112.4
LREI2017-07	15.4	complete	7.3	100.2	107.9
LREI2017-08	17.5	uncertain	5.9		87.2
LREI2017-09	17.8	uncertain	7.8		115.3
LREI2017-11	20.3	uncertain	7.2		106.5
LREI2017-13	17.9	complete		116.5	
LREI2017-14	15.0	uncertain	6.3		93.2
LREI2017-17	24.3	uncertain	9.8		144.9
LREI2017-18	19.2	complete	8.6	124.9	127.2
LREI2017-19	21.7	uncertain	9.3		137.5
LREI2017-20	20.1	uncertain	10.6		156.7
LREI2017-22	20.5	complete	8.1	133.4	119.8
LREI2017-24	20.7	uncertain	9.5		140.5
LREI2017-25	22.0	uncertain	9.8		144.9

**Table S6 (2/2).** Dimensions and estimated statures for 104 footprints from the D3b-4 subunit

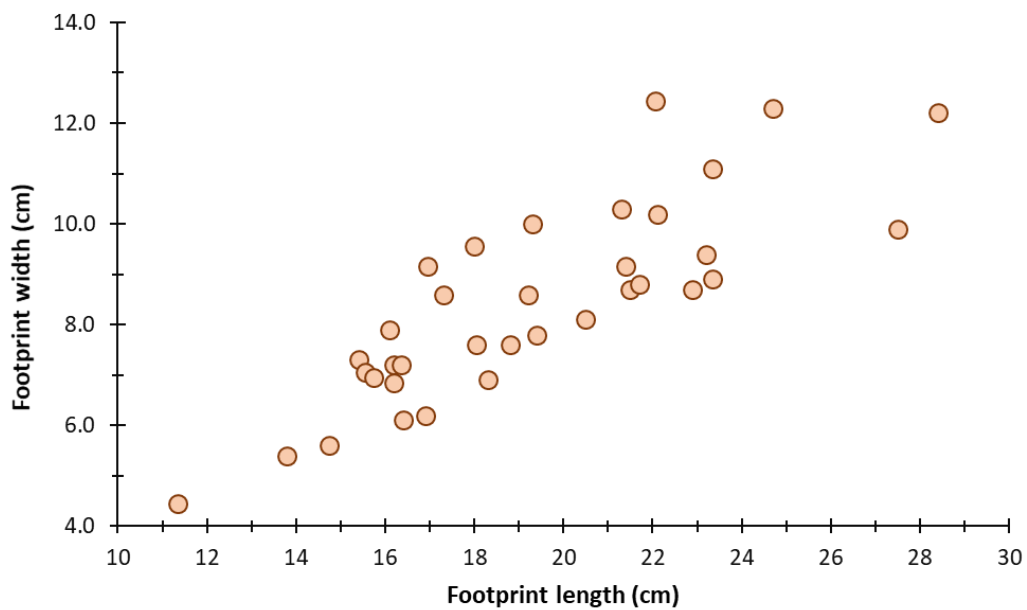
Footprints	Length (cm)	Longitudinal completeness	Width (cm)	Estimated stature (cm)	
				from footprint length	from footprint width
LREI2017-27	25.9	uncertain	11.2		165.6
LREI2017-29	22.9	uncertain	9.0		133.1
LREI2017-30	26.4	uncertain	12.8		189.3
LREI2017-31	18.4	uncertain	8.9		131.6
LREI2017-32	21.3	complete	10.3	138.6	152.3
LREI2017-33	18.7	uncertain	7.8		115.3
LREI2017-36	24.0	uncertain	9.5		140.5
LREI2017-37	20.8	uncertain	9.2		136.0
LREI2017-41	18.1	complete	7.6	117.4	112.4
LREI2017-42	22.0	uncertain	9.9		146.4
LREI2017-45	22.6	uncertain	9.4		139.0
LREI2017-47	24.7	complete	12.3	160.7	181.9
LREI2017-48	17.2	uncertain	9.2		136.0
LREI2017-49	21.4	complete	9.2	138.9	135.3
LREI2017-51	29.1	slide	10.5		155.3
LREI2017-52	23.2	complete	9.4	150.9	139.0
LREI2017-53	22.1	uncertain	10.1		149.3
LREI2017-56	22.9	complete	8.7	149.0	128.6
LREI2017-57	19.4	complete	7.8	126.2	115.3
LREI2017-63	23.8	uncertain	9.2		136.0
LREI2017-64	23.4	complete	8.9	151.9	131.6
LREI2017-66	21.6	uncertain	11.2		165.6
LREI2017-68	23.8	uncertain	11.2		164.9
LREI2017-71	23.4	complete	11.1	151.9	164.1
LREI2017-73	22.1	complete	10.2	143.8	150.8
LREI2017-75	17.3	complete	8.6	112.6	127.2
LREI2017-76	20.9	uncertain	9.4		139.0
LREI2017-78	22.3	uncertain	8.7		128.6
LREI2017-81	19.7	uncertain	8.0		118.3
LREI2017-86	28.4	complete	12.2	184.8	180.4
LREI2017-87	27.5	complete	9.9	178.9	146.4
LREI2017-90	13.8	uncertain	8.9		131.6
LREI2017-91	16.2	uncertain	8.8		130.1
LREI2017-92	22.1	uncertain	10.1		149.3
LREI2017-95	18.8	complete	7.6	122.3	112.4
LREI2017-96	15.1	uncertain	7.0		103.5
LREI2017-97	19.9	uncertain	9.3		137.5
LREI2017-98	24.9	uncertain	11.4		168.6
LREI2017-99	17.4	uncertain	7.9		116.8
LREI2017-101	15.8	complete	7.0	102.5	102.8
LREI2017-102	16.4	complete	7.2	106.4	106.5
LREI2017-103	22.1	complete	12.5	143.5	184.1
LREI2017-104	17.0	complete	9.2	110.3	135.3
LREI2017-105	21.7	complete	8.8	141.2	130.1
LREI2017-107	16.1	uncertain	9.2		135.3
LREI2017-108	16.5	uncertain	8.5		125.7
LREI2017-109	19.5	uncertain	8.9		131.6
LREI2017-110	19.3	complete	10	125.6	147.9
LREI2017-111	16.9	complete		110.0	
LREI2017-112	15.6	complete	7.05	101.2	104.2
LREI2017-113	14.6	uncertain	8.2		121.3
LREI2017-114	34.0	slide	12.2		180.4
LREI2017-115	16.1	uncertain	8.3		122.7

