Measuring Genealogical Stability of Typological Data

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or:

A Plea for Genealogically *Biased* Sampling

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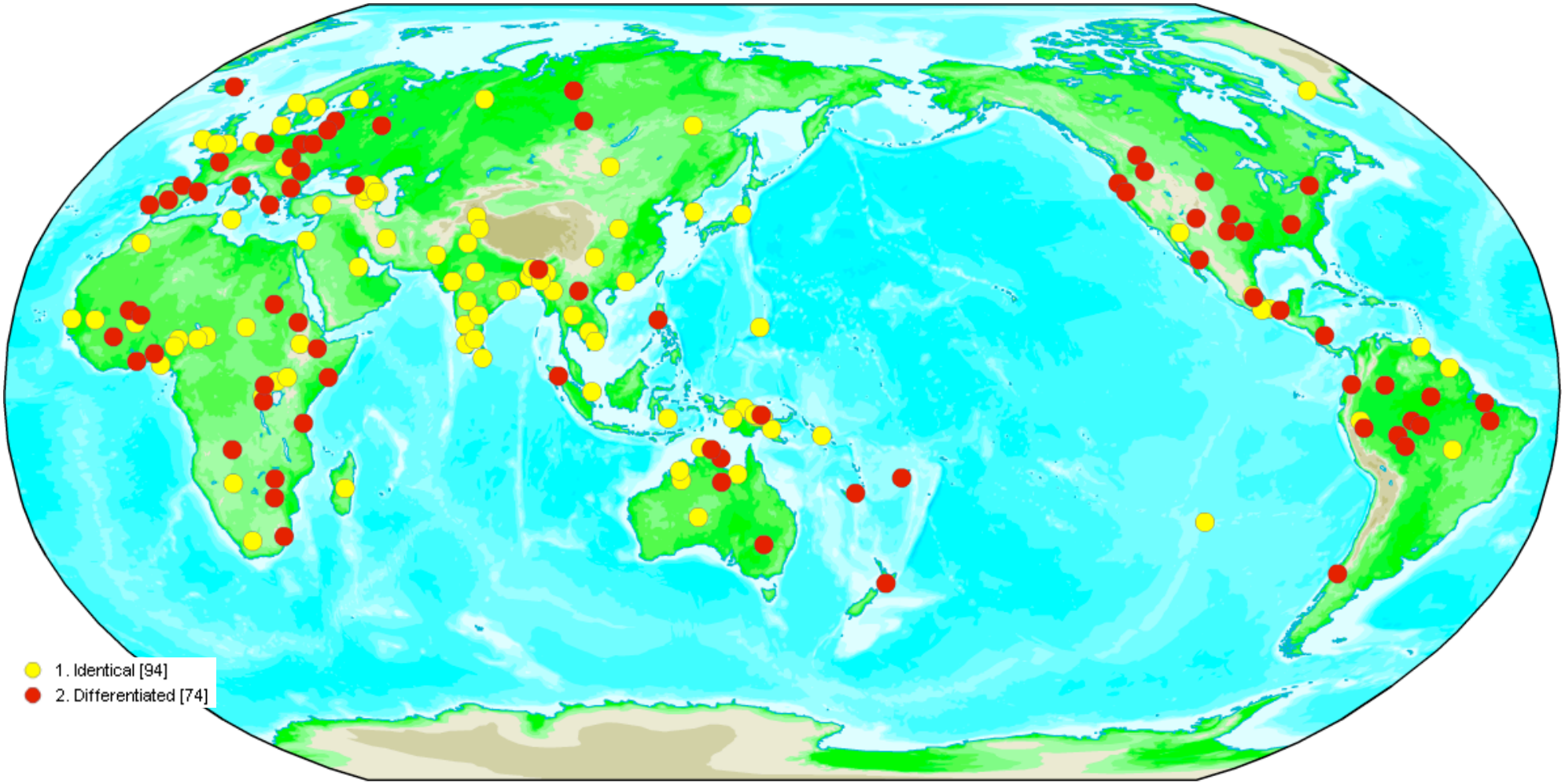
Questions for Typology

- How to explain world-wide typological distributions ?
  - a-historical, intra-linguistic, *universal* influences
  - historical, extra-linguistic, *contingent* influences
- How to deal with *large-areal consistency* in genealogically balanced samples ?

Intensifiers & Reflexive Pronouns



König, Ekkehard & Peter Siemund (with Stephan Töpper). 2005. Intensifiers and Reflexive Pronouns. In: Haspelmath *et al.* (eds.) *The World Atlas of Linguistic Structures.* Oxford University Press.

Reactions to *Large Areal Consistencies*

- Matthew Dryer (starting from 1989):

  Problem for universals !

- Johanna Nichols (starting from 1992):

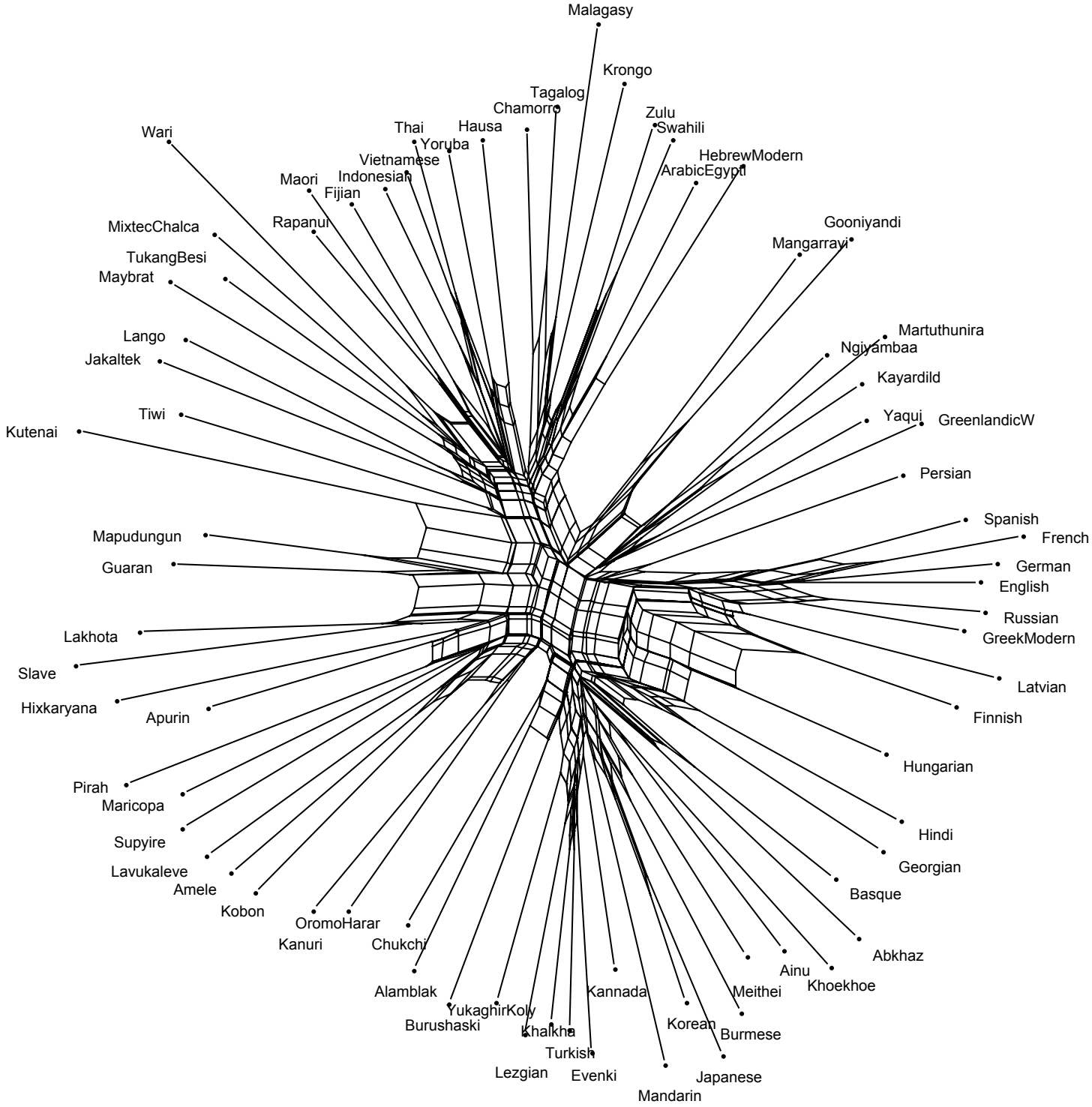
  Great for investigation of history !

- Michael Cysouw:

  there is indeed history to be uncovered,
  but it is far from clear with which methods

How tree-like is typological data?

