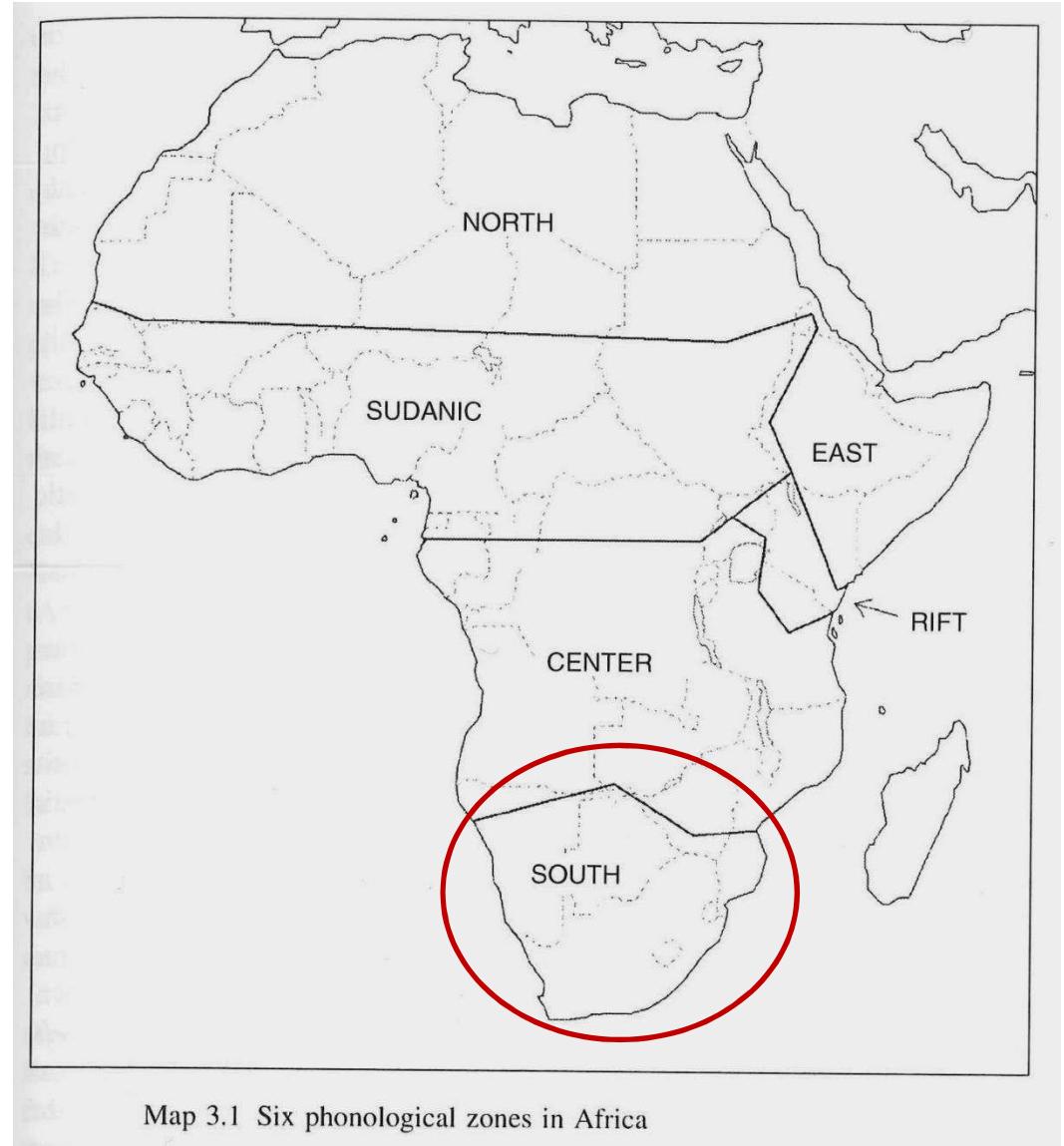


06/01/2015

Southern Africa as a phonological area

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Quelle: Clements & Rialland (2008: 37)

Phonological similarities

Naro [nhr] (Khoe-Kwadi; Botswana, Namibia; Visser in Vossen 2013: 60ff. and others)

Consonants

	bilab	alv	alv affr	pal	vel	velar/uv	affr	glott	tr	dent	ingr	alv	ingr	pal	ingr al-lat
stop, vls.	(p)	t	ts		k	kx	kg	?	'	c	! q	‡	tc	x	
stop, aspir.	(p ^h)	t ^h	th	ts ^h	tsh	k ^h	kh			ch	! qh	‡	tch	^h xh	
stop, vd.	b	~wd	~rdz			g	gh			dc	! dq	‡	d ^{tc}	dx	
stop, ejective		t'	ts'			kx'	kg'		'	c'	! q'	‡	t ^c	' x'	
nasal, voiced	m	n							~	nc	! nq	‡	ntc	~ nx	
fricative, vls.	(f)		s		x g			h							
lateral approx.				(l)											
trill, voiced			[r]	r											
approximant	[w]			j y											

- large consonantal inventory (45)
- clicks
- aspirated and ejective stops
- dorsal affricate

Phonological similarities

Zulu [zul] (Bantu S.42, Nguni/Zunda; South Africa; Taljaard & Bosch 1988, and others)

Consonants

	bilab	lab-dent	alv	alv affr	alv later	p-alv (affr)pal	vel	vel/uv affr	glott	ingr	dent	ingr alv	ingr pal	ingr al-lat
stop, vls.							k k							
stop, aspir.	p ^h ph		t ^h th				k ^h kh			! ^h ch	! ^h qh		^h xh	
stop, breathy	b ^g bh		d ^g d			g ^g j	g ^g g			! gq	! gq		gx	
stop, ejective	p' p		t' t	ts' ts	(k! ^f) kltʃ' tsh		k' k	(kx') kl		! c	! q		' x	
stop, vd. impl.	b ^g b													
nasal, voiced	m m		n			j n nyŋ ng				! nc	! nq		nx	
nasal, other	(m̩) m̩		(n̩) n̩											
fricative, vls.	f f	s		ɬ	hl	ʃ sh	x~χ	h	h h					• large consonantal inventory (50)
fricative, vd.	v v	z z		ʂ	dl				ɦ hh					• clicks
lateral approx.				l l										• aspirated and ejective stops
lateral, other				(l) l										• (dorsal affricate)
approximant						j y w w								• lateral obstruents
approx., other						(j) y (w) w								

Phonological similarities

Tsonga ~Changana, Thonga [tso] (Bantu S.53, RSA, Mocambique; Baumbach 1987: 3-20 and others)

Consonants

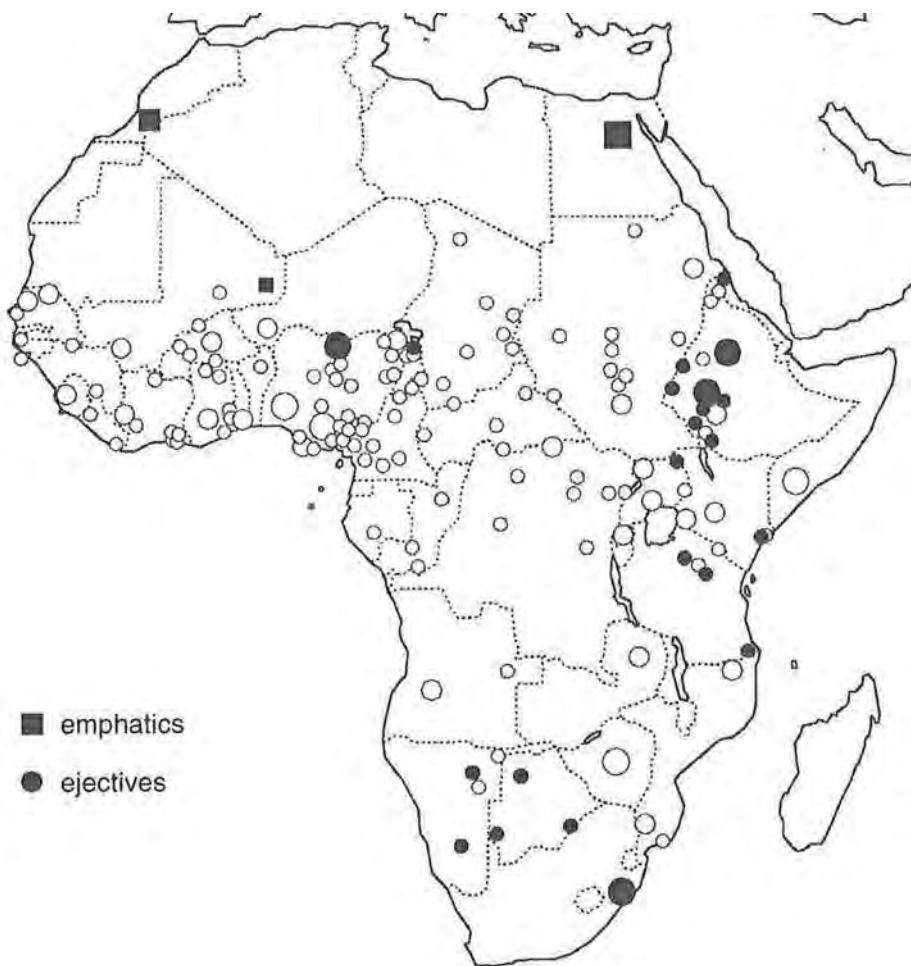
	bilab	lab-dent	alv	alv affr	alv later	p-alv (affr)	vel	glottal	gr	dent	other (+ secondary)
stop, vls.	p	pf pf	t	ts	tl tl	tʃ c	k	(! ~ q)	ts ^{v*} tsw	pʂ ^{**} ps~py	
stop, aspir.	p ^h ph	p ^f p ^h	p ^h p ^f h	t ^h th	ts ^h tsh	tl ^h tlh	tʃ ^h ch	k ^h kh	(! ^h ~ ^h qh)	ts ^{vh*} tshw	
stop, vd.	b	bv bv	d	dz	dl dl	dʒ j	g	(l ~ gq)	dz ^{v*} dzw	bz ^{**} bz~by	
stop, breathy*	b ^f bh	bv ^h bvhd ^h dh	dz ^h dzh	dʒ ^h dhl	dʒ ^h jh	g ^h gh			dz ^{vh*} dzhw		
stop, vd. impl.	ɓ ^{**} b'		d ^{**} d'								
nasal, voiced	m	[m]	n			j n̬	ŋ n'	(l ^{**} n'q)			
nasal, other*	m̩ mh		n̩ nh			ŋ̩ nh					
fricative, vls.	ɸ* ff	f	s		ɬ~χ? hl	ʃ x	x* hh		(s ^v sv)		
fricative, vd.	β~v vv vh		z		ɬ~χ? lh	ʒ xj	f h		(z ^{v**} zv)		
fricative, other*		v vh									
lateral approx.				l							
trill, voiced			r								
intermittent, other*			r ^h rh								
approximant	w				j y						
approx., other*	w wh				j yh						

*Uncertain.

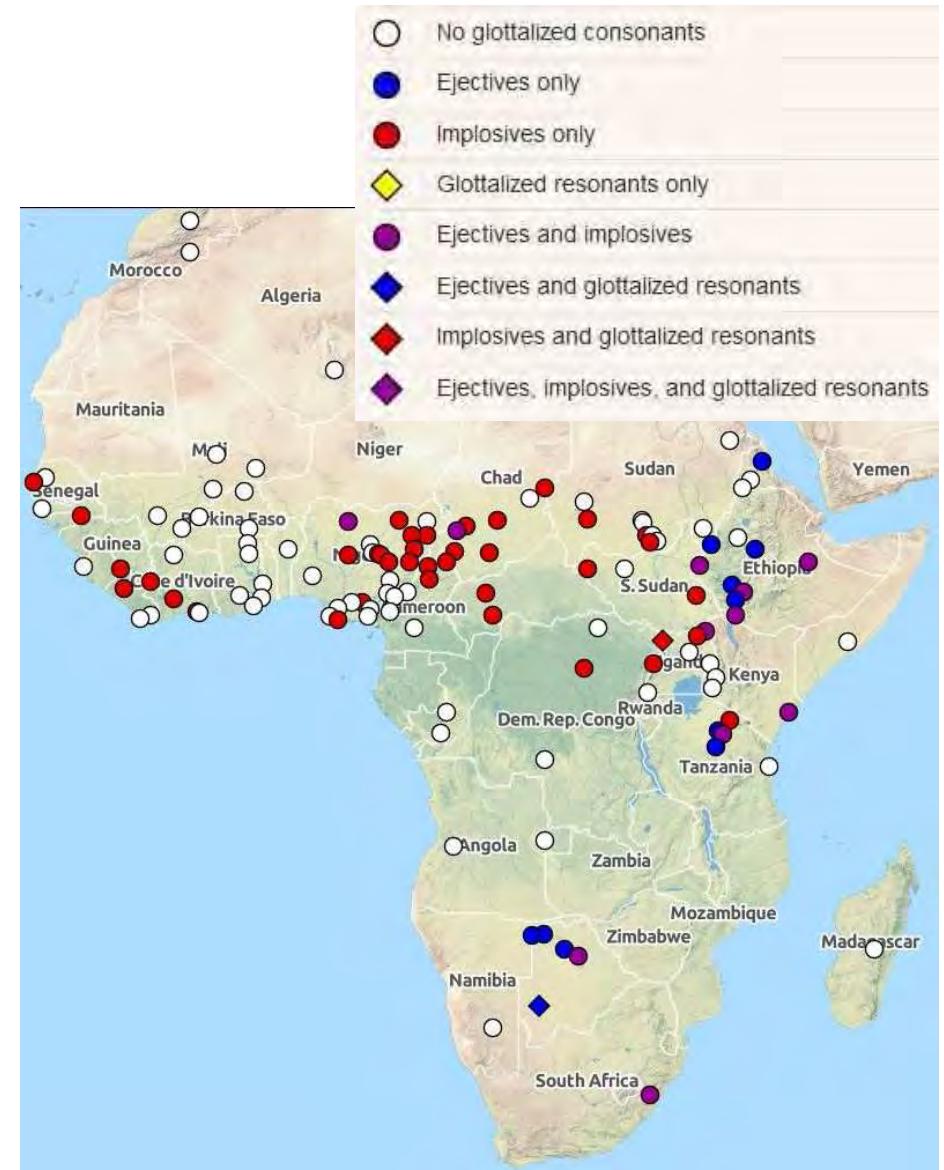
- large consonantal inventory (68)
- (clicks)
- aspirated, breathy and implosive stops
- lateral obstruents

01. Introduction

Example: Distribution of ejectives/glottalized consonants



Clements & Rialland (2008: 62)



Maddieson (2013)

Problems

- data basis of previous studies
- conflicting conclusions:

"A third zone, the South, is sharply delineated by the remaining features ...: ejective and aspirated stops, clicks, and slack voiced stops. To these features we could add their characteristic series of lateral affricates and fricatives. All these features are widely shared by Khoisan and Bantu languages in the region."

Clements & Rialland (2008: 82)

"... [S]ubstrate interference contributed repeatedly to creating linguistic similarities [in Nguni, Tswana, (possibly other southern Bantu languages,) and Afrikaans] with Kalahari Basin languages (or at least maintaining existing ones) but has not been strong enough to make the newcomers "full" members of the area."

Güldemann & Fehn (in prep.: 18; cf. also Güldemann 2010: 572f.)

This talk

- (slightly) more systematic investigation of phonological features (phoneme inventories, syllable structure)
 - Southern Africa vs. Kalahari Basin ("Khoisan") (vs. Southeastern Bantu)
 - compared to other languages further north (subequatorial Africa)
-
- Are there sufficient features to treat Southern Africa as one clearly delineated area?
 - Can we recognize neat subareas?
 - Is it possible to compare their validity on quantitative data?
 - Are there South African languages that are not part of the linguistic area? (Why?)
 - Are there links to areas outside of the region?

Linguistic and phonological areas

- phonological areas: linguistic areas claimed on the basis of phonological traits
- linguistic areas (Campbell 2006: 6)
 - several (marked) linguistic features
 - shared by two or more languages (unrelated, or from different subgroups of the family)
 - in a geographically contiguous area
 - < diffusion (borrowing)

Qualifications

- I agree: "*linguistic areas are after-the-fact constructs based on the residue and accumulation of borrowed traits*" (Campbell 2006:14)
- I do not fully agree:
 - "... [I]t would be more productive just to investigate the facts of linguistic diffusion without the concern for defining linguistic areas." (Campbell 2005:2)
 - "*the whole notion of 'areal phenomena' is built on the convenient fiction that each language has a specific location in space, that no more than one language is spoken in each place, and that language contact takes place between adjacent languages. However, language contacts typically occur in densely [multilingual] populated places ...*" (Dahl 2001, cited in Campbell 2006: 14)

"(South African) Khoisan" languages: 3 distinct families

Khoe-Kwadi (\approx "Central Khoisan")

Kwadi†

Khwe (Caprivi Khwe, ||Ani ...; Ts'ixa ?)

Shua (Cara, Deti†, |Xaise, Danisi ...)

Tshwa (Kua, ...)

Naro

G||ana (G|ui, G||ana)

Namibian Standard Khoekhoe

(Nama-Damara, Hai||om, †Aakhoe)

!Ora-Xiri (†)

Eini†

Cape Khoekhoe†

Kx'a (\approx "Northern Khoisan")

Ju (NW !Xun, Ju|'hoan, ...)

†'Amkoe (N!aqriaxe, †Hoan, Sasi)

Tuu ("Southern Khoisan")

Taa (West !Xoon, East !Xoon, ...)

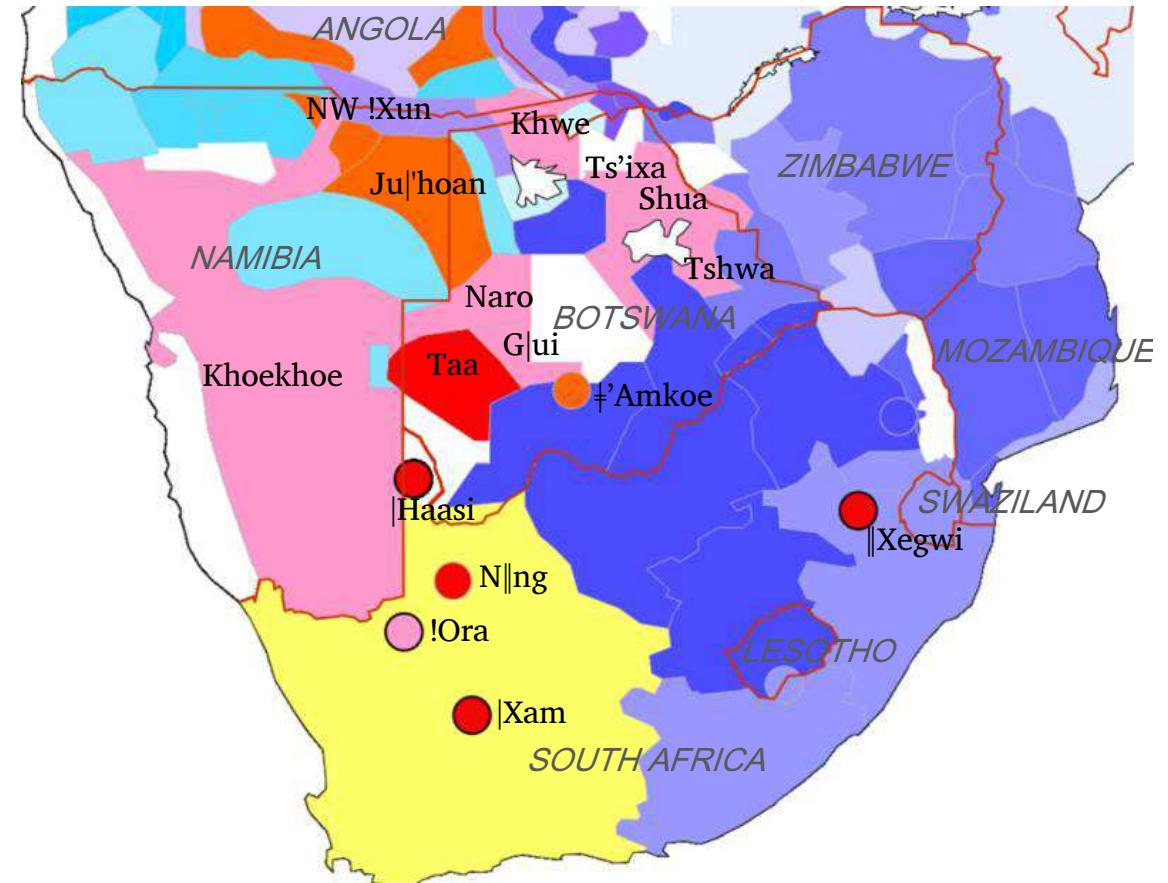
Lower Nossob† (|Haasi, |'Auni)

N||ng (= N|uu, †Khomani, ...)

|Xam† (Strandberg, Achterveld, ...)

