Humboldt-Universität zu Berlin

22. Afrikanistentag 17. – 18. Juni 2016

Southern Africa as a phonological area

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Map 3.1 Six phonological zones in Africa

Quelle: Clements & Rialland (2008: 37)

Contents

1. Introduction

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	ingr dent	ingr alv	ingr pal	ingr al-lat
stop, vls.	(p)	t	ts		k	kx kg	ʔ ’	| c	! q	ǂ tc	‖ x
stop, aspir.	(pʰ)	tʰ th	tsʰ tsh		kʰ kh			|ʰ ch	!ʰ qh	ǂʰ tch	‖ʰ xh
stop, vd.	b ~w	d ~r	dz		g gh			ǀ dc	ǃ dq	ǂ dtc	‖ dx
stop, ejective		t’	ts’			kx’ kg’		|’ c’	!’ q’	ǂ’ tc’	‖’ x’
nasal, voiced	m	n						˜ǀ nc	˜! nq	˜ǂ ntc	˜‖ nx
fricative, vls.	(f)		s		x g		h				
lateral approx.			(l)								
trill, voiced		[r] r									
approximant	[w]			j y							

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

1. Introduction

Phonological similarities

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

Consonants

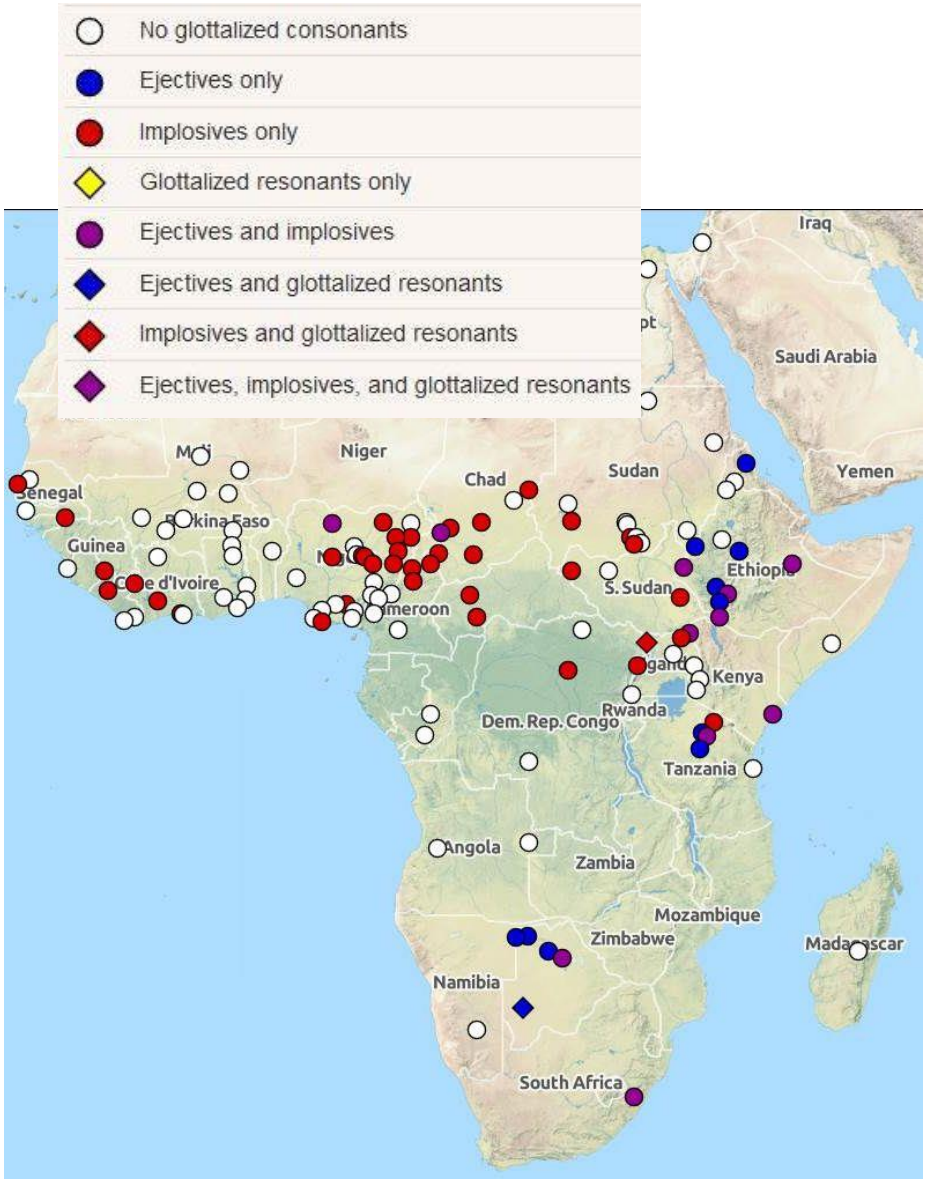
	bilab	lab-dent	alv	alv affr	alv later	p-alv (affr)	vel	glott	ingr dent	other (+secondary)
stop, vls.	p	pf pf	t	ts	tl tl	tʃ c	k		(! ~| q)	ts^{v}*tsw pʂ** ps~py
stop, aspir.	p^{h} ph	pf^{h} pfh	t^{h} th	ts^{h} tsh	tl^{h} tlh	tʃ^{h} ch	k^{h} kh		(!^{h} ~|^{h} qh)	ts^{vh}* tshw
stop, vd.	b	bv bv	d	dz	dl dl	dʒ j	g		(ǃ̬ ~|̬ gq)	dz^{v}* dzw bʐ̬**bz~by
stop, breathy*	b^{ɦ} bh	bv^{h} bvh	d^{h} dh	dz^{h}dzh	dɮ dhl	dʒ^{h} jh	g^{h} gh			dz^{vh}* dzhw
stop, vd. impl.	ɓ** b’		ɗ** d’							
nasal, voiced	m	[ɱ]	n			ɲ ny	ŋ n'		(ǃ̃** n’q)	
nasal, other*	m̤ mh		n̤ nh				ŋ̤ n'h			
fricative, vls.	ɸ* ff	f	s		ɬ~ʎ̥? hl	ʃ x	x* hh			(s^{v} sv)
fricative, vd.	β~ʊ vv vh		z		ɮ~ʎ? lh	ʒ xj		ɦ h		(z^{v}** zv)
fricative, other*		v̤ vh								
lateral approx.					l					
trill, voiced			r							
intermittent, other*			r^{h} rh							
approximant	w					j y				
approx., other*	w̤ wh					j̤ yh				

*Uncertain.

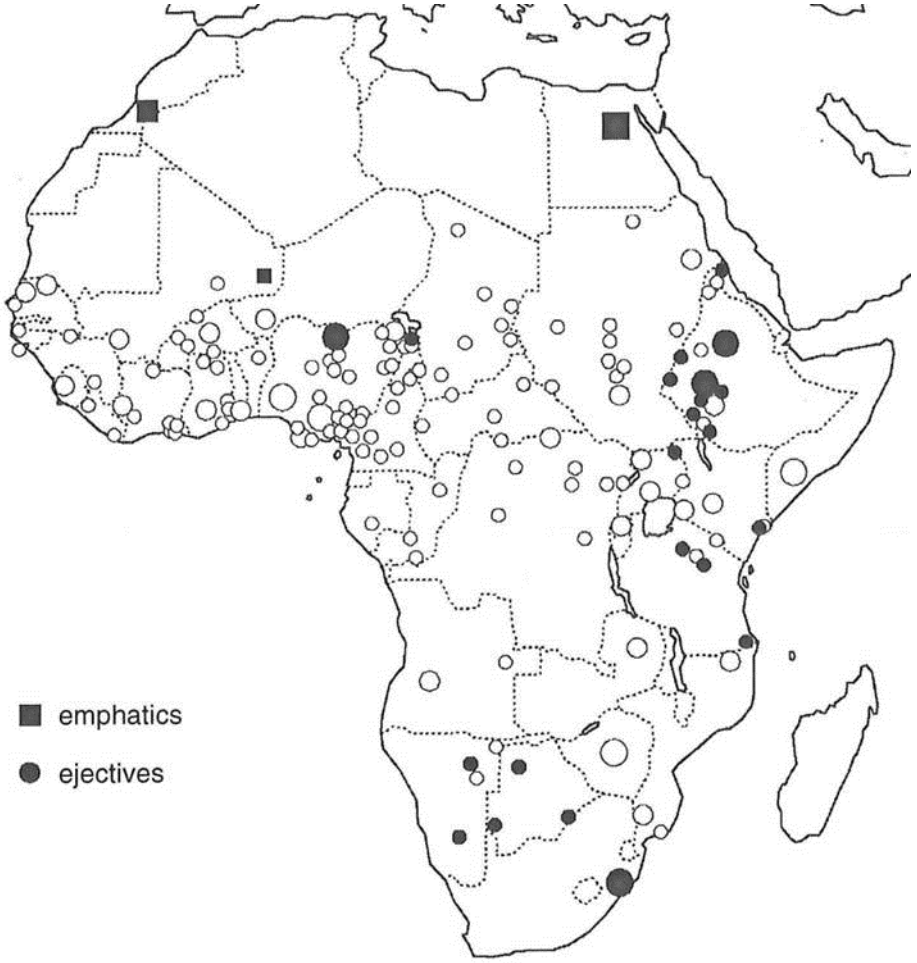
- *large consonantal inventory (68 c.)*
- *(clicks)*
- *aspirated, breathy and implosive stops*
- *lateral obstruents*

1. Introduction

Example: Distribution of ejectives/glottalized consonants



Maddieson (2013)



Clements & Rialland (2008: 62)

1. Introduction

Africa/South: Phonological characteristics

(Clements & Rialland 2008: 81)

- ejective stops	*very common*
- aspirated stops	*very common*
- clicks	*common*
- two series of high vowels	*infrequent*
- nasal vowels	*Khoisan: very common*
- 3+ tone levels	*Khoisan: infrequent*
- slack voiced stops	*Bantu: common*
- implosives	*Bantu: infrequent*

Linguistic features of the Kalahari Basin:

Phonetics-phonology (Güldemann & Fehn, in prep.)

	Tuu	*Kx'a*	*Khoe-Kw.*	*Nguni*	*Tswana*
- ejectives	X	X	X	X	(X)
- aspirates	X	X	X	X	X
- clicks	X	X	X	X	(X)
- nasalization	X	X	X	--	--
- register tone system	X	X	X	--	--
- uvular stops	X/--	X/--	X/--	--	--
- obstruent-obstruent clusters	X	X	X	--	--
- pharyngealization	X	X	X/--	--	--
- specific lexical root phonotactics	X	X	X	--	--

(X = frequent, -- = absent; list includes non-phonological features not given here)

1. Introduction

Problems

Å data basis of previous studies (coverage of languages and features)

Å 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, 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.)

(Note: Clements & Rialland (2008) refer to *phonological* areas, Güldemann & Fehn (in prep.) are concerned more generally with *linguistic* areas.)

1. Introduction

This study

- 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?

1. Introduction

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 2006:2)
  - "*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)

Cf. also Heine & Leyew (2008: 16)

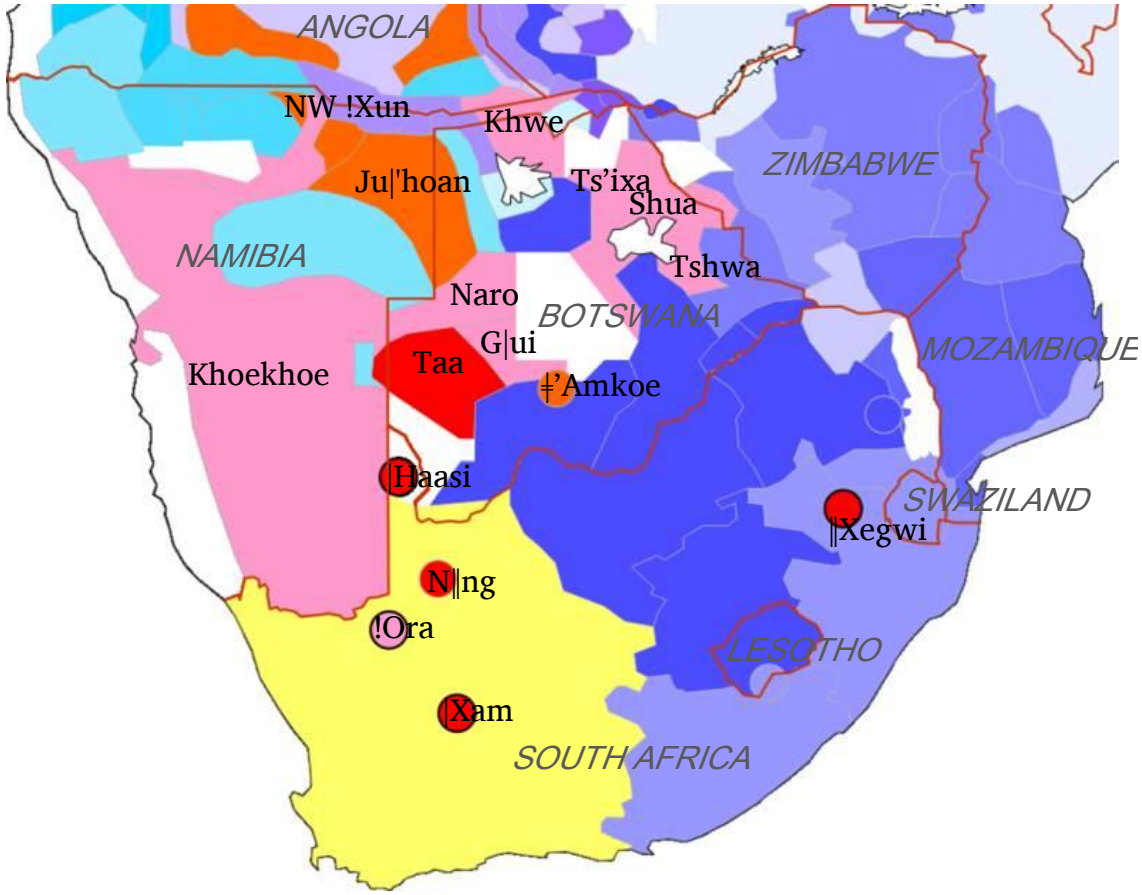
1. Introduction

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

Khoe-Kwadi (≈"Central Khoisan")
- Kwadi†
- Khwe (Caprivi Khwe, ǁAni ...; Ts'ixa ?)
- Shua (Cara, Deti†, |Xaise, Danisi ...)
- Tshwa (Kua, ...)
- Naro
- Gǁana (G|ui, Gǁana)
- Namibian Standard Khoekhoe (Nama-Damara, Haiǁom, ǂAakhoe)
- !Ora-Xiri (†)
- Eini†
- Cape Khoekhoe†