- Using the *World Atlas of Language Structures*
- Investigating overall typologically similarity of the world's languages
- Calculate overall similarity between all pairs of languages
- Are there any clusters of similar languages ?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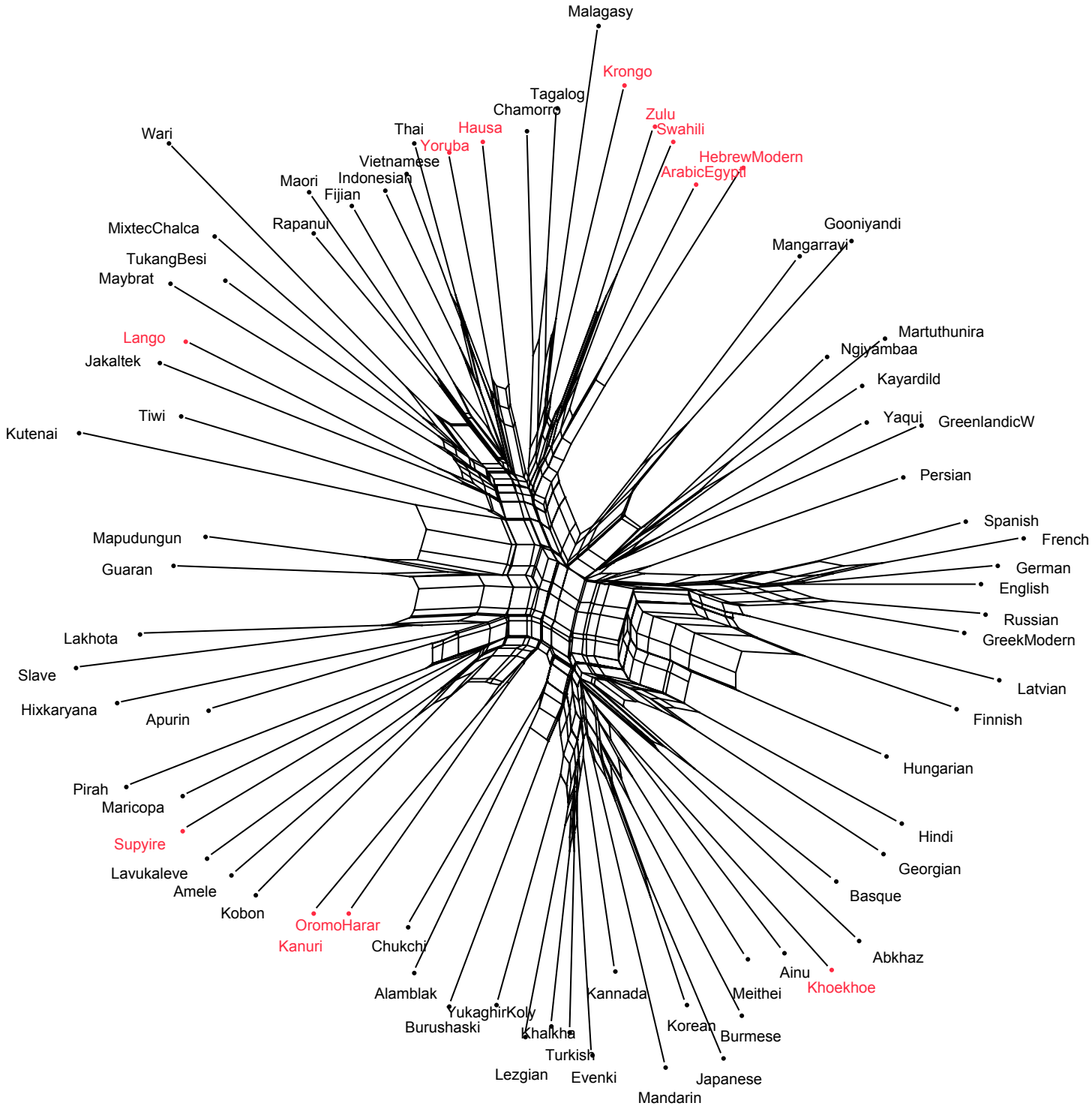
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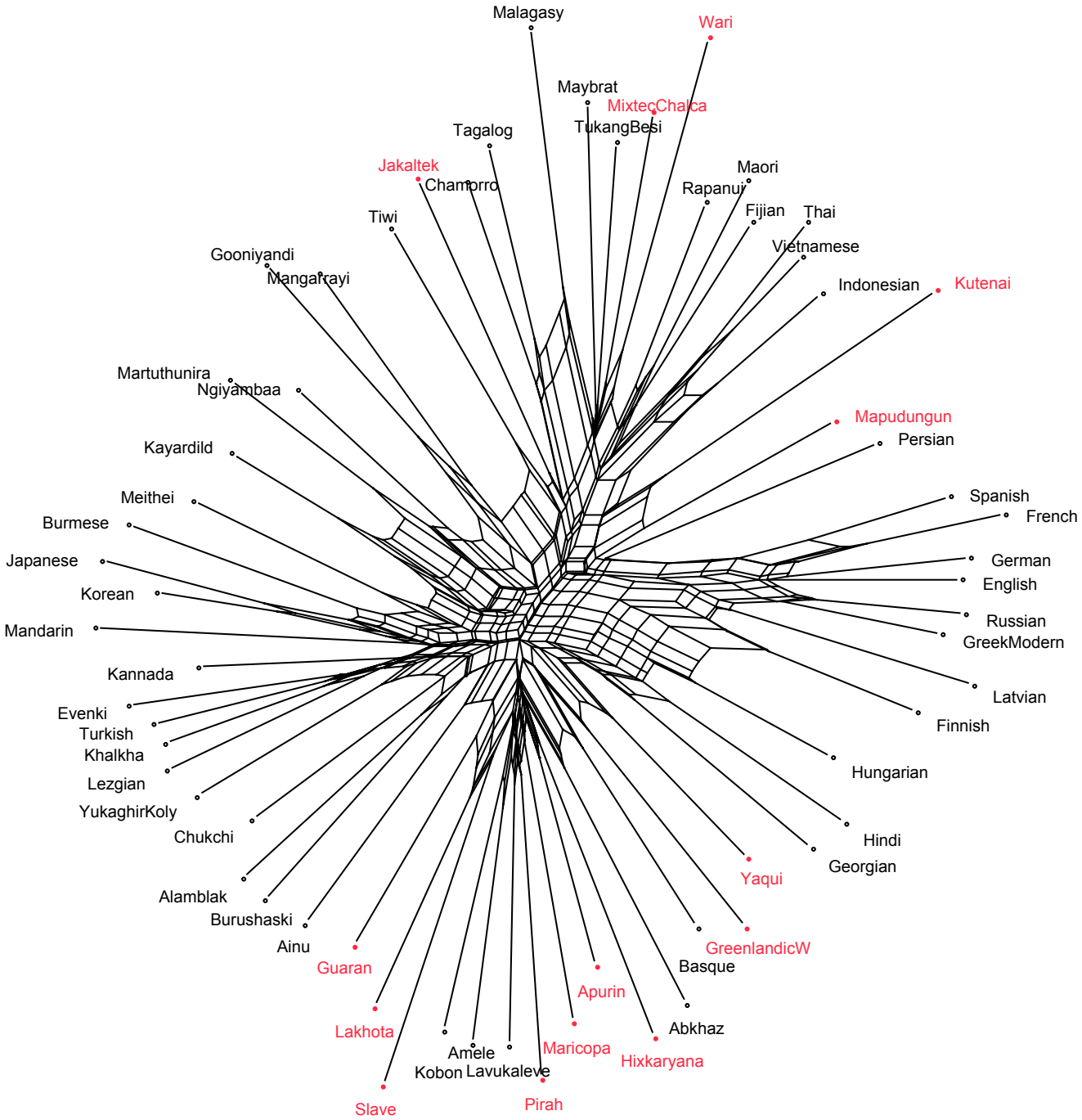
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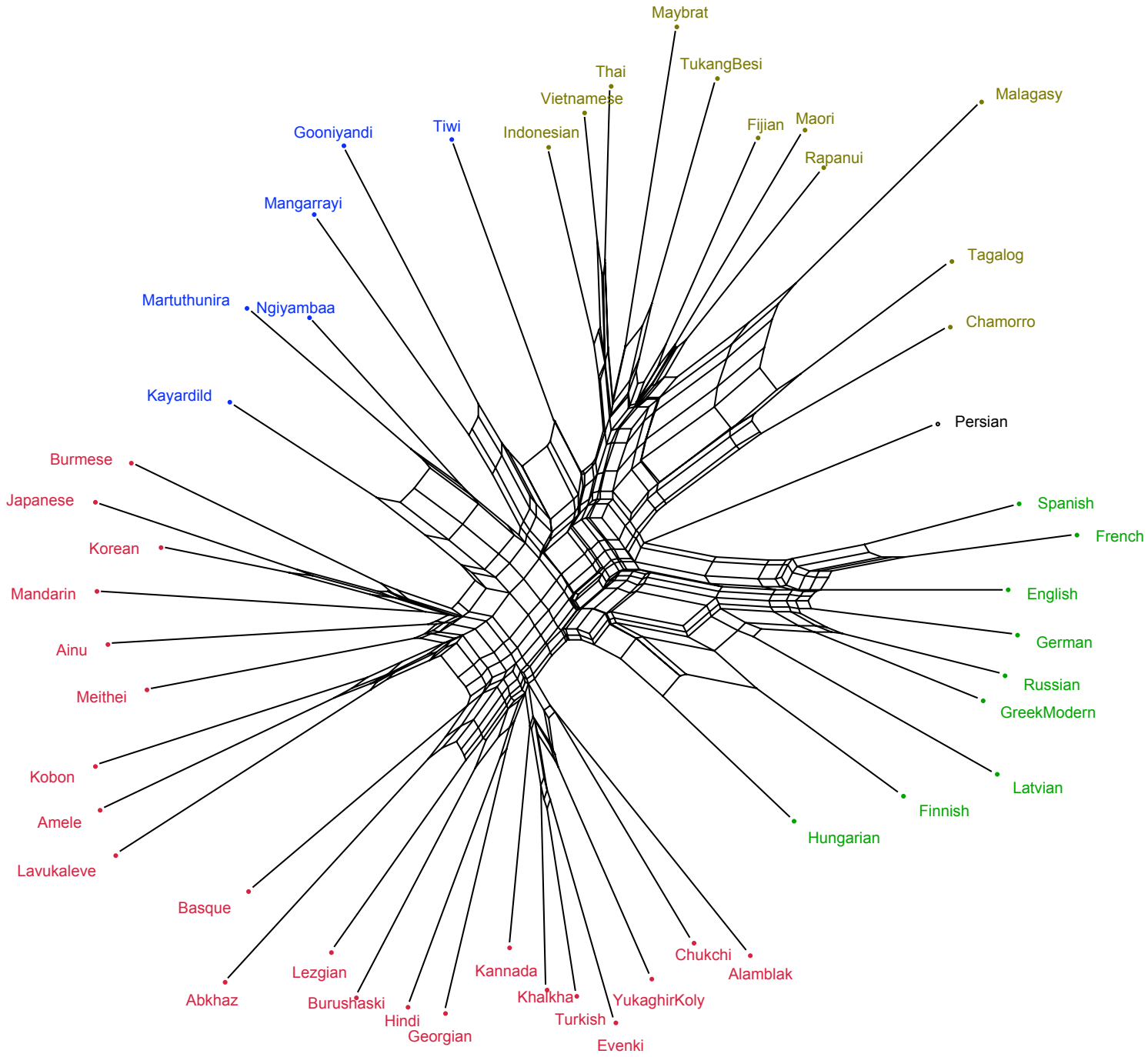
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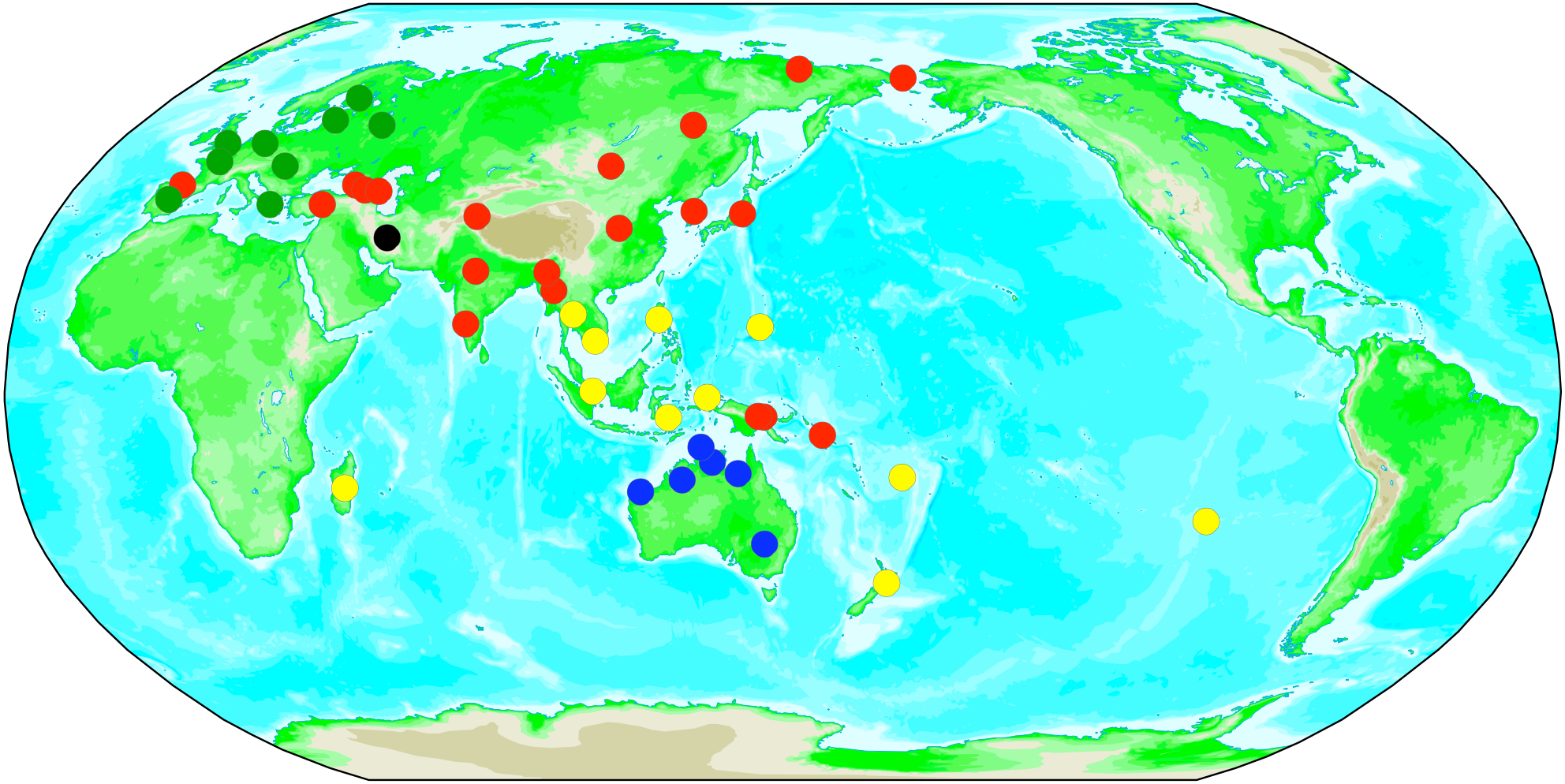
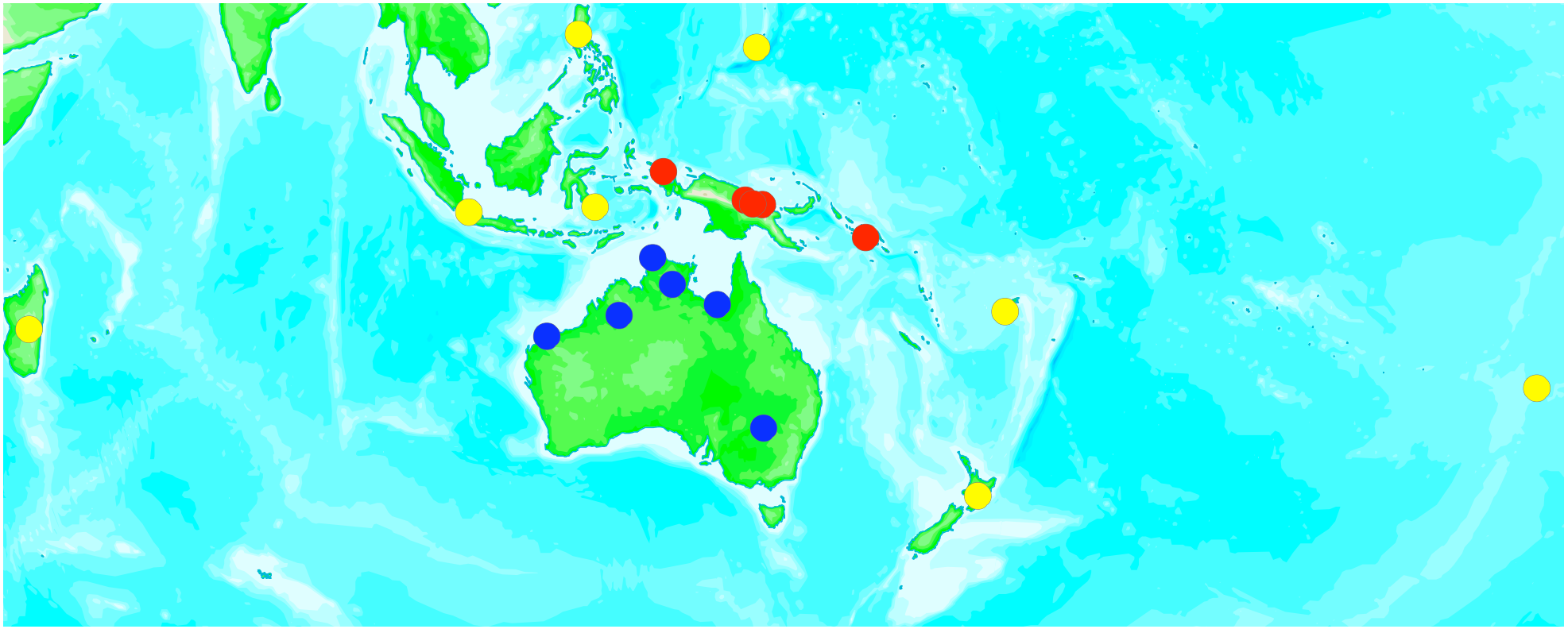
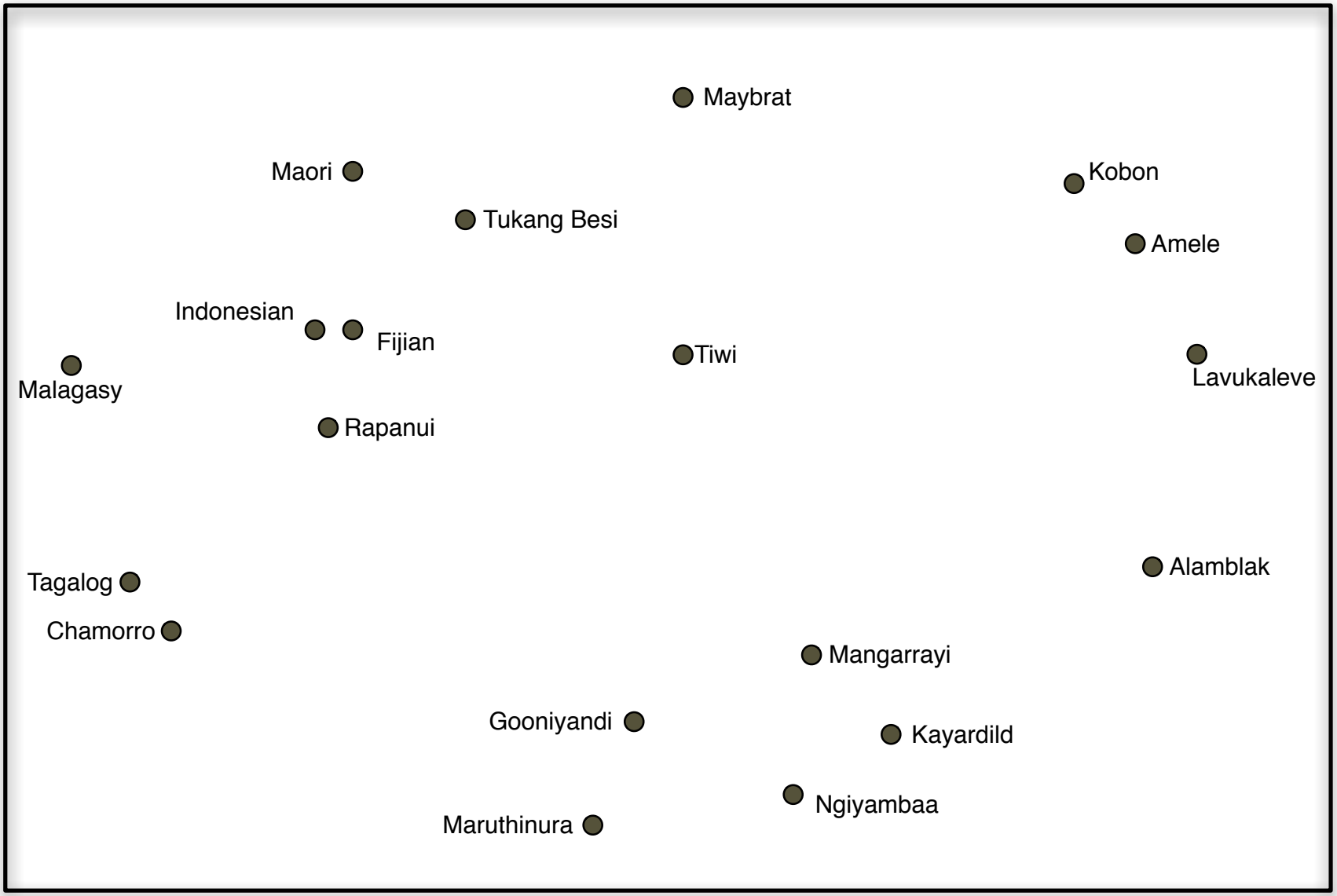
Overall Similarities show aspects of Geography *and* Genealogy