†Ungkue †

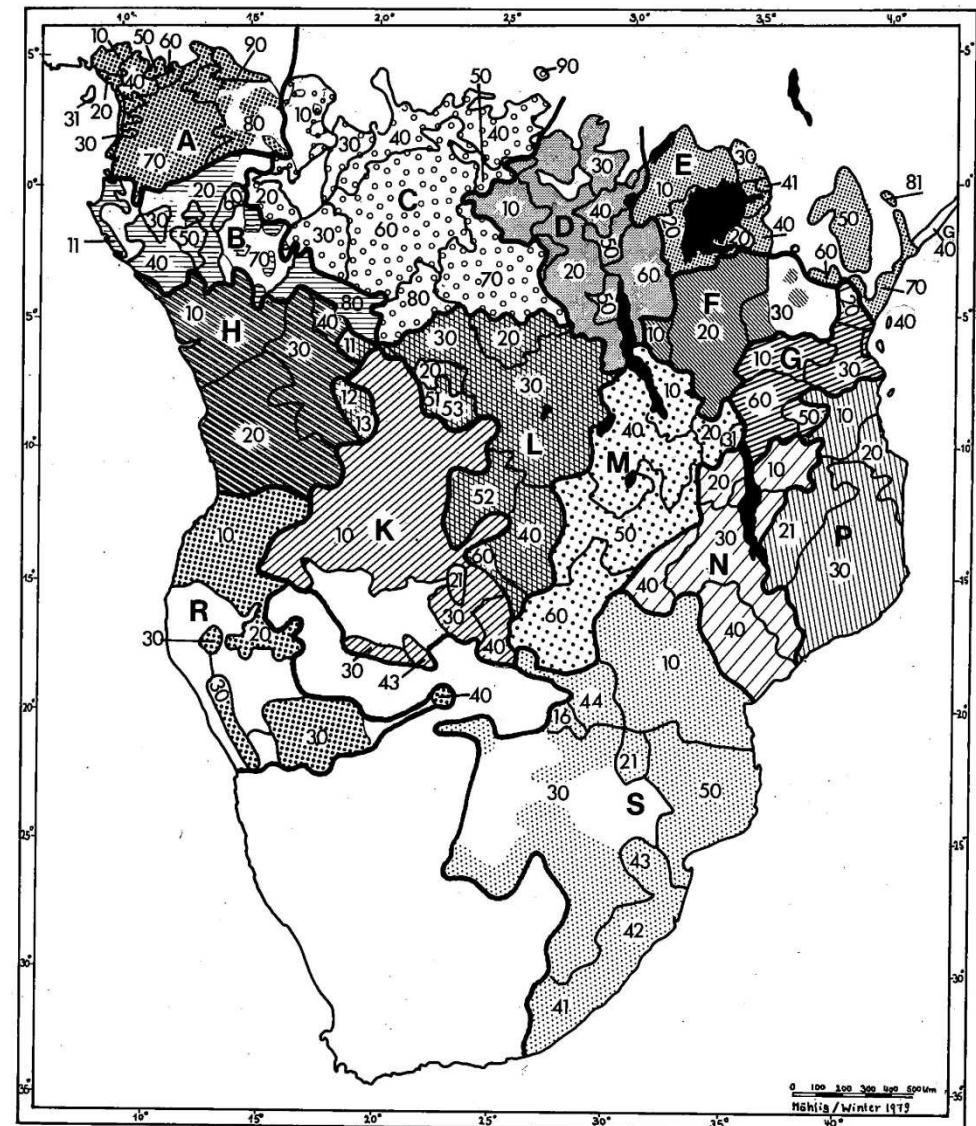
||Xegwi†



No accepted genealogical classification of Bantu languages

The referential system by Guthrie (1967-71) (revised by Maho 2009)

- geographic zones: A - S
- local groupings, e.g. A10, S40
- individual languages, e.g.
 - Ewondo A.72
 - Bulu A.74
 - Fang A.75(1)
 - Lingala C.30b
 - Kinyarwanda D.61
 - Kirundi D.62
 - Luganda E.15
 - Gikuyu E.51
 - Kamba E.55
 - Sukuma F.21
 - Swahili G.42-43
 - Kikongo H.14-16
 - Kimbundu H.21
 - Chokwe K.11
 - Luba-Kasai L.31
 - Chichewa N.31
 - Tonga (Zambia) M.64
 - Makhuwa P.31
 - Umbundu R.11
 - Ovambo R.21-24
 - Herero R.31
 - **Shona S.11-15**
 - **Tswana S.31**
 - **N. Sotho S.32**
 - **S. Sotho S.33**
 - **Xhosa S.41**
 - **Zulu S.42**



No accepted genealogical classification of Bantu languages

E.g.

Hinnebusch (1989: 458,
citing Heine, Hoff & Vossen
1977)

Bantu

- I. Tiv
- ...
- VIII. Kongo Branch
 - 1. Upper Kongo Group
 - ...
 - 8. East Highlands Group
 - ...
 - u. Shona Subgroup [S10]
 - v. Rue [Sena, N.40?]
 - w. Venda [S20]
 - x. Tsonga Subgroup [S50]
 - y. Inhambane Subgroup [S60]
 - z. Sotho-Zulu Subgroup [S30 + S40]

Nurse & Philippson (2003):
Intermediate Bantu groupings
(preliminary proposal)

Bantu

- ?A11-4, A20-30 less A31
- ...
- K10-30 less K31, L10-50-60,
H21, R
- ...

S10

S20-30-40-?S50-?S60, P30

cf. Hammarström et al.
(2014)

Narrow Bantu

- [1.] Ababuan

...

[6.] East Bantu

- Botatwe
- ...
- Shona [S10]
- Southern Bantu-Makua
 - Chopi [S60]
 - Nguni-Tsonga [S30 + S50]
 - Sotho-Makua-Venda
 - Sotho-Makua [S30 + P30]
 - Venda [S20]

Bantu languages of Southern Africa (local, largely non-controversial genealogical groupings)

(Zone K)

K10: Ngangela, Chokwe, Luchazi, ...

K30: Kwangali, Manyo, Mbukushu, ...

K40: Fwe, Ikuhane (=Subiya), Totela

(Zone R)

R20 (Wambo): Kwanyama, Ndonga, ...

R30 (Herero): Central Herero, Mbanderu, ...

R40 Yeyi

(Zone S)

S10 (Shona): Standard Shona, Ndau, Kalanga, ...

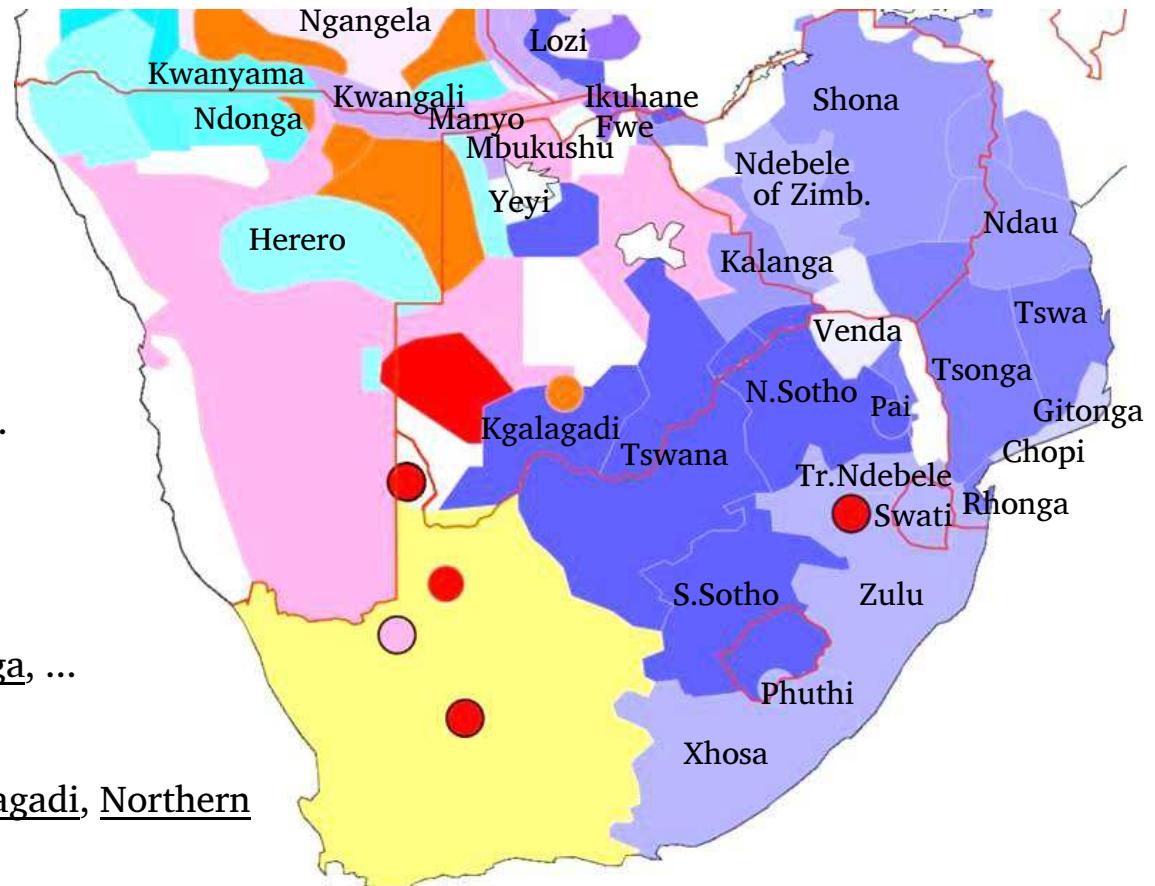
S20 Venda

S30 + K20 (Sotho-Tswana): Tswana, Kgalagadi, Northern Sotho, Pai, Southern Sotho, Lozi

S40 (Nguni): Xhosa, Zulu, Swati, Phuthi, Transvaal Ndebele, Ndebele of Zimbabwe

?S50 (Tswa-Rhonga): Tswa, Tsonga (=Changana), Rhonga

?S60 (Copi): C(h)opi, Gitonga



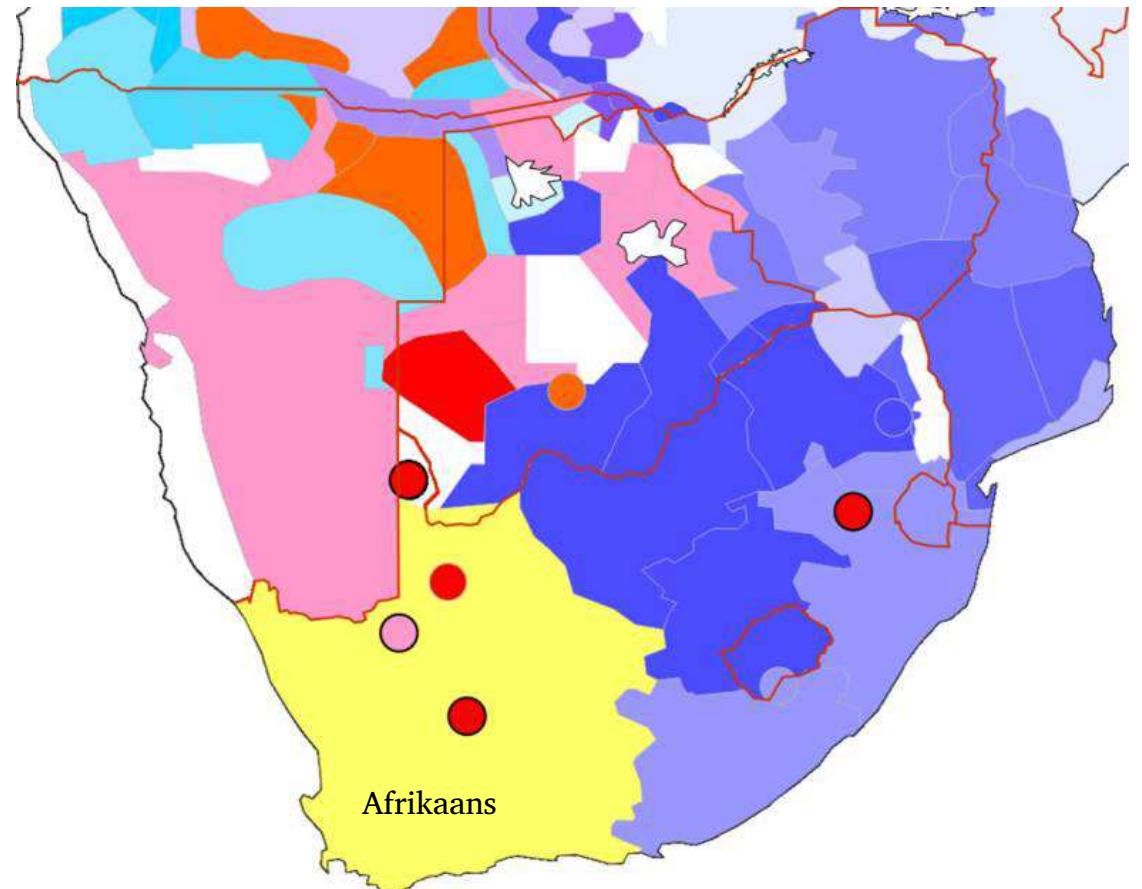
Other languages

Indo-European

Germanic: Afrikaans

Ignored:

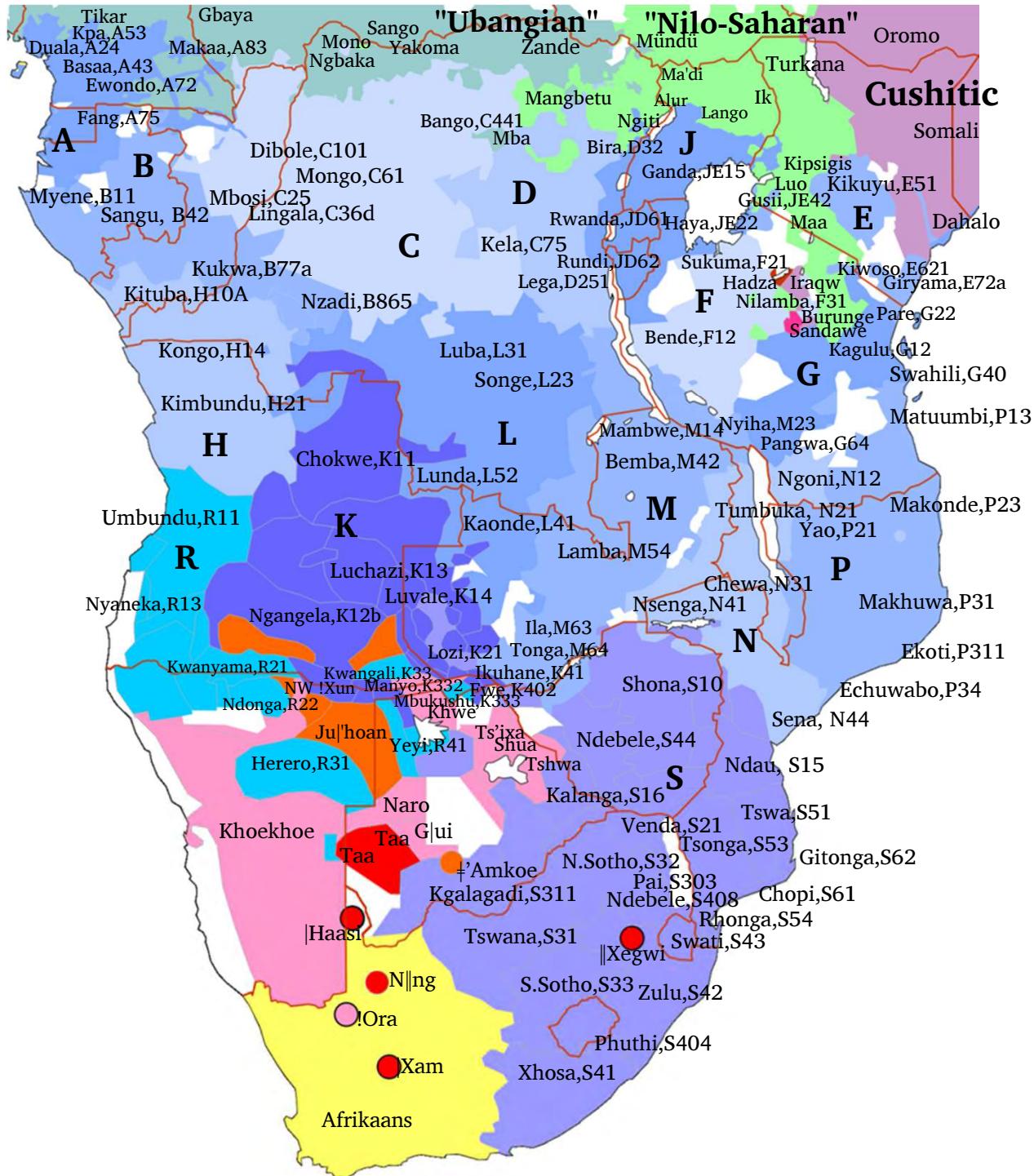
- sign languages
- restructured urban varieties and contact languages
- other Indo-European languages



02. Procedure

- data collection: extraction of phoneme inventories and syllable types from published sources
- language sample: 138 languages
 - aimed at maximal number of documented languages of Southern Africa (cf. above)
 - Sandawe & Hadza (Greenberg's "Khoisan": clicks)
 - 'Southern' Cushitic: Dahalo (clicks), Burunge, Iraqw
 - 3 – 6 languages of different groupings in the remaining Bantu zones (A – P)
 - exemplary languages for other subequatorial and adjacent lineages (Non-Bantu Bantoid [Niger-Kordofanian]; Gbayic, Bandic, Ngbandic, Mbaic, Baka-Mundu, Zandic [Niger-Kordofanian/"Ubangian"]; Lowland East Cushitic [Afroasiatic]; Western, Eastern and Southern Nilotic, Moru-Mangbetu, Kuliak ["Nilo-Saharan"])
- each language: coding of numerical or categorical phonological features, e.g. "number of consonants" (14 – 88) or "whistled obstruents" (0 absent, 1 present)
- value plots for each feature (Hans-Jörg Bibiko, in "R")
- visual inspection: assessment of areally distributed feature values and typical traits of Southern Africa and other potential regions, e.g. Kalahari Basin: 15 features
- counting feature values for each language and each assumed area, e.g. "How many typical Kalahari features (values) are found in Zulu?" > listing and histograms
- summary for language groups (cf. handout)

