

Reporting Summary

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Please do not complete any field with "not applicable" or n/a. Refer to the help text for what text to use if an item is not relevant to your study. For final submission: please carefully check your responses for accuracy; you will not be able to make changes later.

Text

Statistics

For all statistical analyses, confirm that the following items are present in the figure legend, table legend, main text, or Methods section.

|                          |                                                                                                                                                                                                                                                                                                |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| n/a                      | Confirmed                                                                                                                                                                                                                                                                                      |
| <input type="checkbox"/> | <input type="checkbox"/> The exact sample size ( <i>n</i> ) for each experimental group/condition, given as a discrete number and unit of measurement                                                                                                                                          |
| <input type="checkbox"/> | <input type="checkbox"/> A statement on whether measurements were taken from distinct samples or whether the same sample was measured repeatedly                                                                                                                                               |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> The statistical test(s) used AND whether they are one- or two-sided<br><i>Only common tests should be described solely by name; describe more complex techniques in the Methods section.</i>                                                               |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> A description of all covariates tested                                                                                                                                                                                                                     |
| <input type="checkbox"/> | <input type="checkbox"/> A description of any assumptions or corrections, such as tests of normality and adjustment for multiple comparisons                                                                                                                                                   |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> A full description of the statistical parameters 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) |
| <input type="checkbox"/> | <input type="checkbox"/> 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<br><i>Give P values as exact values whenever suitable.</i>                                |
| <input type="checkbox"/> | <input type="checkbox"/> For Bayesian analysis, information on the choice of priors and Markov chain Monte Carlo settings                                                                                                                                                                      |
| <input type="checkbox"/> | <input type="checkbox"/> For hierarchical and complex designs, identification of the appropriate level for tests and full reporting of outcomes                                                                                                                                                |
| <input type="checkbox"/> | <input type="checkbox"/> Estimates of effect sizes (e.g. Cohen's <i>d</i> , Pearson's <i>r</i> ), indicating how they were calculated                                                                                                                                                          |

Our web collection on [statistics for biologists](#) contains articles on many of the points above.

Software and code

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

|                 |                            |
|-----------------|----------------------------|
| Data collection | Supplementary Data 1 and 2 |
| Data analysis   | Supplementary Data 1 and 2 |

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 and reviewers. We strongly encourage code deposition in a community repository (e.g. GitHub). See the Nature Portfolio [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 description of any restrictions on data availability
- For clinical datasets or third party data, please ensure that the statement adheres to our [policy](#)

All data analyzed or generated during this study are available within the paper. "Supplementary Data 1 and 2" are provided as Excel spreadsheets. The datasets used are publicly available and can be accessed from the sources cited in the manuscript.

## Research involving human participants, their data, or biological material

Policy information about studies with [human participants or human data](#). See also policy information about [sex, gender \(identity/presentation\), and sexual orientation](#) and [race, ethnicity and racism](#).

Reporting on sex and gender

Reporting on race, ethnicity, or other socially relevant groupings

Population characteristics

Recruitment

Ethics oversight

Note that full information on the approval of the study protocol must also be provided in the manuscript.

## Field-specific reporting

Please select the one below that is 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/documents/nr-reporting-summary-flat.pdf](https://www.nature.com/documents/nr-reporting-summary-flat.pdf)

## Life sciences study design

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

Sample size

Data exclusions

Replication

Randomization

Blinding

## Behavioural & social sciences study design

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

Study description

This study presents a spatiotemporal analysis of climate-related disasters and social vulnerability across the Brazilian Amazon, integrating secondary data on disaster occurrences, economic losses, and socioeconomic indicators at the municipal level.

Research sample

The analysis covers all 772 municipalities within the Brazilian Legal Amazon. No human subjects were involved, and no individual-level data were used.

Sampling strategy

No sampling was applied, as the study includes the full population of municipalities in the target region.

