

Reporting Summary

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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 exact sample size (n) 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
Only common tests should be described solely by name; describe more complex techniques in the Methods section.
- 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 central tendency (e.g. means) or other basic estimates (e.g. regression coefficient) AND variation (e.g. standard deviation) or associated estimates of uncertainty (e.g. confidence intervals)
- For null hypothesis testing, the test statistic (e.g. F , t , r) with confidence intervals, effect sizes, degrees of freedom and P value noted
Give P values as exact values whenever suitable.
- 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 d , Pearson's r), indicating how they were calculated
- Clearly defined error bars
State explicitly what error bars represent (e.g. SD, SE, CI)

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

Software and code

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

Data collection

Forest Islands and per-Columbian earthworks have been mapped using ArcGIS pro 2.4

Data analysis

Spatial data have been analysed using ArcGIS pro 2.4; radiocarbon ages have been calibrated and modelled using OxCal 4.3

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

All data needed to evaluate the conclusions in the paper are included in the paper or in the Extended Data. Code used for 14C calibration in OxCal is available in Supplementary Information.

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	Data are quantitative. The study includes mapping of landscape elements based on visual analysis of remote sensing data; sampling of forest islands; 14C of the FIs' samples; phytolith extraction and visual (microscope) analysis (counting of individual phytoliths) of FIs' samples
Research sample	Samples are sediments cored on forest islands using an auger. In four cases (SM1, SM3, SM4 and Manechi) samples have been taken from profiles exposed during archaeological excavations. Samples are representative for the whole region because the four areas we surveyed cover all the different eco-regions identified in the Llanos de Moxos.
Sampling strategy	For archaeological excavations, samples have been taken from stratigraphic profiles at different depths. For the rest of forest islands, samples have been analysed from the lowest (i.e. oldest) datable level. FIs have been chosen for sampling based on their location. The two main criteria have been assuring the representativeness of the total population (by sampling 4 different regions) and accessibility. The amount of FIs sampled was not per-determined. We sampled the maximum number of sites we could sample within our logistic constraints.
Data collection	Samples have been taken with an auger. After extraction from the subsoil the excess of material has been cut off with a knife and only the inner, uncontaminated part of the extracted samples have been stored in plastic bags. These have been air-dried in Bolivia before being shipped. Charcoal fragments for 14C have been collected in situ, enveloped in aluminium foil and stored in plastic bags. Field observations have been wrote down on a notebook. The researchers were aware of the study hypothesis at the time of sampling.
Timing and spatial scale	Sampling has been done in different field seasons for different sites. The totality of the samples have been taken in 2012, 2013, 2014, 2016 and 2017. Samples have been taken in the Beni department, Bolivia.
Data exclusions	We decided to discard the identification of maize based of statistical analysis of cross-shaped phytoliths in order to rely only on the presence of wavy top rondel phytoliths. This exclusion was not pre-established. Maize can be identified using a discriminant function on non diagnostic phytoliths (cross shaped) or by identifying diagnostic phytoliths (wavy rondel),as we did for the rest of cultivars. Diagnostic pftoliths are a direct evidence far more reliable than the discriminant function. The discriminant function on cross shaped phytoliths indicate presence of maize in samples dated ca. 10.000 BP. It is almost impossible that maize was present in Bolivia 10k yrs ago, as this would precede the time of its domestication in Mexico. It could be that in this particular context (Bolivian Amazon in the early Holocene) some other plant produced maize-like cross-shaped phytoliths which affected our discriminant analysis. In the early contexts we did not find the diagnostic wavy-top rondels phytoliths derived from the maize glumes which were found in the other later samples. This need more research and we plan to further investigate this issue.
Reproducibility	The experiments consisted in counting a standard number (200) of diagnostic phytoliths. This number is considered sufficient to be representative of the sample, therefore it is not standard practice to repeat the counting.
Randomization	Sampling was not completely random because we choose the forest islands also based on their accessibility and ownership of the land. However, none of these criteria affect the representativeness of our sample.
Blinding	Sampling was not blind because we sampled soil and subsoil, so we knew the origin of each sample. In the lab samples where coded with numbers. Sample extraction and phytolith counting was blind because the origin of the sample was unknown during these steps.
Did the study involve field work?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

Field work, collection and transport

Field conditions	Sampling has always being performed during the dry season, between July and September. No forest islands has been sampled while raining.
Location	Fieldwork took place in the Beni department, Bolivia. The area surveyed is enclosed in a square area: up right corner lat -13° Lon -67°; down left corner Lat -15.5°; Lon -63.5°. Average elevation 180 ma s l. All sampling was performed on land.
Access and import/export	Field sites have been accessed with the permission of the land owner. Authorizations have been obtained by the Bolivian Ministry of Cultures and Tourism (UDAM 017/2012, UDAM 027/2013, 019/2014, UDAM 006/2015, UDAM 071/2017) and by the Beni Autonomous Government (08/08/2013, DDT 64-A/2014 and DDT 138/2017).

Disturbance

Forest islands were accessed by walking. Cores were taken with a manual auger with a 5 cm diameter, archaeological excavation were performed with manual tools, minimizing noises and impact on local fauna. The excavation pits were refilled with the excavated sediments in order to restore the aspect of the sites previous to the excavation.

Reporting for specific materials, systems and methods

Materials & experimental systems

- | n/a | Involvement | Included |
|-------------------------------------|--|----------|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> Unique biological materials | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> Antibodies | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> Eukaryotic cell lines | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> Palaeontology | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> Animals and other organisms | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> Human research participants | |

Methods

- | n/a | Involvement | Included |
|-------------------------------------|---|----------|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> ChIP-seq | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> Flow cytometry | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> MRI-based neuroimaging | |