Language sample



02. Procedure

Phoneme inventories

- "Khoisan-centric" arrangement of consonant charts: series of affricates and clicks in parallel to place of articulation; e.g. for Taa/West !Xoon below

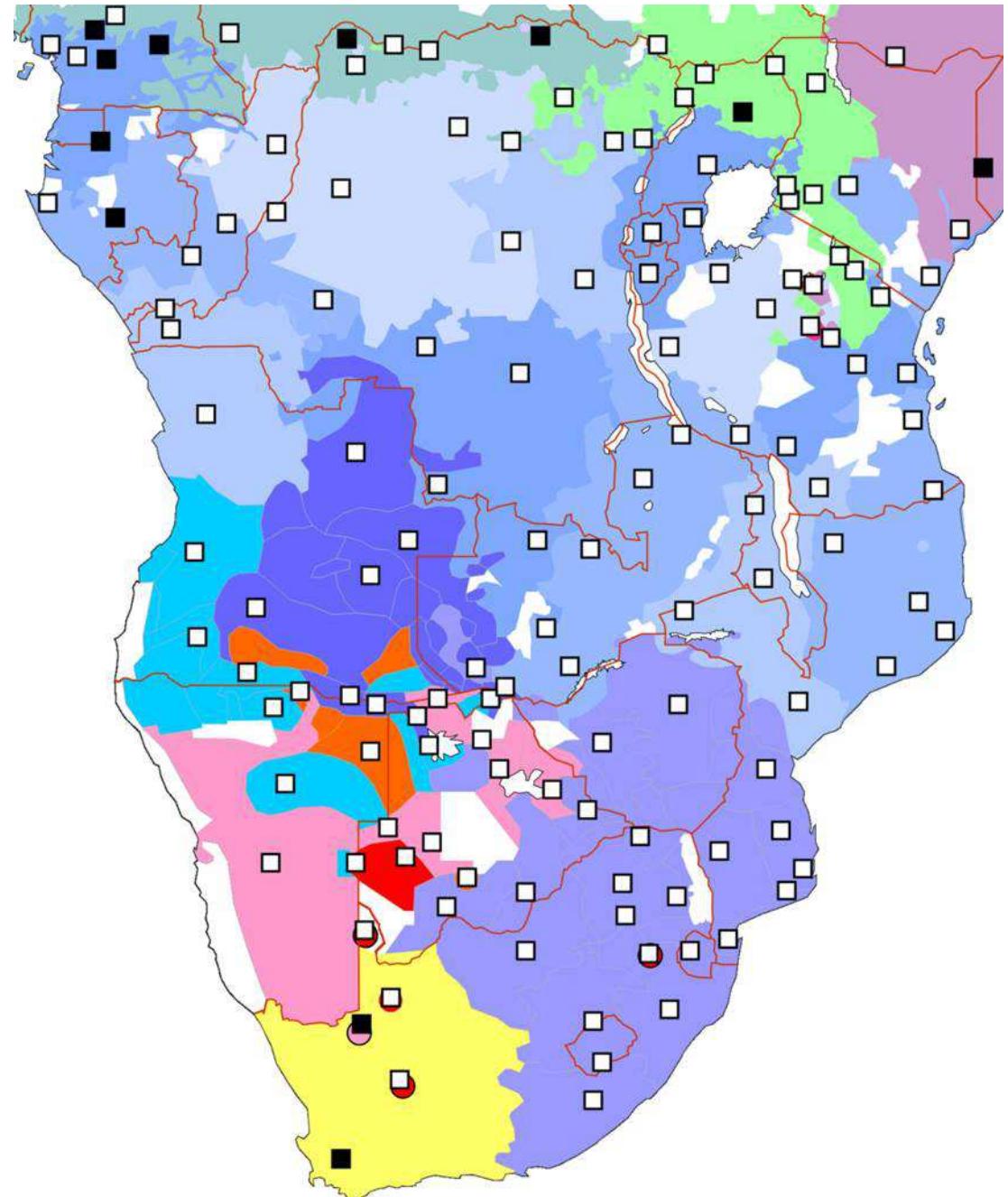
	bilab	lab-dent	dent	alv	alv	alv	retro	p-alv	pal	vel	lab-vel	uvul	vel/u	phar	glott	ingr bilab	ingr dent	ingr alv	ingr pal	ingr al-lat	other (+ secondary)
	p	f	t̄	t̄	ts̄	tl̄	t̄	t̄ʃ	c	k	k̄p	q̄	q̄χ̄	h̄	?	○		!̄	‡̄	̄	k̄j̄, k̄w̄, t̄f̄
stop, vls.	p			t̄	ts̄					k	q̄			?	○		!̄	‡̄	̄		
stop, aspir.	p ^h			t ^h	ts ^h					k ^h	q ^h				○ ^h	^h	! ^h	‡ ^h	^h		
stop, vd.	b			d	dz					g	ḡ				○	↓	↓̄	‡̄	̄		
stop, breathy	b ^h			d ^h	dz ^h					g ^h	g ^h				○ ^h	↓ ^h	↓ ^h	‡ ^h	^h		
stop, ejective	p'			t'	ts'					k'	q'	q̄χ'			○'	'	!'	‡'	'		
stop, vd. impl.																					
stop, other					dz'					g'	ḡ	ḡχ'				↓'	↓̄'	‡̄'	̄'		
nasal, voiced	m			n					ŋ	ŋ̄					○	↑	↑̄	‡̄	̄		
nasal, voiceless																↑̄	↑̄	‡̄	̄		
nasal, other	'm			'n											'○	↑̄	↑̄	‡̄	̄		
fricative, vls.	f			s							χ̄			h̄							
fricative, vd.																					
fricative, other																					
lateral approx.			(l)																		
lat. approx., vls																					
lateral, other																					
tap or flap				r̄																	
trill, voiced																					
intermittent, other																					
approximant	w ?								j												
approx., vls																					

02. Procedure

Example

Presence (■) vs. absence (□) of non-open central vowels (e.g. ə, i, ɛ)

- > areal distribution
- > not very important for subequatorial Africa

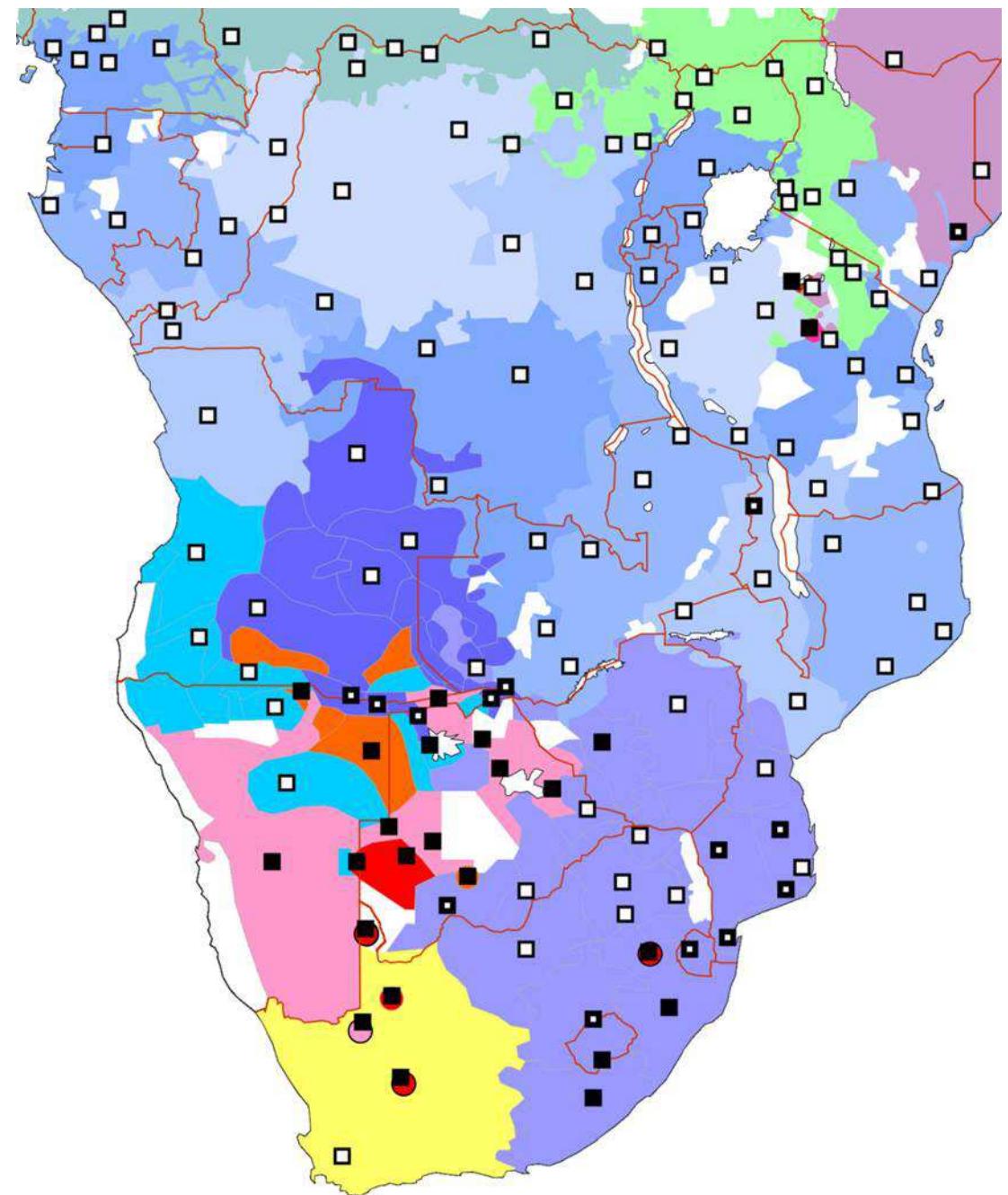


03. Results: Kalahari Basin

> 5 clicks: significant click inventories

Presence of clicks

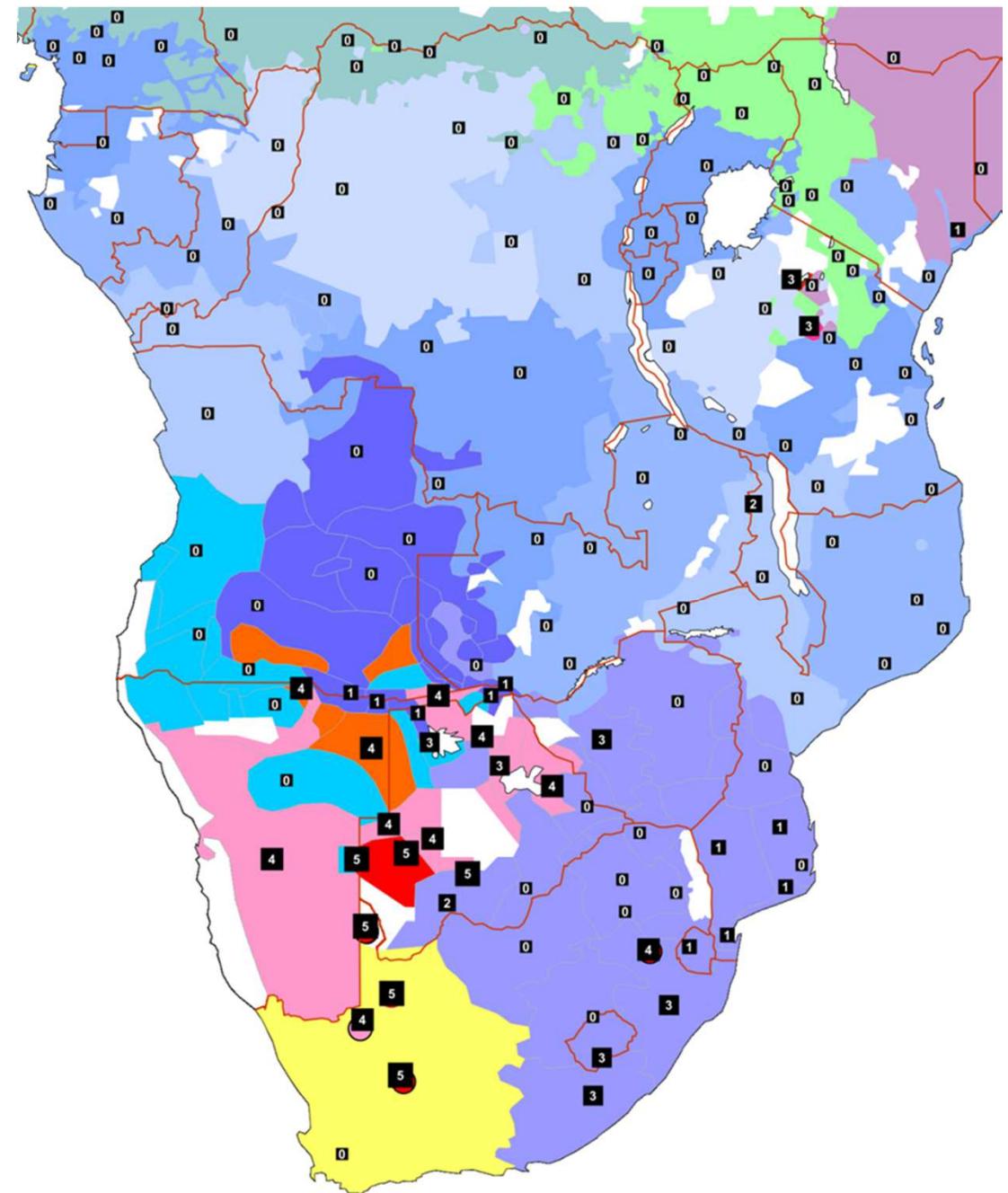
- 0
- 1-5
- > 5



03. Results: Kalahari Basin

>3 click types: more than three basic click types,
e.g. ⊖, |, !, ‡, ||

Number of basic click types:
0 - 5

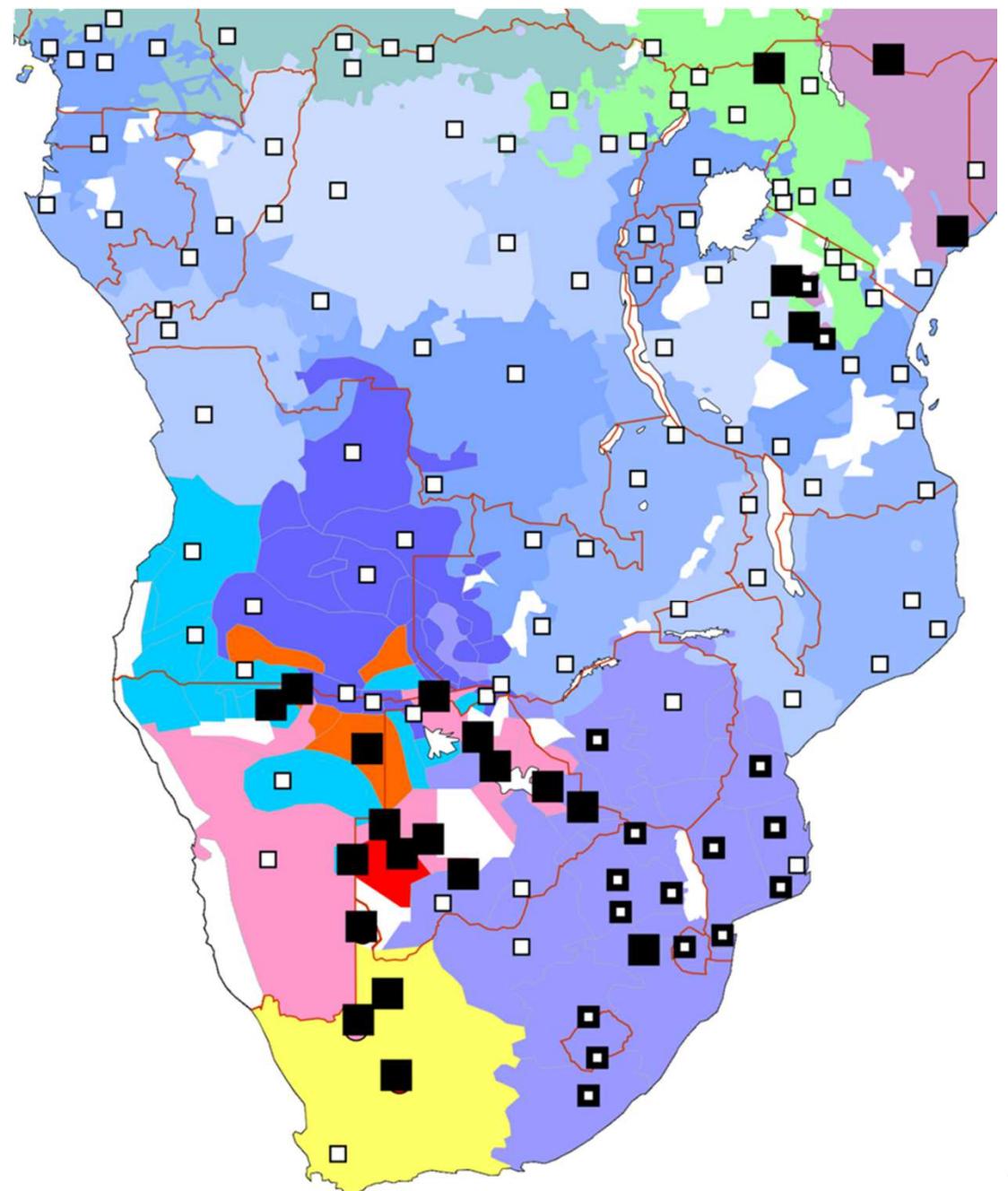


03. Results: Kalahari Basin

/ejectives/: presence of
ejective obstruents contrastive
with plain series,
e.g. /k'/ : /k/

Presence of ejective obstruents

- no ejectives
- ◻ non-contrastive with plain stops
- contrastive with plain stops