Data collection

Data were collected from publicly available secondary sources, including the Brazilian Atlas of Disasters, IBGE (Brazilian Institute of Geography and Statistics), and the Social Progress Index database. No primary data collection was conducted.

Timing

The study examines the period from 2000 to 2022. Data were compiled and analyzed between 2023 and early 2024.

Data exclusions

No municipalities in the Legal Amazon were excluded from the analysis. However, where specific indicators were missing in national datasets, those variables were not used in that segment of analysis. These exclusions are noted in the Methods.

Non-participation

Not applicable. This study did not involve human participants or survey-based research.

Randomization

Not applicable. No experimental or randomized design was used, as the study relies entirely on observational data.

# Ecological, evolutionary & environmental sciences study design

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

|                          |                      |
|--------------------------|----------------------|
| Study description        | <input type="text"/> |
| Research sample          | <input type="text"/> |
| Sampling strategy        | <input type="text"/> |
| Data collection          | <input type="text"/> |
| Timing and spatial scale | <input type="text"/> |
| Data exclusions          | <input type="text"/> |
| Reproducibility          | <input type="text"/> |
| Randomization            | <input type="text"/> |
| Blinding                 | <input type="text"/> |

Did the study involve field work? ☐ Yes ☐ No

## Field work, collection and transport

|                        |                      |
|------------------------|----------------------|
| Field conditions       | <input type="text"/> |
| Location               | <input type="text"/> |
| Access & import/export | <input type="text"/> |
| Disturbance            | <input type="text"/> |

## Reporting for specific materials, systems and methods

We require information from authors about some types of materials, experimental systems and methods used in many studies. Here, indicate whether each material, system or method listed is relevant to your study. If you are not sure if a list item applies to your research, read the appropriate section before selecting a response.

### Materials & experimental systems

| n/a                      | Involved in the study                                  |
|--------------------------|--------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> Antibodies                    |
| <input type="checkbox"/> | <input type="checkbox"/> Eukaryotic cell lines         |
| <input type="checkbox"/> | <input type="checkbox"/> Palaeontology and archaeology |
| <input type="checkbox"/> | <input type="checkbox"/> Animals and other organisms   |
| <input type="checkbox"/> | <input type="checkbox"/> Clinical data                 |
| <input type="checkbox"/> | <input type="checkbox"/> Dual use research of concern  |
| <input type="checkbox"/> | <input type="checkbox"/> Plants                        |

### Methods

| n/a                      | Involved in the study                           |
|--------------------------|-------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> ChIP-seq               |
| <input type="checkbox"/> | <input type="checkbox"/> Flow cytometry         |
| <input type="checkbox"/> | <input type="checkbox"/> MRI-based neuroimaging |

## Antibodies

|                 |                      |
|-----------------|----------------------|
| Antibodies used | <input type="text"/> |
| Validation      | <input type="text"/> |

## Eukaryotic cell lines

Policy information about [cell lines and Sex and Gender in Research](#)

Cell line source(s)

Authentication

Mycoplasma contamination

Commonly misidentified lines  
(See [ICLAC](#) register)

## Palaeontology and Archaeology

Specimen provenance

Specimen deposition

Dating methods

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

Ethics oversight

Note that full information on the approval of the study protocol must also be provided in the manuscript.

## Animals and other research organisms

Policy information about [studies involving animals](#); [ARRIVE guidelines](#) recommended for reporting animal research, and [Sex and Gender in Research](#)

Laboratory animals

Wild animals

Reporting on sex

Field-collected samples

Ethics oversight

Note that full information on the approval of the study protocol must also be provided in the manuscript.

## Clinical data

Policy information about [clinical studies](#)

All manuscripts should comply with the ICMJE [guidelines for publication of clinical research](#) and a completed [CONSORT checklist](#) must be included with all submissions.