Kx'a (≈"Northern Khoisan")
- Ju (NW !Xun, Ju|'hoan, ...)
- ǂ'Amkoe (N!aqriaxe, ǂHoan, Sasi)

Tuu ("Southern Khoisan")
- Taa (West !Xoon, East !Xoon, ...)
- Lower Nossob† (|Haasi, |'Auni)
- Nǁng (= N|uu, ǂKhomani, ...)
- |Xam† (Strandberg, Achterveld, ...)
- ǂUngkue †
- ǁXegwi†



Güldemann (2014: 7), modified

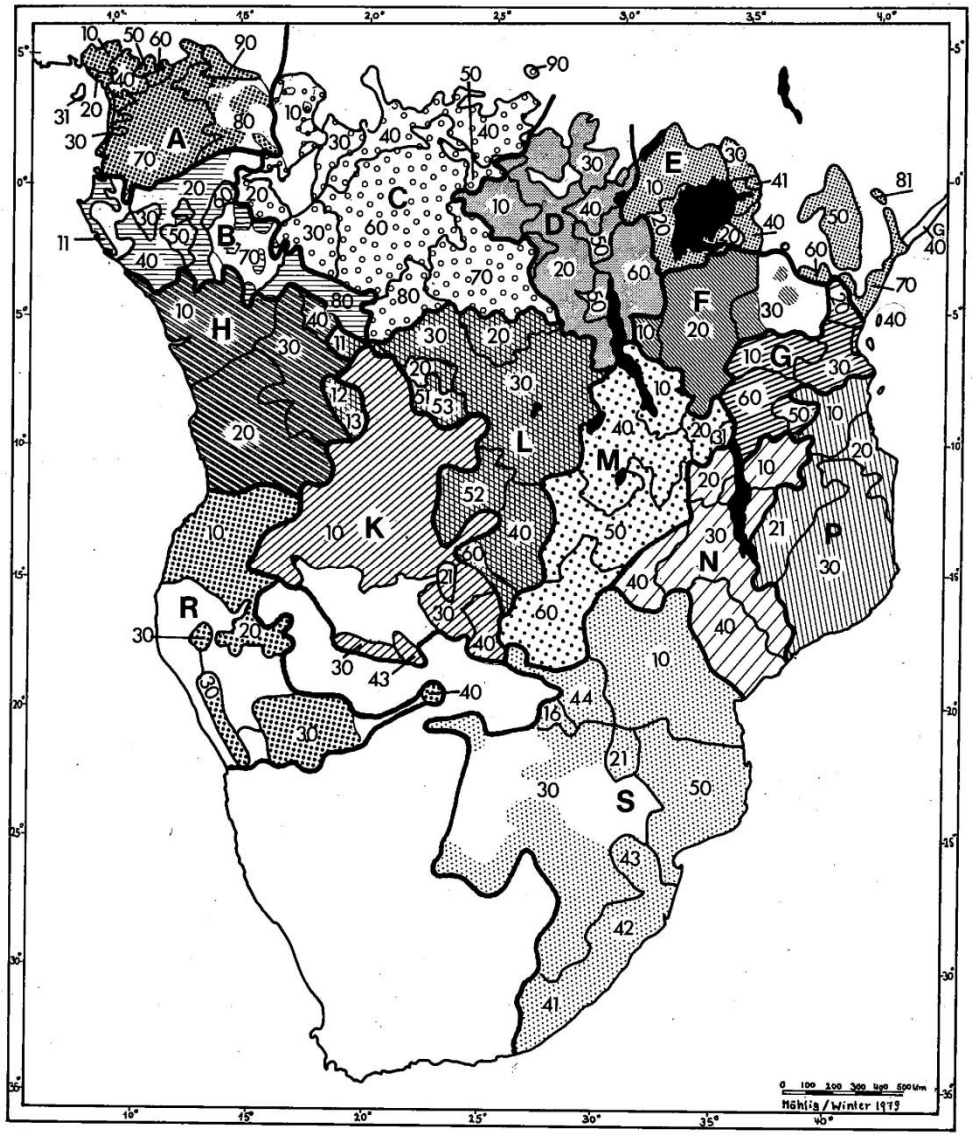
1. Introduction

No accepted genealogical classfication 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



Möhlig (1981: 81)

1. Introduction

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, ...

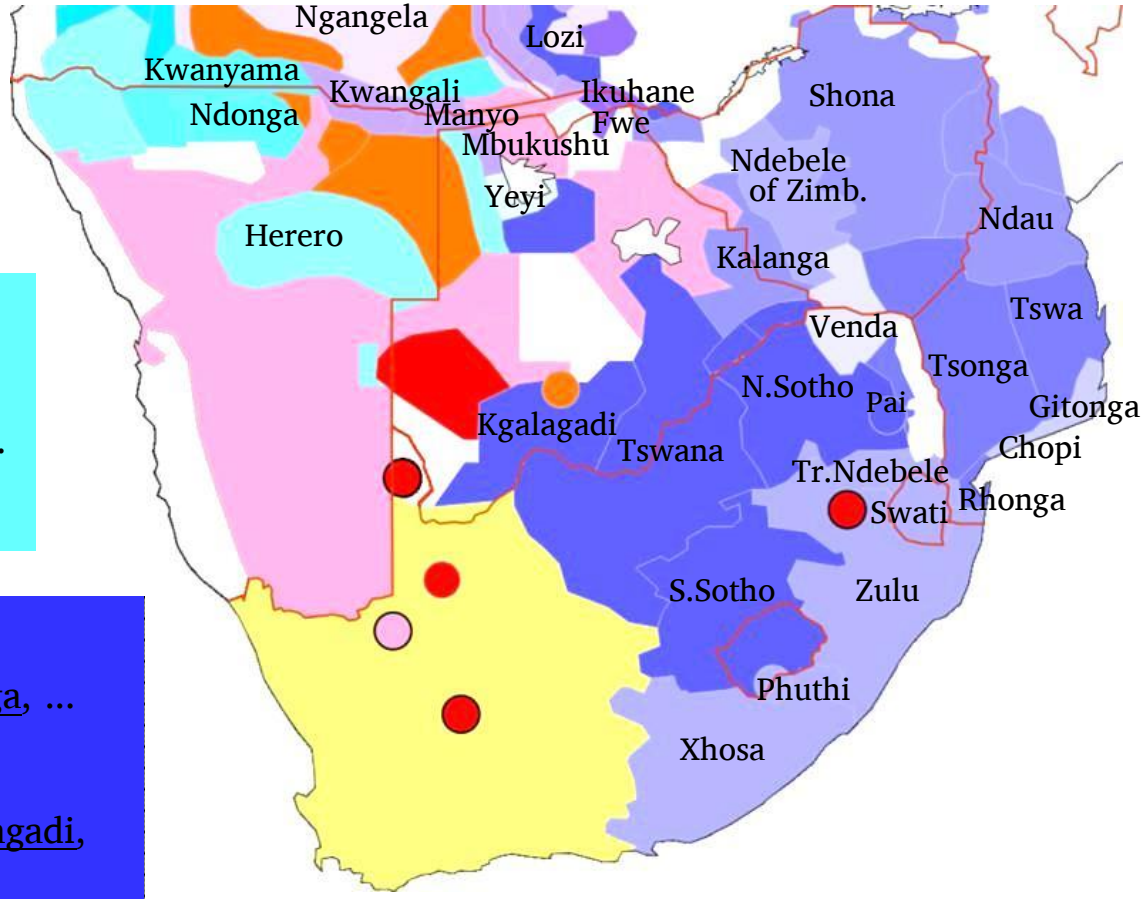
S20 Venda

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



Nurse & Philippson (2003: 169f.), Maho (2009).

1. Introduction

Other languages

Indo-European

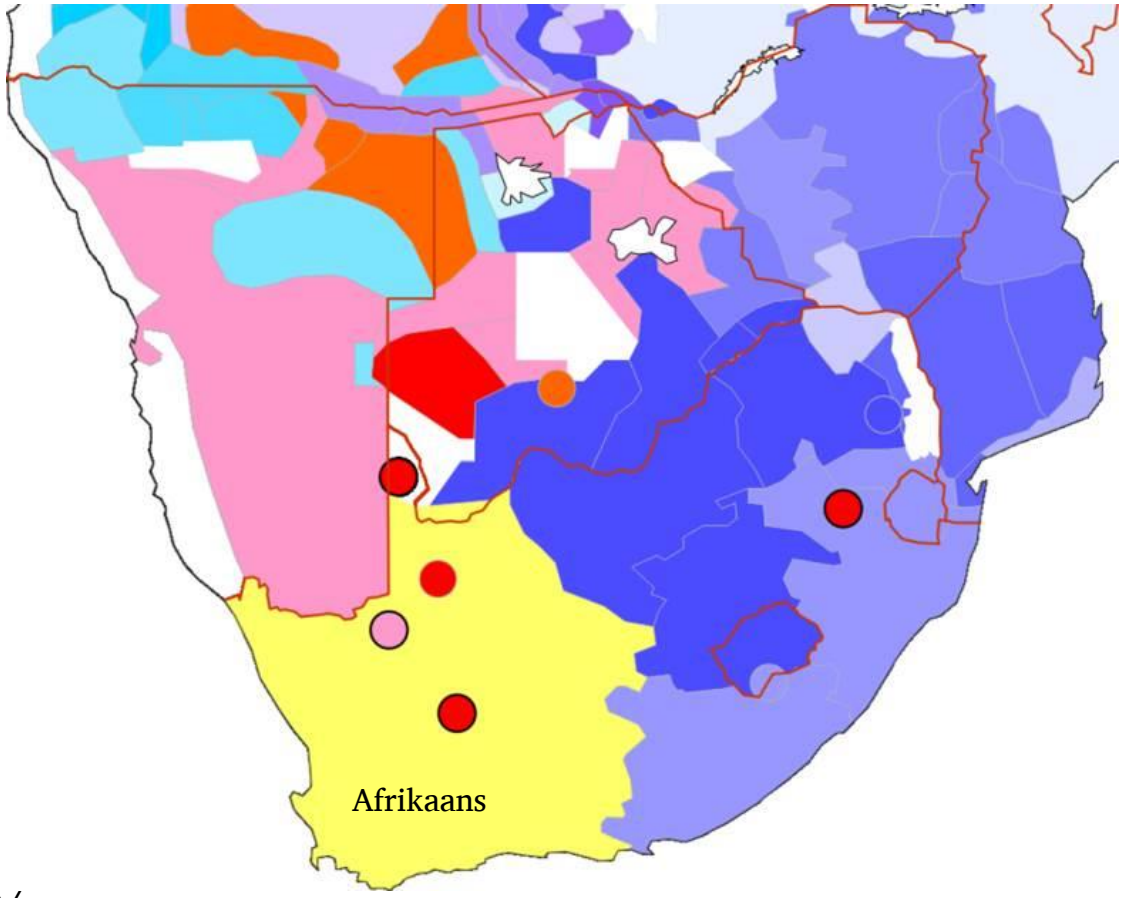
Germanic: Afrikaans

Ignored:

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

Notes:

- Å maps intended as abstraction of majority languages (plus selected minorities and extinct languages)
- Å Afrikaans also in Namibia (Khoekhoe/ Afrikaans bilingualism)



2. Procedure

Data collection - Phoneme inventories

- extraction of phoneme inventories and syllable types from published sources on 138 languages
- special arrangement of consonant charts: affricates and clicks parallel to place of articulation, following the "cluster analysis" of clicks (Nakagawa 2006); e.g. for Taa/West !Xoon below

	bilab	lab-dent	dent	alv	alv affr	alv later	retro	p-alv (affr)	pal	vel	lab-vel	uvul	vel/uv affr	phar	glott	ingr bilab	ingr dent	ingr alv	ingr pal	ingr al-lat	other (+secondary)
	p	f	t̪	t	t͡s	t͡ɬ	ʈ	t͡ʃ	c	k	k͡p	q	q͡χ	ħ	ʔ	ʘ	ǀ	ǃ	ǂ	ǁ	k^j, k^w, $t^ɾ$
stop, vls.	p			t	ts					k		q			ʔ	ʘ	ǀ	ǃ	ǂ	ǁ	
stop, aspir.	p^h			t^h	ts^h					k^h		q^h				$ʘ^h$	$ǀ^h$	$ǃ^h$	$ǂ^h$	$ǁ^h$	
stop, vd.	b			d	dz					g		ɢ				ʘ̬	ǀ̬	ǃ̬	ǂ̬	ǁ̬	
stop, breathy	b^h			d^h	dz^h					g^h		$ɢ^h$				$ʘ̬^h$	$ǀ̬^h$	$ǃ̬^h$	$ǂ̬^h$	$ǁ̬^h$	
stop, ejective	p’			t’	ts’					k’		q’	qχ’			ʘ’	ǀ’	ǃ’	ǂ’	ǁ’	
stop, vd. impl.																					
stop, other					dz’					g’		ɢ’	ɢʁ’				ǀ̬’	ǃ̬’	ǂ̬’	ǁ̬’	
nasal, voiced	m			n					ɲ	ŋ						ʘ	ǀ	ǃ	ǂ	ǁ	
nasal, voiceless																	ǀ̥	ǃ̥	ǂ̥	ǁ̥	
nasal, other	’m			’n												’ʘ	ˀǀ	ˀǃ	ˀǂ	ˀǁ	
fricative, vls.		f		s								χ			h						
fricative, vd.																					
fricative, other																					
lateral approx.				(l)																	
lat. approx., vls																					
lateral, other																					
tap or flap				ɾ																	
trill, voiced																					
intermittent, other																					
approximant	w ʔ								j												

