

A Phylogenetic Study of the Cariban Family

Combining Linguistic and Archaeological Data

Tiago Tresoldi¹, Fernando Orphão de Carvalho², Fabrício Ferraz Gerardi³ and Bruno de Souza Barreto⁴

1 Uppsala Universitet

2 Museu Nacional, Universidade Federal do Rio de Janeiro

3 Eberhard Karls Universität Tübingen

4 Universidade de São Paulo

26th International Conference on Historical Linguistics (ICHL26), Heidelberg, 04.09.2023

The Cariban language family

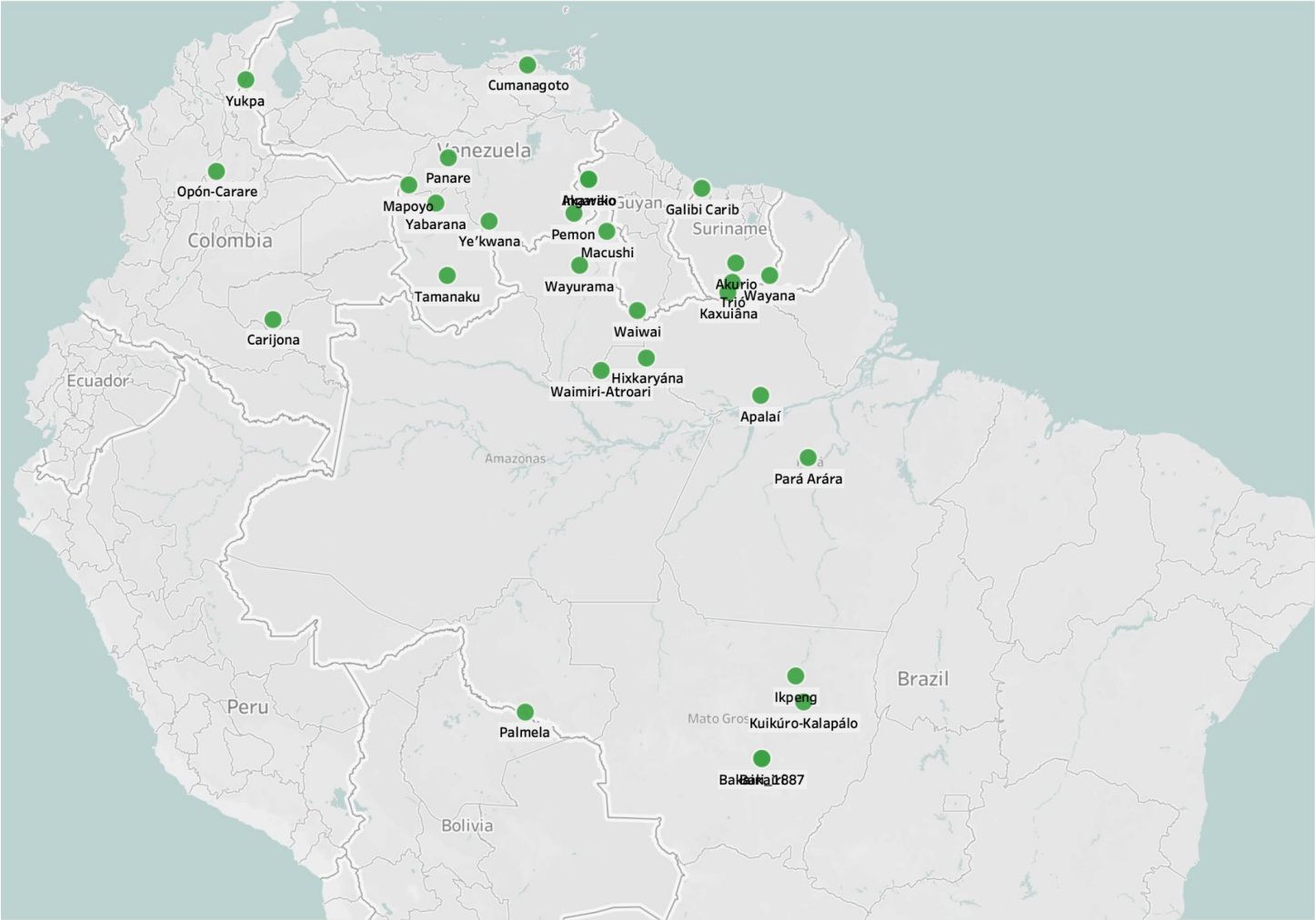
- Family

- Comprises ca. 25 languages spoken in South America: Brazil, Suriname, French Guiana, Guiana, Colombia, and Venezuela
- Disputes on internal classification (Meira 2006, Gildea 2012)
- Individual languages (Apalai, Waimiri-Atroari) of difficult internal classification
- Unclear structure beyond obvious low-level subgroups

- Homeland and dating

- Greatest linguistic diversity (possible homeland) in the Guiana Highlands
- Southern Amazonia proposed as homeland by Meira and Franchetto (2005)
- No concrete dating estimates, save for glottochronological attempts

Geographic
distribution of
Cariban languages
(from Glottolog
4.7)



Expansion from the Guiana Homeland

- Northwards:
 - Reached Middle & Lower Orinoco by 400 AD, interacting with Arawakan (Zucchi 1985)
 - By 800-900 AD, extended to Sierra de Perijá, Colombia, encountering Chibchan and additional Arawakan languages (Antczak, Urbani, & Antczak 2017)
- Southwards:
 - Reached Guiana and Suriname by 700 AD, supplanting or blending with Barrancoid pottery artisans (likely Arawakan) (Rostain 2008: 231)
 - Possible further south migration to Lower & Middle Amazon between 500-1000 AD, suggested by the Incised-Punctate pottery style, an Arauquinoid trait (Heckenberger & Neves 2009: 256)
 - Later reached Central Brazil