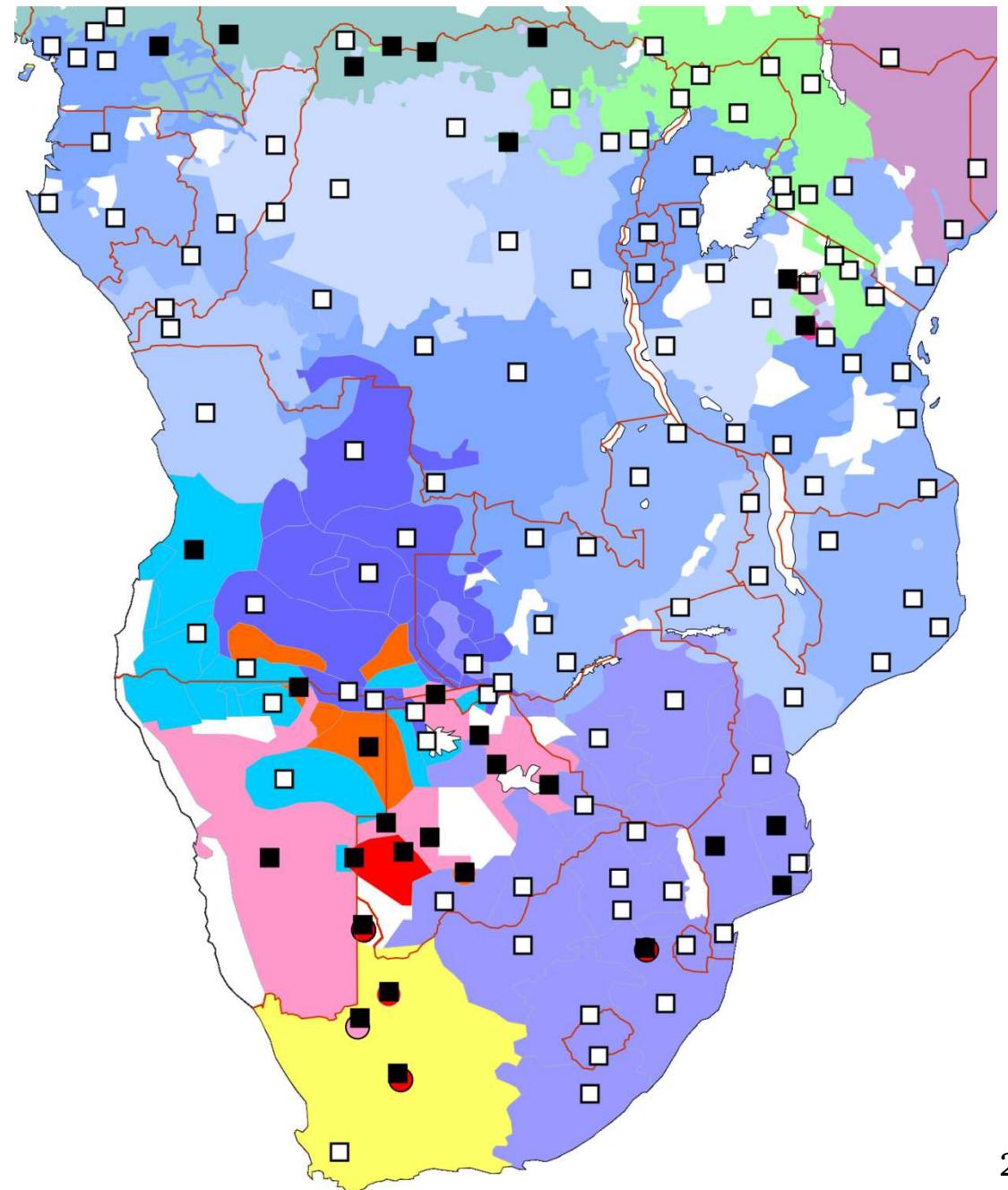


03. Results: Kalahari Basin

Vn: presence of nasalized vowels,
e.g. /ã/ (:/a/)

Presence of nasalized vowels

- 0
- > 0

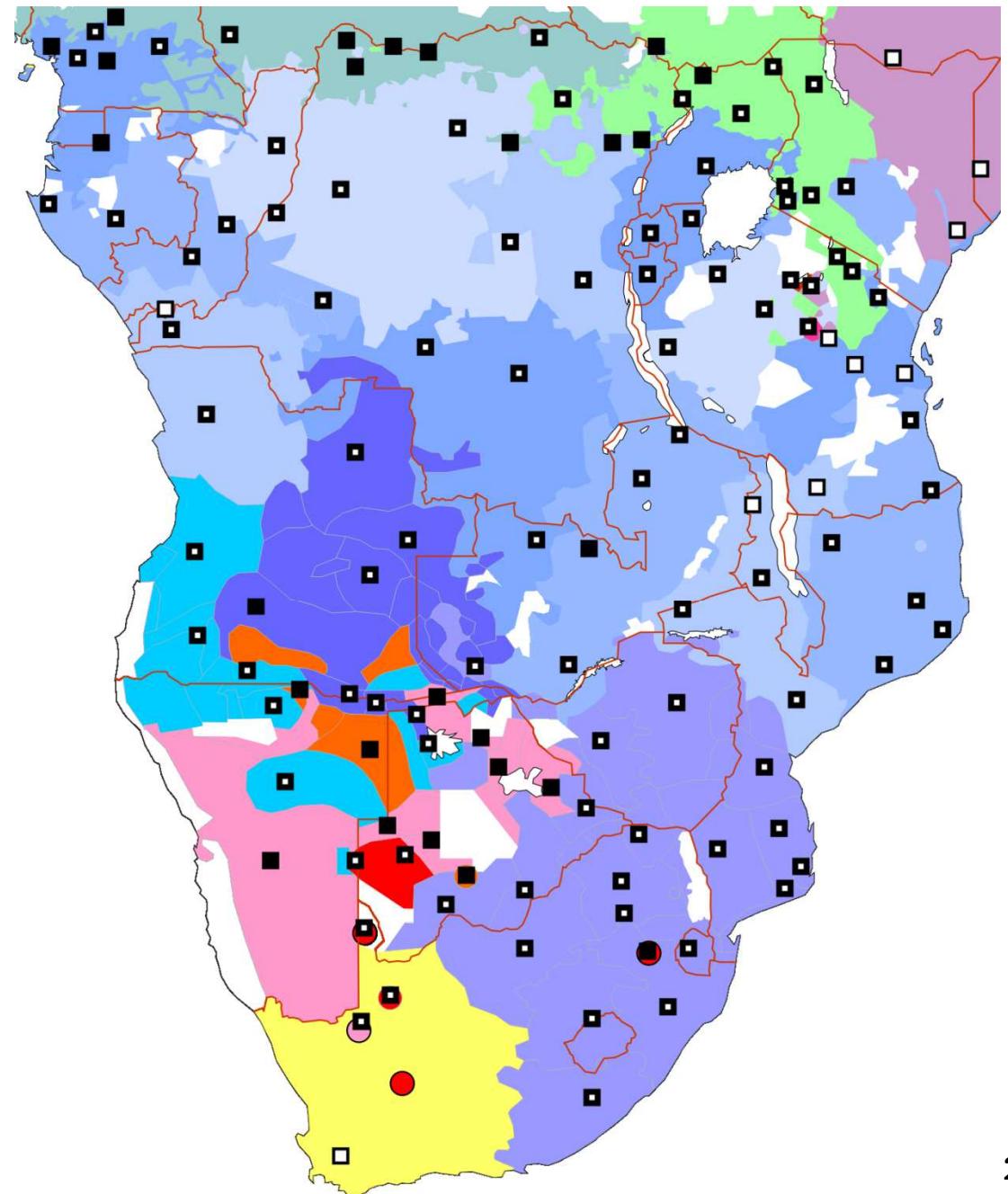


03. Results: Kalahari Basin

>2 tones: presence of complex tone systems including more than 2 tone levels,
e.g. high : mid : low

Number of distinctive tone levels

- non-tonal
- ◻ 2 levels
- > 2 levels



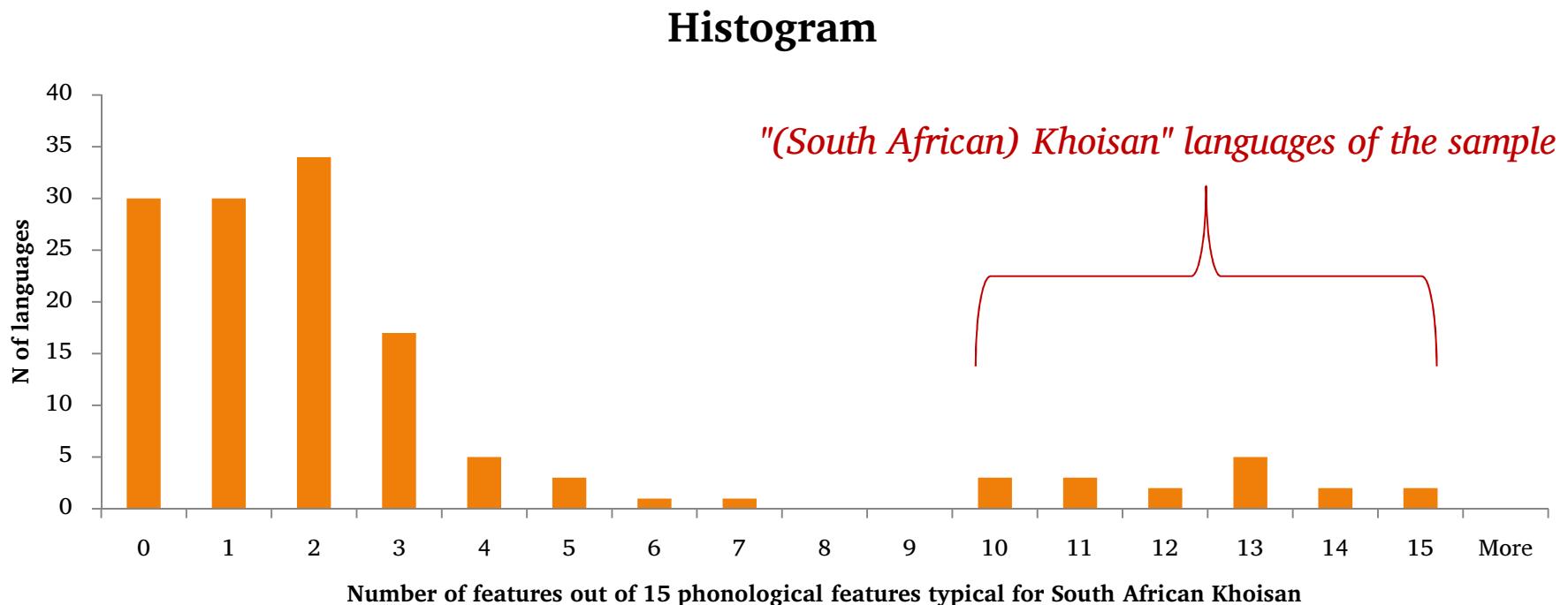
Kalahari Basin ("South African Khoisan")

15 Features

- >5 clicks: significant inventory of clicks
- >3 click types: more than three basic click types, e.g. ⊖, |, !, ‡, ||
- KX: presence of dorsal (velar or uvular) affricates, e.g. kχ, qχ', kχ'
- uvulars: presence of uvular obstruents, e.g. q, g, χ, qχ'
- /ejectives/: presence of ejective obstruents contrastive with plain series, e.g. /k'/: /k/
- TK onsets: presence of coronal-dorsal syllable onsets (ignoring plain clicks), e.g. tk, s+k, ts+x, ts'+χ
- N coda: exclusively nasals allowed in syllable codas (C(C)V(N) syllable structure)
- Vn*: presence of nasalized vowels, e.g. /ã/ (:/a/)
- Vqh: presence of non-modal or pharyngealized vowels, e.g. /a᷑/, /a᷒/, /aᷓ/
- >2 tones: presence of complex tone systems including more than 2 tone levels, e.g. high : mid : low
- R, no L: presence of intermittents (taps, flaps, trills) and absence of lateral approximants
- no voiced frics: absence of voiced fricatives, e.g. /s/, /ʃ/, but */z/
- 1 sibilant: presence of one sibilant (place of articulation) only, e.g. /s/ but */ʃ/
- no NC: absence of nasal + obstruent syllable onsets, e.g. *NCV and *NCV
- no C + w: absence of obstruent + /w/ onset clusters

Kalahari Basin: Features by language

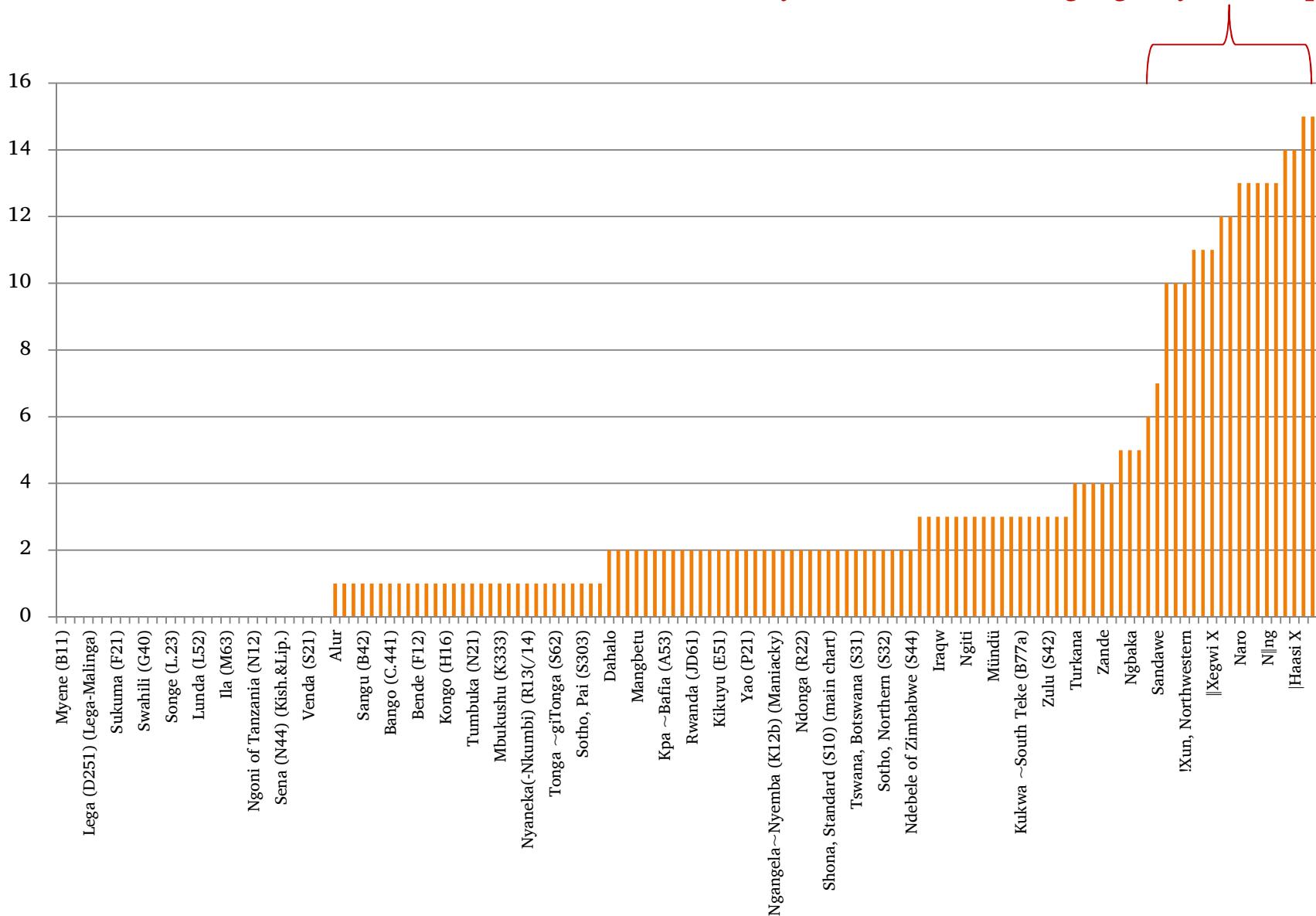
- ideal phonological area: clear boundaries (not fuzzy)
- all "Khoisan" languages show at least 10 out of 15 typical phonological features, no other language has more than 7 > bimodal distribution, discrete boundary



03. Results: Kalahari Basin

Features by language

"(South African) Khoisan" languages of the sample



03. Results: Kalahari Basin

Features by language group

group	>5 clicks	>3 click types	KX	uvulars	/ejectives/	TK onsets	N coda	Vn	Vqh	>2 tones	R, no L	no voiced frics	1 sibilant	no NC	no C+w
Cushitic, other (2)	0	0	0	0.5	0.5	0	0	0	0	0	0	0	0	1	1
Nilotic (6)	0	0	0	0	0	0	0	0	0.167	0	0	0.83	0.83	0.67	0.167
Kuliak (1)	0	0	0	0	1	0	0	0	1	0	1	0	1	1	0
Moru-Mangbetu (3)	0	0	0	0	0	0	0	0	0	0.67	0	0	1	0	1
"Ubangian" (8)	0	0	0	0	0	0	0	0.75	0	0.75	0.125	0	0.75	0.125	0.625
N-Bantu Bantoid (1)	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0
Bantu A-R, other (68)	0	0	0	0	0.013	0.016	0.05	0.013	0.016	0.1	0.13	0.14	0.41	0.06	0.05
Germanic (1)	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0
'South' Cushitic (3)	0	0	0.33	0.33	0.33	0	0	0	0.33	0	0	0.33	0.33	0.67	1
Sandawe, Hadza (2)	1	0	0	0	1	0	0	1	0.5	0	0	0.5	0.5	0.5	0.5
Bantu K30 (3)	0	0	0	0.33	0	0	0	0	0	0	0.67	0	0.33	0	0
Bantu R40 (1)	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Bantu S10 (3)	0	0	0	0	0.33	0.67	0	0	0	0	0.67	0	0	0	0
Bantu S20 (2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bantu S60 (2)	0	0	0	0	0	0	0	0.5	0	0	0	0.5	0.5	0	0
Bantu S50 (3)	0	0	0	0	0	0	0	0.67	0	0	0	0	0	0	0
Bantu S30,K21 (7)	0	0	0.43	0.43	0	0	0	0	0	0	0	0	0	0.71	0
Bantu S40 (6)	0.67	0	0.83	0	0	0	0	0	0	0	0	0.5	0	0	0
Khoe-Kwadi (8)	1	0.875	0.625	0.5	0.875	0.75	1	1	0.25	0.875	0.75	0.875	1	0.5	0.875
Kx'a (3)	1	1	1	0.67	1	1	1	1	1	1	0.67	0.33	0.67	0.67	0.67
Tuu (6)	1	1	1	0.83	1	1	1	1	1	0.2	0.67	0.67	0.83	1	0.83

0: wrong/no; < 0.26 infrequent, 0.26 - 0.74 common, > 0.74 very frequent; 1: true/yes