**Table S7.** Statistical parameters of the dimensions of the Le Rozel footprints (n = 104) from the D3b-4 stratigraphic subunit

	Frequency	Min.	Mean	Max.	s.d.
Length (cm)	39	11.4	19.0	28.4	3.8
Width (cm)	100	4.5	8.5	12.8	1.9
Width / Length	35	0.36	0.44	0.56	0.05



**Fig. S18.** Sizes of the footprints from the D3b-4 stratigraphic subunit at Le Rozel



**Fig. S19.** Length vs width of 35 footprints from the D3b-4 stratigraphic subunit



### Text S7: Minimum Number of Individuals:

For the D3b-4 subunit, 39 footprints allowed for the measurement of length and 100 allowed for the measurement of width. In order to determine a Minimum Number of Individuals the 12.8% largest maximum intra-individual deviation obtained for the experimental footprint length. We considered that footprints falling within the interval  $[L \times (1 - m.d.); L \times (1 + m.d.)]$  of each other have been made by the same individual. The 39 footprints are associated with a minimum of 4 individuals according to 4 configurations (Fig. S20).

The experimental intraindividual maximum deviation in widths reaches 38,5% (which gave a MNI of 2), which is too high to allow any reliable estimation of the number of individuals using this method. However, in order to study their size distribution, based on the results obtained on the lengths (MNI = 4), the 100 width measurements were divided into 4 metric classes using the quartiles of their dispersion (4.5-12.8 cm).

