

# Tracing the Evolution of Pano Languages in Parallel with Archaeological Changes in the Ucayali Basin

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New Advances in Phylolinguistics

# Collaborators



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- Lead, Data



José Iriarte

- Archaeology



Simon Greenhill

- Phylogeny



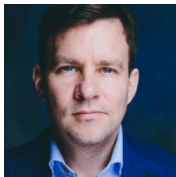
Ezequiel Koile

- Phylogeny



Pilar Valenzuela

- Pano expert



Mattis List

- RDM



Damián Blasi

- Framing

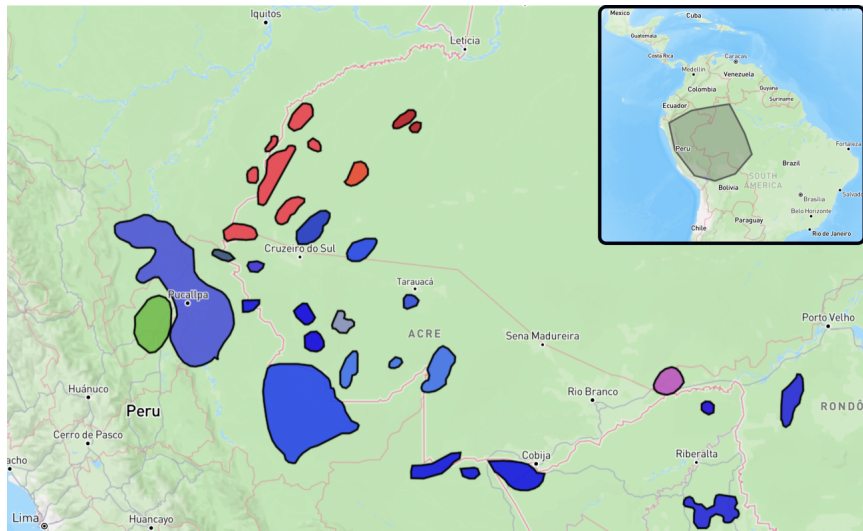


Russell Gray

- Framing

# Introduction

# Location of the Pano language family



# The language family

## Key information

- 33 languages in total, 18 still spoken (Fleck 2013)
- Around 50,000 speakers

# The language family

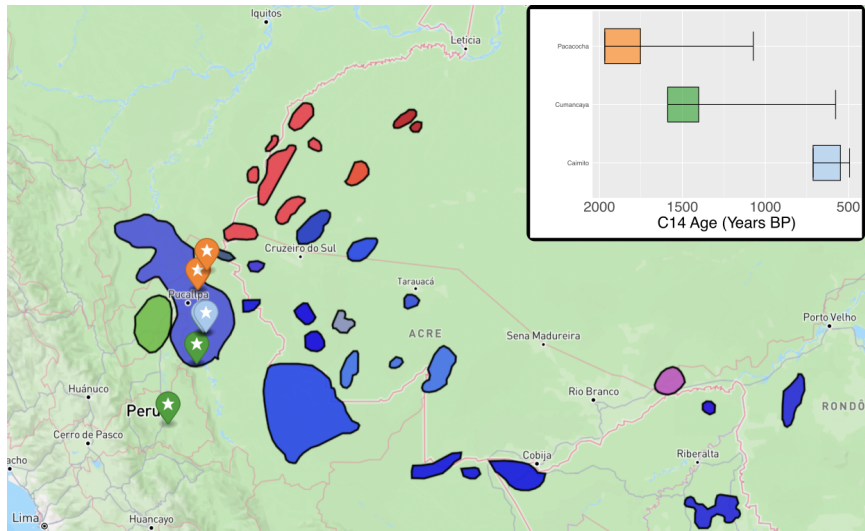
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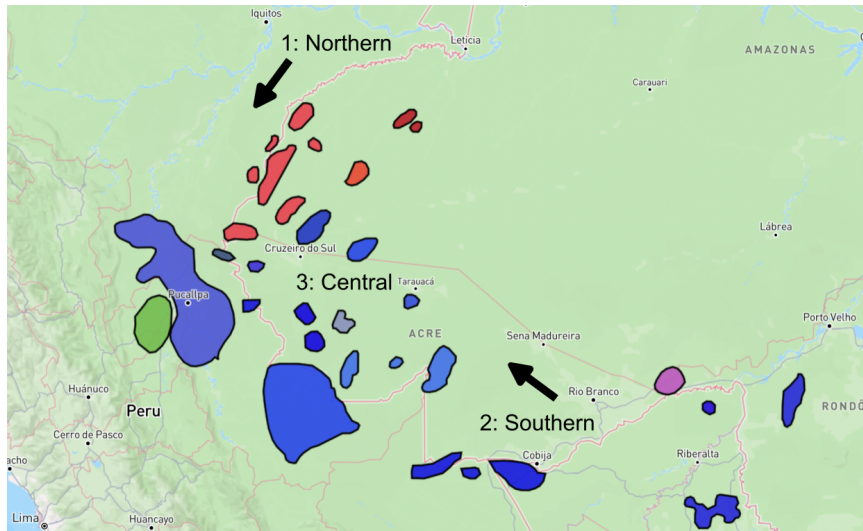
## Key information