A closer look at geography: the case of Oceania



MDS of typological distances



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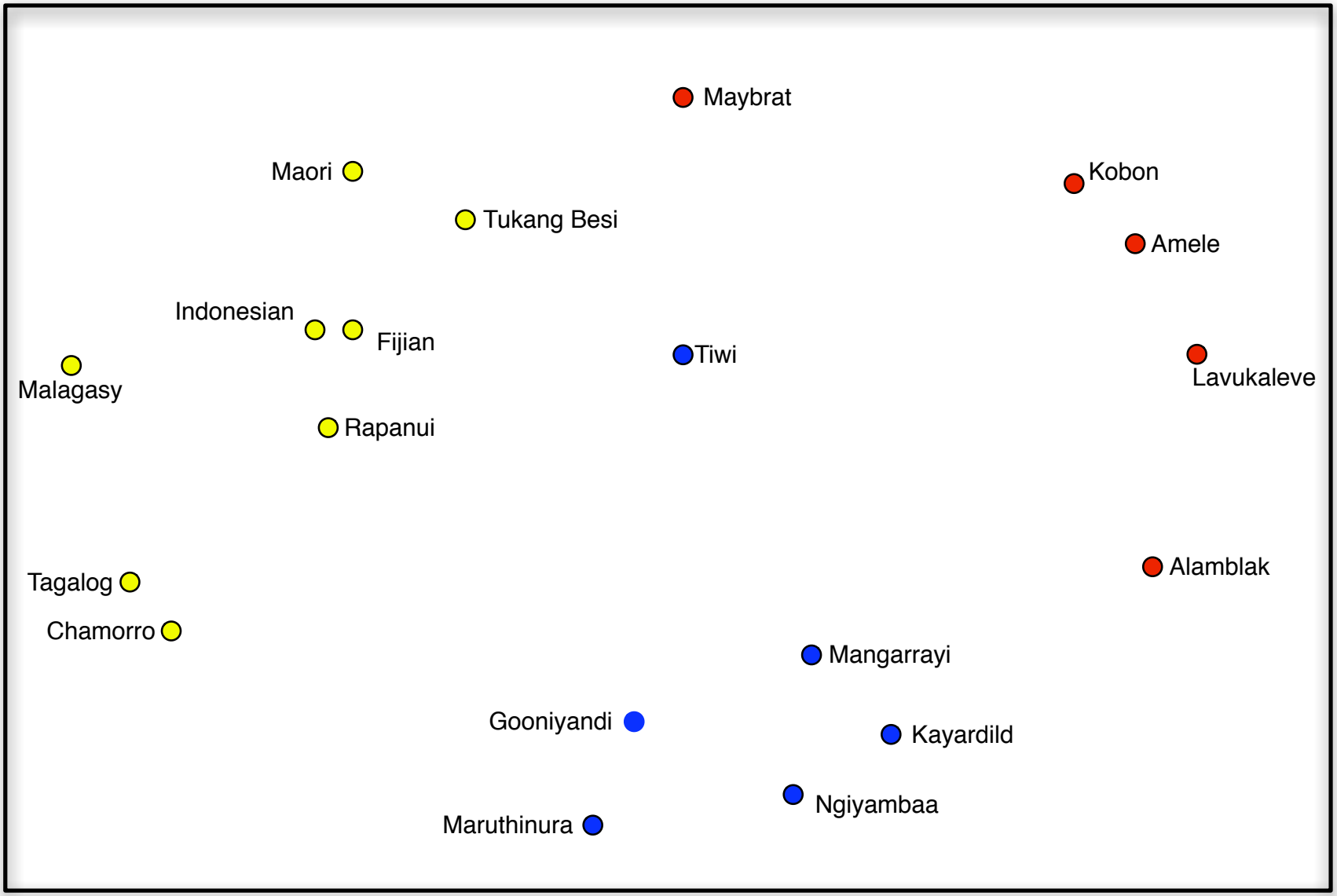