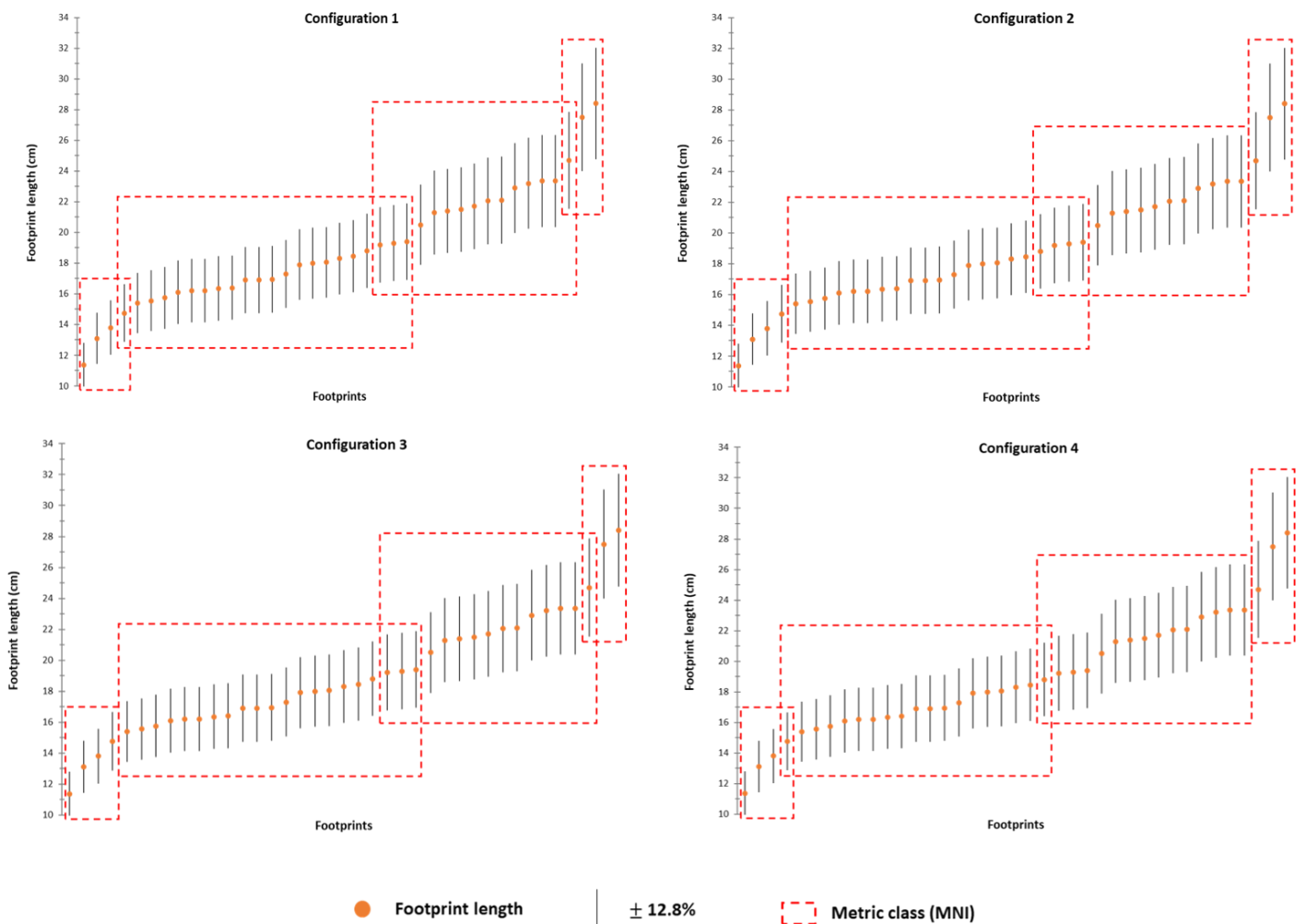


Fig. S20. MNI estimate for the footprints from the D3b-4 stratigraphic subunit

### Text S8: Estimation of statures:

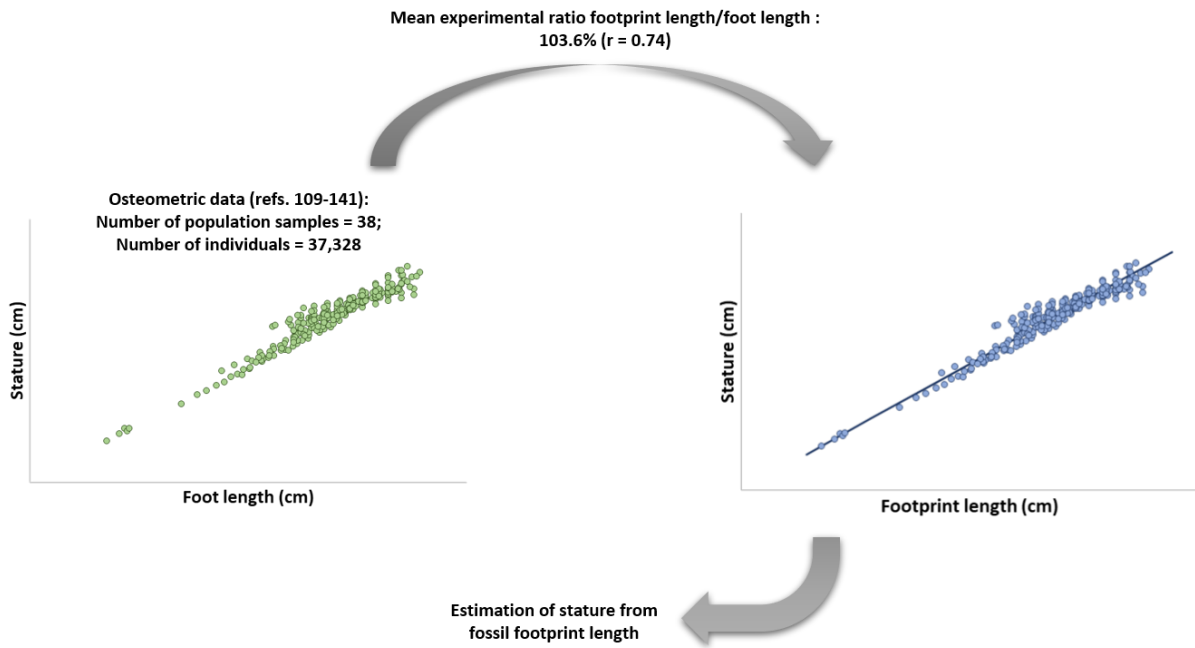
For each footprint, stature was estimated from the length by achieving two methodological steps (Fig. S21). First of all, the variation between foot length and stature was quantified thanks to published osteometric data for *H. sapiens* (109-141). Then, footprint length was estimated from foot length using the mean ratio calculated in our experimental study (Footprint length / Foot length = 103.6%,  $r = 0.74$ , Table S4). A relationship between footprint length and stature is thus obtained.