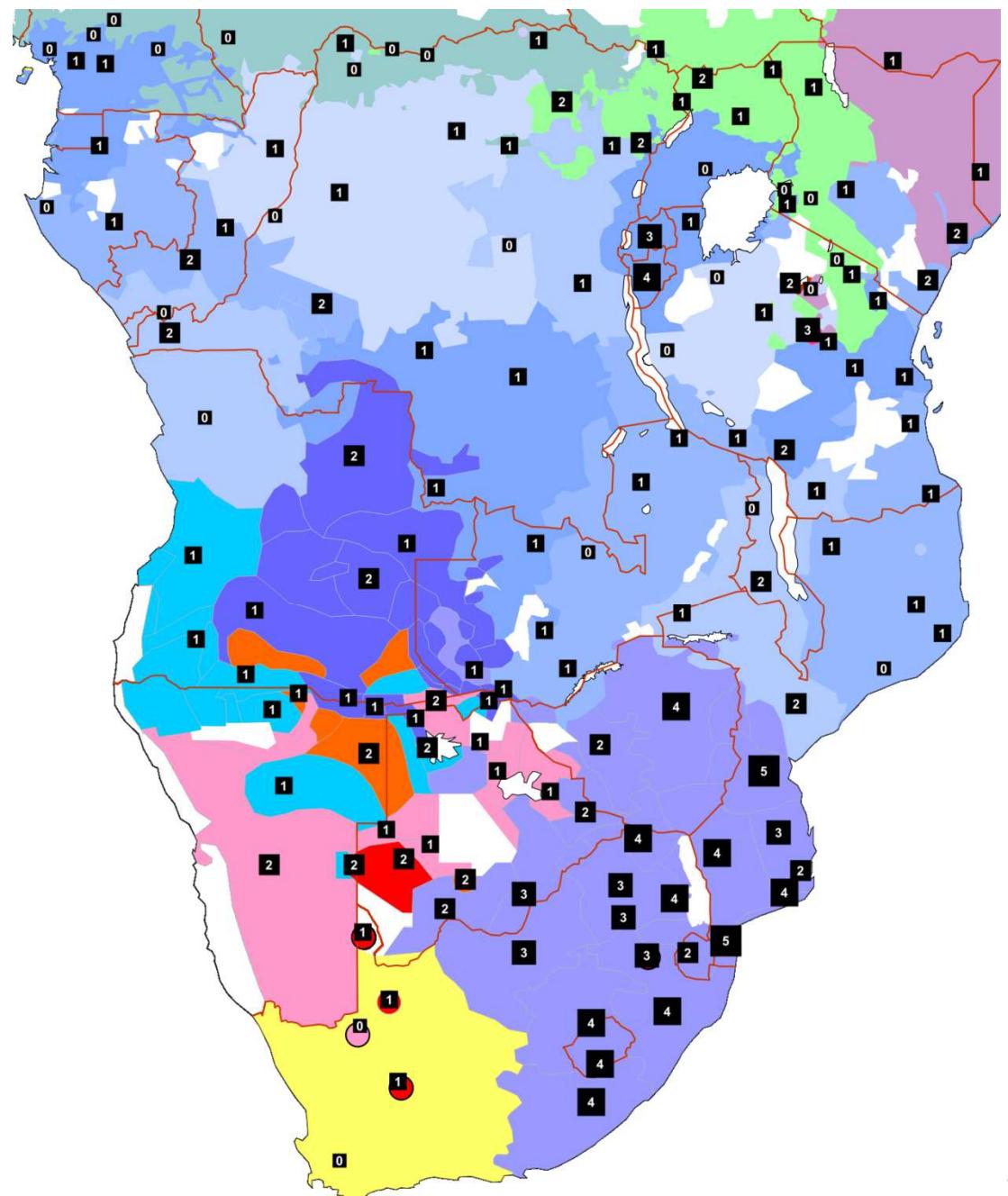
average of area	1.00	0.96	0.88	0.67	0.96	0.92	1.00	1.00	0.75	0.69	0.70	0.63	0.83	0.72	0.79
average of languages outside	0.15	0.00	0.09	0.09	0.23	0.09	0.00	0.16	0.11	0.14	0.14	0.16	0.37	0.37	0.24
difference	0.85	0.96	0.79	0.58	0.73	0.82	1.00	0.84	0.64	0.55	0.55	0.47	0.46	0.35	0.55

03. Results: Southeastern Bantu

>2 affricated series: more than two series of affricates, e.g. \widehat{ts} , $\widehat{tʃ}$, \widehat{pf} (:t, f)

*Number of affricated series
paradigmatic to non-affricated stops in
at least one series (ts/dz :t, tʃ/dʒ :t,
pf/bv :p, kx, qχ, tl)*

0 - 5

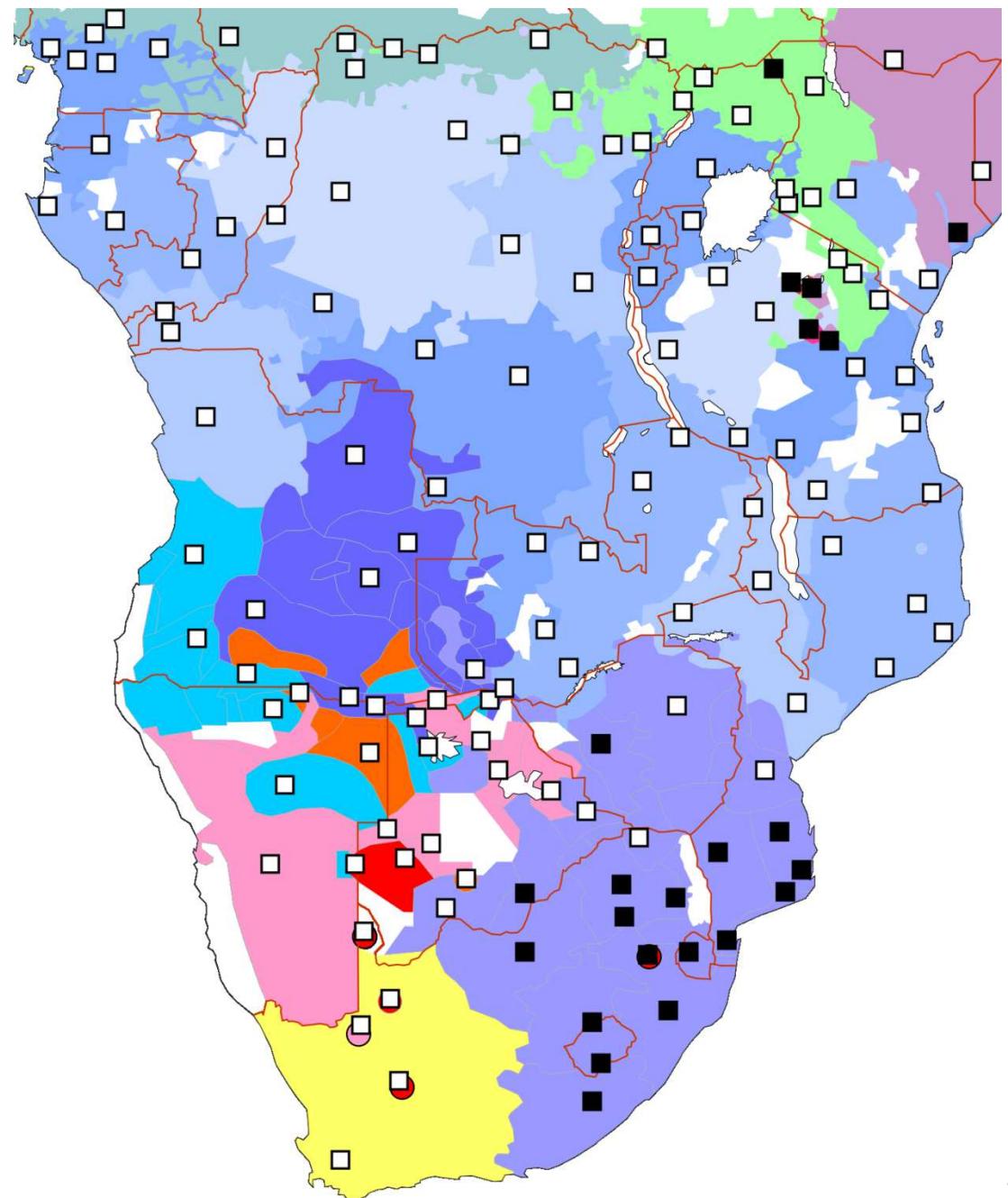


03. Results: Southeastern Bantu

TL: presence of lateral obstruents,
e.g. $\widehat{t\ell}$, $\widehat{t\ell}$, ℓ , ζ

Number of obstruents with lateral airstreams (ℓ , $t\ell$, tl , ζ), (excluding lateral clicks, lateral approximants)

- 0
- > 1

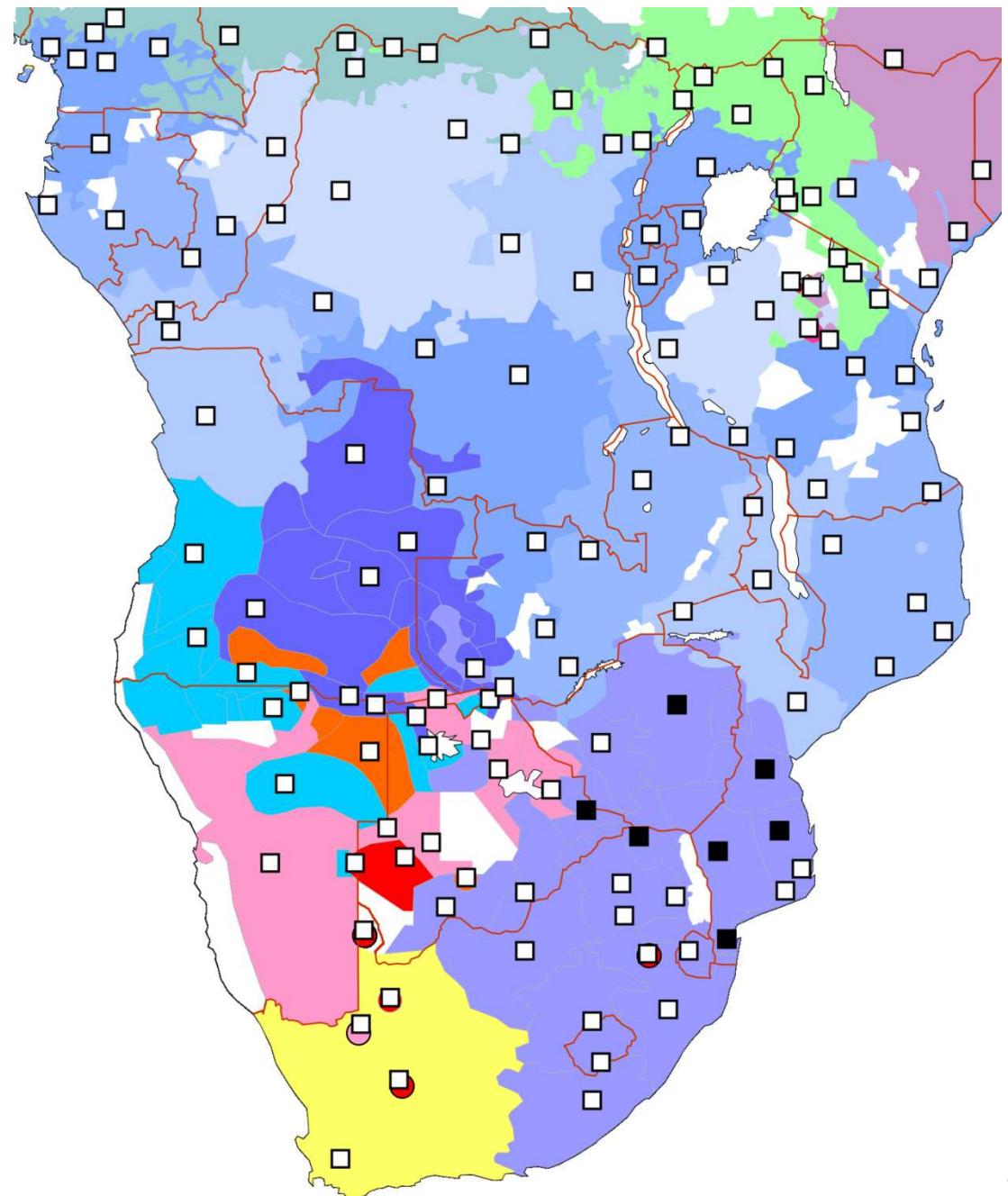


03. Results: Southeastern Bantu

Whistled obstruents: presence of whistled fricatives and affricates, e.g. s^v , z^v , $\overset{\sim}{ts}^v$

Presence of whistled fricatives/affricates

- 0
- > 1

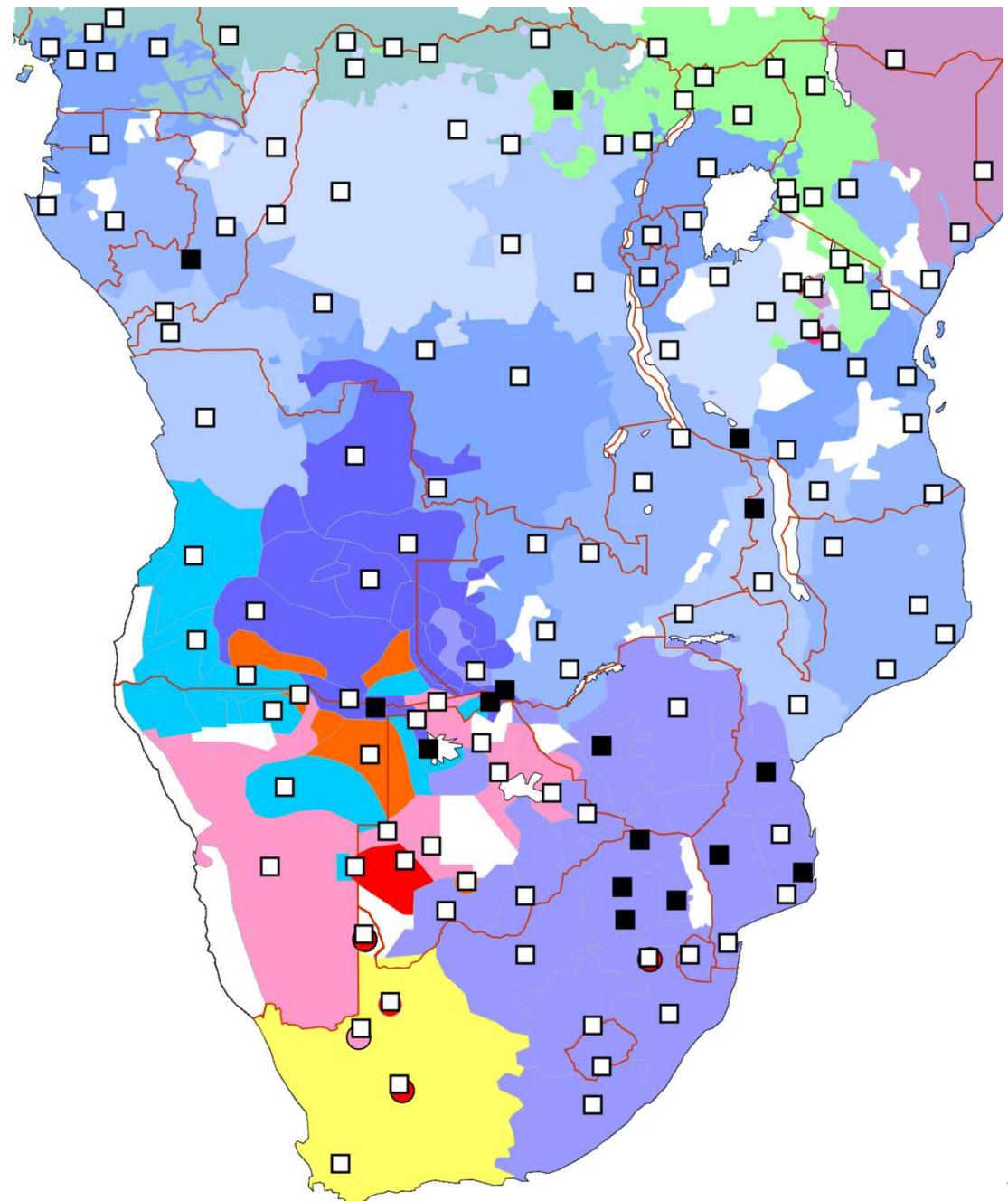


03. Results: Southeastern Bantu

ph:f: contrast between bilabial
and labio-dental continuants,
e.g. /ɸ:/: /f/, /m:/: /mj/, /β:/: /v/
(excluding p:pf, mp:mf)

*Presence of bilabial continuants
contrastive with labio-dental
counterparts*

- 0
- > 0



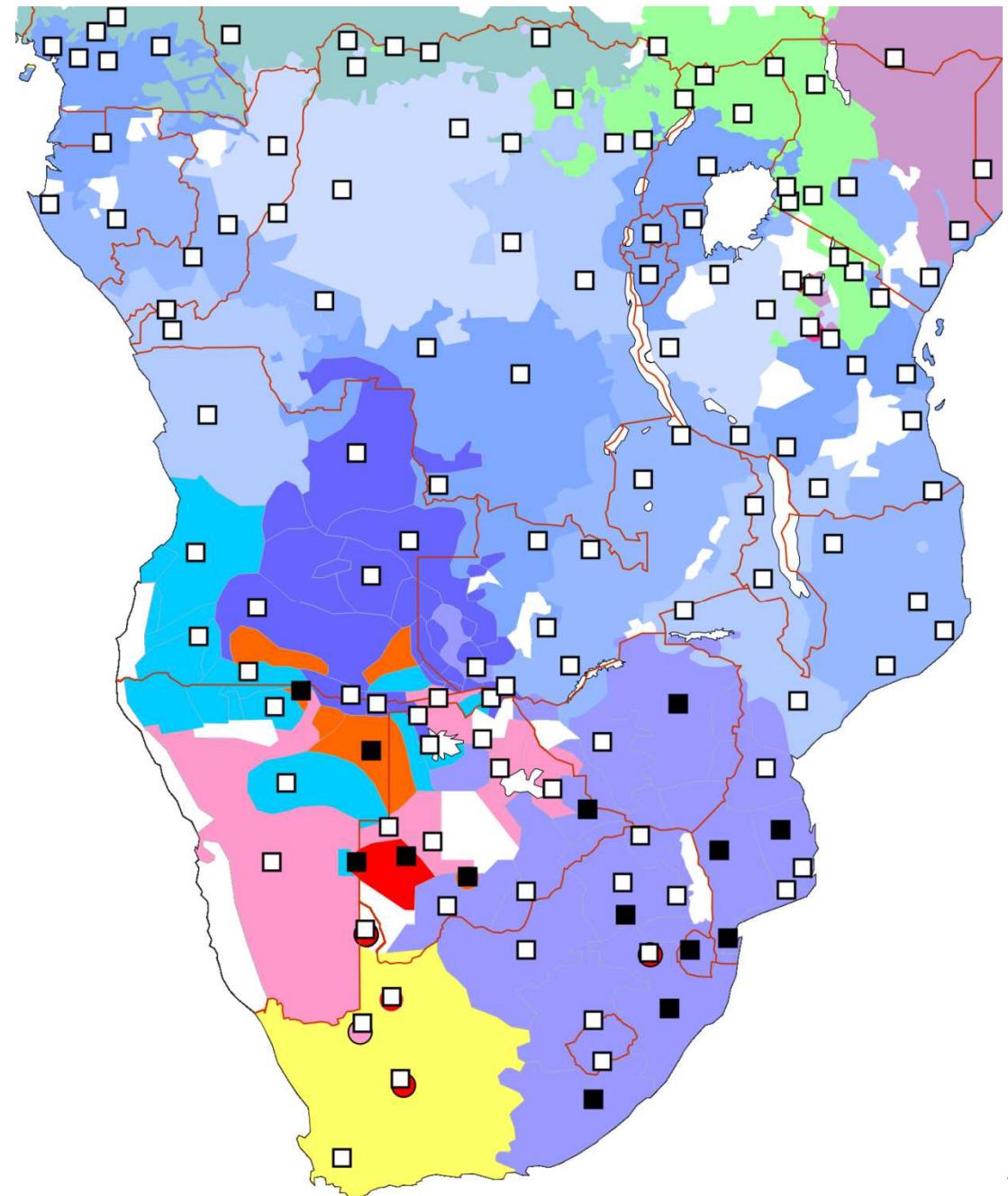
03. Results: Southeastern Bantu

BH,DH: presence of breathy or slack voiced stops,
e.g. /b^h/ or /b_{slack}/

Presence of clicks

Presence of ejective obstruents

- no ejectives
- ◻ non-contrastive with plain stops
- contrastive with plain stops