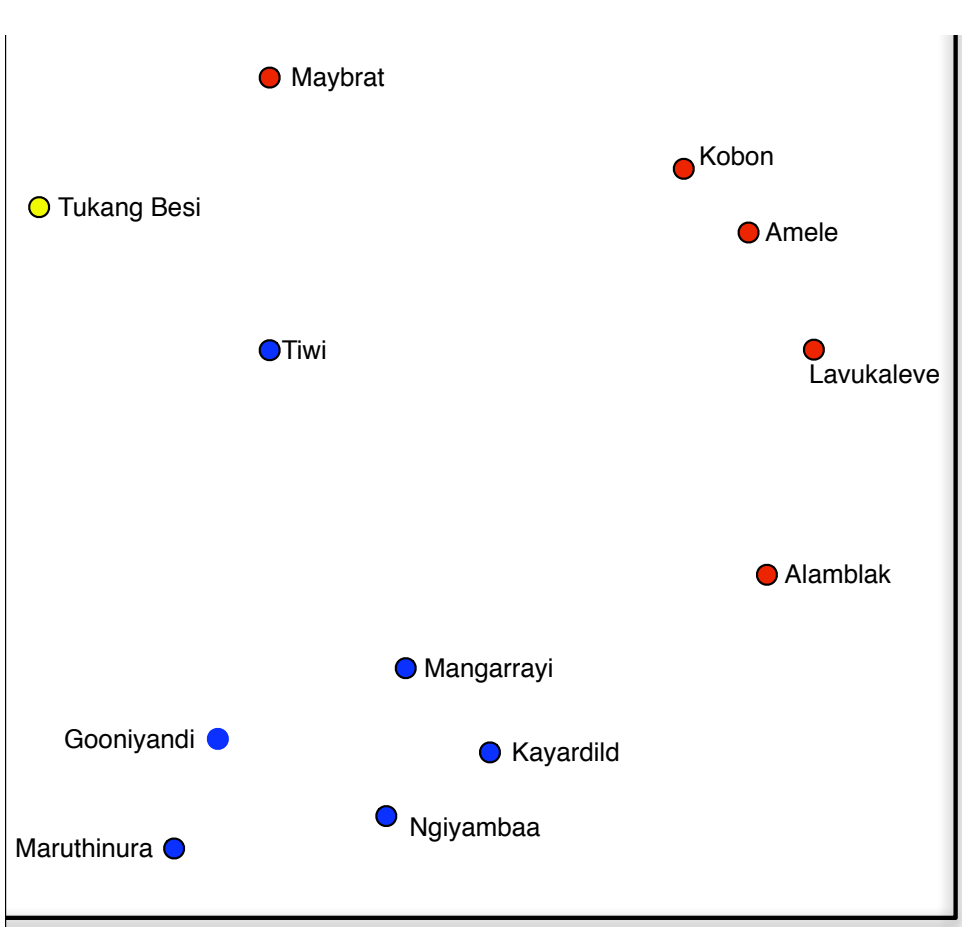
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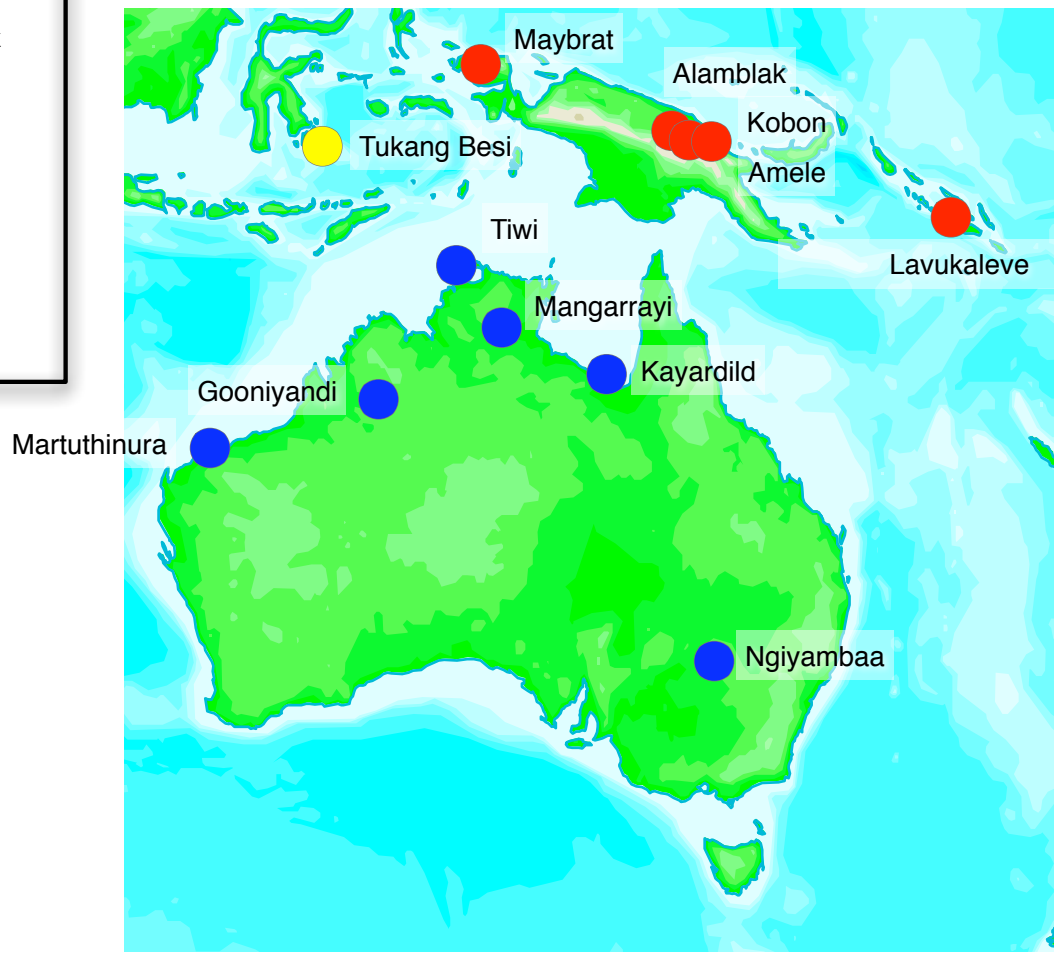
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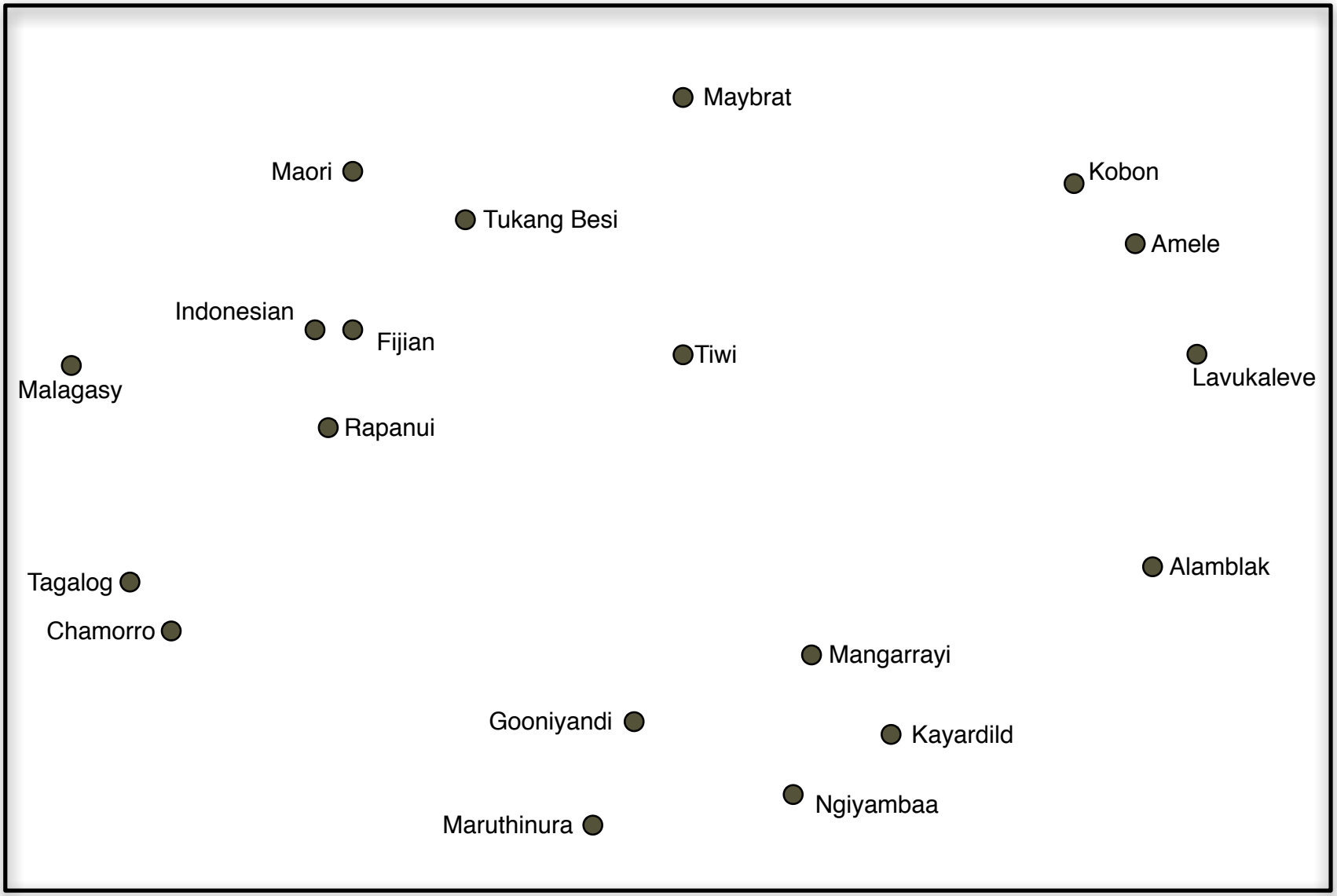