The osteometric database (109-141, Table S8) encompasses different populations around the world, which enable us to take into account the differences in body proportions (*e.g.* 110, 142). These data also represent different age groups, from new born to adult (*e.g.* 112-113). The average values of foot length and stature were obtained either directly when they were available, or were estimated from published regressions when the foot length range is known and the correlation coefficient is significant enough ( $r > 0.60$ ). An average foot length to stature ratio was calculated for each population sample and was used in order to calculate the global mean (14.8%) for all samples. The maximum (17.0%) and minimum (12.8%) ratios were also calculated.

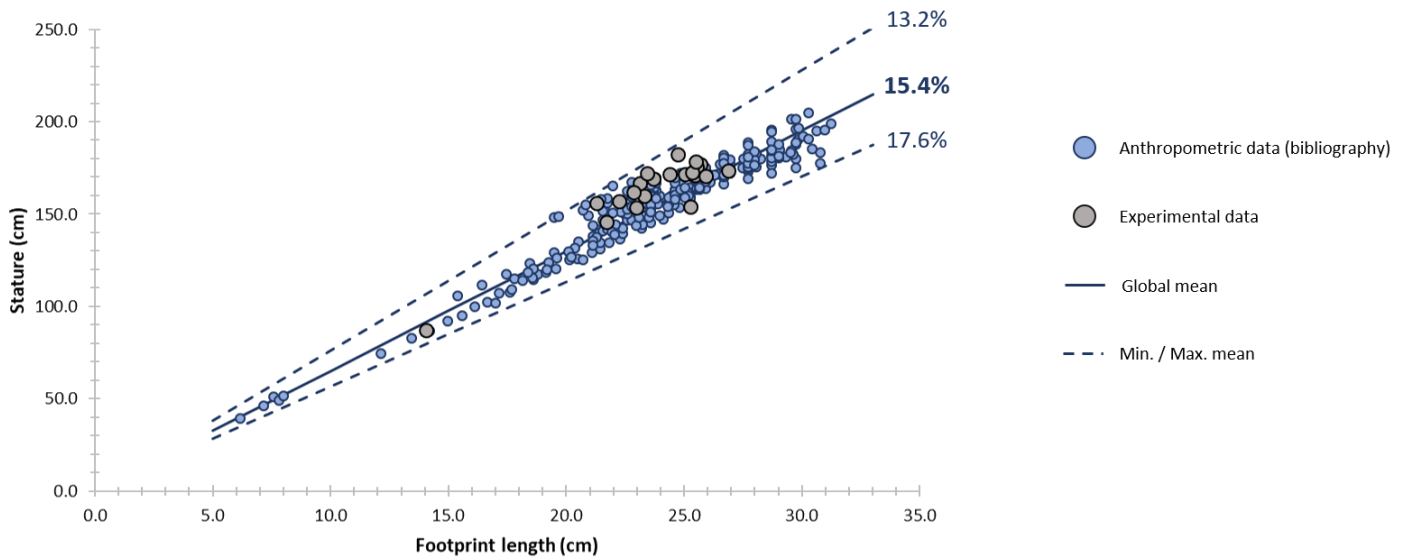
Prehistoric footprints, such as those made at Le Rozel, were made by individuals whose feet are presumed to be morphologically different from those of current habitually shod populations (*e.g.* 98-99). Our database includes both shod and unshod individuals. In the literature, studies of body segment proportions between habitually shod and unshod groups usually involve samples from different regions (*e.g.* 137, 139-140). It is therefore difficult to know whether potential differences are related to footwear behavior or geographical differences. In our database, the habitually shod populations have an average foot length to stature ratio of about 15%, which does not differ from that of the habitually shod populations (*e.g.* 137, 139-140).

The application of the footprint length to foot length ratio enabled us to obtain an average linear relationship (Fig. S22) between stature (S) and footprint length (L):  $S = 6.51 \times L$ .

Furthermore, the maximum (17.6%) and minimum (13.2%) footprint length to stature ratios were determined in order to define the range of this ratio. The footprint length and stature data from our experimental study fall within this range (Fig. S22).