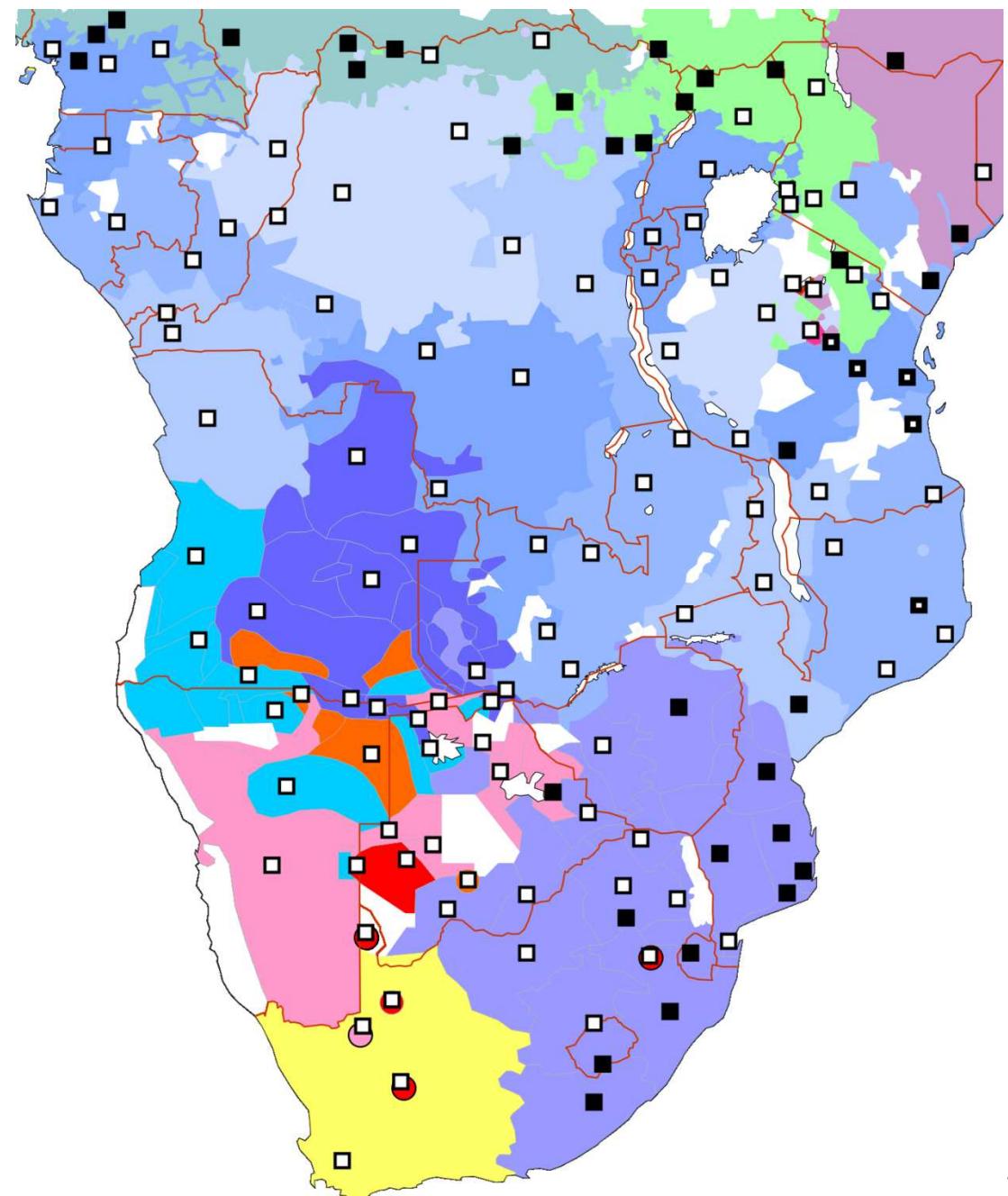


03. Results: Southeastern Bantu

implosives: presence of implosives,
e.g. /ɓ/ or /b/ [ɓ]

Presence of implosives

- no implosives
- ◻ non-contrastive with voiced stops
- contrastive with voiced stops



List of typical features

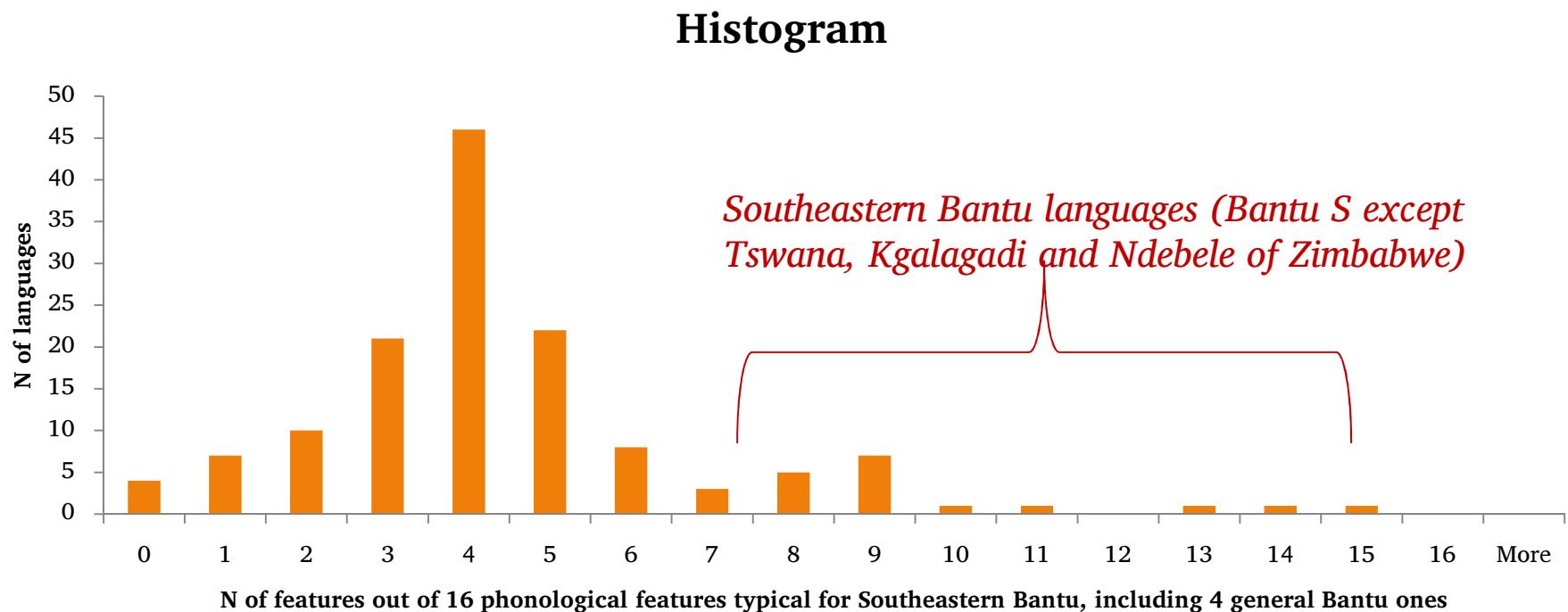
16 Features

- >2 affricated series: more than two series of affricates, e.g. /ts/, /tʃ/, /kx/
- plain stops ejected: plain series of (voiceless) stops is ejective
- TL: presence of lateral obstruents, e.g. $\widehat{t}l$, $\widehat{t}\ell$, ℓ , ζ
- whistled obstruents: presence of whistled fricatives and affricates, e.g. s^v, z^v, \widehat{ts}^v
- ph:f: contrast between bilabial and labio-dental continuants, e.g. /ɸ:/: /f/, /m:/: /m/, /β:/: /v/
- > 2 sibilants: presence of more than two sibilants (places of articulation), e.g. /s/ : /ʃ/ : /ç/
- > 5 voiced frics: presence of more than five voiced fricatives, e.g. /v/, /z/, /ʒ/, /z^v/, /ɣ/, /ɦ/
- PS: presence of labial-coronal onsets, e.g. bz, ps, pʃ
- implosives: (phonetic) presence of implosives, e.g. /ɓ/ or /b/ [ɓ]
- dent:alv: contrast between dental vs. alveolar stops, nasals or laterals, e.g. /tʃ:/: /t/
- BH,DH: presence of breathy or slack voiced stops, e.g. /bʱ/ or /b/
- > 5 vowels: presence of more than five distinctive vowel qualities, e.g. /i, e, ε, a, ɔ, o, u/
- NC: presence of nasal + obstruent syllable onsets, e.g. *NCV and *N̄CV
- C + w: presence of obstruent + /w/ onset clusters
- no C coda: absence of closed syllables
- 2 tones: two distinctive tone levels, e.g. high vs. low

03. Results: Southeastern Bantu

Features by language (16 features, including 4 general Bantu features)

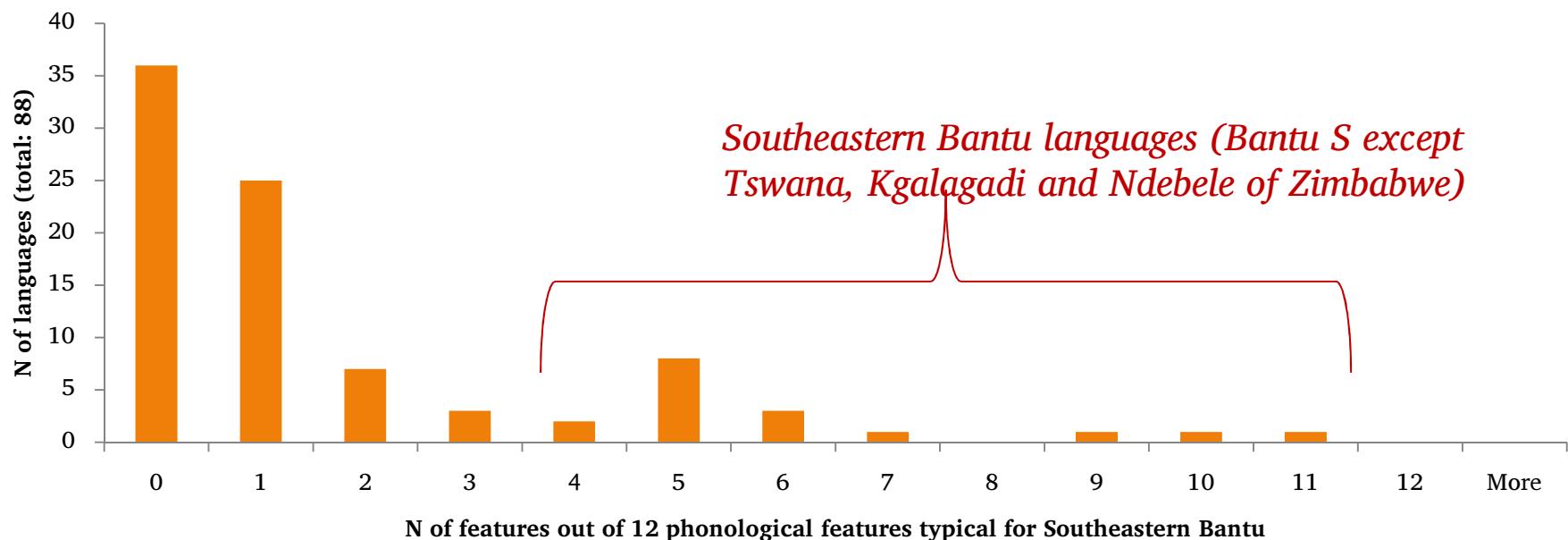
- weak phonological area: fuzzy boundaries, but slight bimodal distribution
- languages are not very homogenous (no language has all features, only three languages have more than 12: Tswa, Tsonga and Transvaal Ndebele)
- problem: genealogical group cannot be excluded (but unlikely)



Features by language (12 features, northern languages excluded)

- similar assessment, but
 - general Bantu features (NC, C + w, no coda, 2 tones) excluded
 - ignoring northern languages (Bantu A – E, Nilotic, "Ubangian", Nilotic, Cushitic, Sandawe & Hadza)
- > better results: most languages share no feature (0 or 1), languages in contiguous southeastern area share more than 3 features

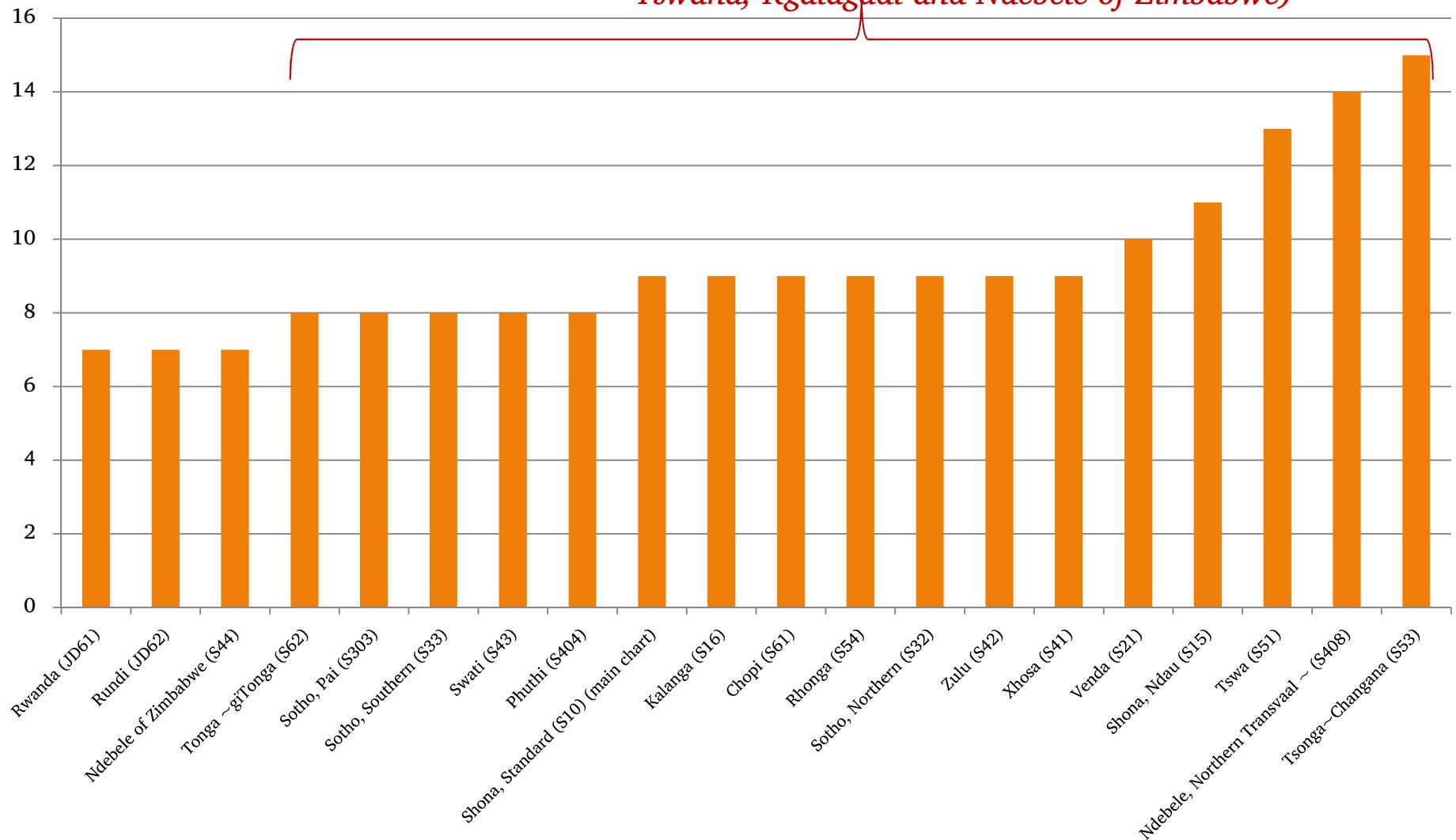
Histogram



03. Results: Southeastern Bantu

Features by language (16 features, all languages)

Southeastern Bantu languages (Bantu S except Tswana, Kgalagadi and Ndebele of Zimbabwe)