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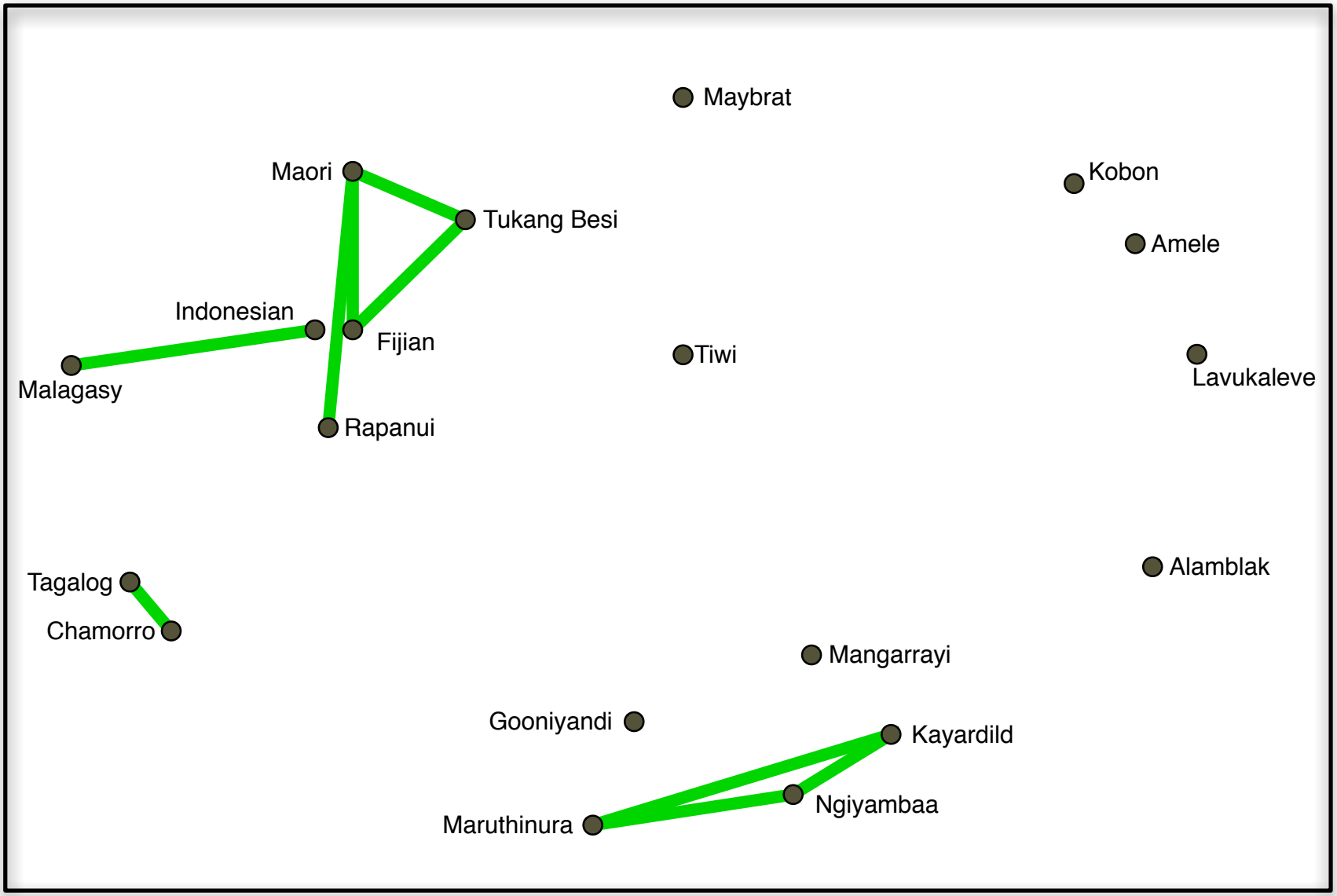


Pairs of linguistically (too) similar languages

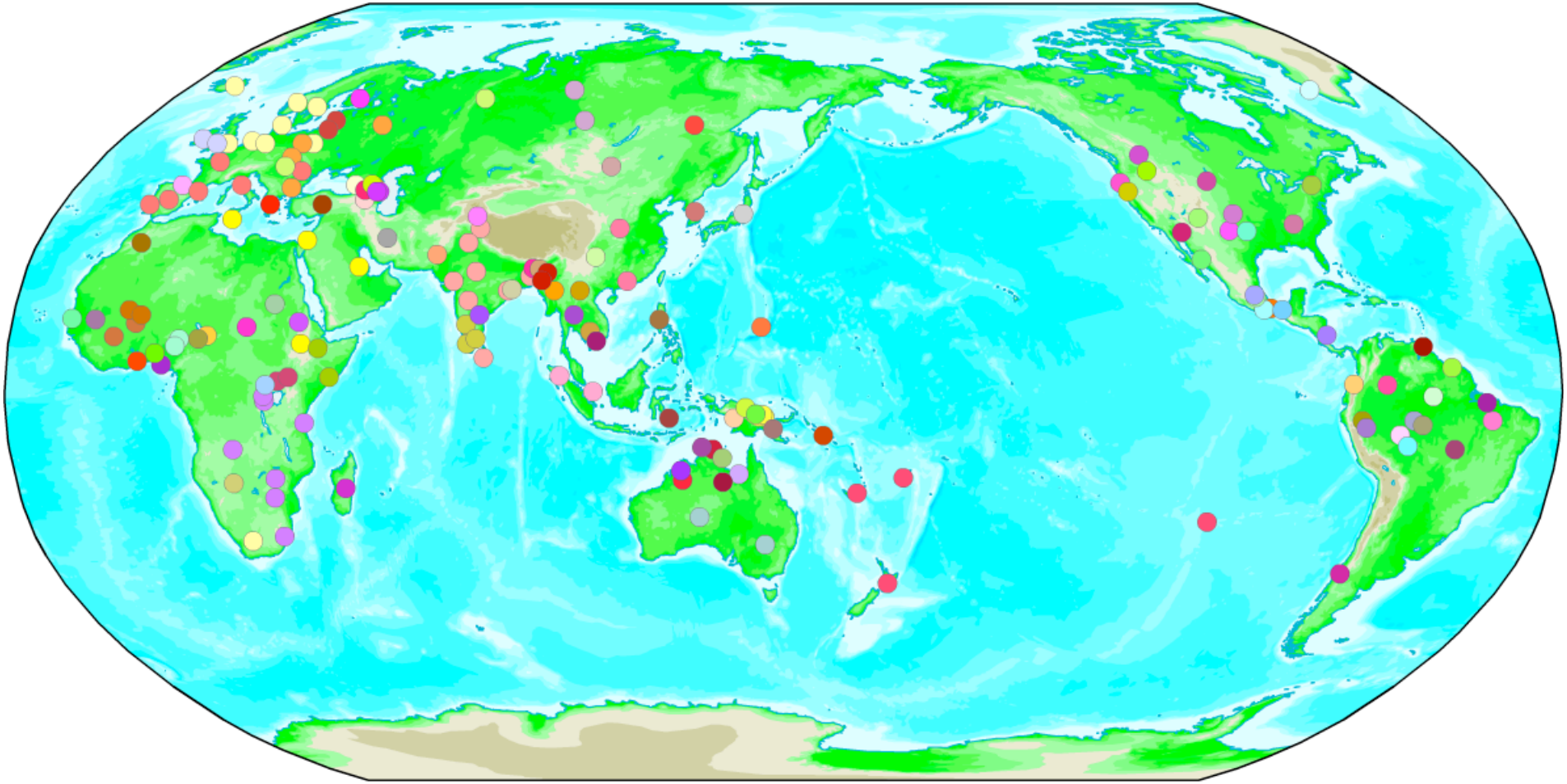
What does this tell us ?

- There appear to be historical “contingencies” hidden in typological data
- Combining typological similarity and geographic distribution gives some clues
- But: can we derive genealogical stability from typological distributions ?

Measuring typological stability (Version I)

- Given a world-wide typological distribution, try to estimate stability
- Attempt A) correlation between individual features and overall similarity (Andreas Dress)
- Attempt B) probability value for diversity on genus level (Søren Wichmann)
- Problem: it does not (yet ?) seem to work

Intensifiers & Reflexive Pronouns



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Measuring typological stability: Variables to consider

- 168 languages
- 24 genera with more than one language *(bias!)*
- in total 79 languages in these 24 groups
- minimally *only 8 changes* needed:
  17 genera are consistent,
  6 genera need one change,
  1 genus needs two changes

Measuring typological stability: Next steps ?

- Given a world-wide typological distribution, try to estimate stability
- Biased samples are needed for this !
- No success yet
- There are many possible methods to try