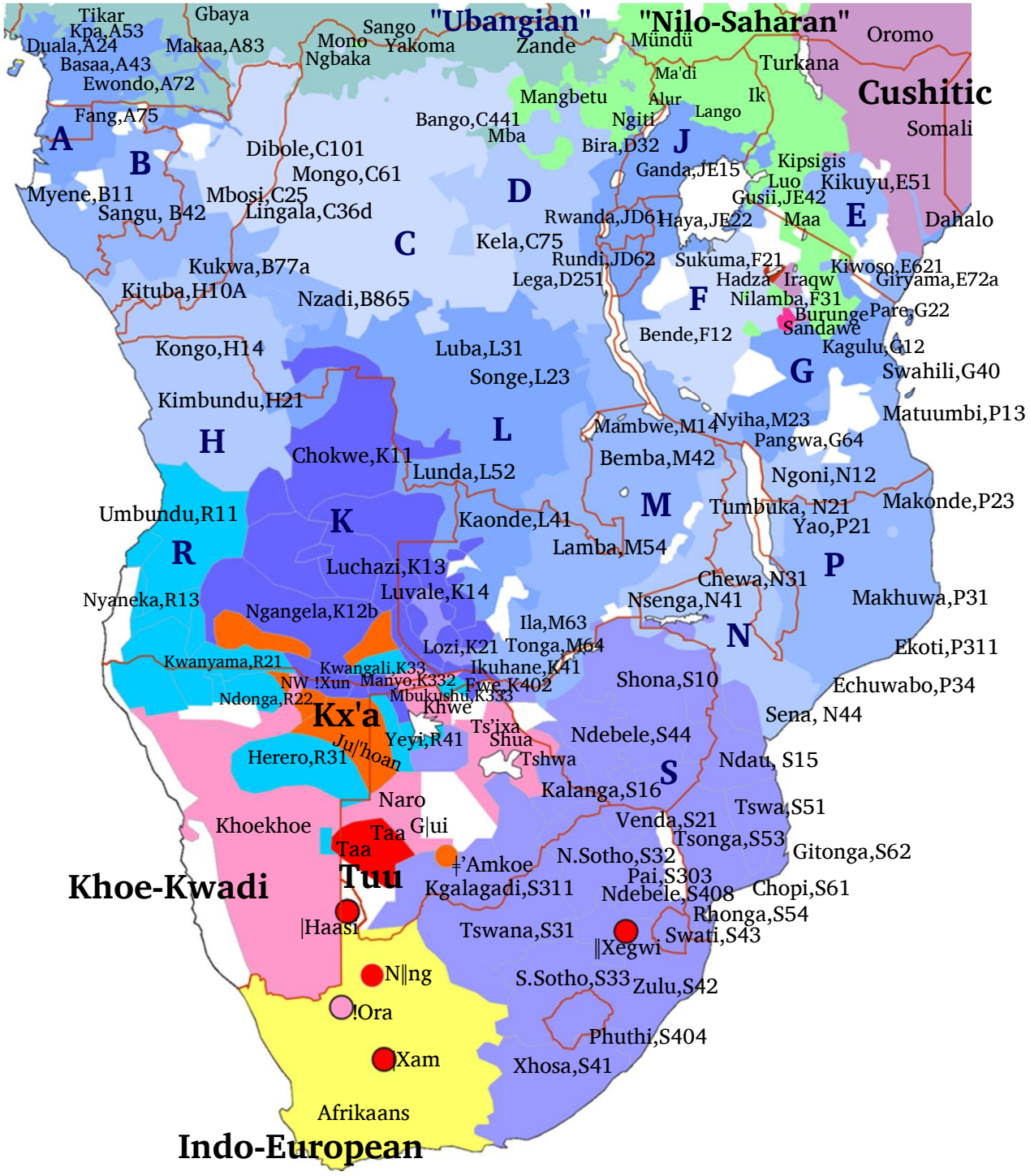
2. Procedure

- language sample: 138 languages
  - Å aimed at maximal number of documented languages of Southern Africa (cf. above)
  - Å Sandawe & Hadza (Greenberg's "Khoisan": clicks)
  - Å 'Southern' Cushitic: Dahalo (clicks), Burunge, Iraqw
  - Å 3 – 6 languages of different groupings in the remaining Bantu zones (A – P)
  - Å 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 81 numerical or categorical phonological features, e.g. "number of consonants" (14 – 88) or "whistled obstruents" (0 absent, 1 present)
- mapped value plots for each feature (Hans-Jörg Bibiko, in "R")
- visual inspection: assessment of 1) areally distributed features and 2) recurring areas (of similar distributions) > Kalahari Basin, Southeastern Bantu, and Southern Africa
- for each language, counting how many features are shared with these areas, e.g. "How many of the 15 typical Kalahari features are found in language A, B, C ...?" > listing and histograms
- summary for language groups

Genealogical groupings following Güldemann & Hammarström (p.c./in prep.)