- 33 languages in total, 18 still spoken (Fleck 2013)
- Around 50,000 speakers
- ASJP: split around 1,853 years ago (Holman et al. 2011)
- Ethnological estimates: 3,000 years (Hornborg & Eriksen 2011)

# Archaeological background



# Hypotheses about the Proto-Pano homeland



## Data and Methods

## Processing of data

- Data from 26 languages (10 from fieldwork by Roberto)
- 181 concepts
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- Released on GitHub and Zenodo  
(v0.1, <https://doi.org/10.5281/zenodo.10988938>)

# Annotation of cognacy

| DOCULECT       | CONCEPT | TOKENS        | COGID             |
|----------------|---------|---------------|-------------------|
| Kapanawa       | stone   | m a k a n     | 1184 <sup>2</sup> |
| Shipibo_Konibo | stone   | m a k a n     | 1184 <sup>2</sup> |
| Chaninawa      | stone   | b a k t s i   | 1185 <sup>3</sup> |
| Sharanawa      | stone   | b a k t s i   | 1185 <sup>3</sup> |
| Yaminawa       | stone   | b a ? t s     | 1185 <sup>3</sup> |
| Chakobo        | stone   | m a s a s a   | 1197 <sup>4</sup> |
| Kakataibo      | stone   | m a s a s     | 1197 <sup>4</sup> |
| Matis          | stone   | m a s a s     | 1197 <sup>4</sup> |
| Kashinawa_B    | stone   | m i s k i     | 1198 <sup>4</sup> |
| Kashinawa_P    | stone   | m i s k i     | 1198 <sup>4</sup> |
| Katukina       | stone   | m i s k i     | 1198 <sup>4</sup> |
| Shanenawa      | stone   | m t s k i t i | 1198 <sup>4</sup> |

Figure 1: Cognates for STONE annotated in EDICTOR (List et al. 2025).

# Calibrations from anthropological sources

| Varieties                       | Prior                              | Original source                                                                                                                                                                    |
|---------------------------------|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Kashinawa<br>(Bolivia and Peru) | $\mathcal{N}(80, 5)$               | 'This occurred probably around 1920. At this point, the history of the Cashinahua is divided into two separate courses, one Brazilian and the other Peruvian.'<br>(Kensinger 1998) |
| Chacobo,<br>Pacahuara           | $\log \mathcal{N}(163, 0.6) + 250$ | 'These Indians are a fraction of the Pacaguara tribe, and they speak the same language, with some differences.'<br>(Cardús 1886)                                                   |