Expansion and languages

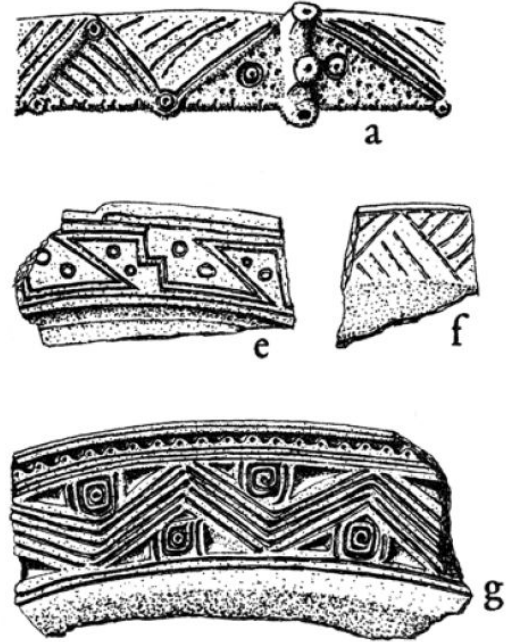
- Emergence of Contact Languages
 - Arising from interactions with other societies
- Role of Kariña
 - Served as a lingua franca along the coast, from the Amazon to the Orinoco River mouth (Hoff 1995: 49)
- Prominent Contact Languages & References
 - Island Carib in the Lesser Antilles (Hoff 1995)
 - Galibi Uaçá in French Guiana (Nimuendajú 1926, S. Meira & Muysken 2017)
 - Amazonian French creoles (Ferreira & Alleyne 2007)
 - Trio-Ndyuka Pidgin: A bridge between Native Americans, Europeans, and African slaves (Huttar & Velantie 1997, Carlin & Boven 2002, S. Meira & Muysken 2017)

Lathrap's (1970) first model for Cariban expansions

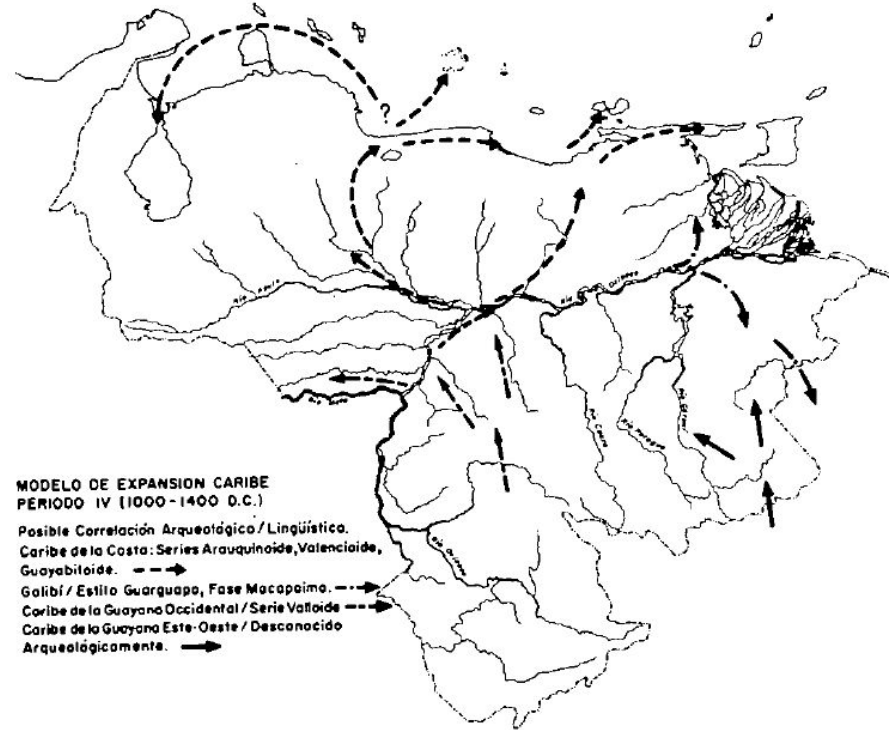
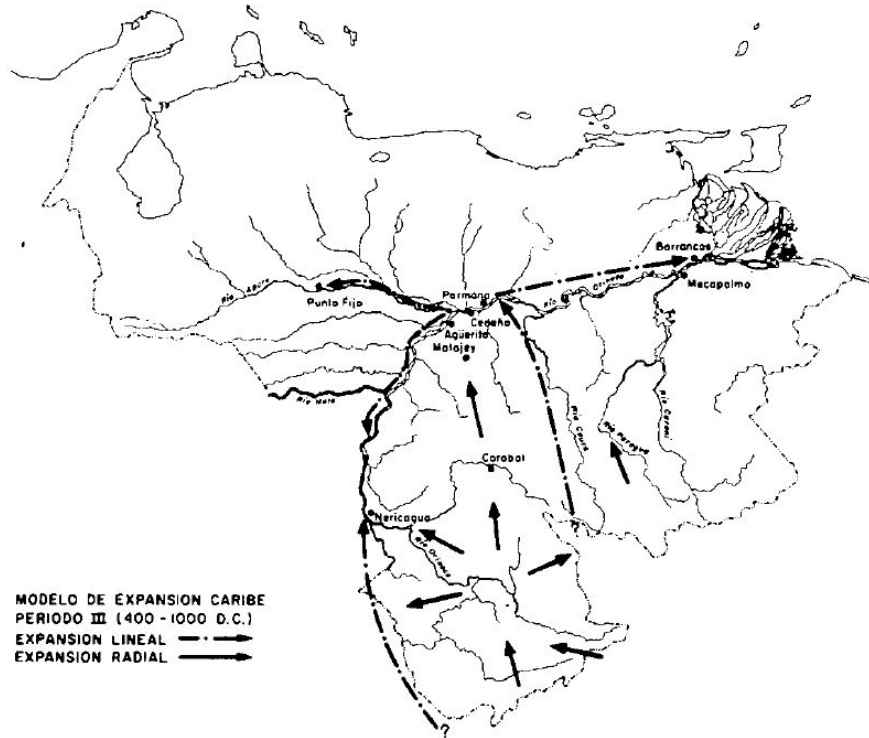
- Two correlated ceramic Traditions were associated with Cariban-languages:
 - Arauquinoid Tradition (Orinoco and Guianas Coast)
 - Incised and Punctate Tradition (Lower Amazon)
 - Pottery paste had inclusions of a espiculae of freshwater sponge called caiuxi
- Homeland: Guyana highlands
- Waves of expansion: Colombian Amazon, Guianas Coast and the Antilles
- Cardiac model: Demographic pressure and competition for fertile lands for maize cultivation (it's not a valid model anymore)
- Exogamic marriage with women of dominated groups would have generated different archaeological signatures on pottery

Problems with the Arauquinoid model

- Pottery Styles Diversity
 - Marked variance in ceramic designs
- Unrelated Styles to Carib-speakers
 - Some ceramics in these traditions do not tie to Carib-speaking communities
- Aristé Pottery Style
 - Strongly linked to Arawak-speaking groups, evidencing continuity with the Palikur of Amapá and French Guiana
- Cauixi-Tempered Pottery
 - Not exclusively associated with Carib-speakers