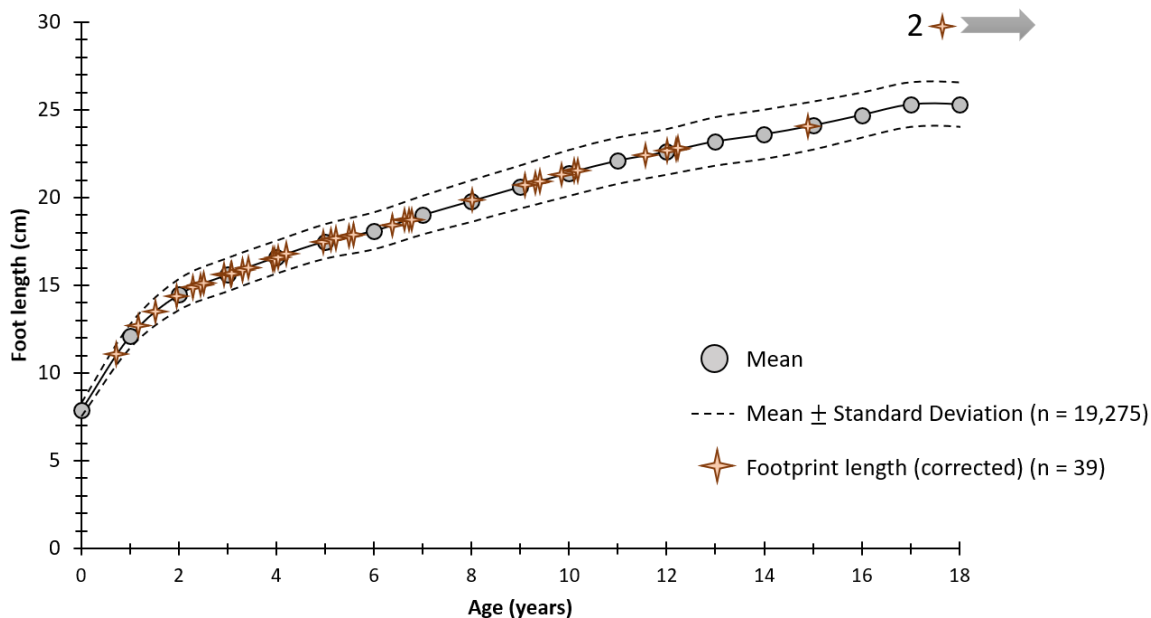
**Fig. S21.** Methods used in order to estimate statures from footprint lengths



**Fig. S22.** Relationship between footprint length and stature. Number of population samples: 38. Total number of individuals: 37,328. Using the data from refs. 109-141.

**Table S8.** Features of the published osteometric data used in order to estimate stature

<b>Number of individuals</b>	<b>Age (year)</b>	<b>Geographical origin</b>	<b>Habitually Shod/Unshod</b>	<b>Mean foot length to stature ratio</b>	<b>Reference</b>
168	Mean: 22 y	India	Unshod	15.2%	137
38	[12-18 y]	Kenya	Unshod	14.6%	139
385	[6-18 y]	South Africa	Unshod	15.5%	140
338	[6-16 y]	USA and Northern Europe	Shod	15.5%	109
271	[28-50 y]	Northern America	Shod	14.8%	110
23	0 y	USA	Shod	15.2%	112
100	[17-24 y]	Africa	Shod	15.3%	112
100	[16-24 y]	India	Shod	15.0%	112
20	[1-18 y]	USA	Shod	14.9%	113
93	[0->55 y]	Alaska	Shod	15.1%	114
7119	[6-11 y]	USA	Shod	15.2%	115
250	[18-23 y]	Canada	Shod	14.8%	116
94	0 y	England	Shod	15.5%	117
8012	Mean: 23 y	USA	Shod	15.3%	118
270	[17-55 y]	India	Shod	14.8%	119
311	[19-71 y]	Turkey	Shod	14.3%	121
155	[17-23 y]	Turkey	Shod	14.8%	122
250	[18-30 y]	Mauritius	Shod	14.8%	123
246	[17-20 y]	India	Shod	14.6%	124
516	[18-83 y]	Turkey	Shod	15.0%	125
5093	[5-20 y]	Greece	Shod	15.0%	126
350	[18-50 y]	India	Shod	14.8%	129
256	0 y	Taiwan	Shod	14.5%	130
300	[18-30 y]	Nigeria	Shod	14.9%	131
7788	[1-13 y]	Germany	Shod	15.6%	133
61	Mean: 40 y	Caucasia	Shod	15.0%	134
160	[25-30 y]	Sudan	Shod	15.2%	135
190	Mean: 24 y	China	Shod	14.4%	137
250	[18-24 y]	Slovakia	Shod	14.5%	138
38	[12-18 y]	Kenya	Shod	14.9%	139
425	[6-18 y]	Germany	Shod	15.1%	140
478	[5-45 y]	Australia (indigeneous)	Unknown	15.4%	111
476	[6-18 y]	Japan	Unknown	14.6%	120
200	[18-80 y]	India	Unknown	14.9%	127
1040	[18-30 y]	India	Unknown	14.9%	128
154	[13-18 y]	India	Unknown	15.2%	132
1020	[19-42 y]	India	Unknown	14.1%	136
200	[18-30 y]	India	Unknown	14.7%	141