Language sample



3. Results: Kalahari Basin

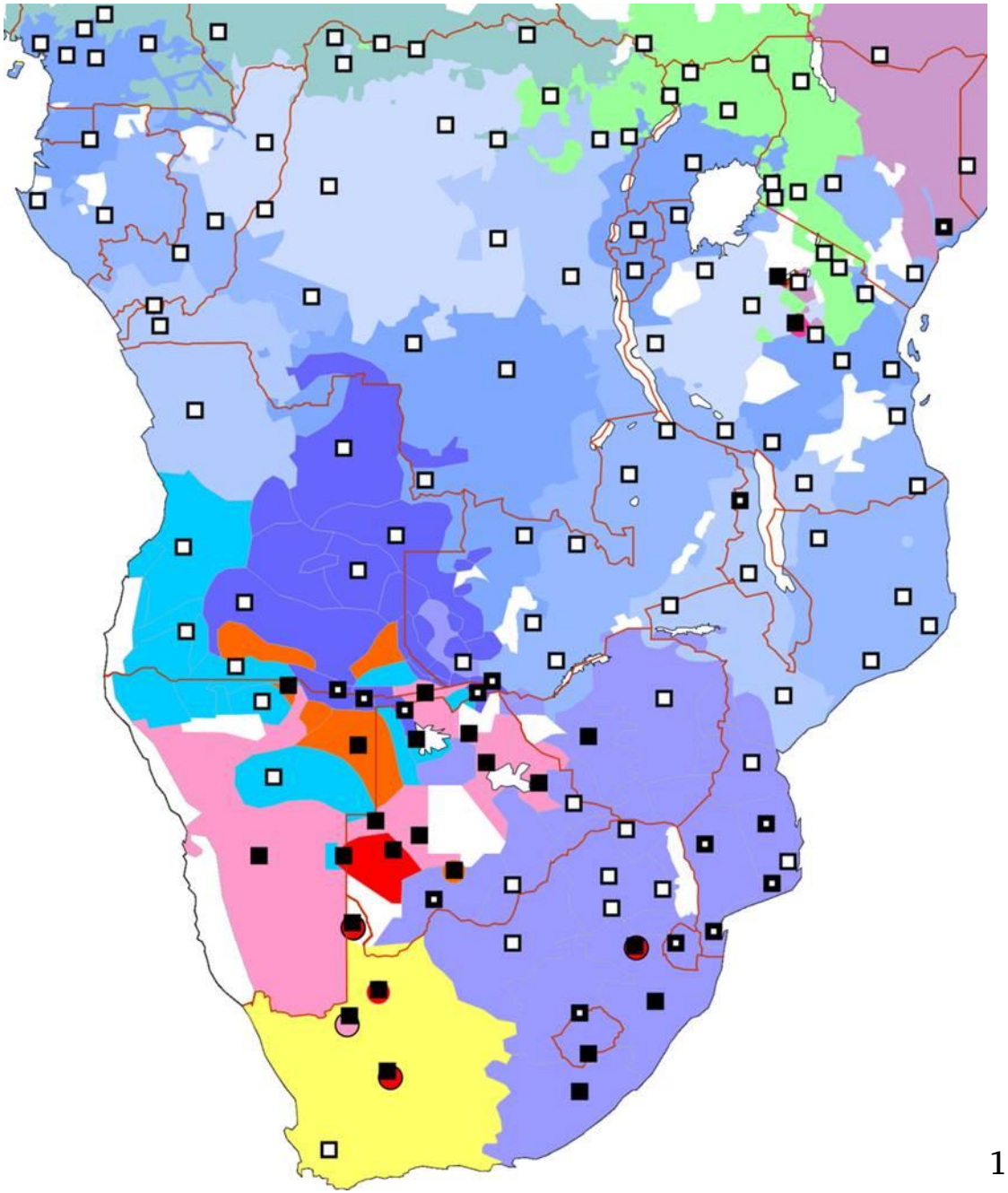
Kalahari Basin

> 5 clicks

significant click inventories

Presence of clicks

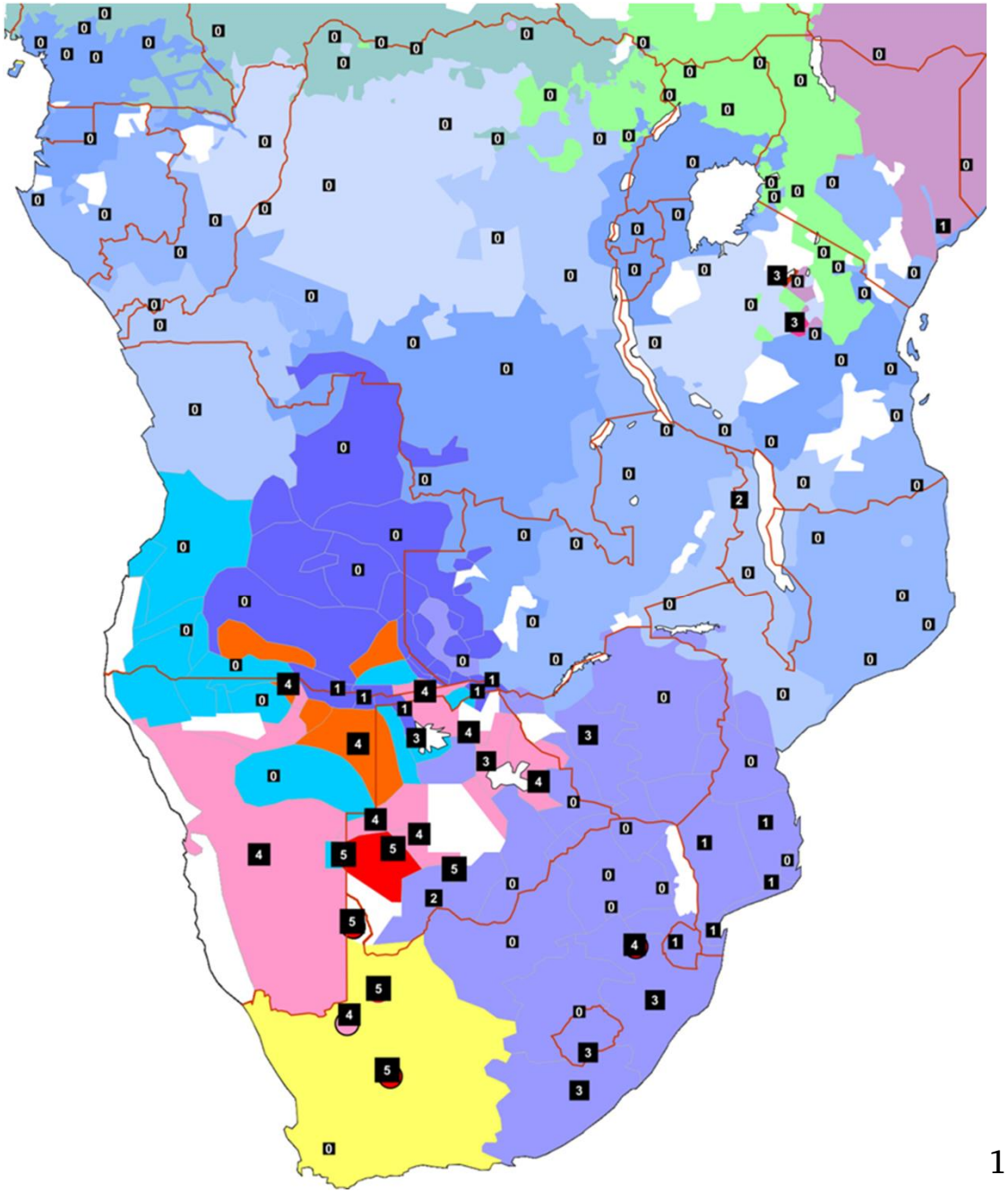
- ☐ 0
- ◘ 1-5
- ■ > 5



3. Results: Kalahari Basin

>3 click types
more than three basic click types,
e.g. ʘ, ǀ, ǃ, ǂ, ǁ

Number of basic click types:
0 - 5



3. Results: Kalahari Basin

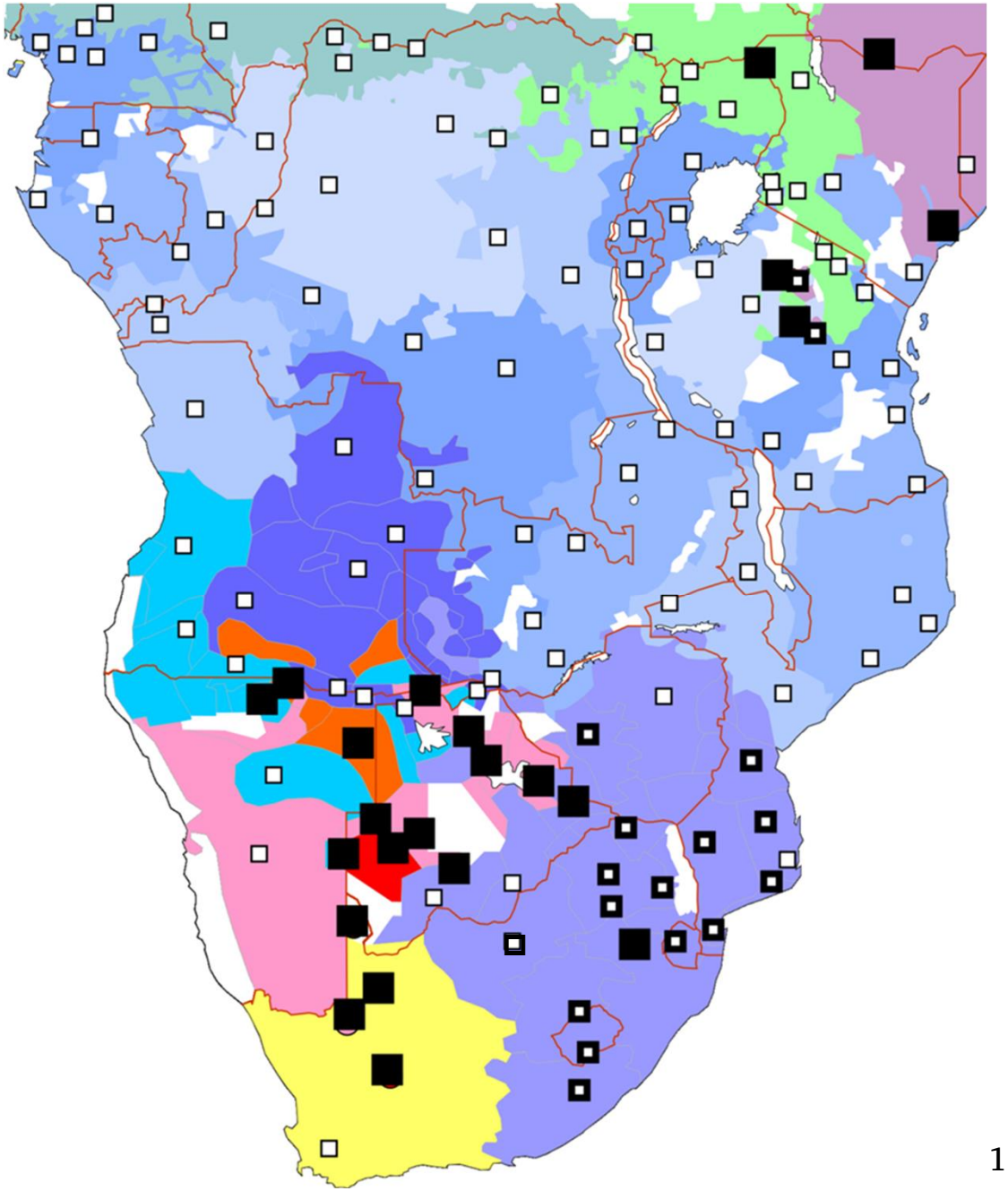
/ejectives/

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



3. Results: Kalahari Basin

Vn

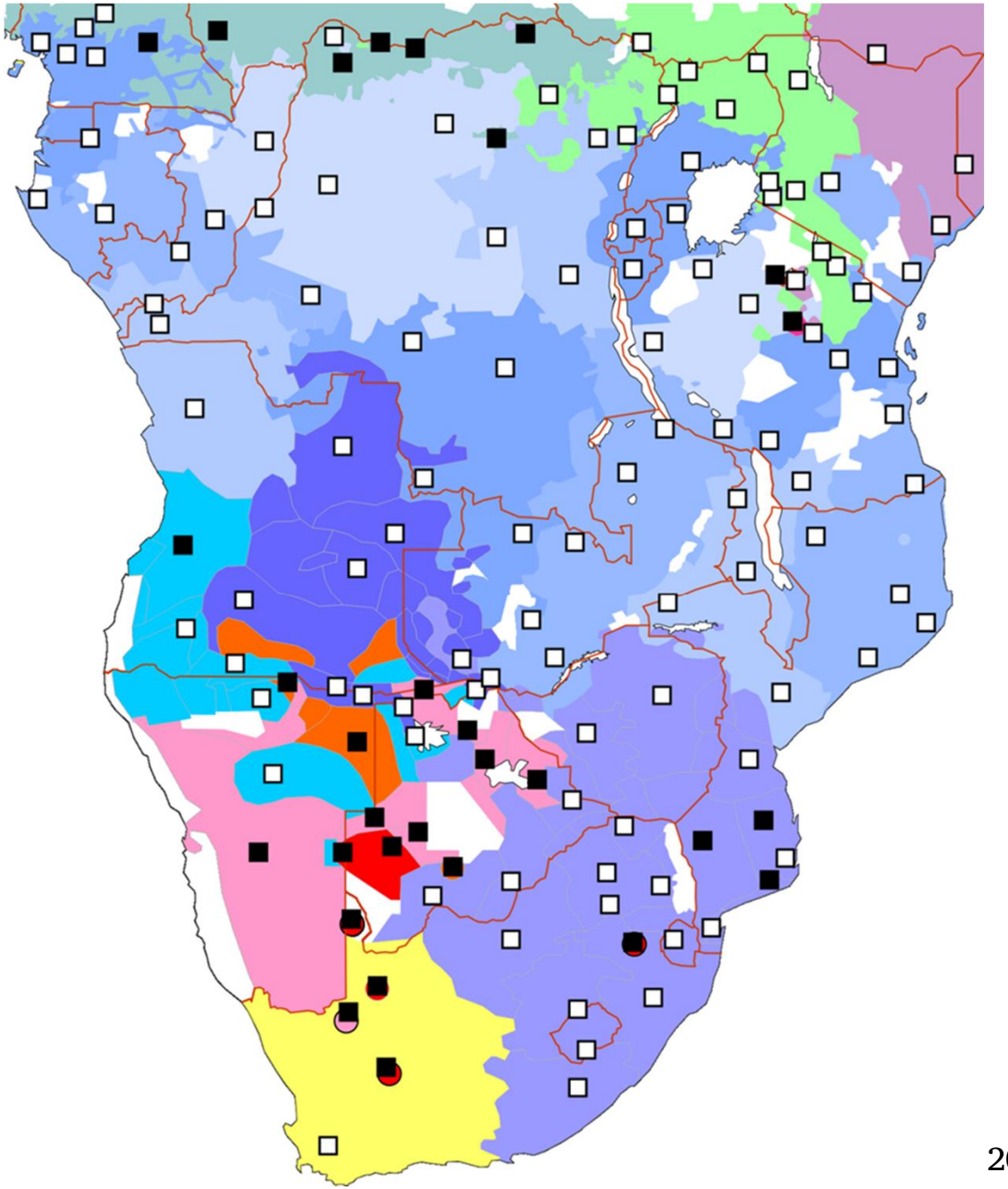
presence of nasalized vowels

e.g. /ã/ (:/a/)

Presence of nasalized vowels

□ 0

■ > 0



3. Results: Kalahari Basin

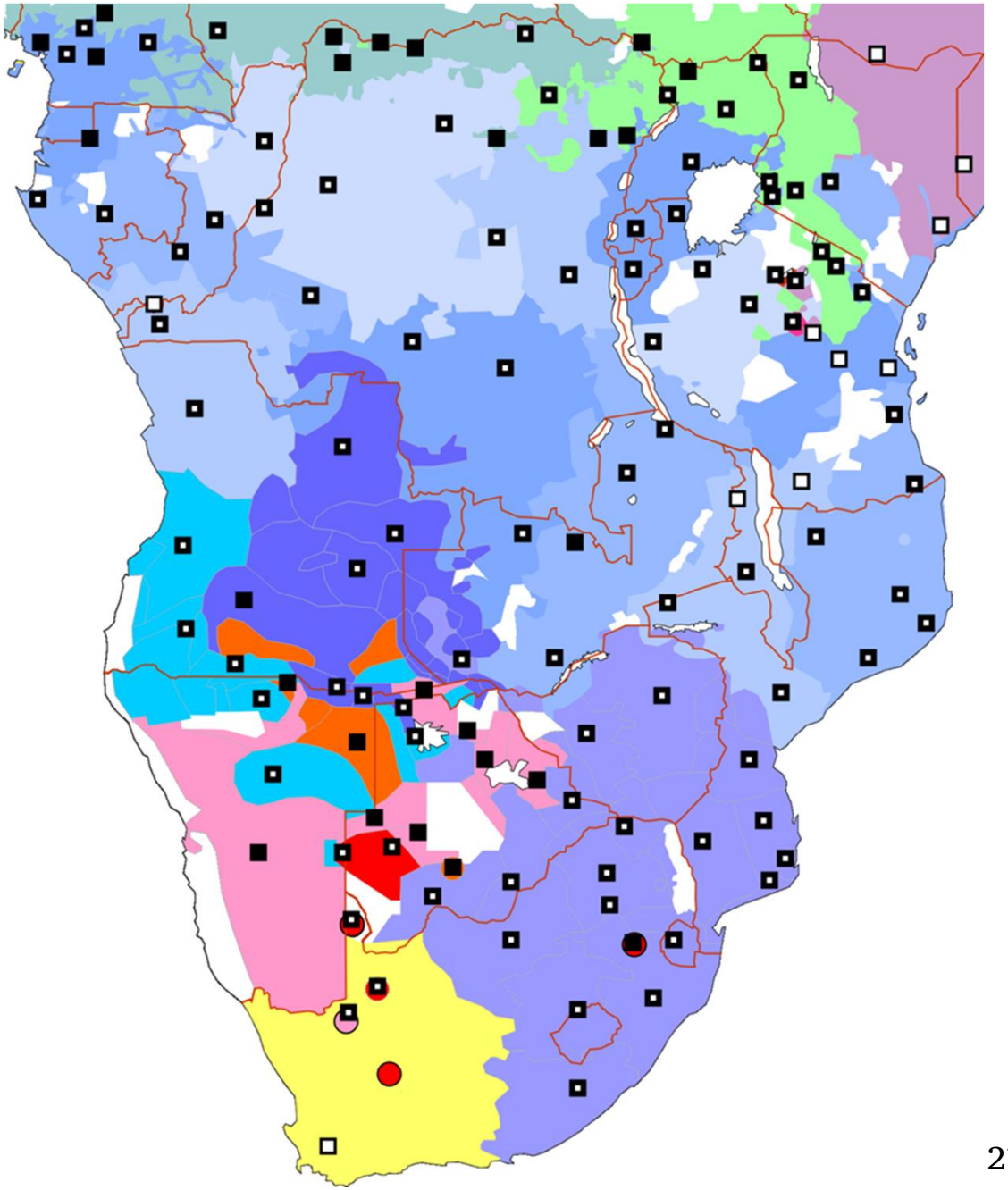
> 2 tones

presence of complex tone systems including more than 2 tone levels,

e.g. high : mid : low

Number of distinctive tone levels

- ☐ non-tonal
- ◘ 2 tone levels
- ■ > 2 tone levels



3. Results: Kalahari Basin

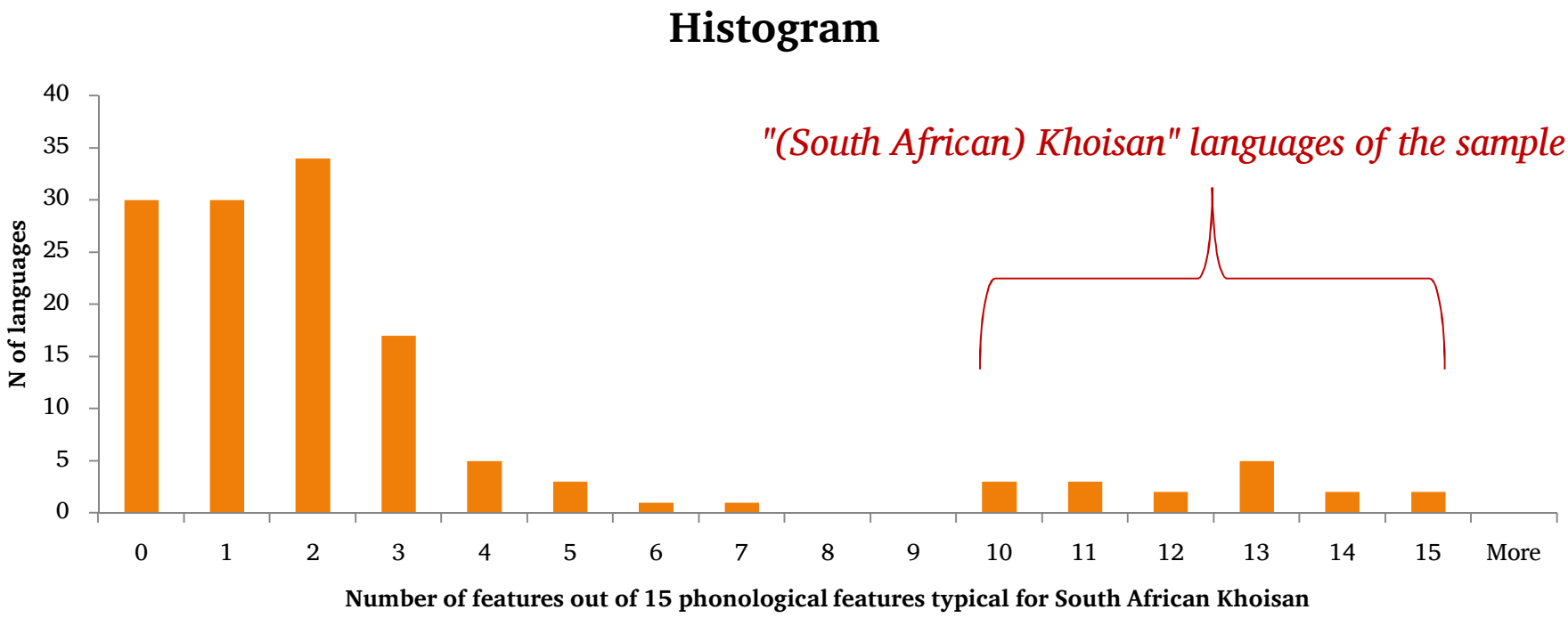
Kalahari Basin ("South African Khoisan"): 15 (13) typical features

- >5 clicks: significant inventory of clicks
- >3 click types: more than three basic click types, e.g. ʘ, ǀ, ǃ, ǂ, ǁ
- /ejectives/: presence of ejective obstruents contrastive with plain series, e.g. /k'/ : /k/
- Vn: presence of nasalized vowels, e.g. /ã/ (:/a/)
- >2 tones: presence of complex tone systems including more than 2 tone levels, e.g. H : M : L
- KX: presence of dorsal (velar or uvular) affricates, e.g. k͡x, q͡χ', k͡χ'
- uvulars: presence of uvular obstruents, e.g. q, ɢ, χ, q͡χ'
- TK onsets: presence of coronal-dorsal syllable onsets (ignoring plain clicks), e.g t͡k, s + k, t͡s + x, ts' + χ
- 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/
- R, no L: presence of intermittents (taps, flaps, trills) and absence of lateral approximants
- Vqh: presence of non-modal or pharyngealized vowels, e.g. /aˤ/, /a̰/, /a̤/
- N coda: exclusively nasals allowed in syllable codas (C(C)V(N) syllable structure)
- no NC: absence of nasal + obstruent syllable onsets, e.g. *NCV and *N͡CV
- no C + w: absence of obstruent + /w/ onset clusters