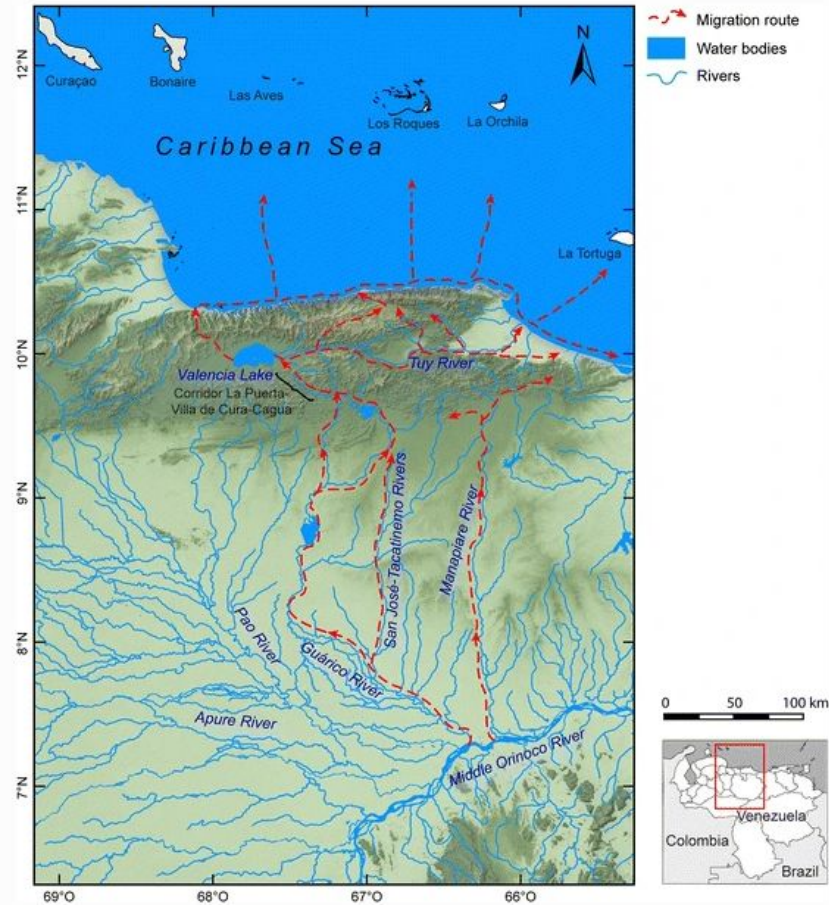


Kay Tarble's (1985) model refination



The middle Orinoco and Venezuelan coast

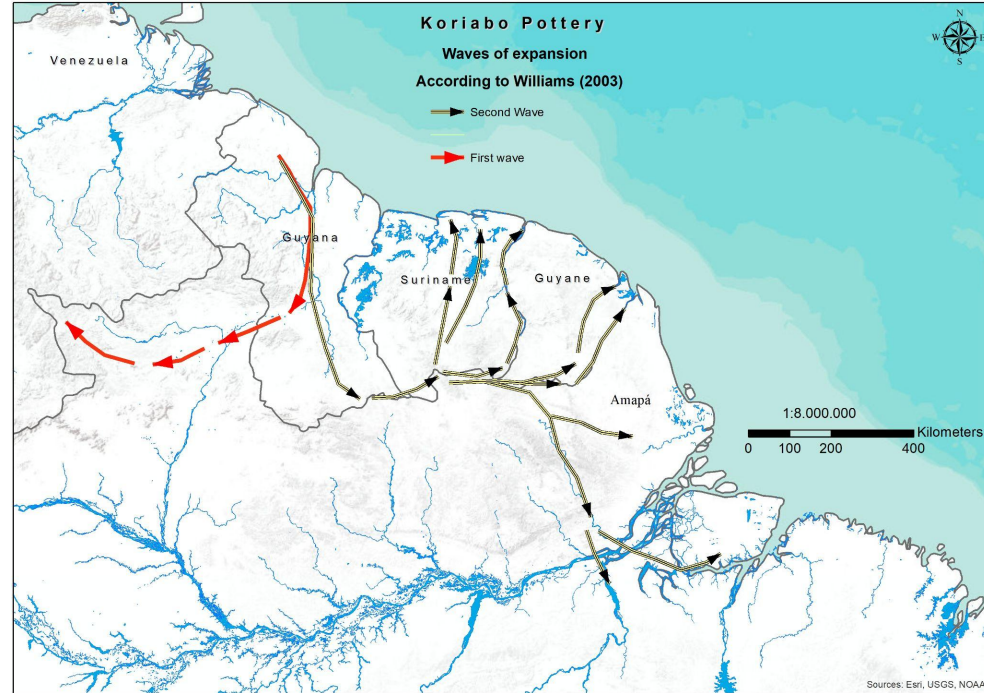
- Expansion towards northern Venezuelan coast started from 600-800 AD
- The expansion regards the split of Arauquinoid ceramics as an offshoot Tradition of the previous middle-Orinoco Valloid ceramics