**Fig. S23.** Foot length from 0 to 18 years old for different modern populations and position of the 39 complete footprints from the D3b-4 stratigraphic subunit after applying the experimental footprint length/foot length ratio (103.6%). Total number of individuals: 19,275. Using the data from refs. 109, 112-113, 115, 133, 143-144.

**Table S9.** Frequencies of the footprints from the D3b-4 stratigraphic subunit per age class determined using the curve representing variation between foot length and age (Fig. S23) for different modern populations. The frequencies for footprint width were obtained by estimating footprint length from the footprint width to length ratio (0.44)

		<b>Children (0-10 years old)</b>	<b>Adolescents (10-18 years old)</b>	<b>Adults (&gt; 18 years old)</b>
<b>length</b>	Number of footprints	30	7	2
	Relative frequency	76.9%	17.9%	5.1%
<b>width</b>	Number of footprints	72	20	9
	Relative frequency	72.0%	20.0%	9.0%
<b>Mean</b>	<b>Relative frequency</b>	<b>74.5%</b>	<b>19.0%</b>	<b>7.1%</b>

**Table S10 (1/2).** Estimations of stature, age and sex based on Neandertal osteological remains

Site	Individual	Age		Stature (cm)		Sex	References
		Estimates (year)	Methods	Estimates (cm)	Methods		
<b>Amud (Israel)</b>	Amud 1	Adult	Osteological development	177 cm [174-180 cm]	Regressions from femur measurements	male	145-149
<b>Cova Negra (Spain)</b>	Cova Negra	5 y	Osteological development	95.5 cm [93-98 cm]	Regressions from femur measurements		150-151
<b>Dederiyeh (Syria)</b>	Dederiyeh 1	1.9 y [1.25-2.5 y]	Tooth development	84 cm [80-88 cm]	Regressions from long bones measurements		151-155
	Dederiyeh 2	2.2 y [1.8-2.5 y]	Tooth development	76 cm [75-77 cm]	Regressions from long bones measurements		
<b>El Sidròn (Spain)</b>	Adult female	Adult	Osteological development	160 cm	Regressions from humerus measurements	female	148, 156
	Adult male	Adult	Osteological development	167 cm	Regressions from ulna measurements	male	
	Juvenile 1	7.5 y [7-8 y]	Tooth development	112.5 cm [105-120 cm]	Regressions from long bones measurements		
<b>Fond-de-Forêt (Belgium)</b>	Fond-de-Forêt 1	Adult	Osteological development	161.5 cm [159-164 cm]	Regressions from femur measurements	male	146-147, 149, 157
<b>Kebara (Israel)</b>	Kebara 2	Adult	Osteological development	171 cm [165-177 cm]	Regressions from long bones measurements	male	147-148, 158
<b>Kiik-Koba (Ukraine)</b>	Kiik-Koba 1	Adult	Osteological development	162 cm [161-163 cm]	Regressions from tibia measurements	male	147-148, 151, 159-162
	Kiik-Koba 2	0.5 y [0.4-0.6 y]	Osteological development	61 cm [58-64 cm]	Regressions from femur measurements		
<b>La Chapelle-aux-Saints (France)</b>	La Chapelle-aux-Saints 1	Adult	Osteological development	164 cm [161-167 cm]	Regressions from humerus measurements	male	146-148
<b>La Ferrassie (France)</b>	La Ferrassie 1	Adult	Osteological development	170.5 cm [168-173 cm]	Regressions from ulna measurements	male	146-148, 151, 161-163
	La Ferrassie 2	Adult	Osteological development	151.5 cm [146-157 cm]	Regressions from long bones measurements	female	
	La Ferrassie 4	0.1 y [0-0.2 y]	Osteological and tooth development	52 cm [51-53 cm]	Regressions from femur measurements		
	La Ferrassie 6	4 y [3-5 y]	Osteological development	84 cm [82-86 cm]	Regressions from femur measurements		
<b>La Quina (France)</b>	La Quina 5	Adult	Osteological development	157.5 cm [156-159 cm]	Regressions from ulna measurements	uncertain	147-148, 158, 164
<b>Le Moustier (France)</b>	Le Moustier 2	0.2 y [0-0.3 y]	Osteological development	50.5 cm [49-52 cm]	Regressions from long bones measurements		151, 165-167
<b>Lezetxiki (Spain)</b>	Lezetxiki 1	Adult	Osteological development	166 cm	Regressions from humerus measurements	uncertain	158
<b>Mezmaiskaya (Russia)</b>	Mezmaiskaya	0 y [Fetus (0.6 y) - Infant (0.2 y)]	Osteological and tooth development	52 cm [51-53 cm]	Regressions from femur measurements		151, 168-169