Using Typological Data for Genealogical Investigations

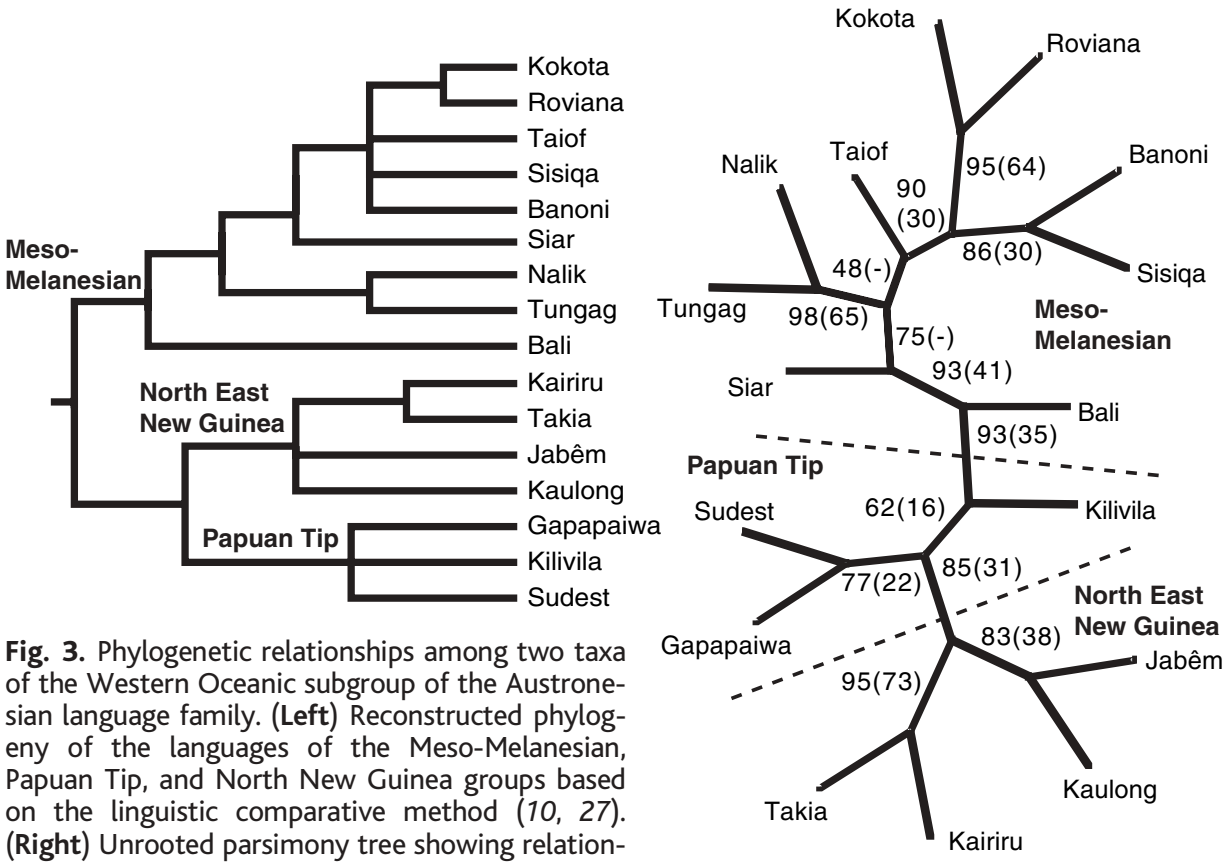
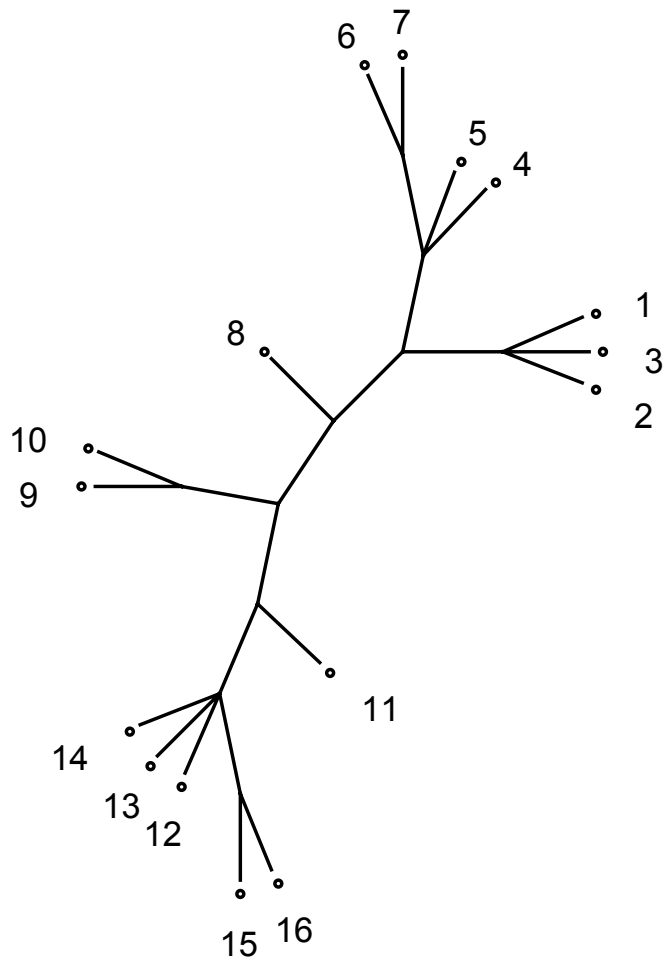


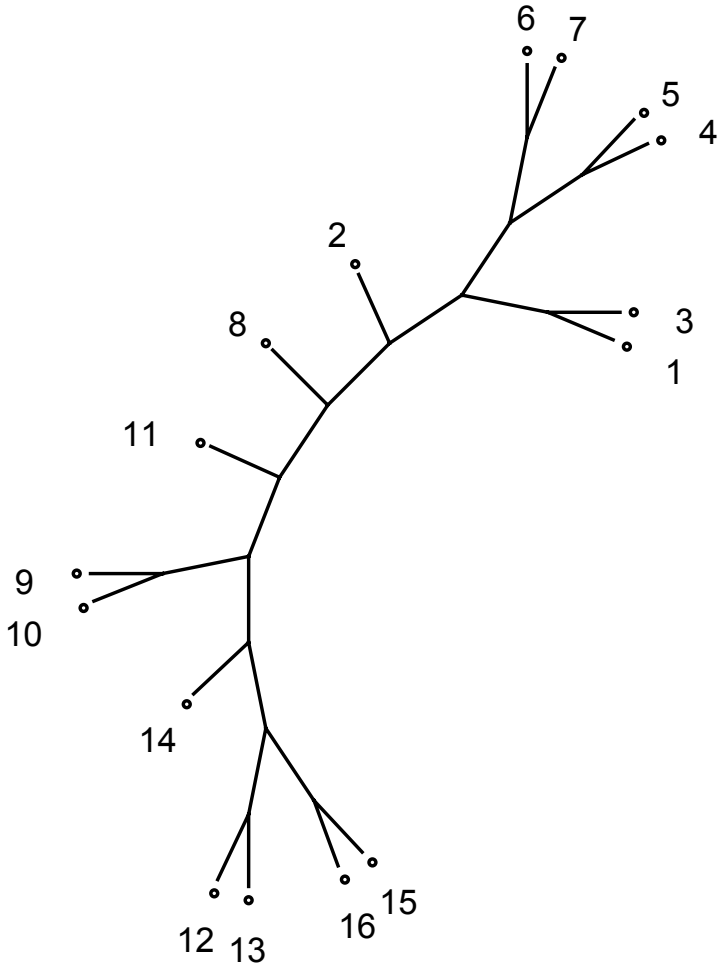
Fig. 3. Phylogenetic relationships among two taxa of the Western Oceanic subgroup of the Austronesian language family. (**Left**) Reconstructed phylogeny of the languages of the Meso-Melanesian, Papuan Tip, and North New Guinea groups based on the linguistic comparative method (*10*, *27*). (**Right**) Unrooted parsimony tree showing relationships among the Meso-Melanesian and Papuan Tip groups based on grammatical traits only (that is, discarding abundant lexical evidence) (the figure shows reweighted and raw bootstrap values). The two trees show a high degree of concordance, with monophyly in both major taxa and the similar geographical structuring of within-taxon diversity.

Dunn, Michael, Angela Terrill, Ger Reesink, Robert A. Foley & Stephen C. Levinson. 2005. Structural Phylogenetics and the Reconstruction of Ancient Language History. *Science* 309: 2072-2075.

Traditional Tree



Dunn *et al.* tree based on typological data

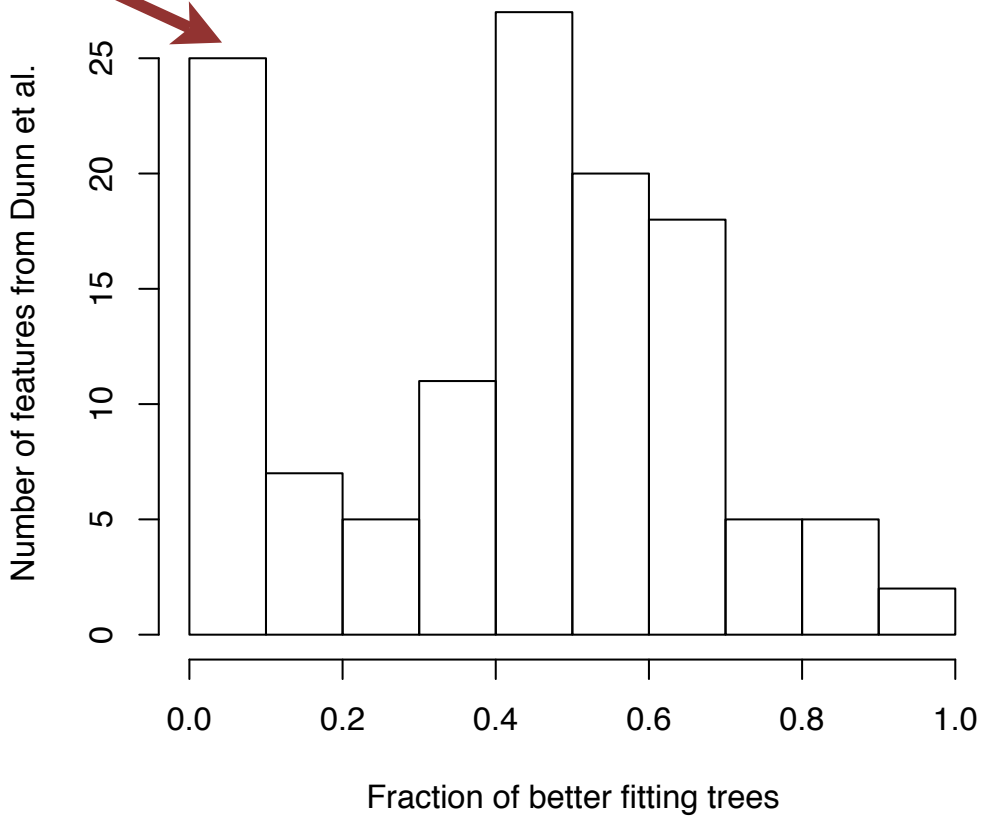


Measuring typological stability, (Version II)

- Given an accepted tree, with many languages sampled from this tree
- how good does a typological feature predict this tree
- Energy-based measurement of fit between a dataset and a tree (work by Mihai Albu)
- Take a large set of random trees, and determine how good the “real” tree fits

Distribution of fits of all 125 features

(Too) many good fits!