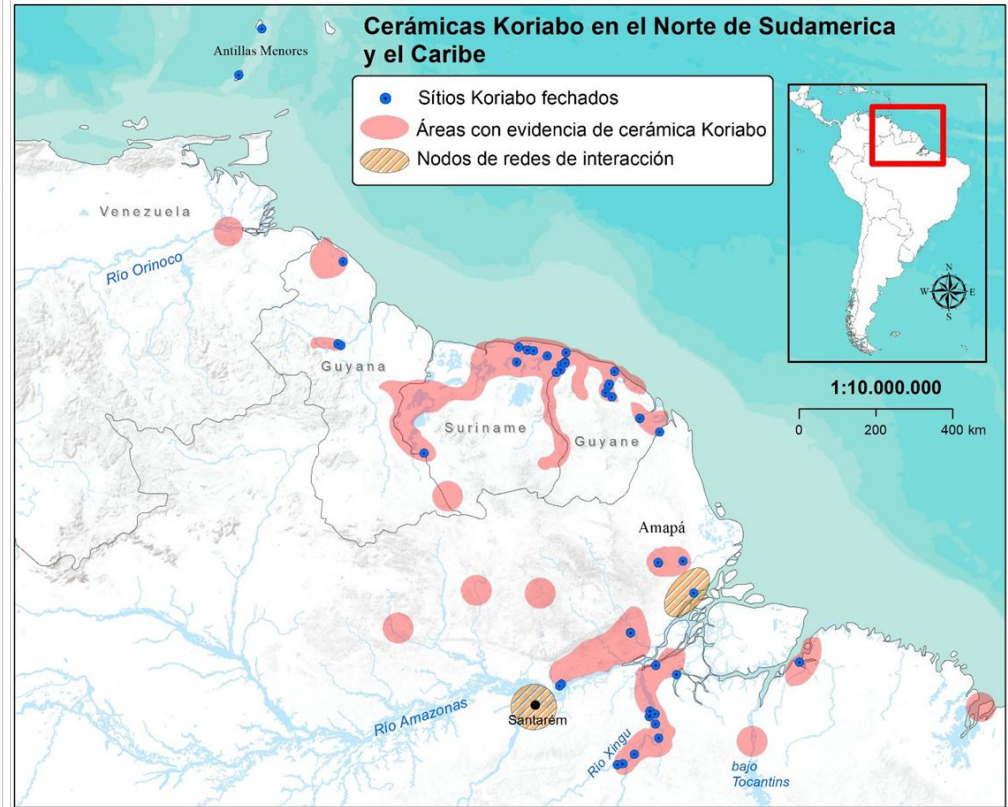
Source: Antczak et al. 2017

The turning point: Koriabo pottery

- Dennis Williams (2003) was who consistently summarized the relation between Koriabo pottery and Carib-speaking expansions
- He established associations with Karinya and Akawaio Languages of western and central guiana shield
- The first migration route was via the great streams of the Essequibo Basin until Rio Branco Savannas
- In the second route, Akawaio traders transversed the forest west to east, descending north-flowing and south-flowing directions, arriving in the lower Amazon, Guianas coast and the Amazon Delta



Koriabo features and distribution



Similarities with late age Lower Amazon styles

Koriabo
(~300/100 BC to AD
1650)



Photo: Bruno Barreto

Konduri
(AD 1100 - 1600)



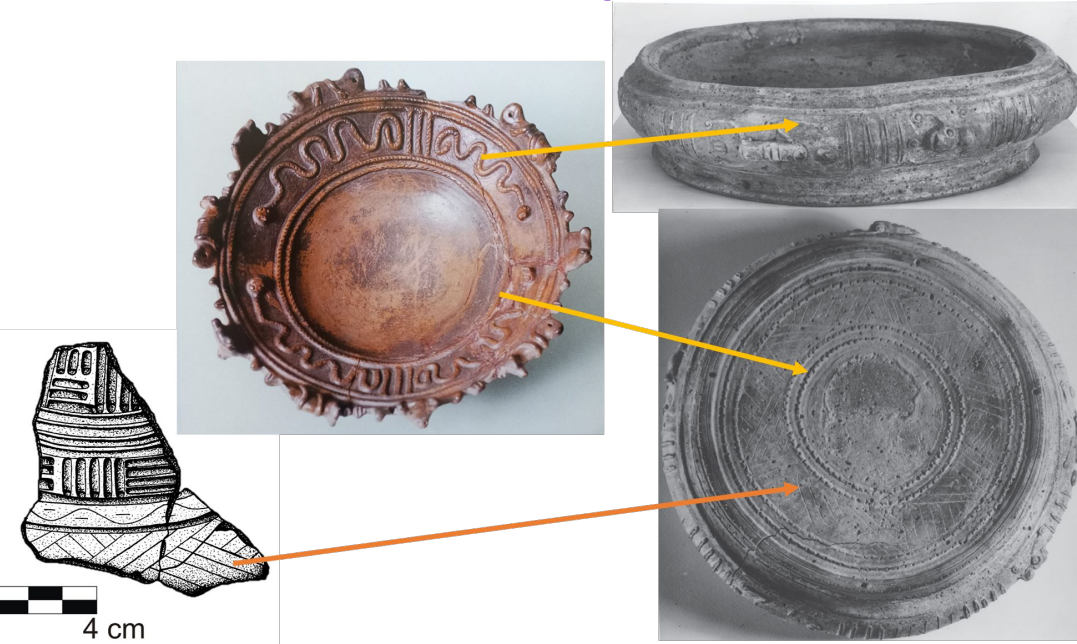
Photo: Maurício de Paiva

Santarém
(AD 1200 - 1600)

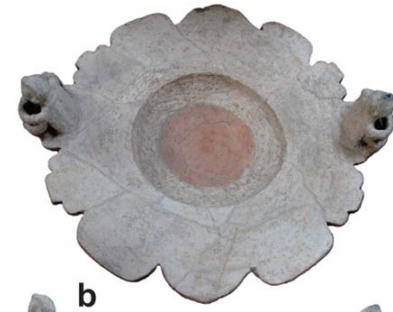


Photo: M. Alves, 2018

Koriabo interaction spheres and ceramic hybridisms



a



b



From: Barreto, Lima and Barreto (in press)



c



d



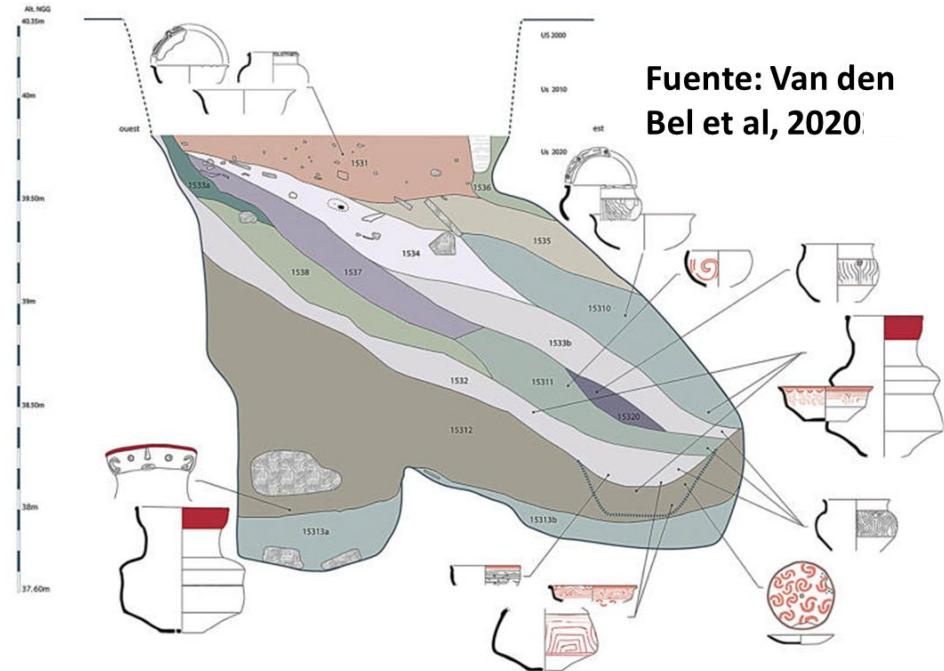
Archaeological evidence on Karib-Arawak contacts