**Table S10 (2/2).** Estimations of stature, age and sex from Neandertal osteological remains

Site	Individual	Age		Stature		Sex	References
		Estimates (year)	Methods	Estimates (cm)	Methods		
<b>Neanderthal (Germany)</b>	Neanderthal 1	Adult	Osteological development	165.5 cm [162-169 cm]	Regressions from long bones measurements	male	146-149
<b>Regourdou (France)</b>	Regourdou 1	Adult	Osteological development	164.5 cm [162-167 cm]	Regressions from humerus and radius measurements	uncertain	147-148, 170
<b>Roc de Marsal (France)</b>	Roc de Marsal 1	3.2 y [2.5-4 y]	Osteological development	83 cm [81-85 cm]	Regressions from femur measurements		151, 163, 171-172
<b>Saint-Césaire (France)</b>	Saint-Césaire 1	Adult	Osteological development	165 cm	Regressions from femur measurements	male	158
<b>Shanidar (Iraq)</b>	Shanidar 1	Adult	Osteological development	168.5 cm [164-173 cm]	Regressions from long bones measurements	male	
	Shanidar 2	Adult	Osteological and tooth development	157 cm [154-160 cm]	Regressions from femur and tibia measurements	male	
	Shanidar 3	Adult	Osteological and tooth development	168 cm [166-170 cm]	Regressions from femur measurements	male	
	Shanidar 4	Adult	Osteological and tooth development	161.5 cm [158-165 cm]	Regressions from femur measurements	male	146-149, 151, 173-174
	Shanidar 5	Adult	Osteological and tooth development	165.5 cm [161-170 cm]	Regressions from femur measurements	male	
	Shanidar 6	Adult	Osteological and tooth development	147.5 cm [144-151 cm]	Regressions from femur measurements	female	
	Shanidar 10	1.5 y [1-2 y]	Osteological development	79 cm [78-80 cm]	Regressions from tibia measurements		
<b>Sima de las Palomas (Spain)</b>	Palomas 92	Adult	Osteological development	152 cm	Regressions from femur measurements	uncertain	149
	Palomas 96	Adult	Osteological development	154 cm	Regressions from femur measurements	uncertain	
<b>Spy (Belgium)</b>	Spy 1	Adult	Osteological development	161 cm	Regressions from femur measurements	female	148, 157-158
	Spy 2	Adult	Osteological development	158.5 cm [156-161 cm]	Regressions from femur and tibia measurements	male	
<b>Tabun (Israel)</b>	Tabun C1	Adult	Osteological development	155.5 cm [151-160 cm]	Regressions from long bones measurements	female	146, 148, 158

**Table S11.** Length of Neandertal femora and second metatarsals.

() Some femurs or second metatarsals are incomplete, their length was estimated from regressions.

\*The femoral length of Kiik koba 1 was estimated from the tibial length and the mean Neandertal crural index (0.79, ref. 175)

Site	Individu	Laterality	Maximal length (cm)		MT/F	References
			Second Metatarsal (MT)	Femur (F)		
Amud	Amud 1	left	(8.0)	(48.4)	16.5%	176
Kiik-Koba	Kiik-Koba 1	left	7.6	(43.8)*	17.4%	159
La Ferrassie	La Ferrassie 1	left	8.0	(46.5)	17.2%	177
	La Ferrassie 2	left	(6.9)	41.1	16.7%	
Shanidar	Shanidar 1	right	(8.0)	(46.1)	17.2%	173
Sima de las Palomas	Palomas 92	left	7.2	39.7	18.1%	178
Tabun	Tabun C1	right	7.4	41.6	17.8%	179
<b>Mean</b>			<b>7.6</b>	<b>43.9</b>	<b>17.3%</b>	



### Text S9: Three-Dimensional captures of Le Rozel footprints

A total of 180 tracks, including 169 hominin footprints, were digitized in 3D (Fig. S24). 133 were digitized by a scanner (Noomeo Optinum) that generates points clouds thanks to its high definition CCD cameras, and 70 by photogrammetry with Agisoft Photoscan (v.1.4.0) and a Canon EOS 1300D camera. 129 were digitized *in situ* and 55 were modeled from their casts (Fig. S25).



