Figures and figure supplements

A multidisciplinary approach to a unique palaeolithic human ichnological record from Italy (Bàsura Cave)

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Figure 1. Planimetry of the ‘Grotta della Básura’ and location of human, bear and canid footprints. White rectangles enclose the three-dimensional reconstructions, obtained via laser scanner, of the innermost room (‘Sala dei Misteri’ - left) and the main gallery (‘Corridoio delle impronte’ - right) of the cave, where the human footprints are preserved. Cross-sections obtained from the three-dimensional reconstruction of the main gallery are highlighted in red and show the branching of the ‘lower’ and ‘upper’ corridors, respectively. Blue rectangle indicate the four areas within the main gallery where most of the human footprints are concentrated (A and B for the lower corridor, C and D for the upper corridor).

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Figure 2. Human footprints imprinted on muddy substrate in different moisture conditions. C37, Human footprint referred to the Morph. 5 ('lower corridor'). CA1 and C9, Human footprint referred to the Morph. 4 ('upper corridor'). C33, Human footprint referred to the Morph. 3 ('lower corridor'). SM15, Human footprint referred to the Morph. 3 ('Sala dei Misteri'). CA8, Human footprint referred to the Morph. 3 ('upper corridor'). SM5 and SM42, Human footprint referred to the Morph. 2 ('Sala dei Misteri'). SM17 and SM18, Human footprint referred to the Morph. 1 ('Sala dei Misteri').

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Figure 3. Finger and hand prints. C0, Two finger traces on the concretioned side-wall of the ‘lower corridor’. C26b, Finger traces (‘lower corridor’). C72, Hand print (‘lower corridor’). SM44, finger traces (‘Sala dei Misteri’). SM55, Finger flutings on the clay on the clay floor (‘Sala dei Misteri’). SM56, Finger flutings on a clay-coated stalagmite (‘Sala dei Misteri’). P8.1, P1.6, Coal dirtied handprints (‘Sala dei Misteri’).

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Figure 4. Canidae incertae sedis and bear footprints. C47-C48-C53 Canidae footprint on saturated mud ('upper corridor'). CA12 well preserved Canidae footprint ('upper corridor'). SM12-SM41 bear footprint (Sala dei Misteri). C12 bear handprint ('lower corridor').

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Figure 5. Principal Component Analysis based on the best-preserved footprints from ‘Sala dei Misteri’ and ‘Corridoio delle impronte’. (a) The five morphotypes to which footprints have been referred are shown above. (b) Selected outlines of the best preserved footprints, for each recognized morphotype, are reported.

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Figure 5—figure supplement 1. Loadings for the first three principal components. (a) Dt1-BL; (b) Dt2-BL; (c) Dt3-BL; (d) Ball medial (mtm-BL); (e) Ball lateral (mtl-BL); (f) Heel medial (ccm-BL); (g) Heel lateral (ctul-BL); (h) Ball (mtm-horiz); (i) Heel (ctul-horiz). Anatomical abbreviations as in Methods section.
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Figure 6. Plantigrade tracks from the ‘lower corridor’. (a) Cast of the 1950s reproducing tracks C61, C63 and C64, preserved in the sector A of the ‘lower corridor’ (see Figure 1 main text). (b) Digital terrain model of the cast obtained from the HDI 3D Scanner. (c) Topographic profile with contour lines, obtained from b. (d) Interpretive draw. Note that the tracks C61 and C63 were most likely left by a producer (Morph. 4) crouched against the side-wall of the ‘lower corridor’.

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Figure 7. Plantigrade track from the ‘lower corridor’. (a) Cast of the 1950s reproducing the track C60 preserved in the sector A of the ‘lower corridor’ (see Figure 1 main text). (b) Digital terrain model of the cast obtained from the HDI 3D Scanner. (c) Topographic profile with contour lines, obtained from b. (d) Interpretive draw. A superimposed partial canid track, C60b, is clearly recognizable in the metatarsal area of the human footprint (Morph. 5).

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Figure 8. Selection of semi-plantigrade and knee traces from the ‘lower corridor’ of the ‘Corridoio delle impronte’ in the Bàsura cave, indicating crawling locomotion of the producers. (a) Associated metatarsal (C44) and knee (C45) traces allowing estimation of the tibial length of the producer. (b) Knee traces (C45, C42 and C41) imprinted on a plastic, waterlogged muddy substrate. (c) Metatarsal traces (C26, C44 and C44b) imprinted on a plastic, waterlogged muddy substrate. (d1) Cast of the 1950s reproducing two knee (C41 and C42) and two metatarsal (C44, C44b) traces preserved in the area B of the ‘lower corridor’ (see Figure 1). (d2) Digital Terrain Model obtained from the HDI 3D Scanner. (d3) Topographic profile with contour lines, obtained from d2. (d4, Interpretive draw. In the knee trace, C42 are located the impressions of the patella (a), vastus medialis (b), the fibular head (c), the patellar ligament (d) and the tibial tuberosity (e).

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Figure 9. Crawling locomotion in the ‘lower corridor’ (sector B in Figure 1). (a) Color topographic profile obtained from the digital photogrammetric model. (b) Topographic contoured profile. (c) Interpretive draw of the track-bearing surface (numbers identify single tracks and traces and are to be intended as preceded by the letter C). (d1) Digital Terrain Model obtained from a cast of the 1950s reproducing a small area of the ‘lower corridor’. (d2) Topographic profile with contour lines, obtained from d1. (d3) Interpretive draw and timing of the different recognized tracks.

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Figure 10. Timing of impressions of human footprints. The interference between footprints attributed to different individuals suggests a single exploring event of the cave. In particular the cross-overlapping of MP3 and MP4 trackmakers confirms their contemporary entry into the main gallery.

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Figure 11. Reconstruction of the exploration routes chosen by the producers to enter and exit the cave. (B) Crawling locomotion adopted by the producers to cross the ‘lower corridor’ and access to the innermost rooms of the cave. (C) Exit route passing through the ‘upper corridor’, traveled by the producers in complete erect walking. The smallest producers are not reported in the sketch.

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Figure 12. Human tracks from the ‘lower corridor’. (a) Tracks C26, C26b, C25 and C24 from the sector B of the ‘lower corridor’ (see Figure 1 main text). (b) Digital terrain model obtained from high-resolution photogrammetry. (c) Topographic profile with contour lines, obtained from b. (d) Interpretive Figure 12 continued on next page
Figure 12 continued

draw. C26b is interpreted as a partial hand-print of which only digit traces are preserved, interfering with a metatarsal trace deeply imprinted on a muddy, highly plastic, substrate.

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Figure 13. Shallow human tracks from the ‘upper corridor’ (a) Tracks CA8, CA9, CA10 and Ca11b from the sector C of the ‘upper corridor’ (see Figure 1 main text). (b) Digital terrain model obtained from high-resolution photogrammetry. (c) Topographic profile with contour lines, obtained from b. (d) Interpretive draw. Tracks were impressed on a hard carbonate substrate covered by a thin muddy deposit, few millimeters in thickness.

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Figure 14. Profile and map of the archaeo-paleontological excavations in the Mysteries Hall (left), soil micromorphology sampling and view of the excavations (right). The sampled charcoal for dating are highlighted by a red dot.
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Figure 15. Adopted landmarks utilized to perform morphometric analysis, showed in two distinct morphotypes (Morphs 3 and 4) as example. Landmarks in the distal portion of digit traces 4, 5, and in the medial, central and lateral portions of the sole trace were not considered reliable enough for the large variability, higher than the fixed error value ($\pm 0.5$ cm). DOI: https://doi.org/10.7554/eLife.45204.023