3. Results: Kalahari Basin

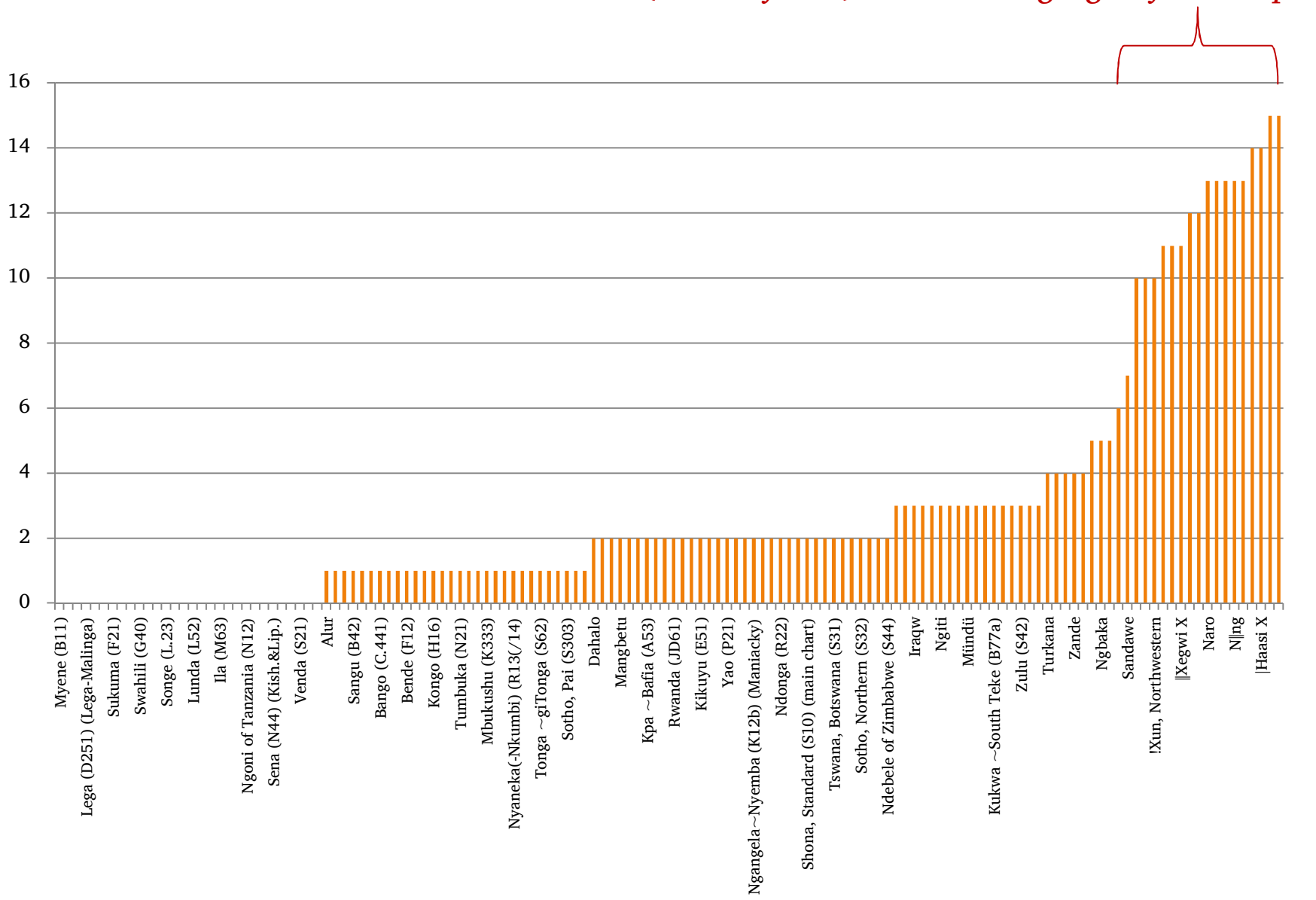
Kalahari Basin: Features by language

- 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



3. Results: Kalahari Basin

Features by language



3. Results: Kalahari Basin

Features by language group

group	>5 clicks	>3 click types	KX	uvulars	/eject-ives/	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

4. Results: Southeastern Bantu

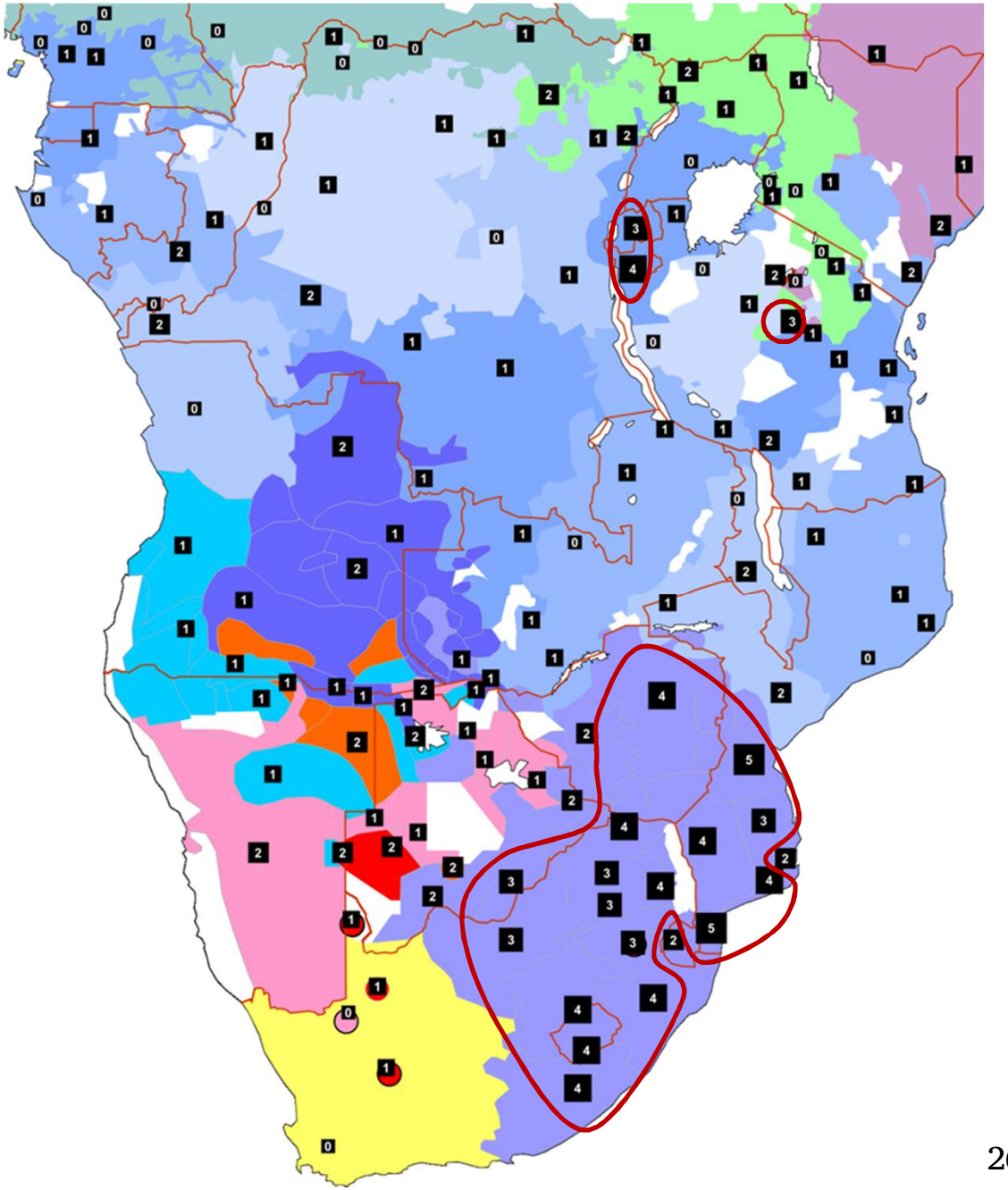
Southeastern Bantu

> 2 affricated series

more than two series of affricates, e.g. t͡s, t͡ʃ, p͡f (:t, f)

Number of affricated series
in paradigmatic relationship with non-affricated stop series at least once (ts/dz :t, tʃ/dʒ :t, pf/bv :p, kx, qχ, tɬ)

0 – 5



e.g. Tsonga: 4 affricated series
Å /p͡f, p͡fʰ, b͡v, b͡vʱ/
Å /t͡s, t͡sʰ, d͡z, d͡zʱ/
Å /t͡ʃ, t͡ʃʰ, d͡ʒ, d͡ʒʱ/
Å /t͡sᵛ, t͡sᵛʰ, dzᵛ, dzᵛʱ/
Å (+/p͡ʂ, b͡ʐ/?)
(cf. /p, pʰ, b, bʱ/)

4. Results: Southeastern Bantu

TL

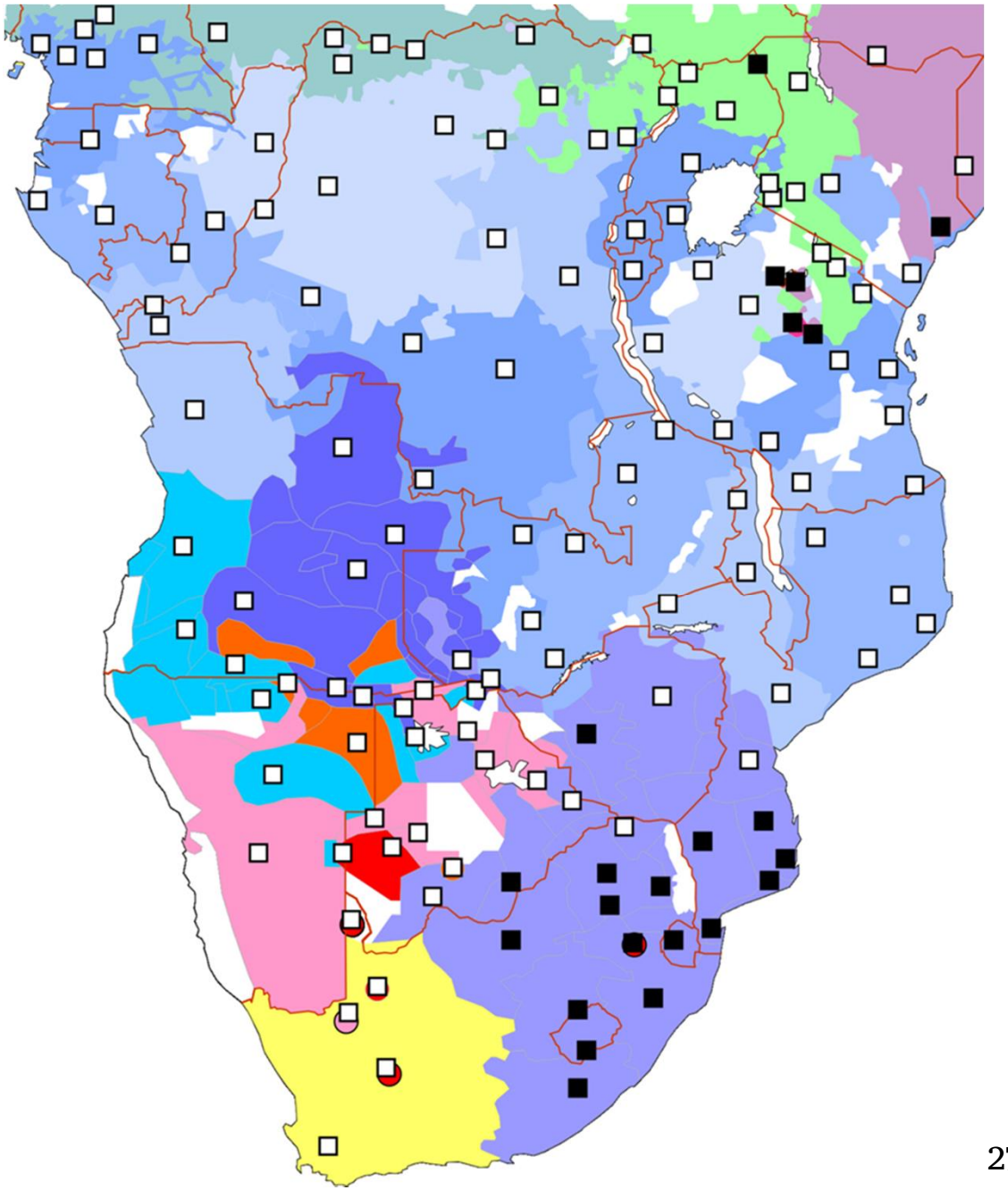
presence of lateral obstruents,

e.g. *t͡l, t͡ɬ, ɬ, ɮ*

Number of obstruents with lateral airstreams (ɬ, t͡ɬ, tl, ɮ), (excluding lateral clicks, lateral approximants)

□ 0

■ > 1



e.g.