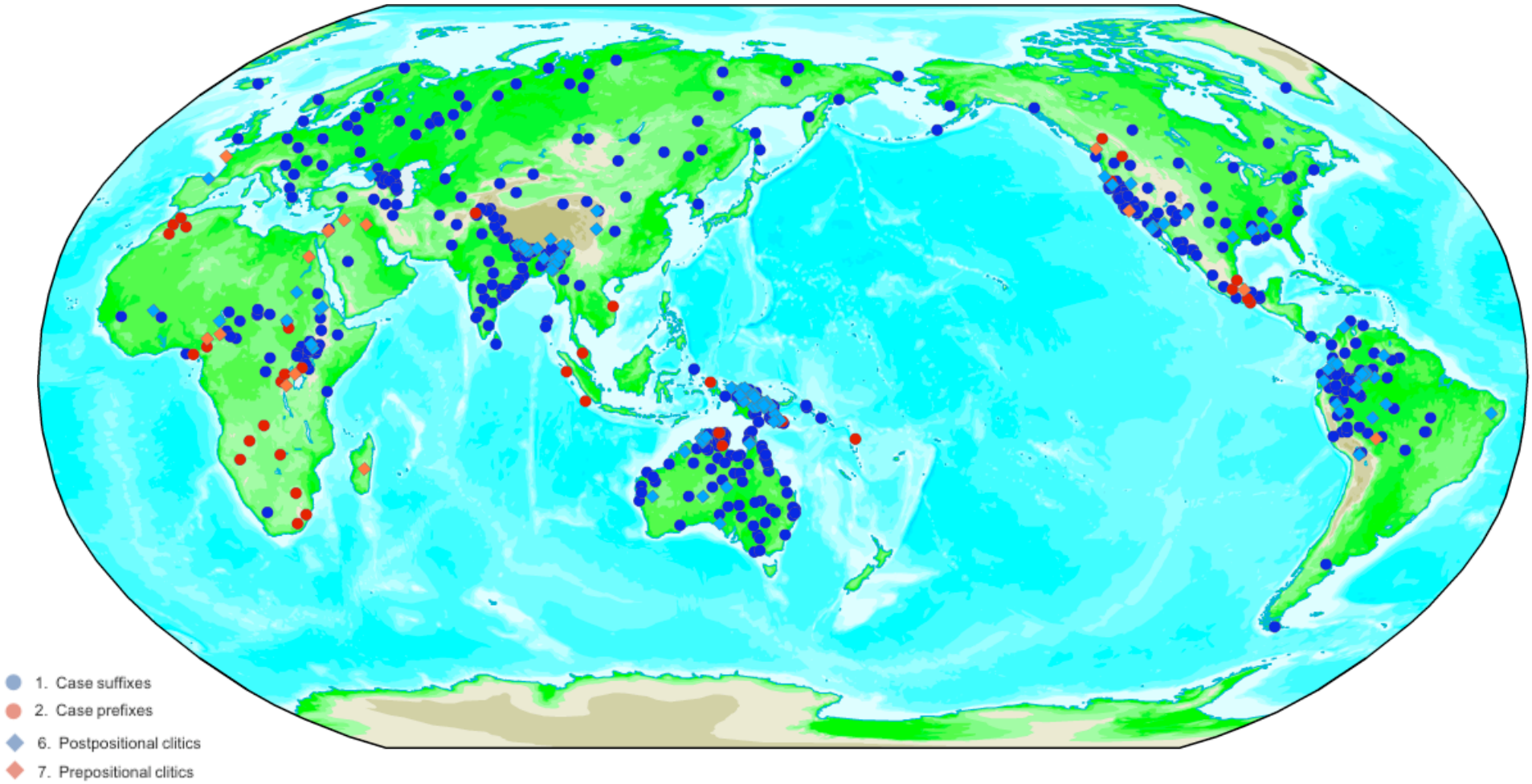
Best features for Austronesian ($p < .05$)

97: VS intransitive clauses
59: S-prefix
61: A-prefix
44: Decimal numerals
83: Reflexive morphology (including affixes and clitics)
14: Article-noun order
35: Possessive classifiers
13: Indefinite or non-specific articles
12: Definite or specific articles
52: Postpositions
85: Verb classifiers
41: Marked possessor
74: Recipient object
66: Verb variation clause type
67: Verb variation person
98: V-initial transitive clauses
112: Clause chaining

Measuring Genealogical Stability (Version III)

- Are there regularities in typological change ?
- To investigate this, a *sample from accepted family-trees* is needed
- The result would be a matrix of *Transition Probabilities* (Maslova 2000)

Example: *WALS*, map 51: Position of Case affixes (selection)



Dryer, Matthew. 2005. Position of Case Affixes. In: Haspelmath *et al.* (eds.)
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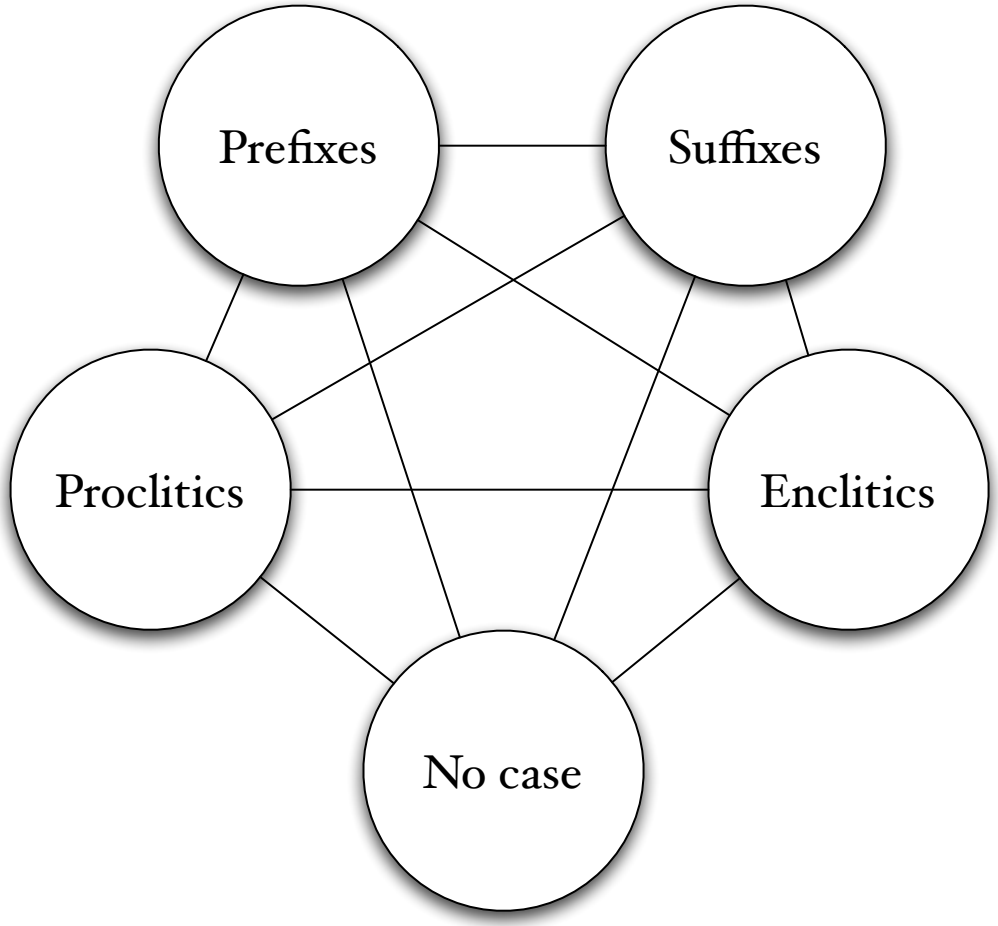
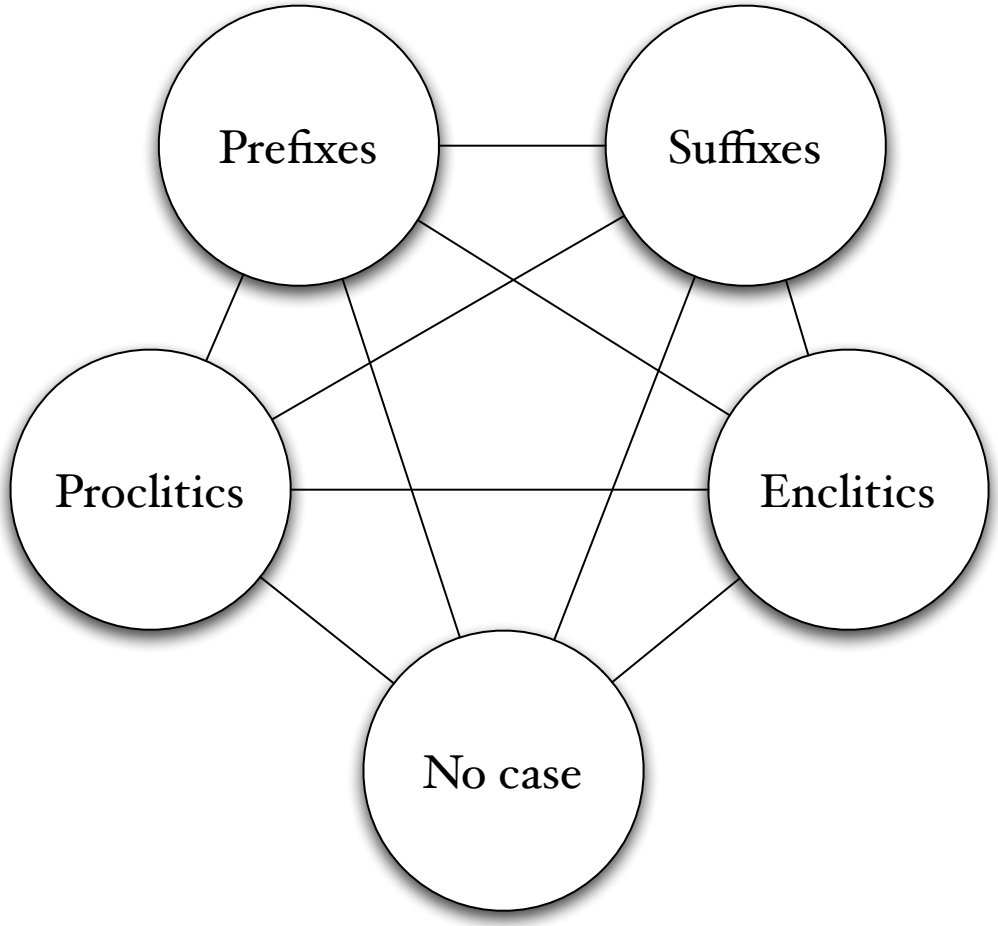
Undifferentiated typology