- Despite the distribution of Koriabo ceramics across the Lower Amazon, they do not appear in northern Amapá
- This can be explained by the presence of Aristé-phase potters related to ancient Arawak speaking groups (Green et al., 2003)



Archaeological evidence on Karib-Arawak contacts

- Some Aristé funerary pits seem to have been revisited and disturbed by a 15th century Koriabo occupation (Migeon et al. 2011)
- That is consistent with Collomb's suggestion (2015) of a Carib-Arawak frontier in this area, marked by many discontinuous war episodes that are still referred to in oral narratives of Oyapock's indigenous groups (Vidal, 2001)



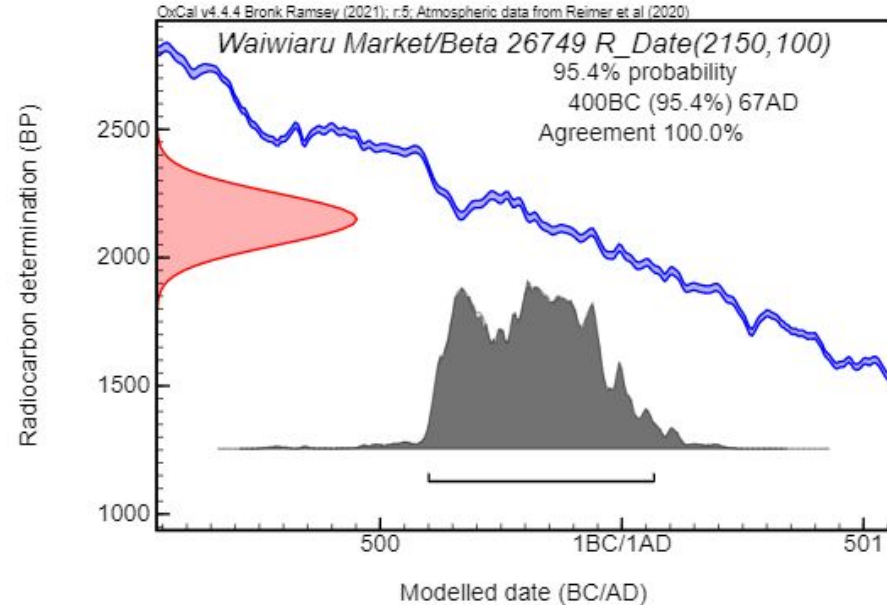
Linguistic evidence on Karib-Arawak contacts

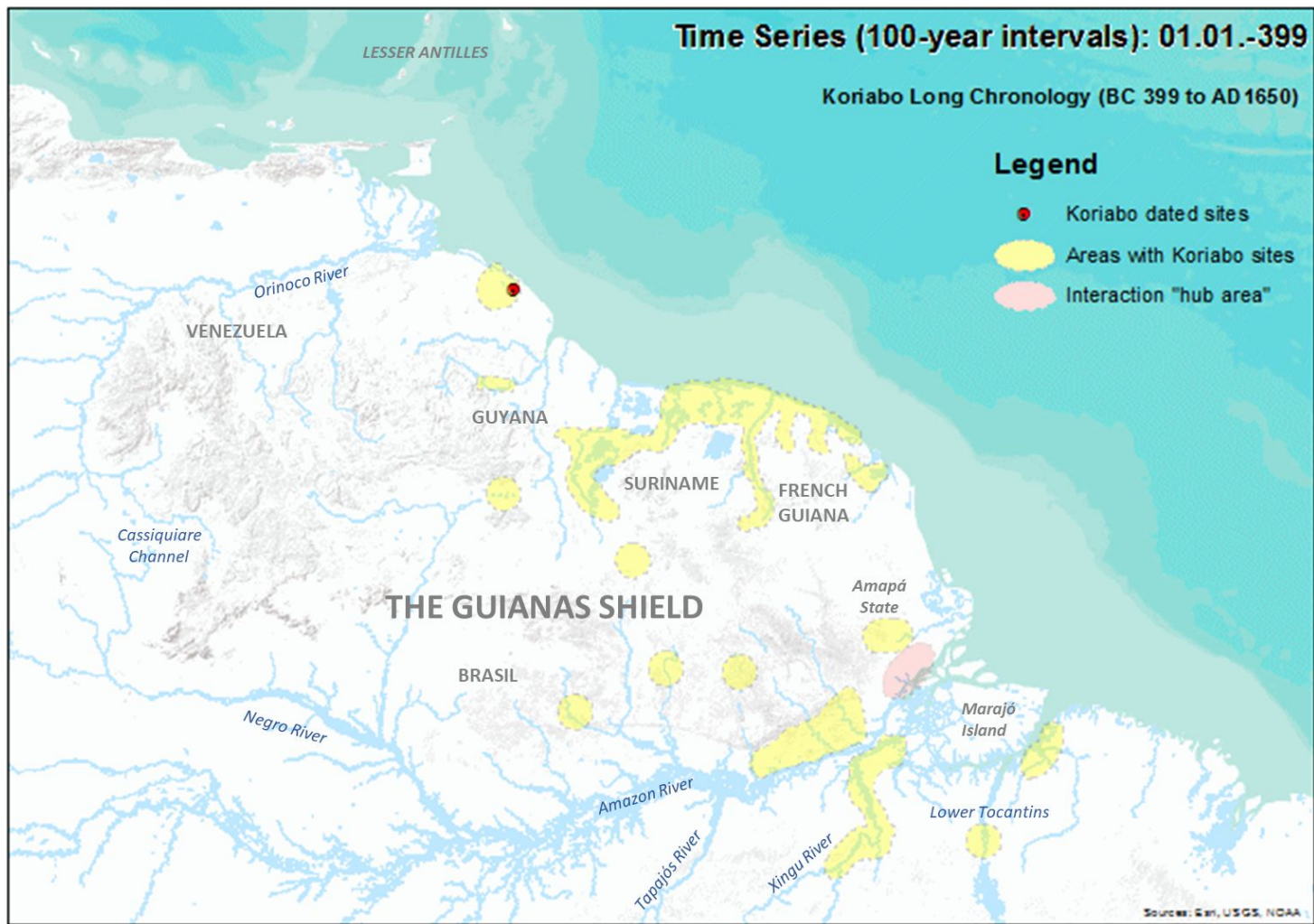
- Candidate Cariban loans in the language of the Palikur (Arawakan)

