

Reporting Summary

Nature Research wishes to improve the reproducibility of the work that we publish. This form provides structure for consistency and transparency in reporting. For further information on Nature Research policies, see [Authors & Referees](#) and the [Editorial Policy Checklist](#).

Statistical parameters

When statistical analyses are reported, confirm that the following items are present in the relevant location (e.g. figure legend, table legend, main text, or Methods section).

n/a Confirmed

- | | | |
|-------------------------------------|-------------------------------------|---|
| ☐ | ☒ | The <u>exact sample size</u> (<i>n</i>) for each experimental group/condition, given as a discrete number and unit of measurement |
| ☐ | ☒ | An indication of whether measurements were taken from distinct samples or whether the same sample was measured repeatedly |
| ☒ | ☐ | The statistical test(s) used AND whether they are one- or two-sided
<i>Only common tests should be described solely by name; describe more complex techniques in the Methods section.</i> |
| ☒ | ☐ | A description of all covariates tested |
| ☒ | ☐ | A description of any assumptions or corrections, such as tests of normality and adjustment for multiple comparisons |
| ☐ | ☒ | A full description of the statistics including <u>central tendency</u> (e.g. means) or other basic estimates (e.g. regression coefficient) AND <u>variation</u> (e.g. standard deviation) or associated <u>estimates of uncertainty</u> (e.g. confidence intervals) |
| ☒ | ☐ | For null hypothesis testing, the test statistic (e.g. <i>F</i> , <i>t</i> , <i>r</i>) with confidence intervals, effect sizes, degrees of freedom and <i>P</i> value noted
<i>Give P values as exact values whenever suitable.</i> |
| ☒ | ☐ | For Bayesian analysis, information on the choice of priors and Markov chain Monte Carlo settings |
| ☒ | ☐ | For hierarchical and complex designs, identification of the appropriate level for tests and full reporting of outcomes |
| ☒ | ☐ | Estimates of effect sizes (e.g. Cohen's <i>d</i> , Pearson's <i>r</i>), indicating how they were calculated |
| ☐ | ☒ | Clearly defined error bars
<i>State explicitly what error bars represent (e.g. SD, SE, CI)</i> |

Our web collection on [statistics for biologists](#) may be useful.

Software and code

Policy information about [availability of computer code](#)

Data collection

as mentioned in the Methods section, the following software were used to process 3D data / models: Avizo, Agisoft PhotoScan Professional and Geomagic Studio

Data analysis

as mentioned in the Methods section, all statistical analyses and graphics were computed with R version 3.5.1, using several functions from Claude (2008), and the packages ade4, geomorph, ggplot2, ggpubr, momocs, Morpho, rgl, shapes, and vegan.

For manuscripts utilizing custom algorithms or software that are central to the research but not yet described in published literature, software must be made available to editors/reviewers upon request. We strongly encourage code deposition in a community repository (e.g. GitHub). See the Nature Research [guidelines for submitting code & software](#) for further information.

Data

Policy information about [availability of data](#)

All manuscripts must include a [data availability statement](#). This statement should provide the following information, where applicable:

- Accession codes, unique identifiers, or web links for publicly available datasets
- A list of figures that have associated raw data
- A description of any restrictions on data availability

The data that support the findings of this study are available from the corresponding authors upon reasonable request. The ZooBank LSID for this publication and the nomenclature acts it contains is urn:lsid:zoobank.org:pub:0E4607F1-1374-4842-B32B-7CE2250807DF

Field-specific reporting

Please select the best fit for your research. If you are not sure, read the appropriate sections before making your selection.

☐ Life sciences ☐ Behavioural & social sciences ☒ Ecological, evolutionary & environmental sciences

For a reference copy of the document with all sections, see [nature.com/authors/policies/ReportingSummary-flat.pdf](https://www.nature.com/authors/policies/ReportingSummary-flat.pdf)

Ecological, evolutionary & environmental sciences study design

All studies must disclose on these points even when the disclosure is negative.