03. Results: Kalahari Basin

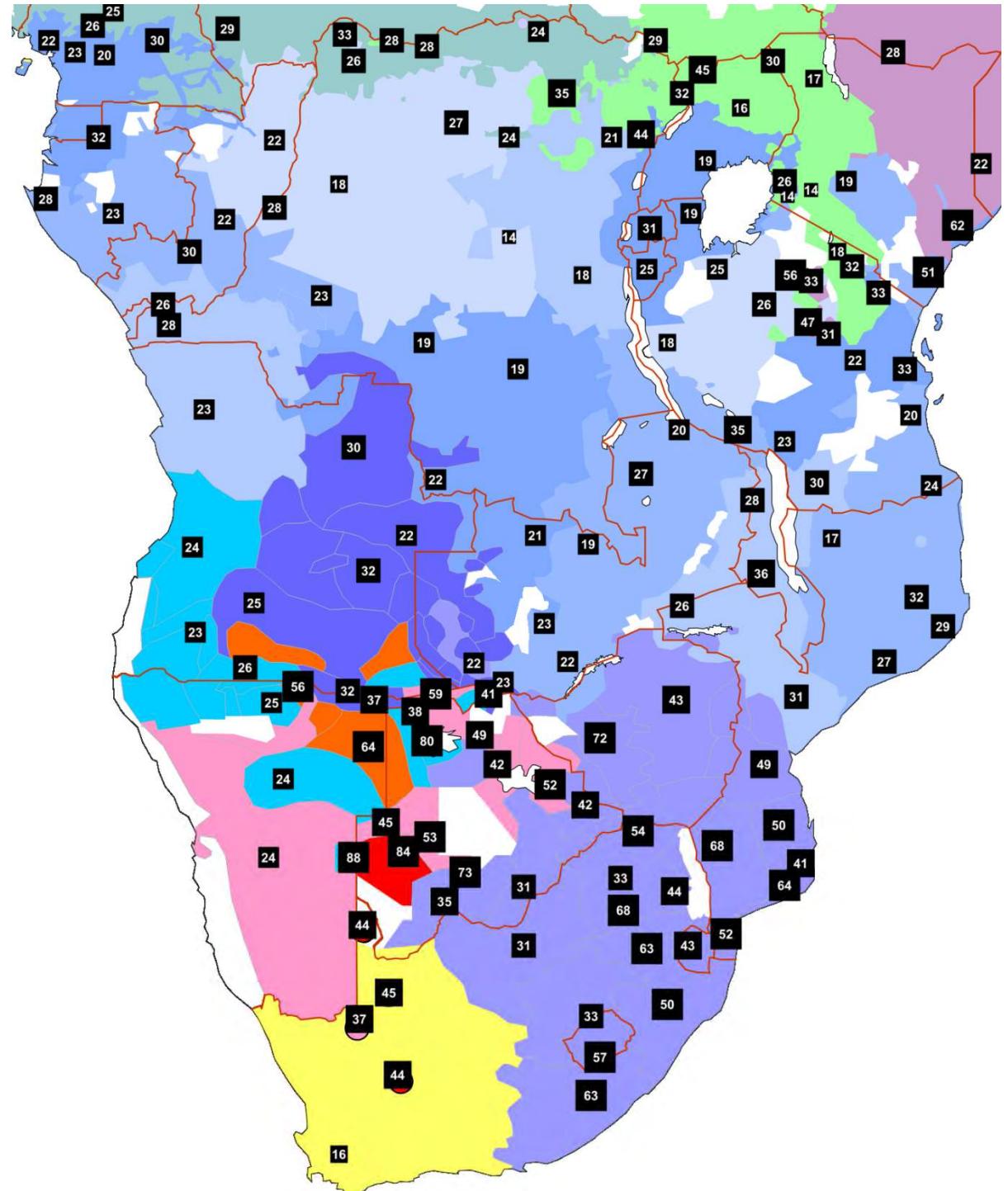
Features by language group

group	> 2 affricated series	plain stops ejected	TL	whistled obstr.	ph:f	> 2 sibilants	> 5 vd_frics	ps,bz,psh	implosives	dental:alv	BH,DH	> 5 vowels	NC onsets	C+w clusters	no C coda	2 tones
Cushitic, other (2)	0	0	0	0	0	0	0	0	0.5	0	0	1	0	0	0	0
Nilotic (6)	0	0	0	0	0	0	0	0	0.33	0.33	0	1	0.33	0.83	0	1
Kuliak (1)	0	0	1	0	0	0	0	0	1	0	0	1	0	1	0	1
Moru-Mangbetu (3)	0	0	0	0	0.33	0	0	0	1	0	0	1	1	0	1	0.33
"Ubangian" (8)	0	0	0	0	0	0	0	0	0.75	0	0	0.875	0.75	0.375	0.75	0.25
N-Bantu Bantoid (1)	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0
Bantu A-R, other (68)	0.03	0.00	0.00	0.00	0.10	0.03	0.00	0.05	0.15	0.07	0.00	0.32	0.94	0.95	0.86	0.81
Germanic (Afrikaans afr)	0	0	0	0	0	0	0	1	0	0	0	1	0	1	0	0
'South' Cushitic (3)	0	0.67	1	0	0	0	0	0	0.67	0.33	0	0	0.33	0	0	0.33
Sandawe, Hadza (2)	0.5	0	1	0	0	0	0	0	0	0	0	0	0.5	0.5	0.5	1
Bantu K30 (3)	0	0	0	0	0.33	0	0	0	0	0.67	0	0	1	1	1	1
Bantu R40 (1)	0	0	0	0	1	0	0	0	0	0	0	0	1	1	1	1
Bantu S10 (3)	0.67	0.33	0	1	0.33	1	0	0.67	0.67	0.33	0.67	0	1	1	1	1
Bantu S20 (2)	1	1	0	1	1	0	1	0	0	1	0	0	1	1	1	1
Bantu S60 (2)	0.5	0.5	1	0	0.5	0	0.5	0.5	1	0	0	0	1	1	1	1
Bantu S50 (3)	1	1	1	1	0.33	1	0.67	0.67	0.67	0	1	0.33	1	1	1	1
Bantu S40 (6)	0.67	1	1	0	0.33	0.167	0	0.167	0.83	0.167	0.67	0.29	1	1	1	1
Bantu S30,K21 (7)	0.71	0.5	0.71	0	0.29	0.14	0	0.29	0	0	0	0.71	0.29	1	1	1
Khoe-Kwadi (8)	0	0	0	0	0	0	0	0	0.125	0	0	0.25	0.5	0.125	0	0.125
Kx'a (3)	0	0	0	0	0	0	0	0	0	1	0	0.33	0.33	0	0	0
Tuu (6)	0.167	0	0.167	0	0	0	0	0	0	0	0.33	0	0	0.167	0	0.8
0: wrong/no; < 0.26 infrequent, 0.26 - 0.74 common, > 0.74 very frequent; 1: true/yes																
average of area	0.76	0.72	0.62	0.50	0.46	0.38	0.36	0.38	0.53	0.25	0.39	0.22	0.88	1.00	1.00	1.00
average of languages outside	0.05	0.04	0.21	0.00	0.12	0.00	0.00	0.07	0.37	0.09	0.09	0.50	0.45	0.55	0.34	0.51
difference	0.71	0.68	0.41	0.50	0.35	0.38	0.36	0.31	0.16	0.16	0.30	-0.27	0.44	0.45	0.66	0.49

Large C inventory: large consonantal inventory (> 33 phonemic consonants)

Number of distinctive consonants
14 – 88

Clicks: cf. above

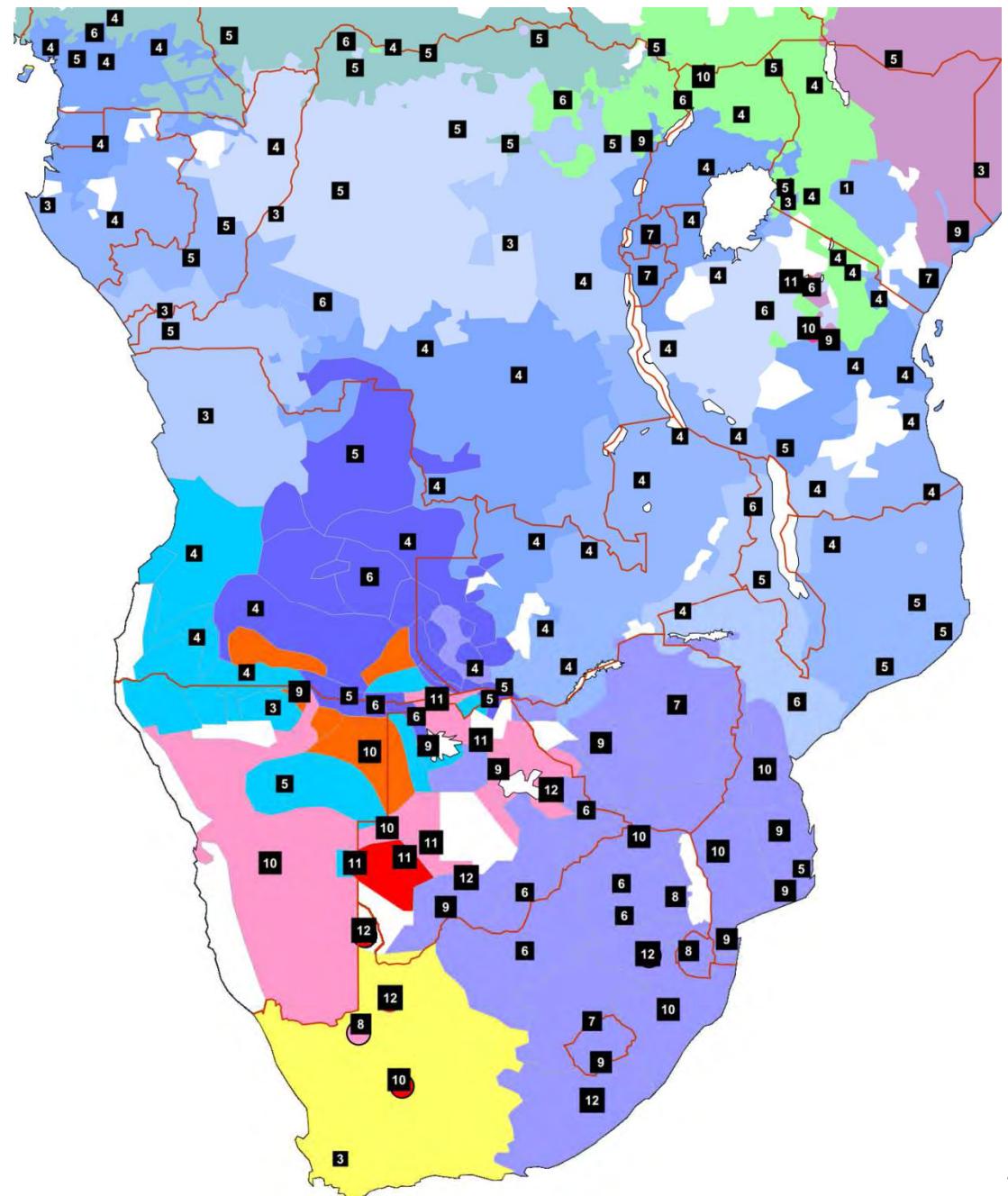


03. Results: Southern Africa

> 5 plain stops: more than 5 places of articulation or configurations for plain series of stops, e.g. /p, t, tʃ, k, q, |/

Number of stops in the plain (usually voiceless or aspirated; sometimes ejected) series

3 - 12



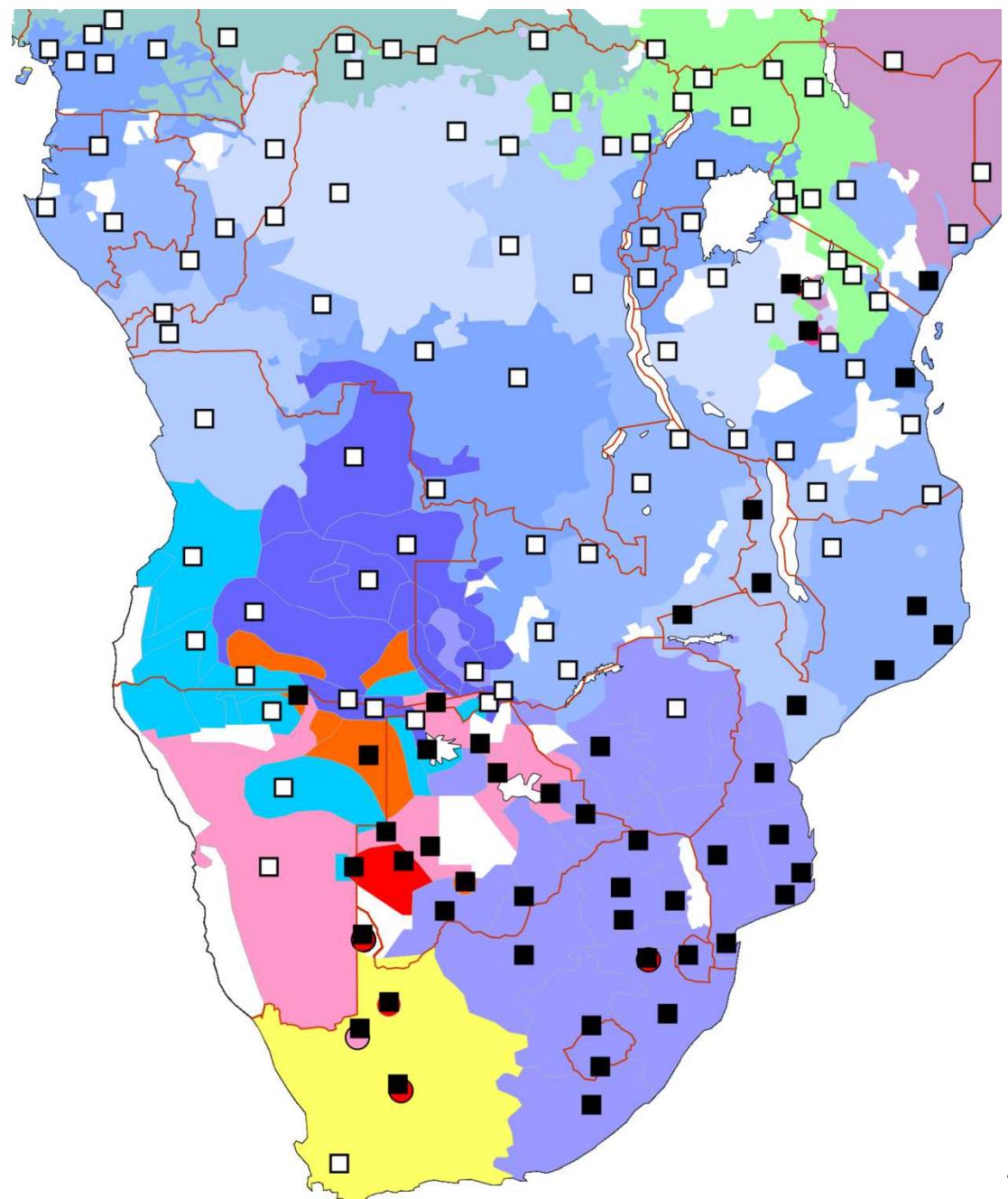
03. Results: Southern Africa

Aspirated stops: presence of aspirated stops contrastive with plain series, e.g. /p^h, t^h/ vs. /p, t/

Presence of clicks

- no
- yes

Ejectives: cf. above

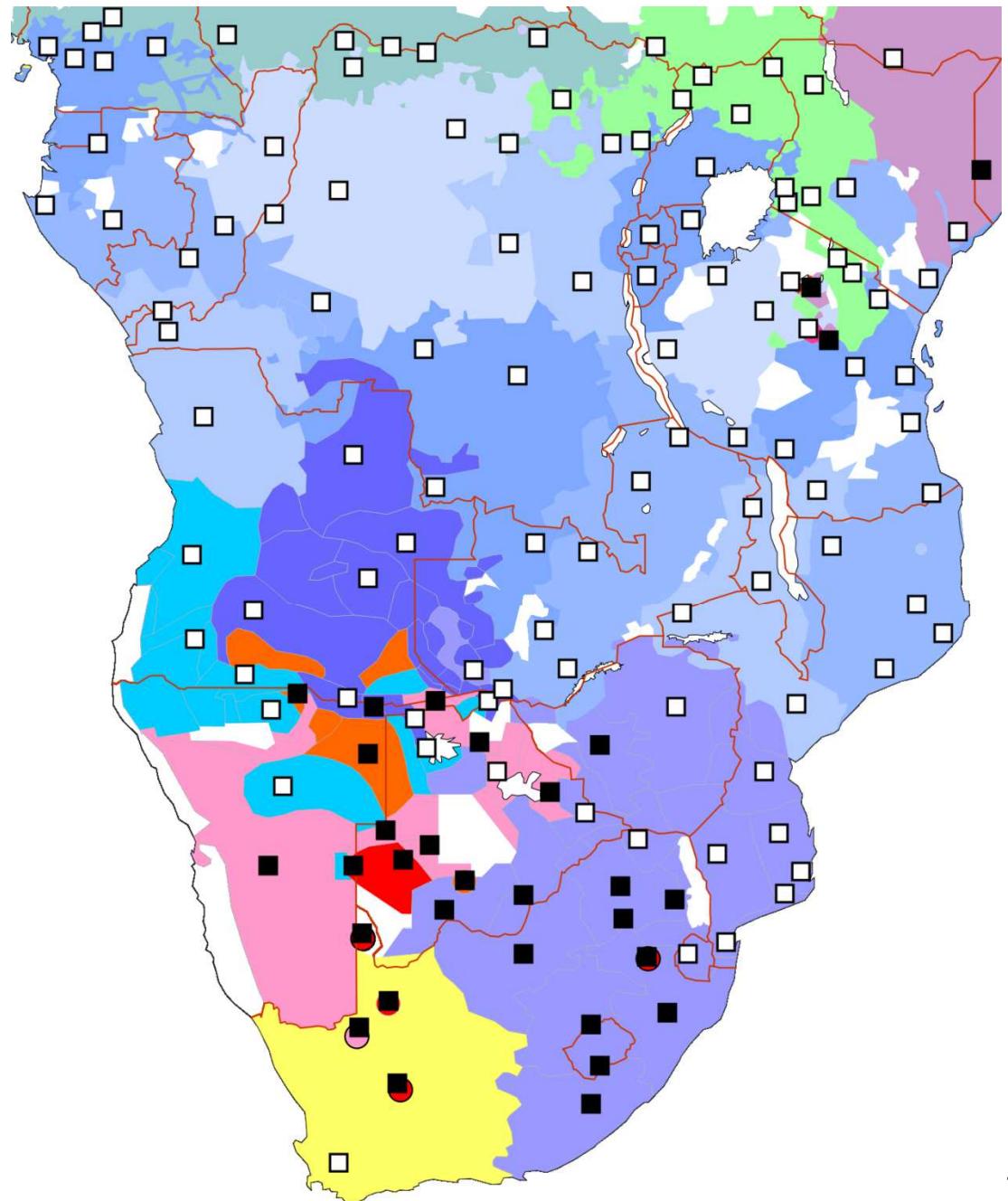


03. Results: Southern Africa

UV or KX: presence of uvular obstruents or dorsal affricates, e.g. *q*, *χ*, *kx*, or *qχ'*

Presence of clicks

- 0
- > 0

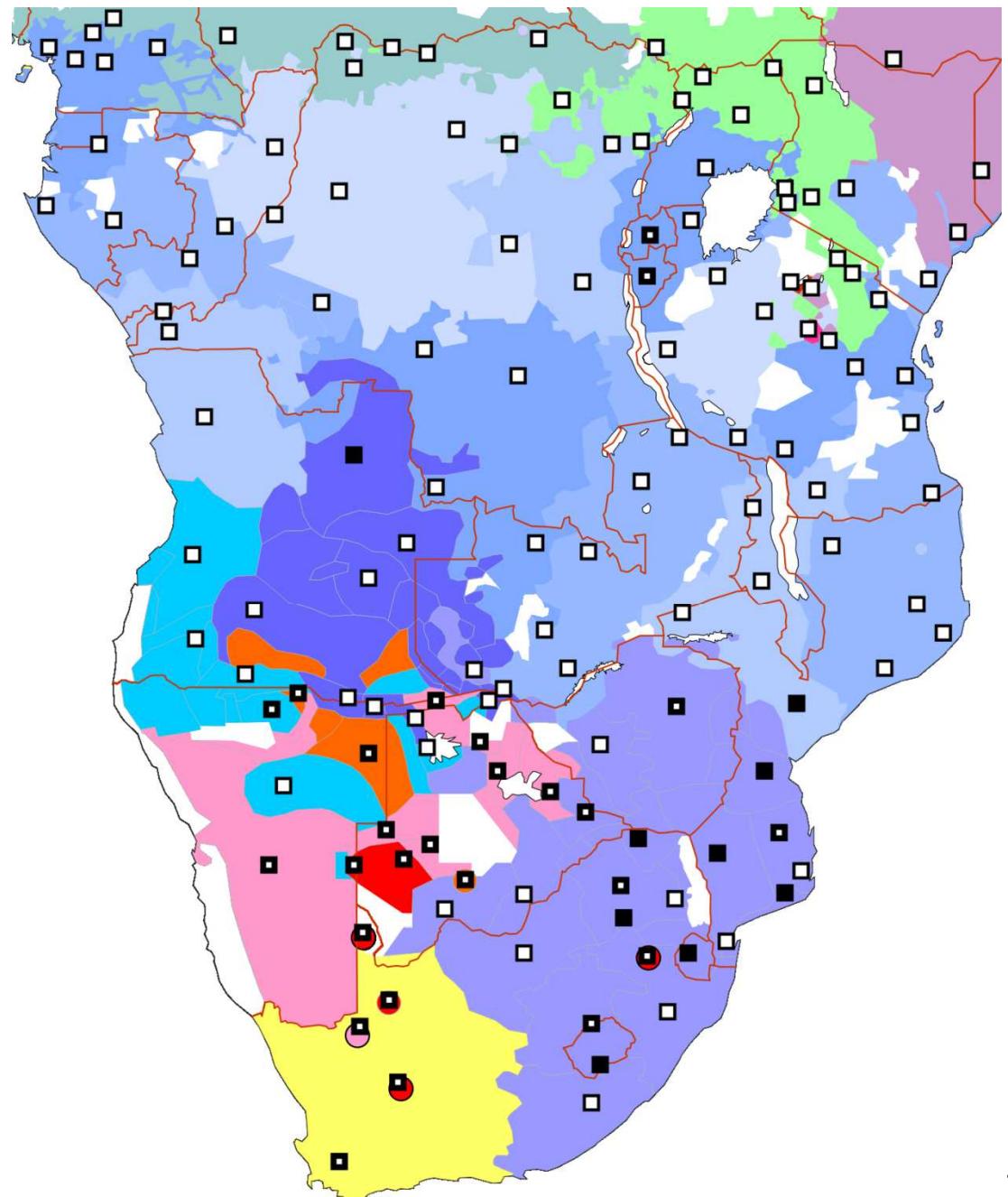


03. Results: Southern Africa

Double obstruent onsets:
presence of double obstruent
onsets disregarding simple
labial-velars (\widehat{kp}), clicks ()
and whistled obstruents ($\widehat{ts^v}$),
e.g. labial-coronal, labial-
dorsal, or coronal-dorsal
double articulations or
clusters such as *ps*, *bg*, *tf* or */χ*