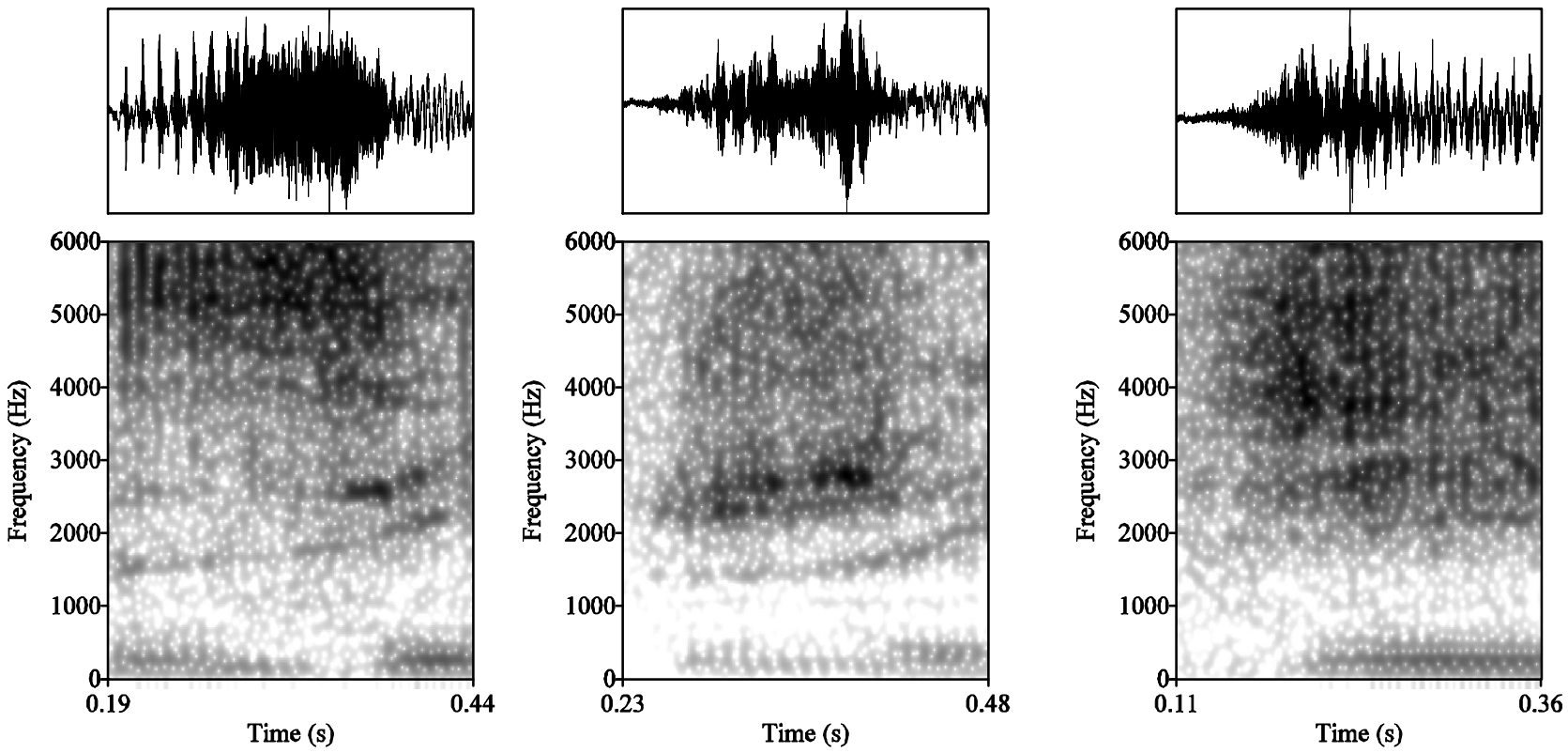
Dahalo (Cushitic)	/ɬ, tɬ’/
Iraqw (Cushitic)	/ɬ, tl’)
Sandawe (isolated)	/ɬ, t͡ɬ, t͡ɬ’, d͡ɮ/
Tswana (S31)	/ t͡ɬ, t͡ɬʰ/
N.Sotho (S32)	/ɬ, t͡lʰ, t͡l’/
Chopi (S61)	/ɬ, t͡ɬ(’), t͡ɬʰ, d͡ɮ/
Tsonga (S53)	/ɬ, ɮ, t͡l, t͡lʰ, d͡l, d͡ɮ/
ǁXegwi (Tuu)	/ɬ, ɮ, k͡ʟ̥, k͡ʟʰ, k͡ʟ’/
Zulu (S42)	/ɬ, ɮ, (k͡ɬ’)/

4. Results: Southeastern Bantu

whistled obstruents (simple [non-velarized] labialized sibilants and affricates, e.g. s^{v}, z^{v}, $\widehat{ts}^{v)}$

Shona (Zimbabwe): /z/ : /z^{v}/ : /ʒ/ (:/z + w/)

	[z i]	[z^{v} i]	[ʒ i]
aus:	/zino/	/z^{v}ino/	/ʒiʒa/
	'tooth'	*'now'*	*'rainy season'*



"Shona" in Ladefoged et al. (2009).

4. Results: Southeastern Bantu

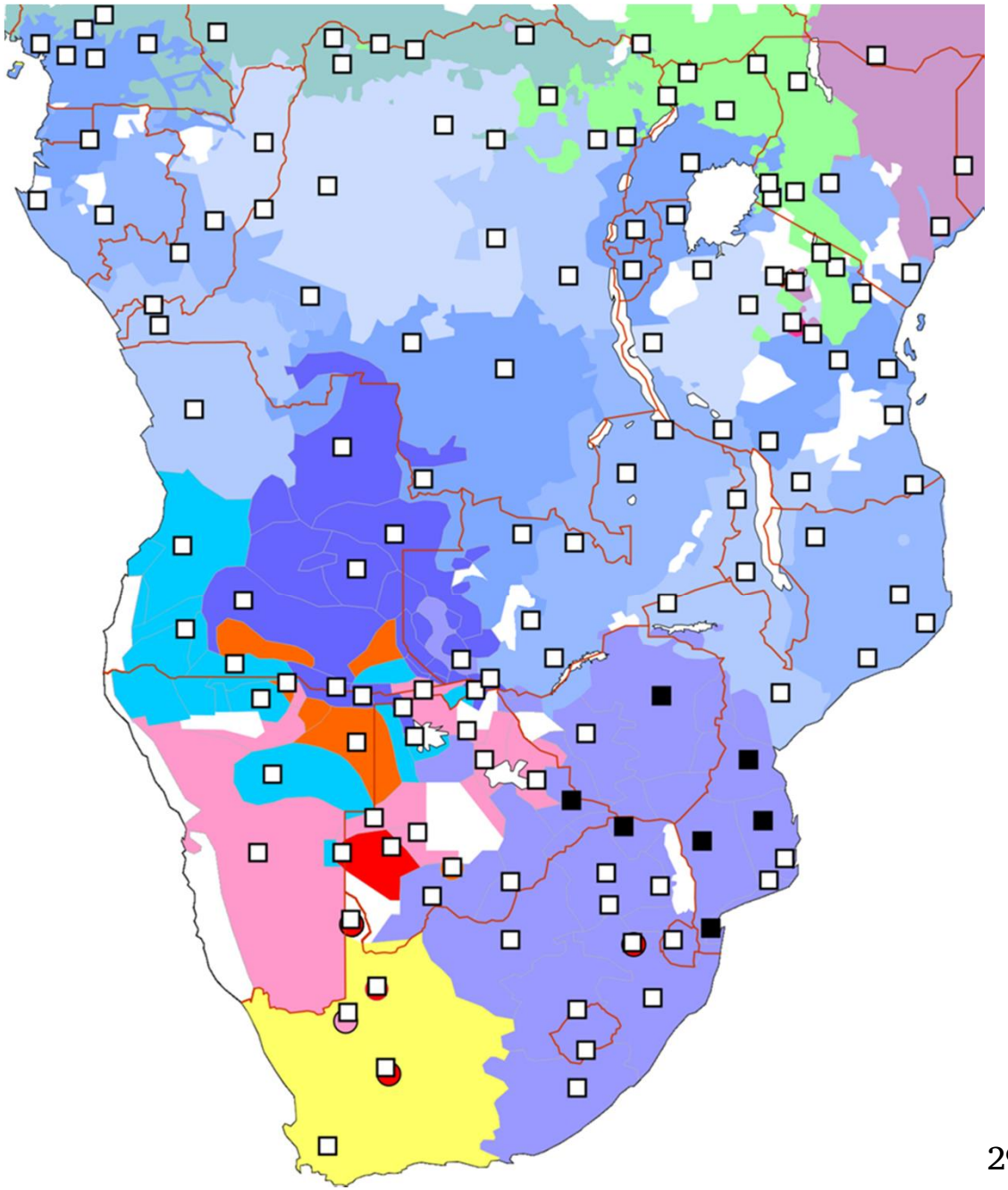
whistled obstruents

presence of whistled fricatives and affricates, e.g. s^{v}, z^{v}, $\widehat{ts}^{v}$

Presence of whistled fricatives/affricates

□ 0

■ > 1



4. Results: Southeastern Bantu

ph:f

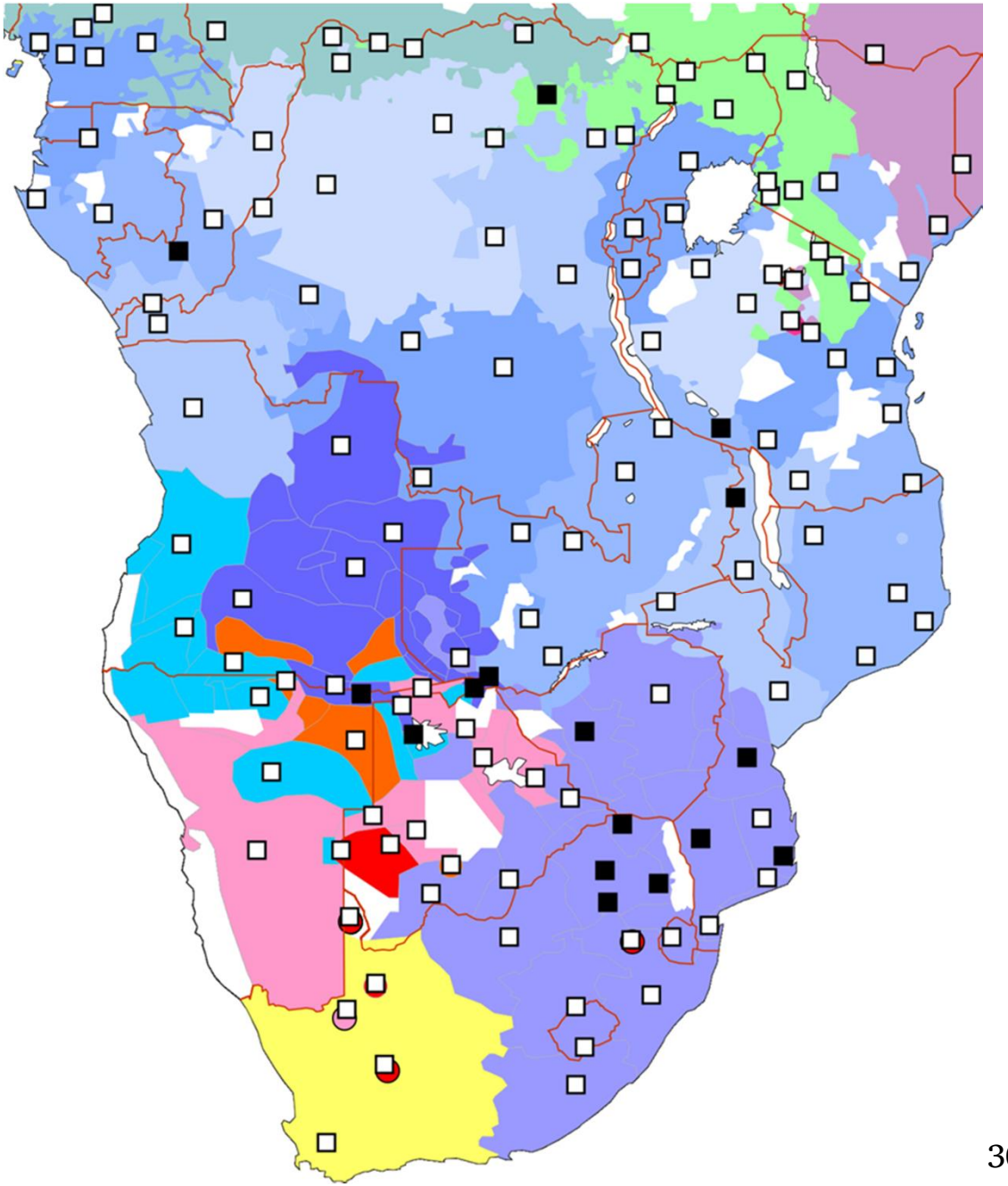
contrast between bilabial and labio-dental continuants,

e.g. /ɸ/:/f/, /m/:/ɱ/, /β̪/:/ʋ/ (excluding p:pf, mp:mf, etc.)

Presence of bilabial continuants contrastive with labio-dental counterparts

□ 0

■ > 0



4. Results: Southeastern Bantu

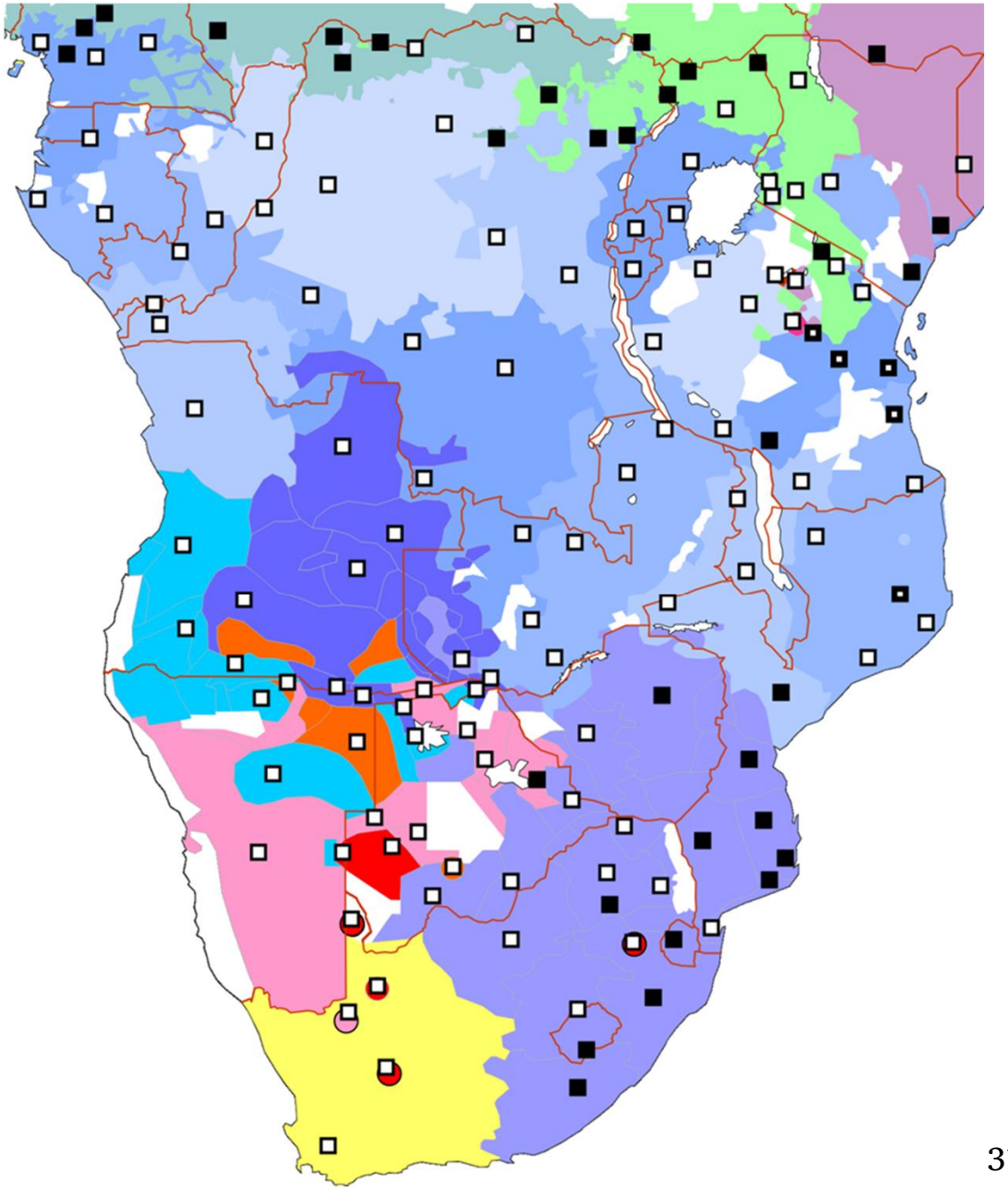
implosives

presence of implosives,

e.g. /ɓ/ or /b/ [ɓ]