<i>-biy(a)</i> ‘mouth’	<	PC <i>*-mita</i>
<i>pam</i> ‘salt’	<	<i>pan</i> ‘salt’ (Makushi)
<i>karukri</i> ‘money’	<	<i>karuukuri</i> ‘gold’ (Makushi)
<i>arigman</i> ‘music’	<	<i>-eremi ~ oremi</i> ‘song’ (Galibi)
<i>-uwit</i> ‘speech, language’	<	<i>*(w)omi</i> ‘voice’ (Proto-Taranoan)
<i>awna</i> ‘language’	<	<i>auran</i> ‘voice, language’ (Galibi)
<i>suku</i> ‘wash’	<	<i>*cuka</i> ‘wash’ (Proto-Taranoan)
<i>kuwak</i> ‘manioc flour’	<	<i>kuwakë</i> ‘manioc flour’ (Wayana)

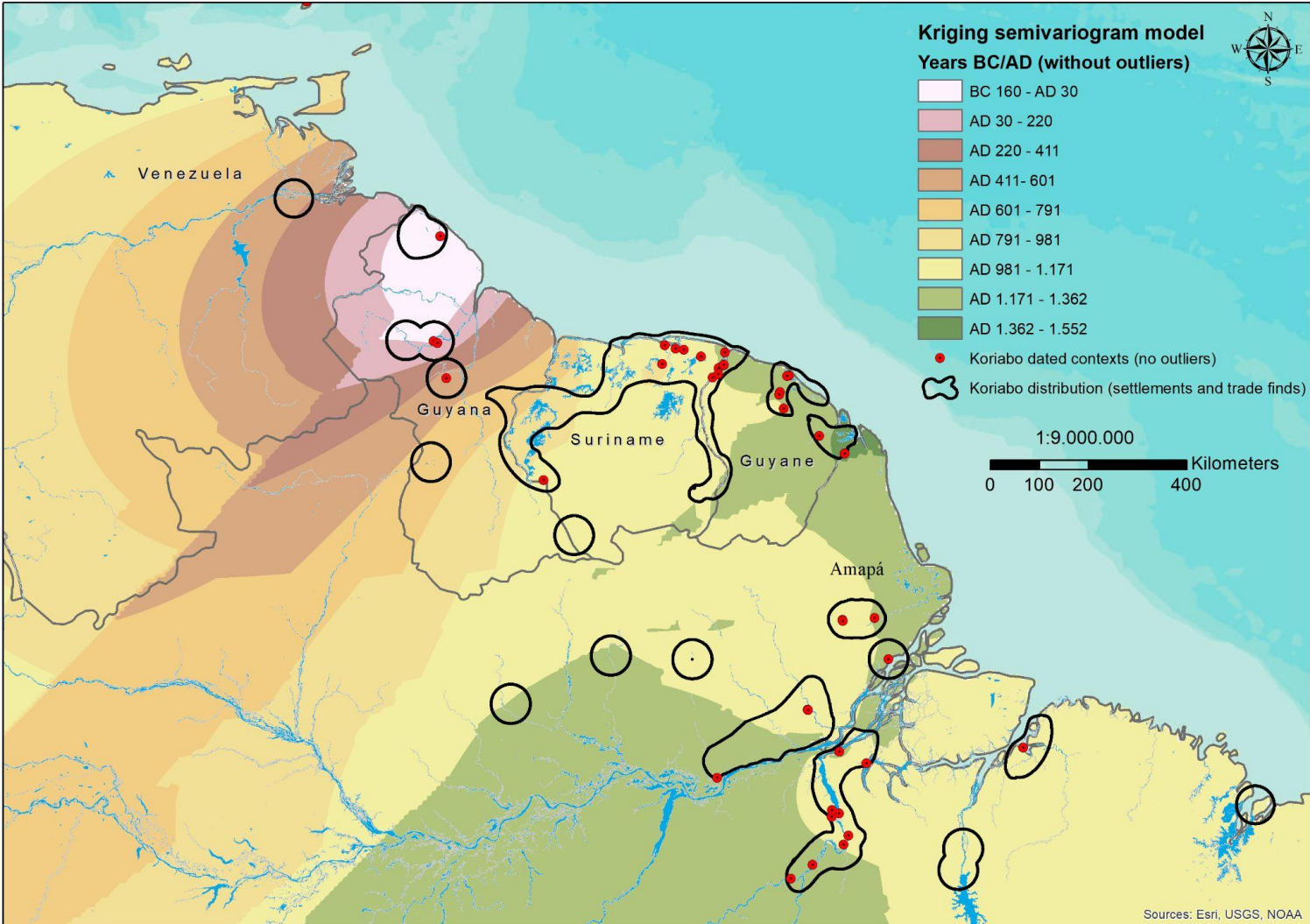
Methods on Radiocarbon age estimation

- The radiocarbon age is a measurement of the remnant C14 in a sample based on the half-life decay rate
- It is translated in BP years with a +/- standard deviation value
- The dates must be calibrated using the atmospheric curve in aim to convert the conventional radiocarbon age in calendar years (BC/AD)
- 92 dates could be attributed to Koriabo, most from French Guiana