Presence of clicks

- 0
- analyzed as clusters (C1 + C2)
- analyzed as units (CC)



Southern Africa

10 Features

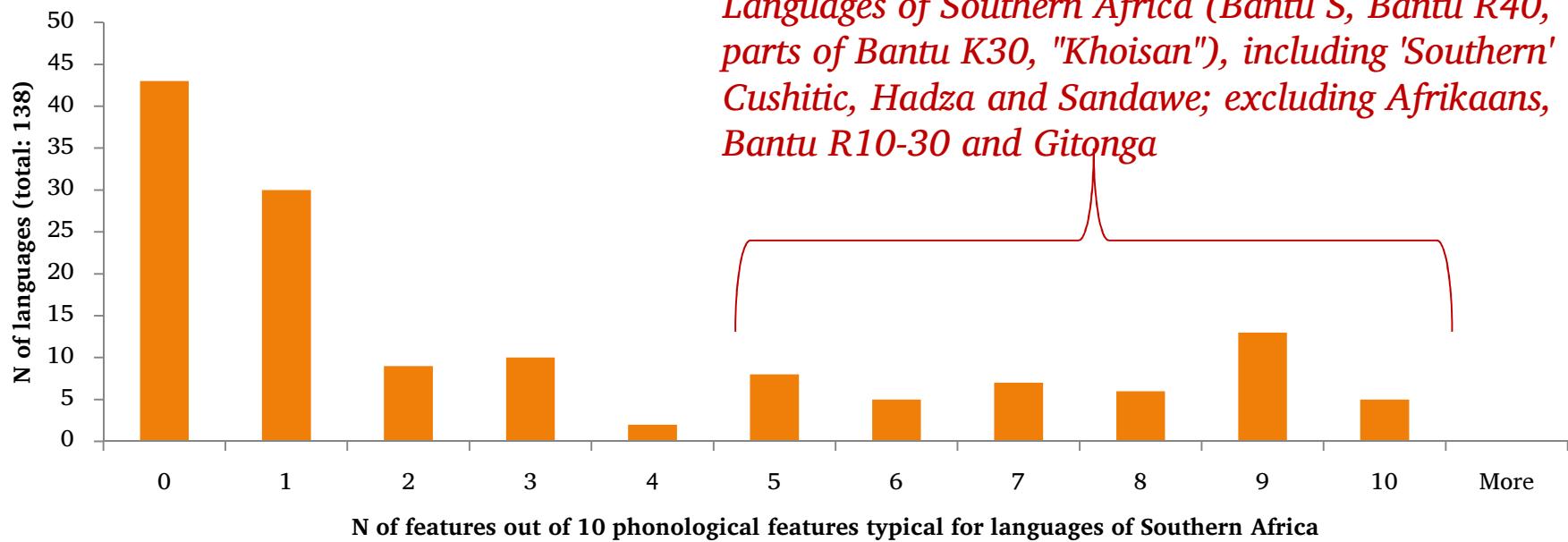
- large C inventory: large consonantal inventory (> 33 phonemic consonants)
- clicks: presence of ingressive stops (clicks), e.g. /, ! or //
- > 5 plain stops: presence of more than 5 places of articulation (or configurations) in the plain series of stops, e.g. /p, t, tʃ, k, q, |/
- aspirated stops: presence of aspirated stops contrastive with plain series, e.g. /p^h, t^h/ vs. /p, t/
- ejectives: presence of ejective obstruents, e.g. /p'/ (vs. /p/) or simply /p/ [p']
- BH,DH: presence of breathy or slack voiced stops, e.g. /bʱ/ or /b̤/
- UV or KX: presence of uvular obstruents or dorsal affricates, e.g. q, χ, kx, or qx'
- double obstruent onsets: presence of double obstruent onsets disregarding simple labial-velars (kp), clicks () and whistled obstruents (ts̪), e.g. labial-coronal, labial-dorsal, or coronal-dorsal double articulations or clusters such as ps, bg, tf or /χ
- dorsal frics: presence of dorsal fricatives, e.g. x, χ, γ
- no C + y: absence of obstruent + /j/ onset clusters

Features by language

- bimodal distribution, although no clearcut boundary
- most languages in the sample share no or few features
- languages of Southern Africa (including 'Southern' Cushitic, Sandawe and Hadza) share more than half of the features (5-10)
- "best languages" are Khoisan > clear relation to Kalahari Basin > "2nd layer"?!

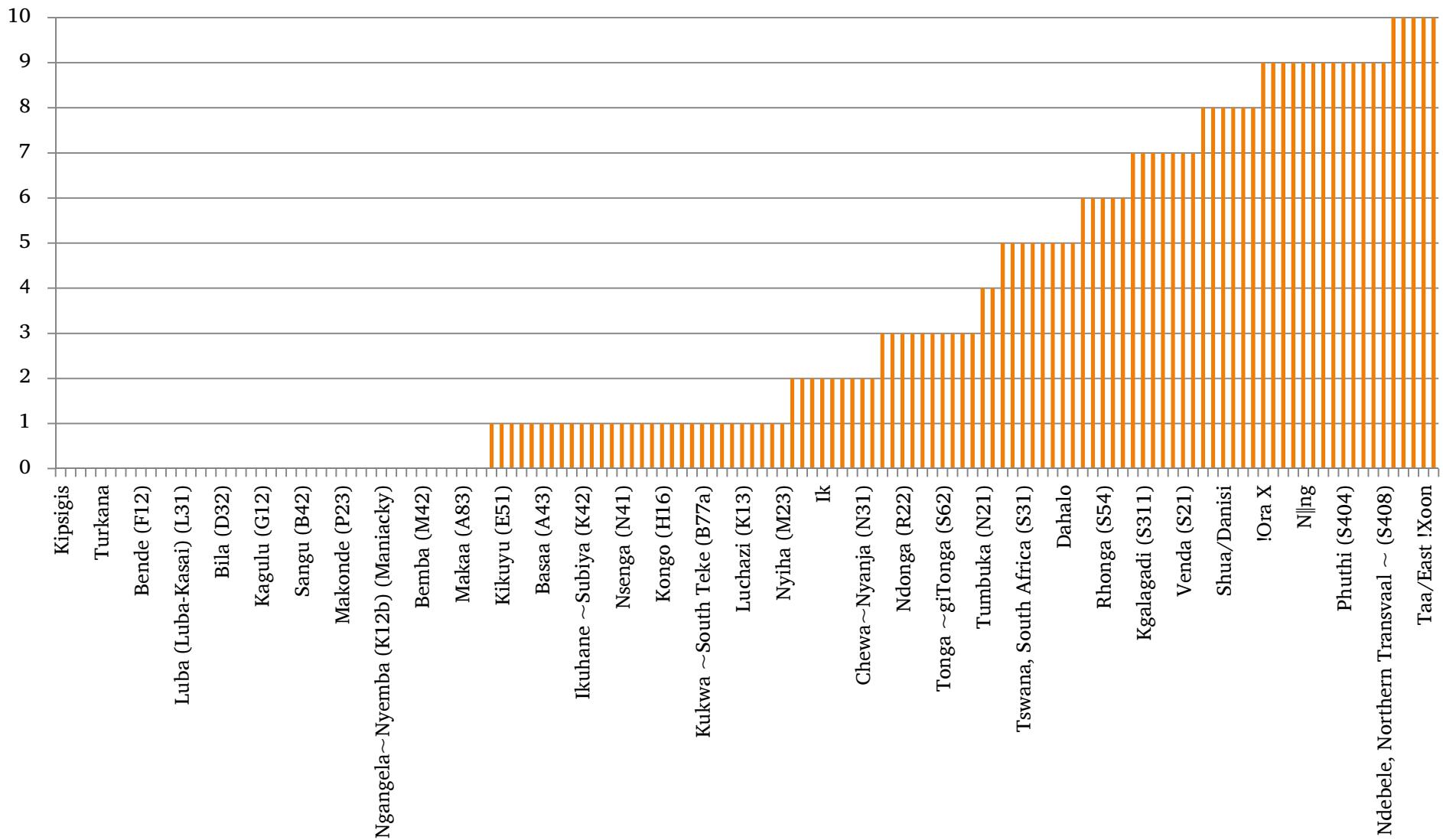
Histogram

Languages of Southern Africa (Bantu S, Bantu R40, parts of Bantu K30, "Khoisan"), including 'Southern' Cushitic, Hadza and Sandawe; excluding Afrikaans, Bantu R10-30 and Gitonga



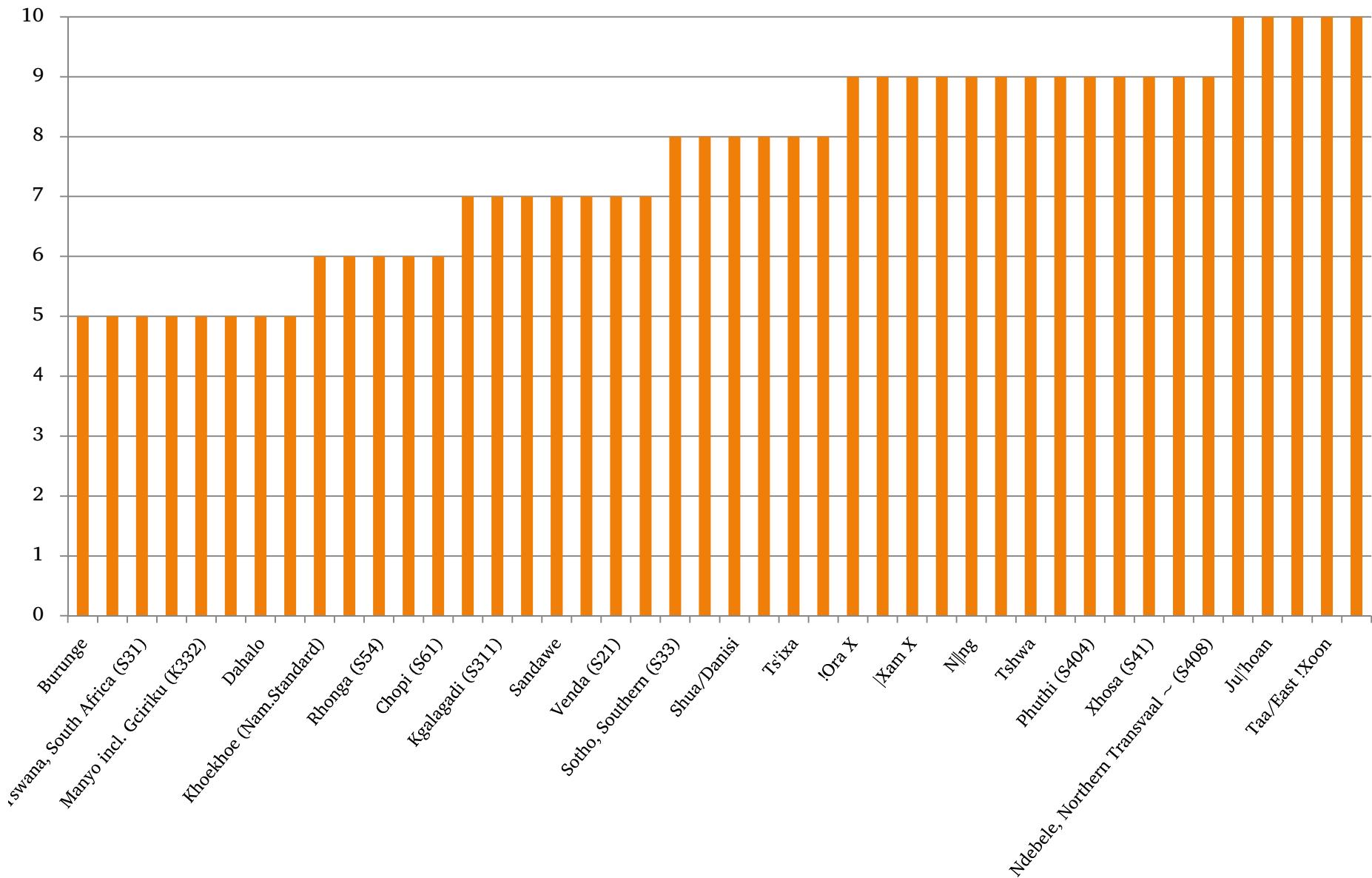
03. Results: Southern Africa

Features by language



03. Results: Southern Africa

Features by language: Languages sharing 5 features and more



03. Results: Southern Africa

Features by language group

	large C inventory	clicks	> 5 plain stops	aspirated stops	ejectives	BH, DH	UV or KX	double obstr. onsets	dorsal frics	no C + y
Cushitic, other (2)	0	0	0	0	0.5		0	0.5	0	1
Nilotic (6)	0	0	0.167	0	0		0	0	0	0.167
Kuliak (1)	0	0	0	0	1		0	0	0	1
Moru-Mangbetu (3)	1	0	1	0	0		0	0	0	1
"Ubangian" (8)	0	0	0.125	0	0		0	0	0.125	0.625
N-Bantu Bantoid (1)	0	0	0	0	0		0	0	1	0
Bantu A-R, other (68)	0.07	0.08	0.13	0.12	0.01		0.00	0.00	0.07	0.18
Germanic (Afrikaans afr)	0	0	0	0	0		0	0	1	1
'South' Cushitic (3)	0.33	0.33	1	0	1		0	0.67	0	0.67
Sandawe, Hadza (2)	1	1	1	1	1		0	0	0	0.5
Bantu K30 (3)	0.67	1	0.67	0	0		0	0.33	0	0.67
Bantu R40 (1)	1	1	1	1	1		0	0	0	0
Bantu S10 (3)	1	0	1	0.67	0.67	0.67	0	1	0.33	1
Bantu S20 (2)	1	0	1	1	1		0	0	1	1
Bantu S60 (2)	1	0.5	0.5	1	0.5		0	0	0.5	0.5
Bantu S50 (3)	1	1	1	1	1	1	0	0.67	0.33	0
Bantu S40 (6)	0.29	0.29	0.86	0.86	0.5		0	0.86	0.29	0.86
Bantu S30,K21 (7)	1	0.83	1	1	1	0.67	0.83	0.5	0.67	1
Khoe-Kwadi (8)	0.875	1	1	0.875	0.875	0	0.875	1	1	0.875
Kx'a (3)	1	1	1	1	1	1	1	1	1	1
Tuu (6)	1	1	1	1	1	0.33	1	1	1	1
<i>0: wrong/no; <0.26 infrequent, 0.26 - 0.74 common, > 0.74 very frequent; 1: true/yes</i>										
average of area	0.86	0.69	0.93	0.80	0.81	0.28	0.43	0.54	0.66	0.67
average of languages outside	0.13	0.01	0.18	0.01	0.19	0.00	0.06	0.13	0.41	0.60
difference	0.72	0.68	0.75	0.79	0.62	0.28	0.37	0.40	0.24	0.07

3 phonological areas

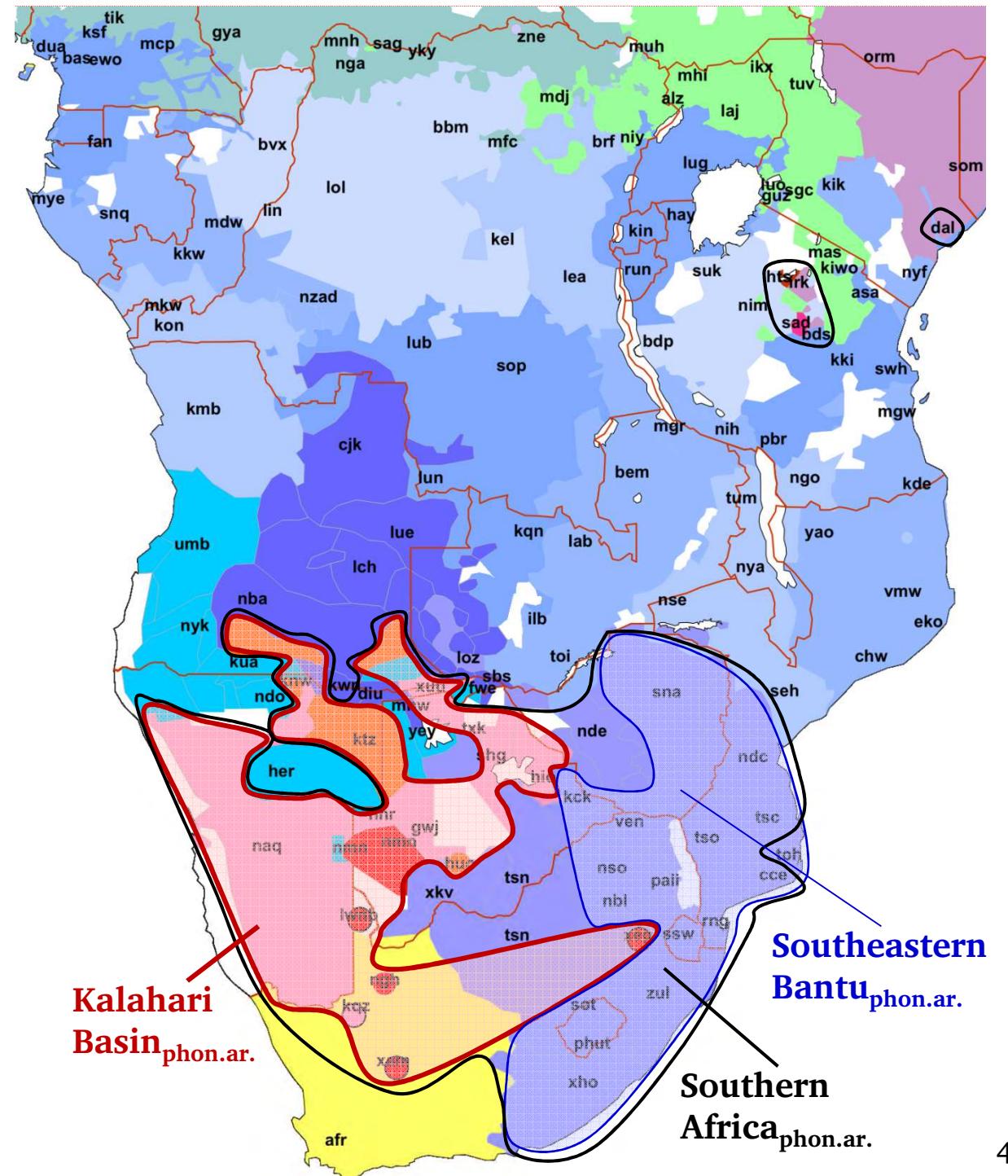
- Kalahari Basin: best
- Southern Africa, with Kalahari Basin languages 'performing' best > related to Kalahari Basin area
- Southeastern Bantu: weakest are, strong genealogical component (shared innovations) cannot be excluded

> my interpretations:

- Southern Bantu languages DO constitute one phonological area with "Khoisan" (Kalahari Basin) languages
- the Kalahari Basin approximates an ideal situation of a linguistic area (genetic studies: long periods of isolation in the past; cf. Australia?)
- "Southern Africa" as a phonological area is a second layer to the Kalahari Basin'
- some languages do not participate: Afrikaans, Herero, Wambo languages

qualifications

- languages are spoken by mobile individuals > variation!, multilingualism, definition of linguistic areas depends on particular settings (often fuzzy), ...



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