Presence of implosives

- ☐ no observed implosives
- ◘ non-contrastive with voiced stops
- ■ contrastive with voiced stops



4. Results: Southeastern Bantu

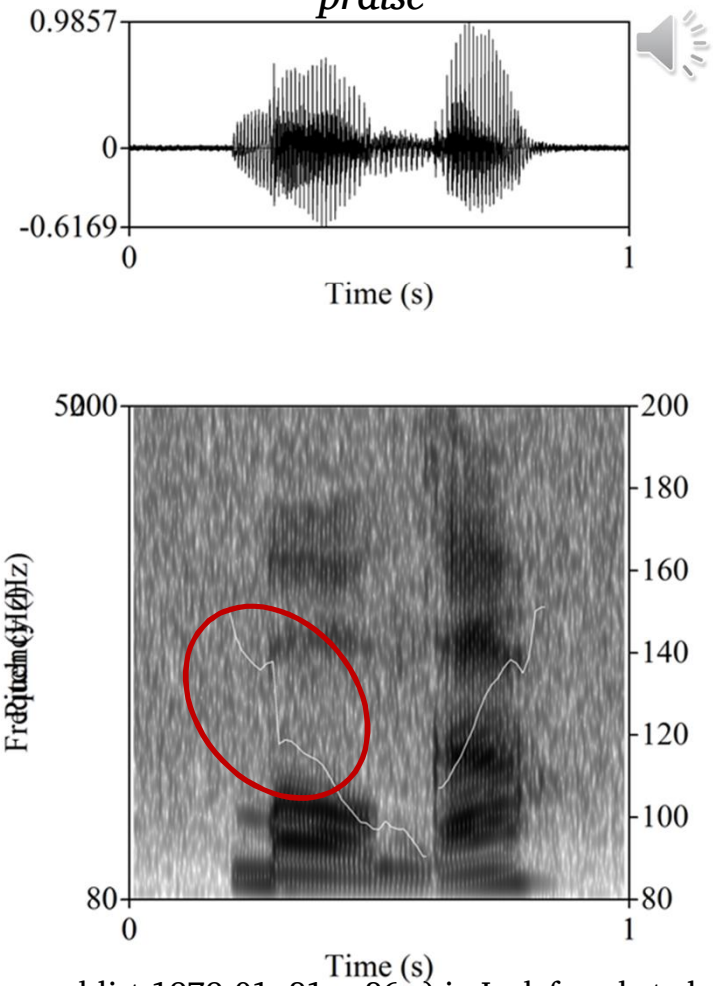
Slack voiced stops

slack voice: slightly increased glottal aperture and flow (less than for breathy voice), F0 depression

e.g. Xhosa: voiced implosive /ɓ/ vs. slack voiced /b̤/ (Nguni: main acoustic cue is F0 depression)

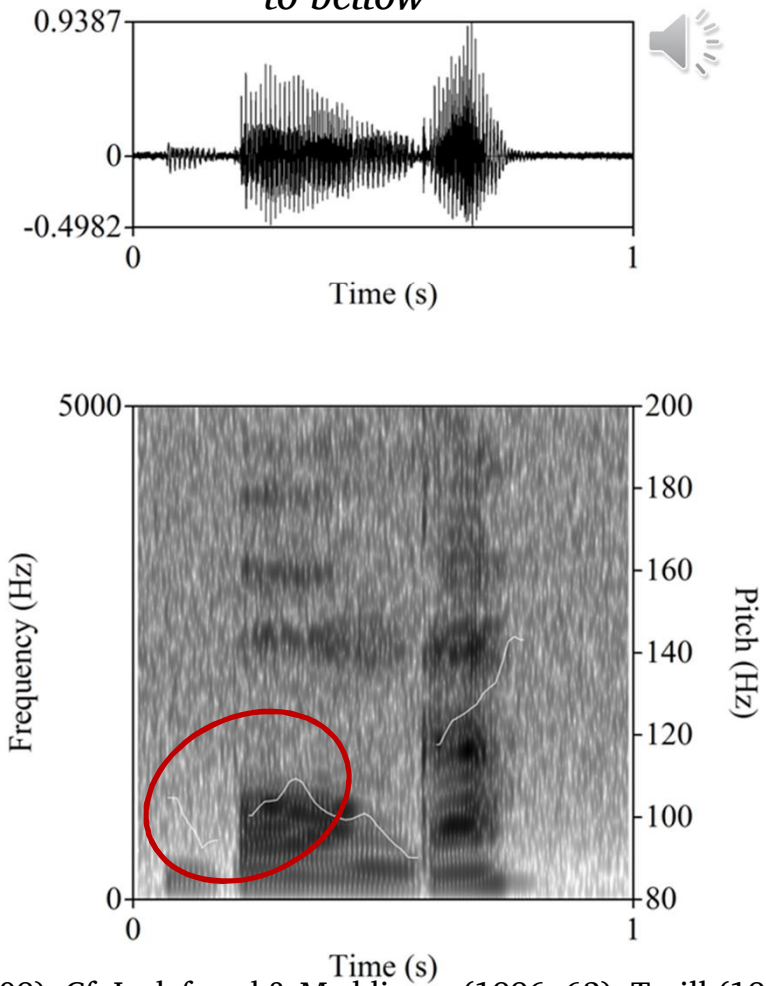
[ɓ ɔ ŋ g a]

'praise'



[b (̤) ɔ ŋ g a]

'to bellow'



"Xhosa" (xho_word-list_1979_01: 81 s, 86 s) in Ladefoged et al. (2009). Cf. Ladefoged & Maddieson (1996: 63), Traill (1987).

4. Results: Southeastern Bantu

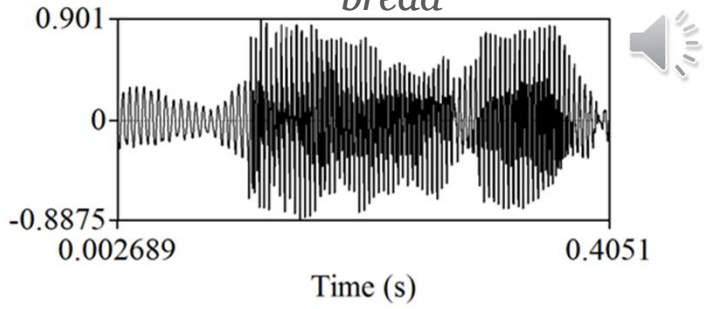
cf. Breathy voiced stops

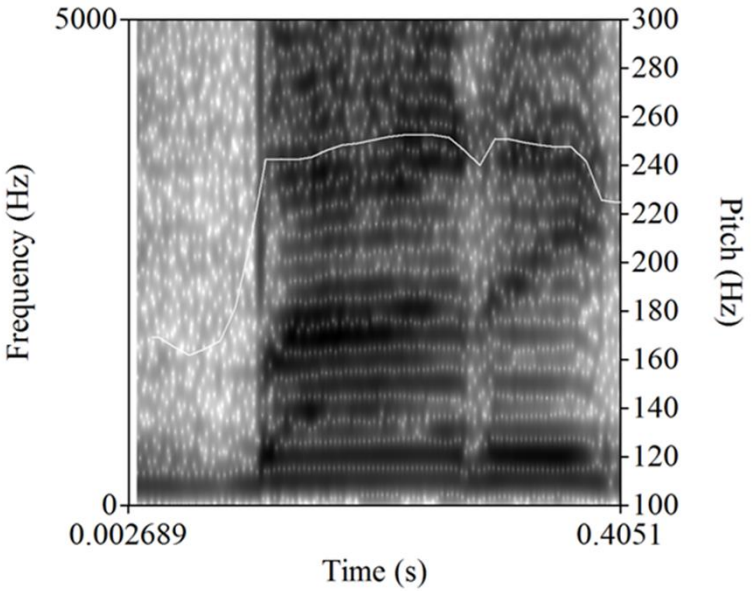
breathy voice: more increased glottal aperture and flow, loose form of vibration of vocal folds

e.g. Taa/West !Xoon: voiced /b/ vs. breathy voiced /bʱ/

[ˬ b a ɾ e]

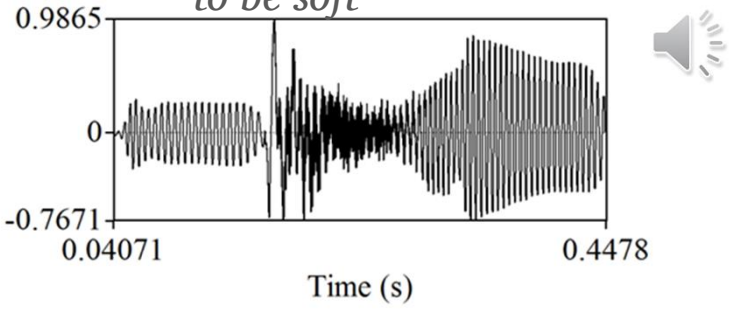
'bread'

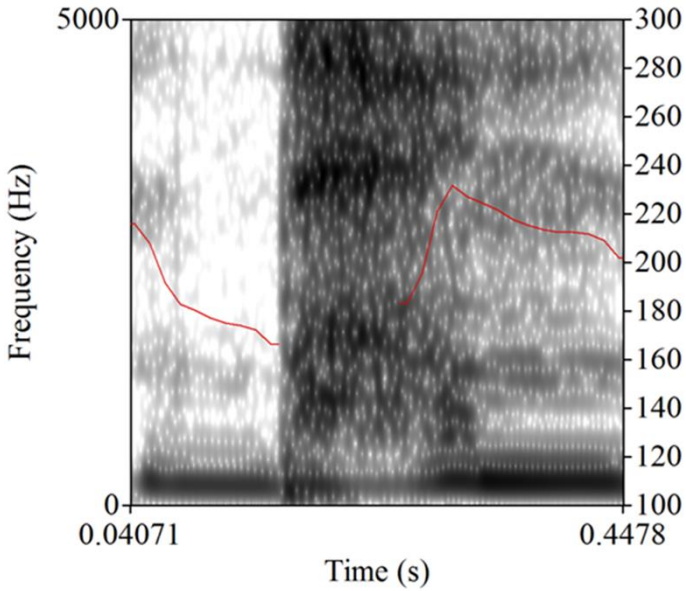




[ˬ b ʱ a m (-bʱam)]

'to be soft'





Own data from Taa (West !Xoon). Cf. Ladefoged & Maddieson (1996: 57).

4. Results: Southeastern Bantu

BH,DH

presence of slack (or breathy) voiced stops,

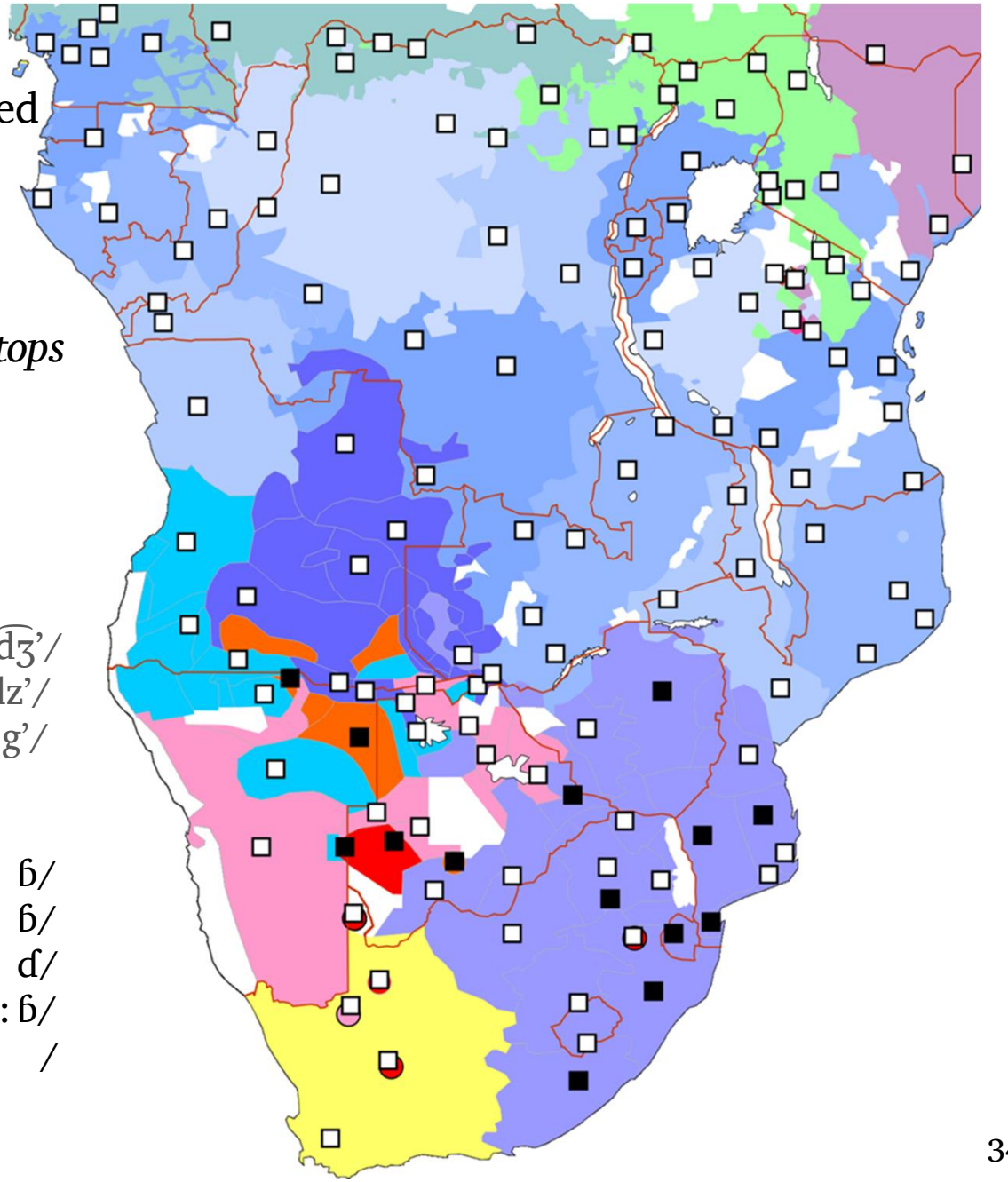
e.g. /b̤/ or /bʱ/

Presence of breathy or slack voiced stops

☐ absent
■ present

e.g.
NW !Xun (Kx'a) /d͡ʒʰ : t͡ʃ : t͡ʃʰ : t͡ʃʼ : d͡ʒ : d͡ʒʼ/
ǂ'Amkoe (Kx'a) /dzʰ : ts : tsʰ : tsʼ : dz : dzʼ/
Taa/W.!Xoon (Tuu) /gʱ : k : kʰ : kʼ : g : gʼ/