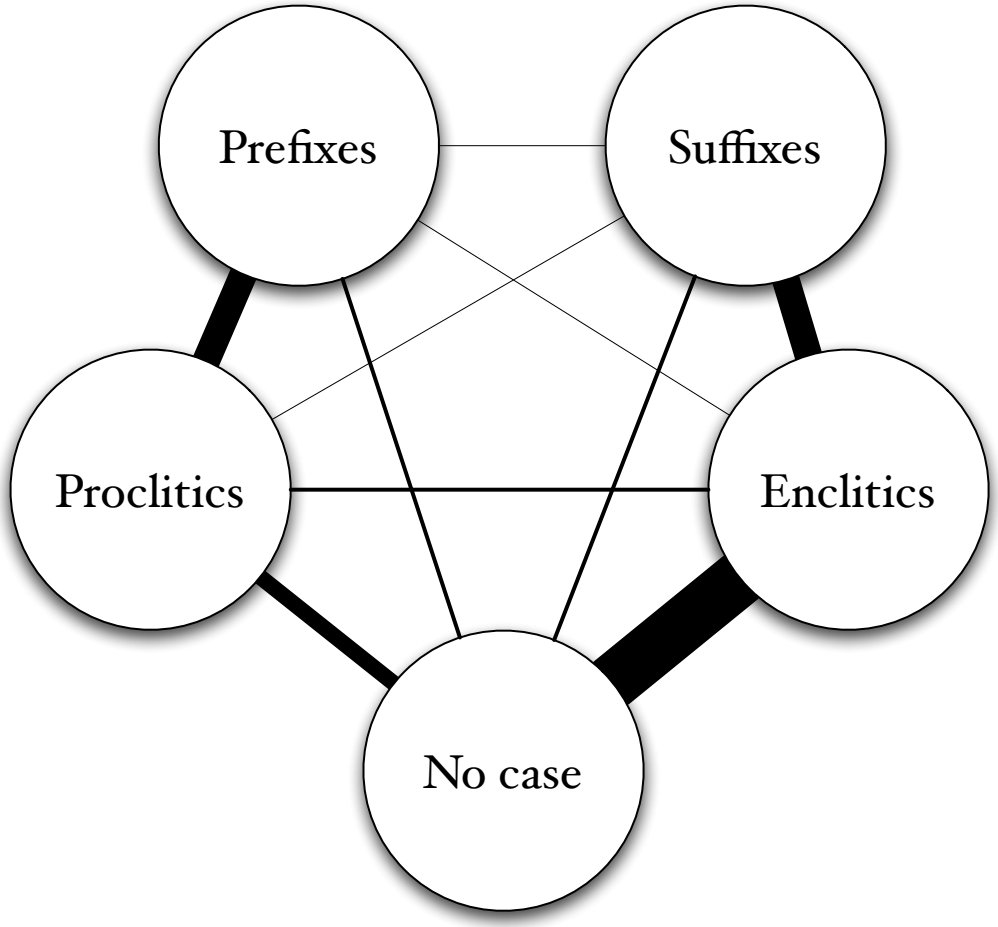
Undifferentiated typology

	no case	proclitics	enclitics	prefixes	suffixes
no case	0	1	1	1	1
proclitics	1	0	1	1	1
enclitics	1	1	0	1	1
prefixes	1	1	1	0	1
suffixes	1	1	1	1	0

Undifferentiated typology



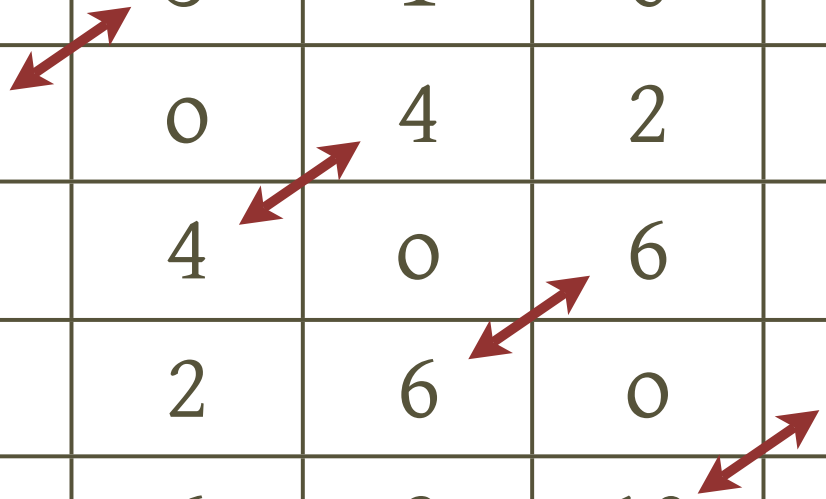
Similarities



Similarities

(relative values; higher values are less likely)

	no case	proclitics	enclitics	prefixes	suffixes
no case	0	3	1	6	6
proclitics	3	0	4	2	6
enclitics	1	4	0	6	2
prefixes	6	2	6	0	10
suffixes	6	6	2	10	0



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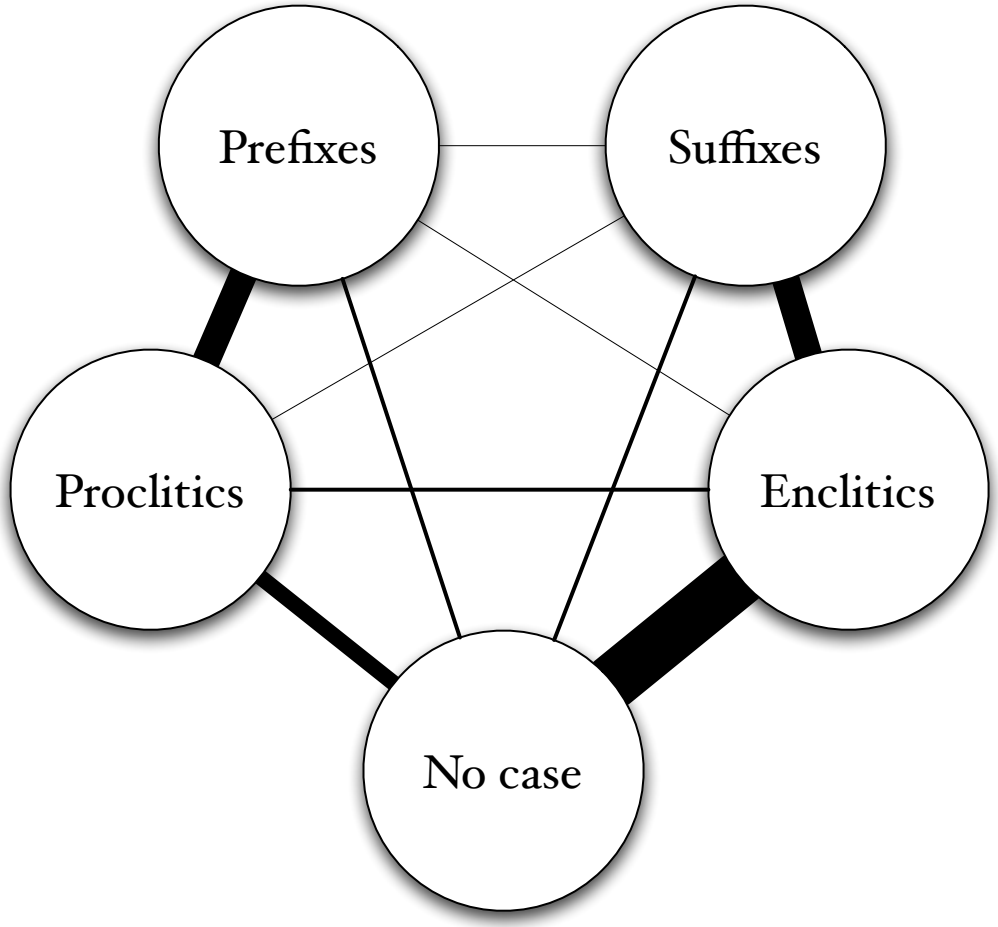
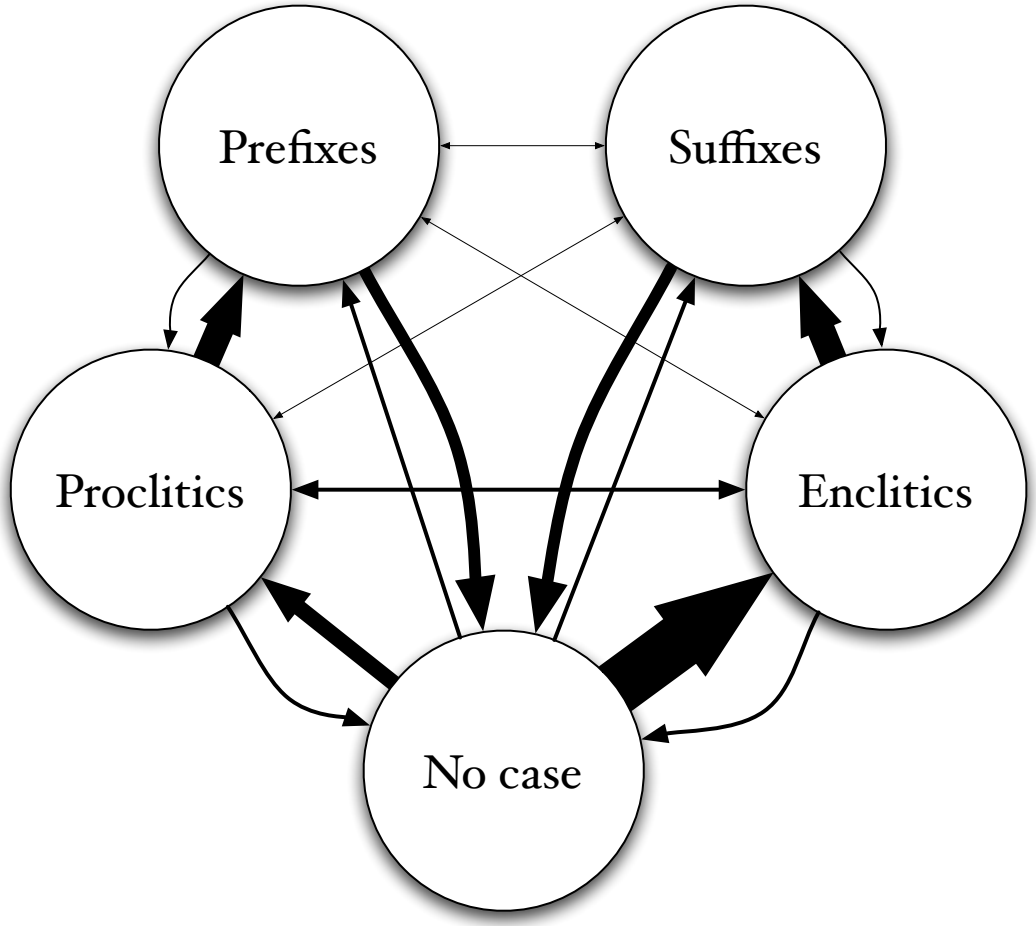


Transition probabilities



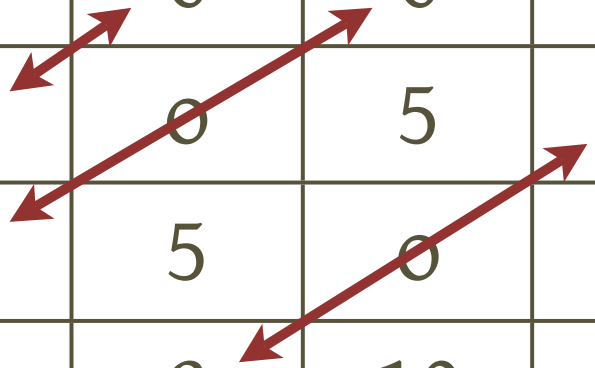
Transition probabilities

(relative values; higher values are less likely)

From:

To:

	no case	proclitics	enclitics	prefixes	suffixes
no case	0	6	6	4	4
proclitics	3	0	5	8	10
enclitics	1	5	0	10	8
prefixes	6	2	10	0	10
suffixes	6	10	2	10	0



Work to do ...

- Yes, historical "coincidences" are important
- But: There are different historical scenarios
  - Unknown language genealogy
  - Spread of features individually (substrate, superstrate, long-term borrowing)
- The real problem of typology is to distinguish between these historical scenarios
- For universals we need something different:

Structural Coevolution

The End