Study description	The original fossils from Callao Cave were compared to other fossil and extant hominins using conventional analytical procedures in morphometrics (traditional morphometrics and geometric morphometrics). All information are given in Methods.
Research sample	The main sample of the analyses consists in the original hominin fossils recovered from Callao Cave. Analyses involve comparisons with other species of fossil and extant hominins. Each comparative sample of fossil specimens was designed in order to maximize the number of available specimens per anatomical element. Detailed descriptions of samples are given in supplementary information.
Sampling strategy	No sample size was determined a priori for hominin specimens used for comparisons, but an effort was made to get as many specimens per group as possible.
Data collection	Data collection was made using digital calipers, surface scanners, photogrammetry and micro-tomography by the authors (Florent Détroit, Julien Corny, Guillaume Daver and Clément Zanolli). Part of the data used for comparisons is derived from published data. All details are given in Methods and Supplementary Information.
Timing and spatial scale	Data collection on the original fossils from Callao Cave started in 2011 (first discoveries) and lasted in 2018 (last measurements made on the 3D models derived from the micro-tomographical record).
Data exclusions	Only comparative specimens with incomplete / damaged parts were excluded from analyses
Reproducibility	All attempts to repeat the measurements made on the original fossils were successful. This work does not involve experiments, but most analyses were tested with different replicate measurements of the original fossils and/or different compositions of the comparative sample of recent <i>H. sapiens</i> and gave similar results.
Randomization	Comparative specimens were allocated into taxonomical groups.
Blinding	Blinding was not relevant to comparative fossil hominins (grouped according to taxonomy). CCH fossils were added a posteriori in the bgPCAs (teeth, intermediate manual phalanx and proximal pedal phalanx).
Did the study involve field work?	☒ Yes ☐ No

Field work, collection and transport

Field conditions	The excavation took place in Callao Cave, Peñablanca, Cagayan Province in Northern Luzon, Philippines (tropical climate)
Location	Callao Cave, at coordinates 17° 42' 11.7" N 121° 49' 25.5" E
Access and import/export	The archaeological excavations at Callao Cave were conducted with a Special Authorization (SA) for Land Archaeological Exploration and /or Excavation issued by the National Museum of the Philippines. The Last SA issued was in May 7, 2015 with CPD SA No. 2015-08. The excavation also has the corresponding permits from the Protected Area Management Board-Peñablanca and the Office of the Cagayan Valley Governor. Export of specimens for laboratory analysis were covered by National Museum Permit to Export Cultural Properties (no 1104 and 1165).
Disturbance	Excavation procedures and techniques followed national and local regulations.

Reporting for specific materials, systems and methods

Materials & experimental systems

n/a	Involved in the study
☒	☐ Unique biological materials
☒	☐ Antibodies
☒	☐ Eukaryotic cell lines
☐	☒ Palaeontology
☒	☐ Animals and other organisms
☒	☐ Human research participants

Methods

n/a	Involved in the study
☒	☐ ChIP-seq
☒	☐ Flow cytometry
☒	☐ MRI-based neuroimaging

Palaeontology

Specimen provenance

Fossil specimens were recovered from the excavation of Layer 14 of Callao Cave, at coordinates 17° 42' 11.7" N 121° 49' 25.5" E. The archaeological excavations at Callao Cave were conducted with a Special Authorization (SA) for Land Archaeological Exploration and /or Excavation issued by the National Museum of the Philippines. The Last SA issued was in May 7, 2015 with CPD SA No. 2015-08. The excavation also has the corresponding permits from the Protected Area Management Board-Peñablanca and the Office of the Cagayan Valley Governor. Export of specimens for laboratory analysis were covered by National Museum Permit to Export Cultural Properties (no 1104 and 1165).

Specimen deposition

As mentioned in the text, the original Callao Cave hominin fossils are deposited at the National Museum of the Philippines, Manila.

Dating methods

Only already published dates are cited in this study

☐ Tick this box to confirm that the raw and calibrated dates are available in the paper or in Supplementary Information.