Clinical trial registration

Study protocol

Data collection

Outcomes

## Dual use research of concern

Policy information about [dual use research of concern](#)

### Hazards

Could the accidental, deliberate or reckless misuse of agents or technologies generated in the work, or the application of information presented in the manuscript, pose a threat to:

| No                                  | Yes                                                 |
|-------------------------------------|-----------------------------------------------------|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> Public health              |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> National security          |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> Crops and/or livestock     |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> Ecosystems                 |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> Any other significant area |

## Experiments of concern

Does the work involve any of these experiments of concern:

| No                       | Yes                                                                                                  |
|--------------------------|------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> Demonstrate how to render a vaccine ineffective                             |
| <input type="checkbox"/> | <input type="checkbox"/> Confer resistance to therapeutically useful antibiotics or antiviral agents |
| <input type="checkbox"/> | <input type="checkbox"/> Enhance the virulence of a pathogen or render a nonpathogen virulent        |
| <input type="checkbox"/> | <input type="checkbox"/> Increase transmissibility of a pathogen                                     |
| <input type="checkbox"/> | <input type="checkbox"/> Alter the host range of a pathogen                                          |
| <input type="checkbox"/> | <input type="checkbox"/> Enable evasion of diagnostic/detection modalities                           |
| <input type="checkbox"/> | <input type="checkbox"/> Enable the weaponization of a biological agent or toxin                     |
| <input type="checkbox"/> | <input type="checkbox"/> Any other potentially harmful combination of experiments and agents         |

## Plants

|                       |                      |
|-----------------------|----------------------|
| Seed stocks           | <input type="text"/> |
| Novel plant genotypes | <input type="text"/> |
| Authentication        | <input type="text"/> |

## ChIP-seq

### Data deposition

- ☐ Confirm that both raw and final processed data have been deposited in a public database such as [GEO](#).
- ☐ Confirm that you have deposited or provided access to graph files (e.g. BED files) for the called peaks.

|                                                                    |                      |
|--------------------------------------------------------------------|----------------------|
| Data access links<br><i>May remain private before publication.</i> | <input type="text"/> |
| Files in database submission                                       | <input type="text"/> |
| Genome browser session<br>(e.g. <a href="#">UCSC</a> )             | <input type="text"/> |

### Methodology

|                         |                      |
|-------------------------|----------------------|
| Replicates              | <input type="text"/> |
| Sequencing depth        | <input type="text"/> |
| Antibodies              | <input type="text"/> |
| Peak calling parameters | <input type="text"/> |
| Data quality            | <input type="text"/> |

Software

## Flow Cytometry

### Plots

Confirm that:

- ☐ The axis labels state the marker and fluorochrome used (e.g. CD4-FITC).
- ☐ The axis scales are clearly visible. Include numbers along axes only for bottom left plot of group (a 'group' is an analysis of identical markers).
- ☐ All plots are contour plots with outliers or pseudocolor plots.
- ☐ A numerical value for number of cells or percentage (with statistics) is provided.

### Methodology

Sample preparation

Instrument

Software

Cell population abundance

Gating strategy

- ☐ Tick this box to confirm that a figure exemplifying the gating strategy is provided in the Supplementary Information.

## Magnetic resonance imaging

### Experimental design

Design type

Design specifications

Behavioral performance measures

Imaging type(s)

Field strength

Sequence &amp; imaging parameters

Area of acquisition

Diffusion MRI

☐ Used☐ Not used

### Preprocessing

Preprocessing software

Normalization

Normalization template

Noise and artifact removal

Volume censoring

### Statistical modeling & inference

Model type and settings

Effect(s) tested

Specify type of analysis: ☐ Whole brain ☐ ROI-based ☐ Both

Statistic type for inference

(See [Eklund et al. 2016](#))

Correction

## Models & analysis

n/a | Involved in the study

- ☐ ☐ Functional and/or effective connectivity
- ☐ ☐ Graph analysis
- ☐ ☐ Multivariate modeling or predictive analysis

Functional and/or effective connectivity

Graph analysis

Multivariate modeling and predictive analysis