# Calibrations visualized

Kashinawa:  $\text{normal}(80, 5)$

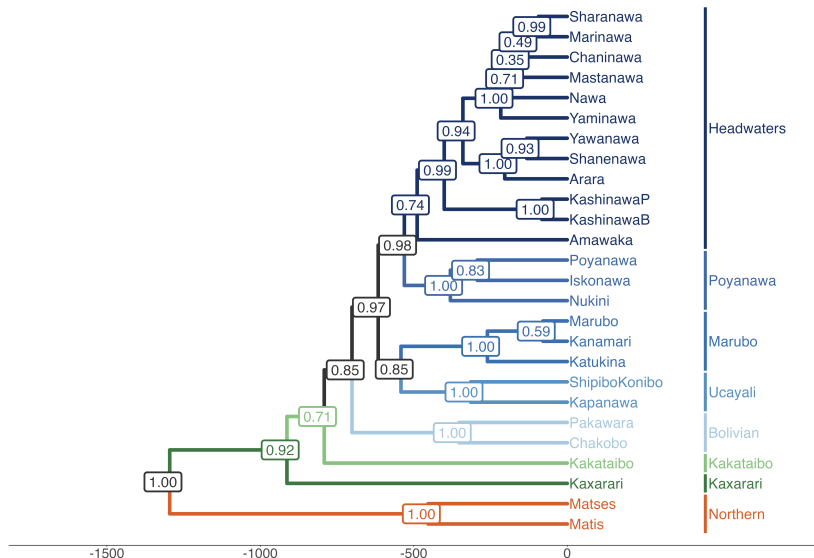


Chakobo + Pacahuara:  $\text{logn}(163, 0.6) + 258$



## Results

# Posterior values of branches



# The case of Kakataibo



# A northern origin of the Pano language family?



*‘Nukën chaitiokëkama kaisa nortenuax  
tsooti kwainakëäkëxa. [...]’*

**Figure 2:** Kakataibo oral tradition  
by Emilio Estrella (Kakataibo  
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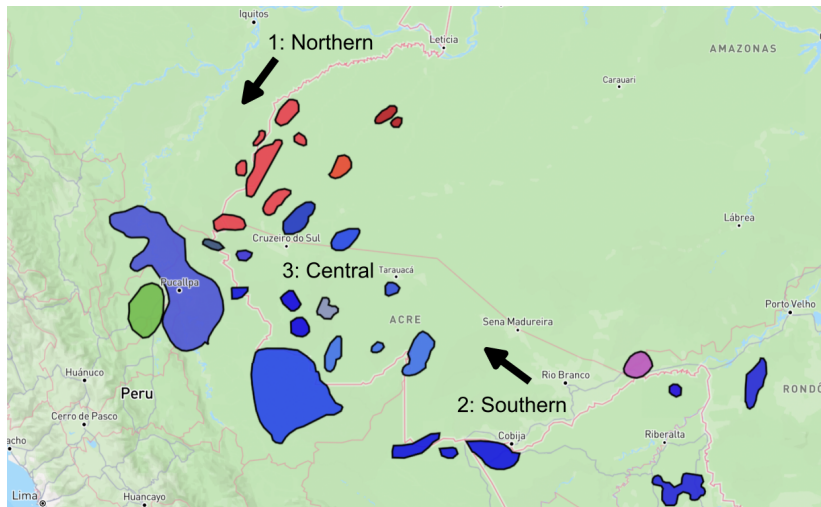


**Figure 2:** Kakataibo oral tradition by Emilio Estrella (Kakataibo wise, ?–2021).

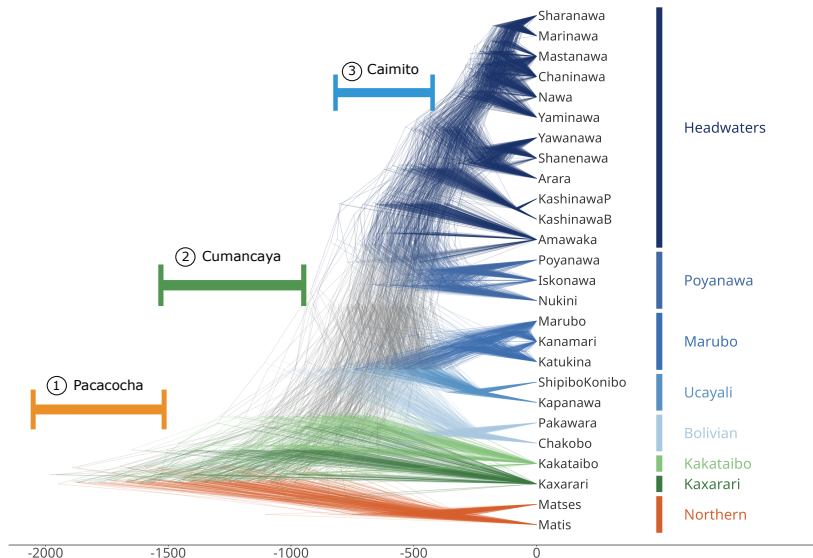
*‘Nukën chaitiokëkama kaisa nortenuax tsooti kwainakëakëxa. [...]’*

*‘It says that our legitimate ancestors, after living in the North, turned around (as if coming this way). Turning around, they say, they came down along the big river [the Ucayali river]. Coming down, living here and there, our ancestors were killing spider monkeys and tapirs, living in places where there were no people. And after living in those places, raising their sons and daughters and killing maquisapas, they came down [to the Ucayali].’*

# Hypotheses about the Proto-Pano homeland



# Relation of branching events and archaeology



## Conclusion

## Key take-aways

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**Thank you!**

- Cardús, José. 1886. *Las misiones franciscanas entre los infieles de bolivia: descripción del estado de ellas en 1883 y 1884, con una noticia sobre los caminos y tribus salvajes, una muestra de varias lenguas, curiosidades de historia natural, y un mapa para servir de ilustración*. Librería de la Inmaculada concepcion.
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## Supplementary slides