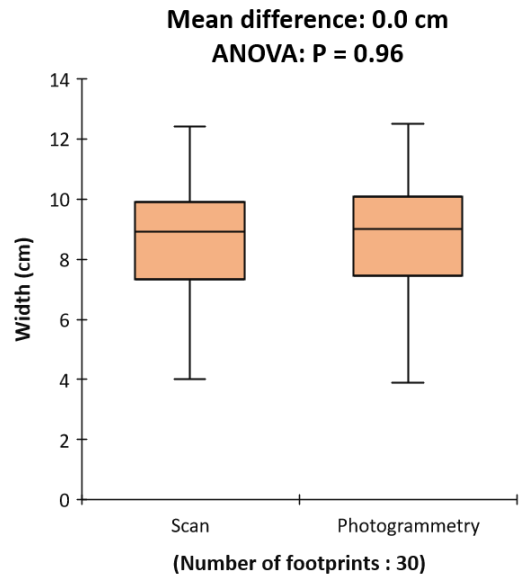
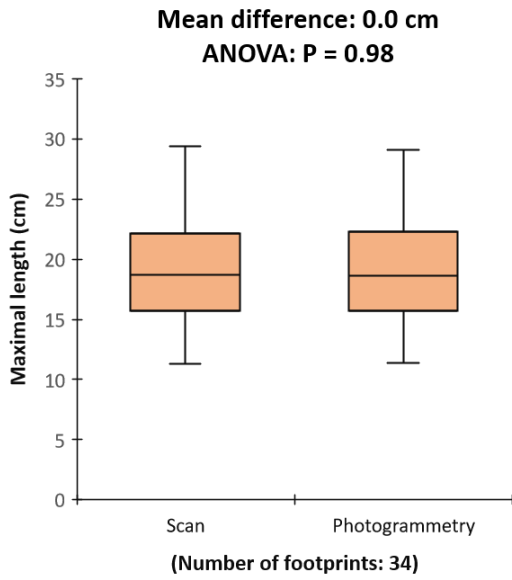
**Fig. S24.** 3D models of the footprint LREI2017-95 obtained by photogrammetry (A) and a scanner (B)



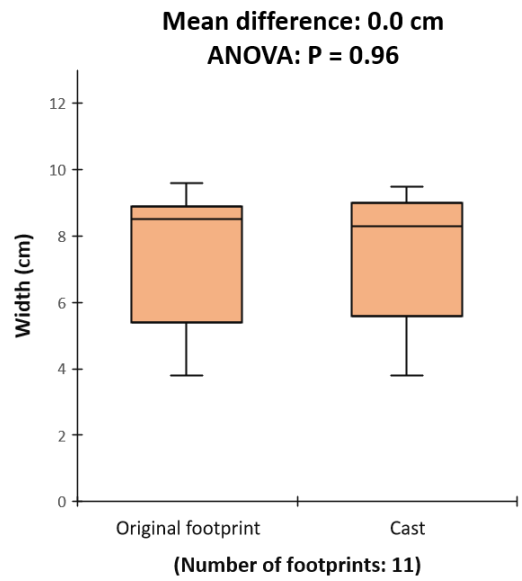
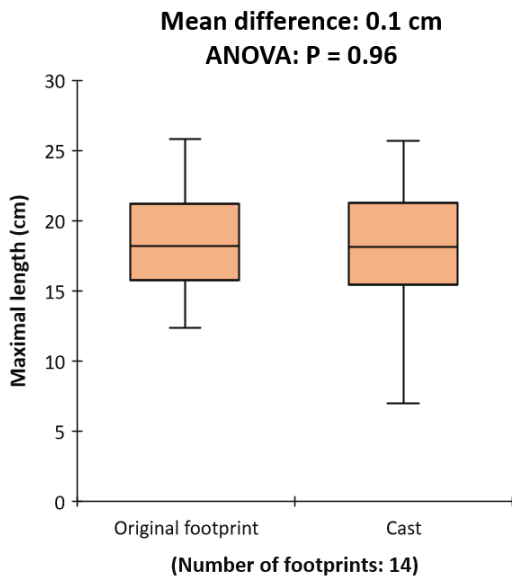
**Fig. S25.** Cast of a footprint

We tested potential differences between digitization techniques (scanner/photogrammetry) or the types of material (original footprints/casts) on their measurements. For both length and width, the average differences are always less than or equal to 0.1 cm (Fig. S26). Furthermore, ANOVA, realized after testing the normality of residuals and the homoscedasticity of variances, show no differences between acquisition techniques (Fig. S26, ANOVA:  $P \gg 0.05$ ). Data were then analyzed independently of the acquisition techniques. For measurements on the same footprint obtained for different acquisition techniques, the value that we considered is the average of the measurements on all 3D models of this footprint.

**A**



**B**



**Fig. S26.** Biometrical differences between digitization techniques (A) and the type of digitized material (B)

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