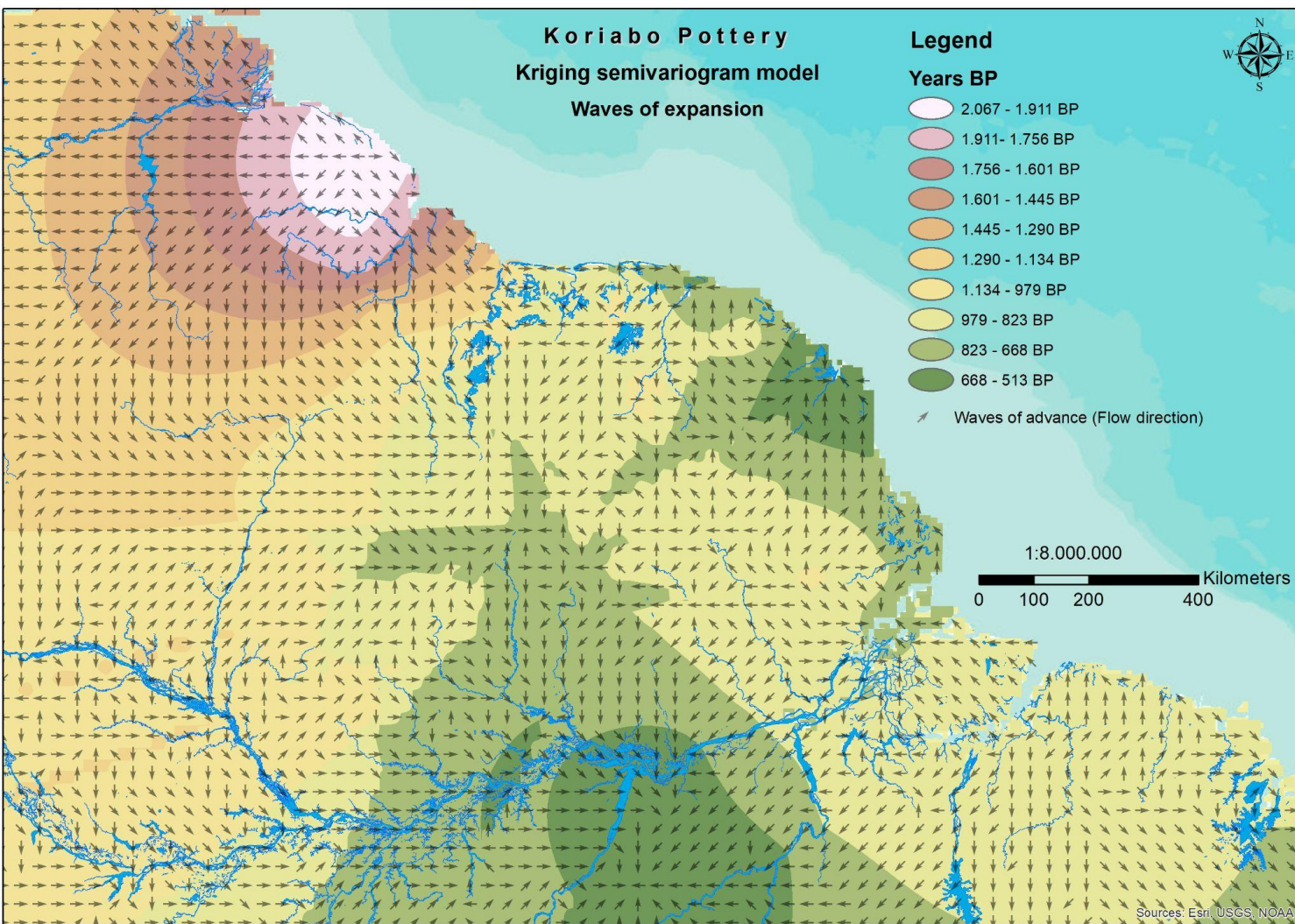
Source: Bruno Barreto (forthcoming)



The interpolation of Radiocarbon dates (Kriging) shows a faster expansion after 790 AD, towards the Guiana shield and lower Amazon.

It probably consisted of a demic diffusion model with substantial population movements

Source: Bruno Barreto



The arrows show the direction of expansion waves according the interpolated dates (Years BP).

Source: Bruno Barreto

A comparative Cariban database

- An extension of the database in Matter (2020)
 - More languages (from 22 to 31), including historical ones
 - More concepts (from 96 to 216)
- Cognate judgments based on expert assessment and regular sound correspondences

Cognacy

- Comparison between cognates when decided by experts and when inferred by automatic methods (SCA, LexStat, LexStat+Infomap, Edit Distance) suggest that our decisions are compatible
 - The highest F-score is with LexStat+Infomap, expected to be the best method (List et al. 2017)
- We will later review all cases of mismatch, using the automatic methods as a form of quality control

B-cubed scores (cogid, scaid)		B-cubed scores (cogid, lexstatid)		B-cubed scores (cogid, infomap)		B-cubed scores (cogid, editid)	
Precision	0.8805	Precision	0.9279	Precision	0.9017	Precision	0.9375
Recall	0.7541	Recall	0.7301	Recall	0.8255	Recall	0.6695
F-score	0.8124	F-score	0.8172	F-score	0.8619	F-score	0.7811

Phylogenetics

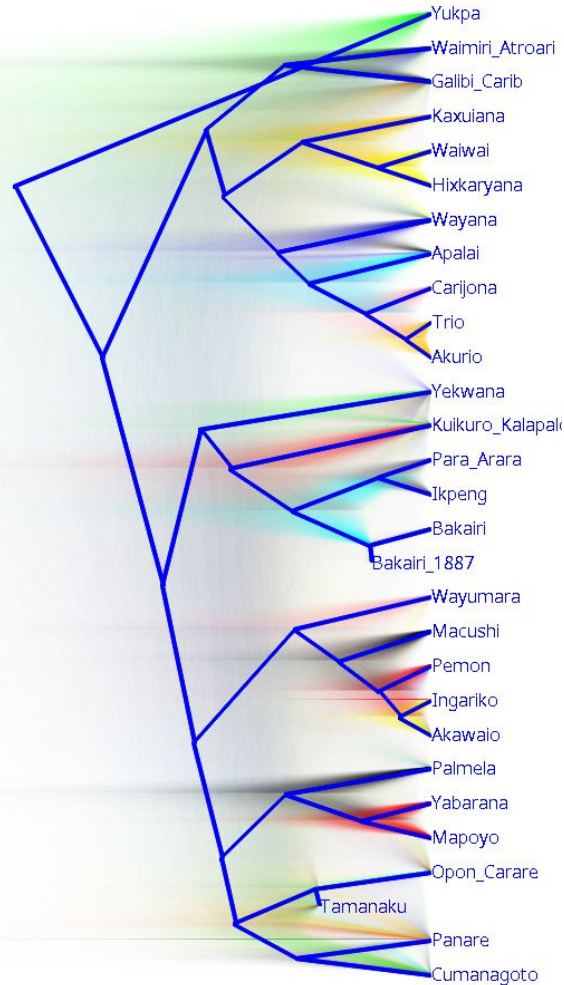
- We follow the best practices from computational historical linguistics (Jäger 2019)
 - Cognate identification
 - Modelled on shared lexical innovations in basic vocabulary
- We use different models in BEAST2
 - Models are compared with Bayes Factor
- Only setting monophyletic constraints for the shallowest clades with scholarly consensus
- We are first focusing on the topology, later we will combine a geographical model and clade dating with the dates from archeology
 - Better results overall, also for estimating replacement rates

Calibration points

Language	Date
*Opon-Carare	1875
Bakairí_Steinen	1887
*Palmela	1889
*Cumanagoto	1680
Tamanaku	1780

- Extensive efforts in extending the number of languages that can be used as temporal calibration points
- Data is still being updated and we need to investigate how to better use this calibration points with the Fossilized Birth-Death model
- Given the properties of our data, it might be worth switching to the BD-Sky model
- The languages with asterisks on the right were not used as temporal calibration points in the tree we are presenting here