# Linguistic innovations in Pano

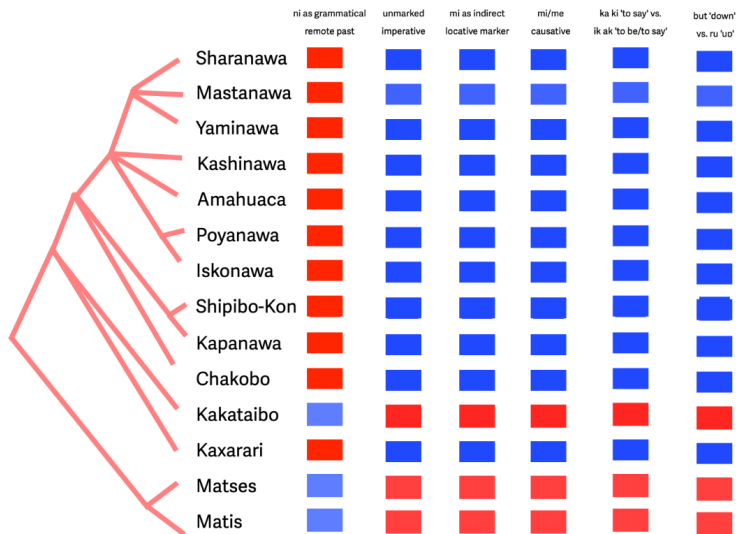


Figure 3: Innovations marked in red

# Topology test

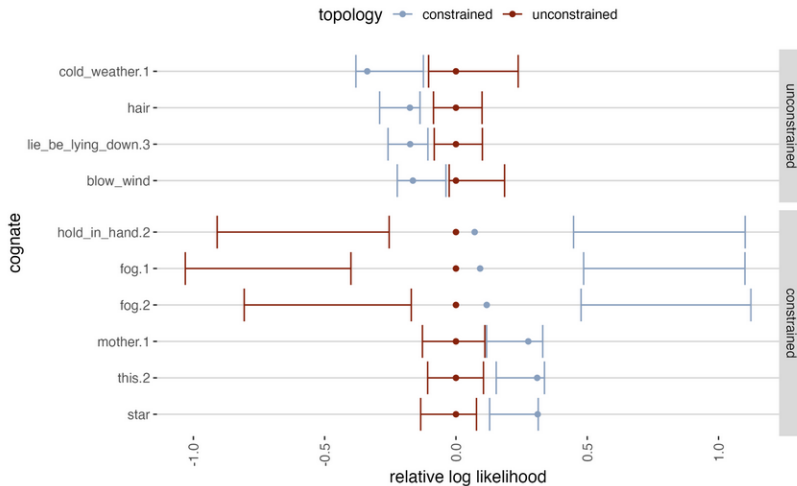


Figure 4: Topology test based on method from King et al. (2024).

# Cognates COLD

| DOCULECT       | CONCEPT        | TOKENS        | COGID             |
|----------------|----------------|---------------|-------------------|
| Amawaka        | cold [weather] | m a ts i      | 170 <sup>21</sup> |
| Chakobo        | cold [weather] | m a ts i      | 170 <sup>21</sup> |
| Kakataibo      | cold [weather] | m a ts i      | 170 <sup>21</sup> |
| Kapanawa       | cold [weather] | m a ts i      | 170 <sup>21</sup> |
| Shipibo_Konibo | cold [weather] | m a ts i      | 170 <sup>21</sup> |
| Iskonawa       | cold [weather] | i k i n i k i | 171 <sup>5</sup>  |
| Matis          | cold [weather] | i k e n       | 171 <sup>5</sup>  |
| Matses         | cold [weather] | i k e n       | 171 <sup>5</sup>  |

# Cognates STAR

| DOCULECT       | CONCEPT | TOKENS        | COGID              |
|----------------|---------|---------------|--------------------|
| Kakataibo      | star    | i s p a       | 733 <sup>3</sup>   |
| Matis          | star    | w i s p a     | 733 <sup>3</sup>   |
| Matses         | star    | w i s p a     | 733 <sup>3</sup>   |
| Amawaka        | star    | w i f i       | 1183 <sup>20</sup> |
| Chakobo        | star    | w i f t i m a | 1183 <sup>20</sup> |
| Kapanawa       | star    | w i f i       | 1183 <sup>20</sup> |
| Shipibo_Konibo | star    | w i f t i n   | 1183 <sup>20</sup> |