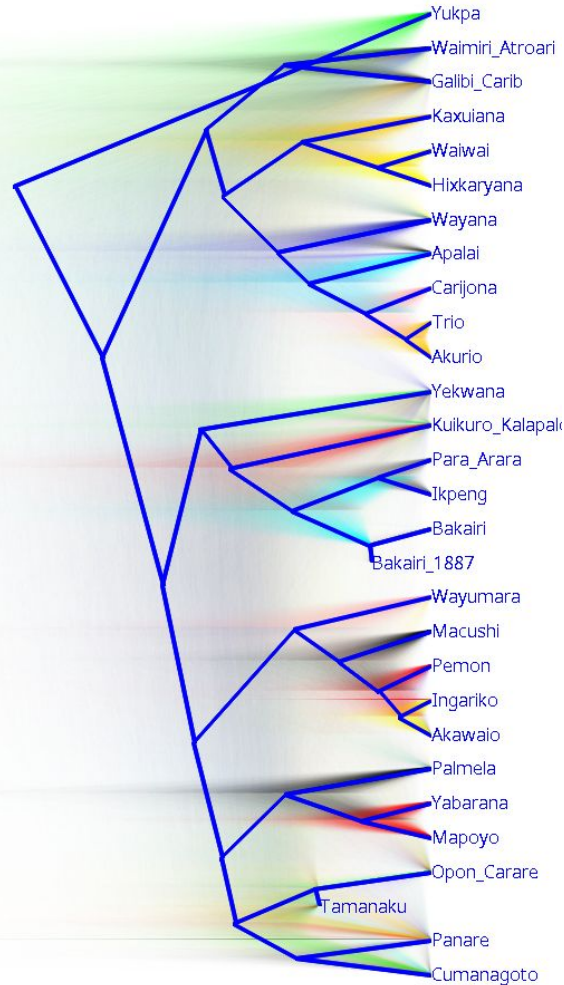
The (preliminary!) language phylogeny



Accepted low-level subgroups are supported by the phylogeny:

- Parukotoan (Hixkaryana, Waiwai, Werikyana/Katxuyana)
- Taranoan (Tiriyó, Akuriyó, Carijona)
- Ikpeng-Arara
- Yawarana-Mapoyo

The (preliminary!) language phylogeny



Surprising and novel proposals:

- Waimiri-Atroari as the first to split off after Yukpa
- Apalai and Wayana joining Taranoan in an intermediate-level clade
- A deeply-nested, monophyletic southern branch (Kuikuro, Bakairi, Ikpeng-Arara)

Combining linguistic and archaeological data

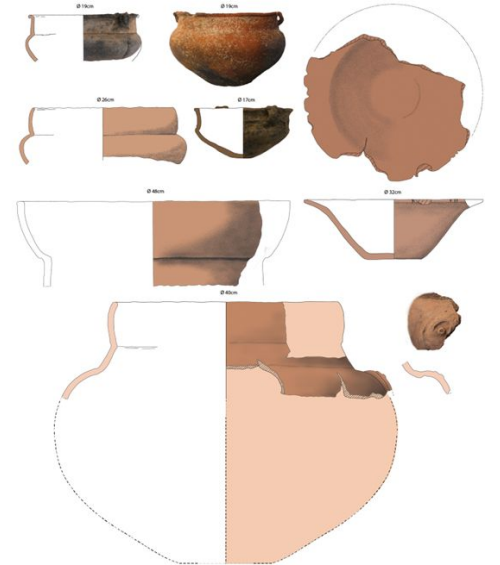
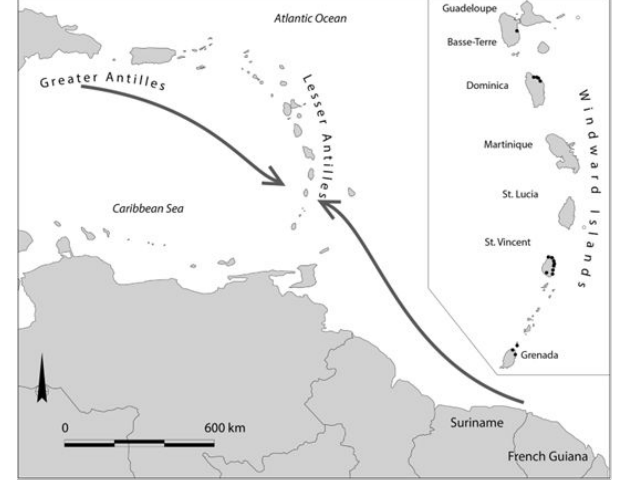
- Koriabo Chronology in Archaeology:
 - Data aligns with the second expansion towards central Guiana's shield, Lower Amazon, and the Suriname/French Guiana coast
 - Radiocarbon calibration matches our proposed phylogeny
- Southward Expansion & Linguistic Evidence:
 - The movement south resonates with numerous Cariban loans into Tupí-Guaraní, especially in flora and fauna terms (Rodrigues 1985)
 - Recent dating of TG by Ferraz Gerardi et al. (2023) bolsters this theory.
 - Cognacy analysis in TuLeD (Ferraz Gerardi et al. 2022) supports this connection (these terms lack cognates in other Tupían branches)

Thank you!



The Island Carib / Garifuna Problem

- The Island Carib represented a creole society
- They spoke two variants of what was basically Maipuran Arawakan: a female and a male register, of which the latter showed numerous Cariban lexical borrowings
- This male register originated as a contact vernacular (pidgin) bridging the gap between Maipuran Arawakan, the women's native tongue, and Kalina, the Cariban language of the men (and women) who had immigrated into the Lesser Antilles from the South American mainland and mixed with the local population
- Cayoid pottery (AD 1450–1620) is clearly an interweaving of local Windward Islands and Greater Antillean and mainland (Koriabo) traditions.



Cayo Pottery (Hofman et al. 2022)

Arrival rhythm of the Koriabo archaeological correlate

- A period of slow-rhythm spread, with more stability in Western Guiana litoral from 2060 to 1290 years BP
- A first wave of expansion towards central Guiana shield starts roughly 1300/1100 years BP (this correlates with the southwards spread of Cariban languages in our phylogeny). Later expansion waves present the following arrival moments:
 - Lower Amazon: between 979 - 823 yrs BP
 - French Guiana Litoral: 823 - 513 yrs BP
 - Tapajós region: 823 - 668 yrs BP
 - Xingu-Iriri confluence: 668 - 513 yrs BP