Xhosa (S41) /b̤ : pʼ : pʰ : ɓ/
Swati (S43) /b̤ : pʼ : pʰ : ɓ/
Tsonga (S53) /d̤ ~ dʱ? : t(ʼ) : tʰ : d : ɗ/
Shona (S10) /b̤? : p: b? : ɓ/
Kalanga (S15) /pʱ : p: pʰ: b? /



4. Results: Southeastern Bantu

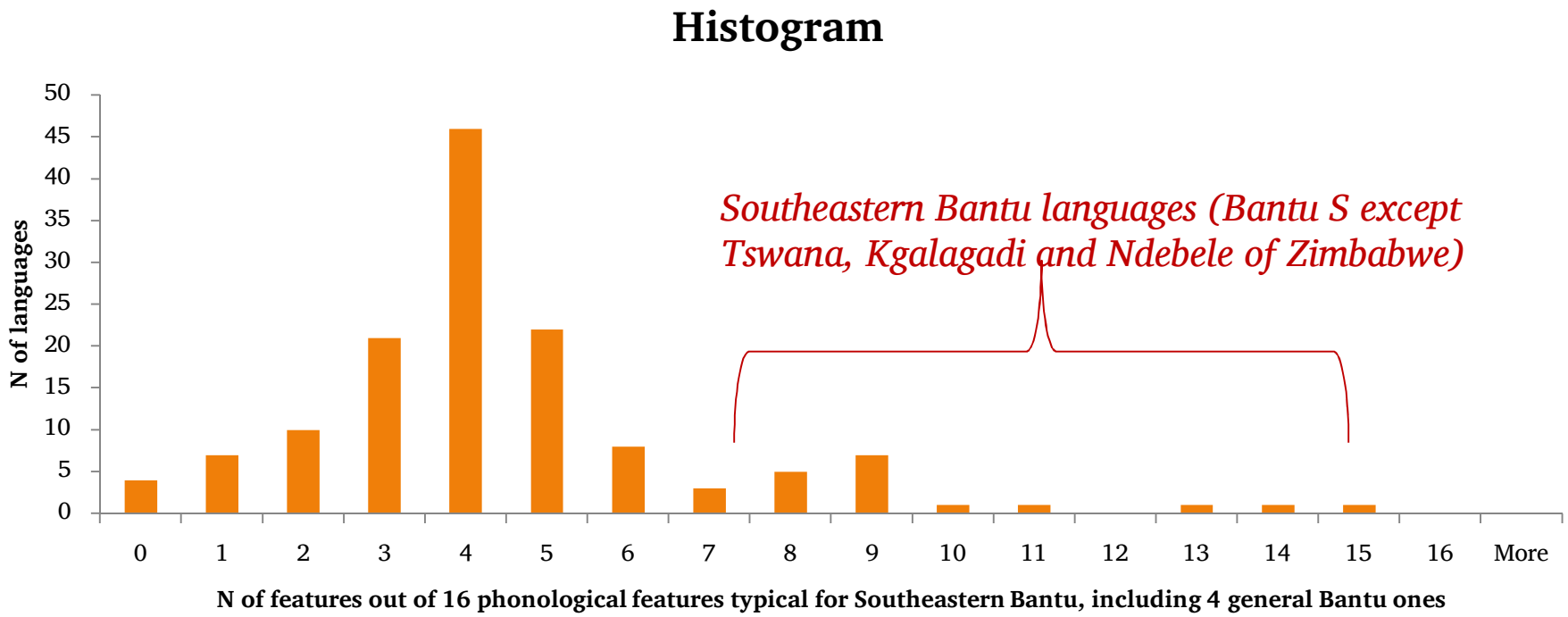
Southeastern Bantu: 16 (12) typical features

- >2 affricated series: more than two series of affricates, e.g. /ts/, /tʃ/, /kx/
- TL: presence of lateral obstruents, e.g. t͡ɬ, t͡ɬʼ, ɬ, ɮ
- whistled obstruents: presence of whistled fricatives and affricates, e.g. sv, zv, t͡sv
- ph:f: contrast between bilabial and labio-dental continuants, e.g. /ɸ/:/f/, /m/:/ɱ/, /β̪/:/ʋ/
- implosives: (phonetic) presence of implosives, e.g. /ɓ/ or /b/ [ɓ]
- BH,DH: presence of breathy or slack voiced stops, e.g. /bɦ/ or /b̤/
- plain stops ejected: plain series of (voiceless) stops is ejective
- > 2 sibilants: presence of more than two sibilants (places of articulation), e.g. /s/ : /ʃ/ : /ʂ/
- > 5 voiced frics: presence of more than five voiced fricatives, e.g. /v/, /z/, /ʒ/, /zv/, /ɣ/, /ɦ/
- PS: presence of labial-coronal onsets, e.g. bz, ps, pʃ
- dent:alv: contrast between dental vs. alveolar stops, nasals or laterals, e.g. /t̪/:/t/ (more local?)
- > 5 vowels: presence of more than five distinctive vowel qualities, e.g. /i, e, ɛ, a, ɔ, o, u/
- NC: presence of nasal + obstruent syllable onsets, e.g. *NCV and *N͡CV
- 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

4. Results: Southeastern Bantu

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

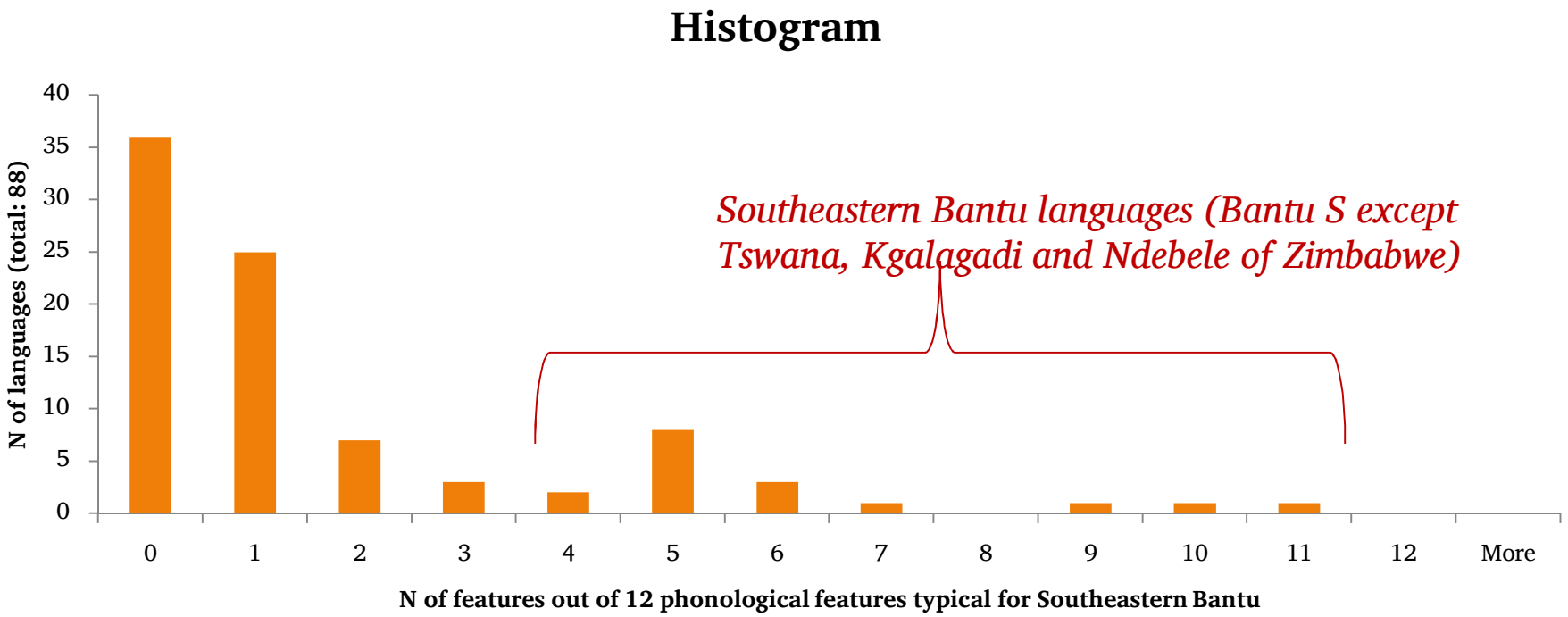
- weak phonological area: fuzzy boundaries, but slight bimodal distribution
- languages are not very homogenous (no language has all features, only three languages have more than 12: Tswa, Tsonga and Transvaal Ndebele)
- problems
  - one genealogical group (clade) cannot be excluded (but unlikely)
  - distortion by correlated features (e.g. whistled obstruents/> 2 sibilants/> 5 vd. fricatives)



4. Results: Southeastern Bantu

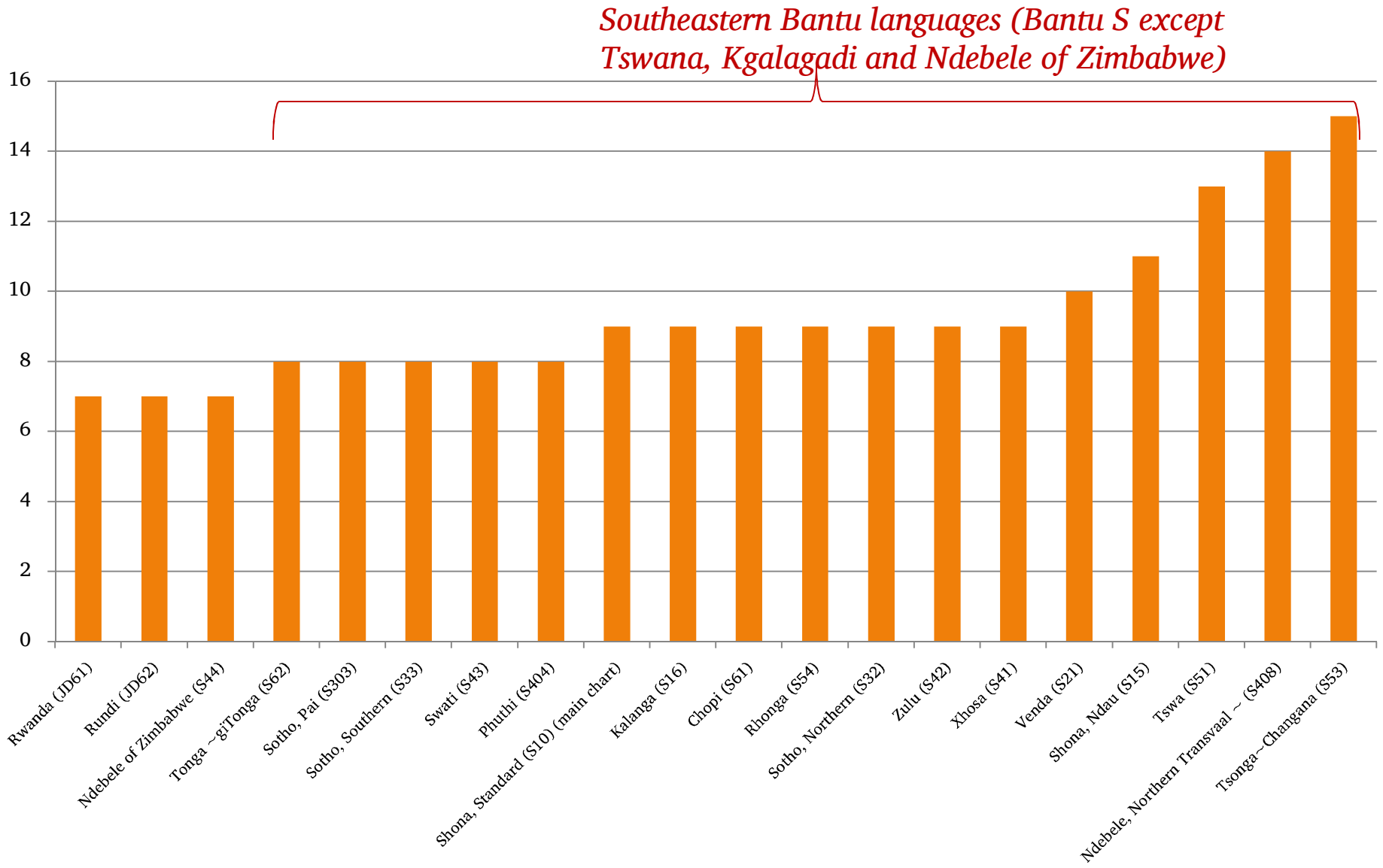
Features by language (12 features, northern languages excluded)

- 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



4. Results: Southeastern Bantu

Features by language (16 features, all languages)



4. Results: Southeastern Bantu

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	dent: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	0	1	0	0.33	0.33	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

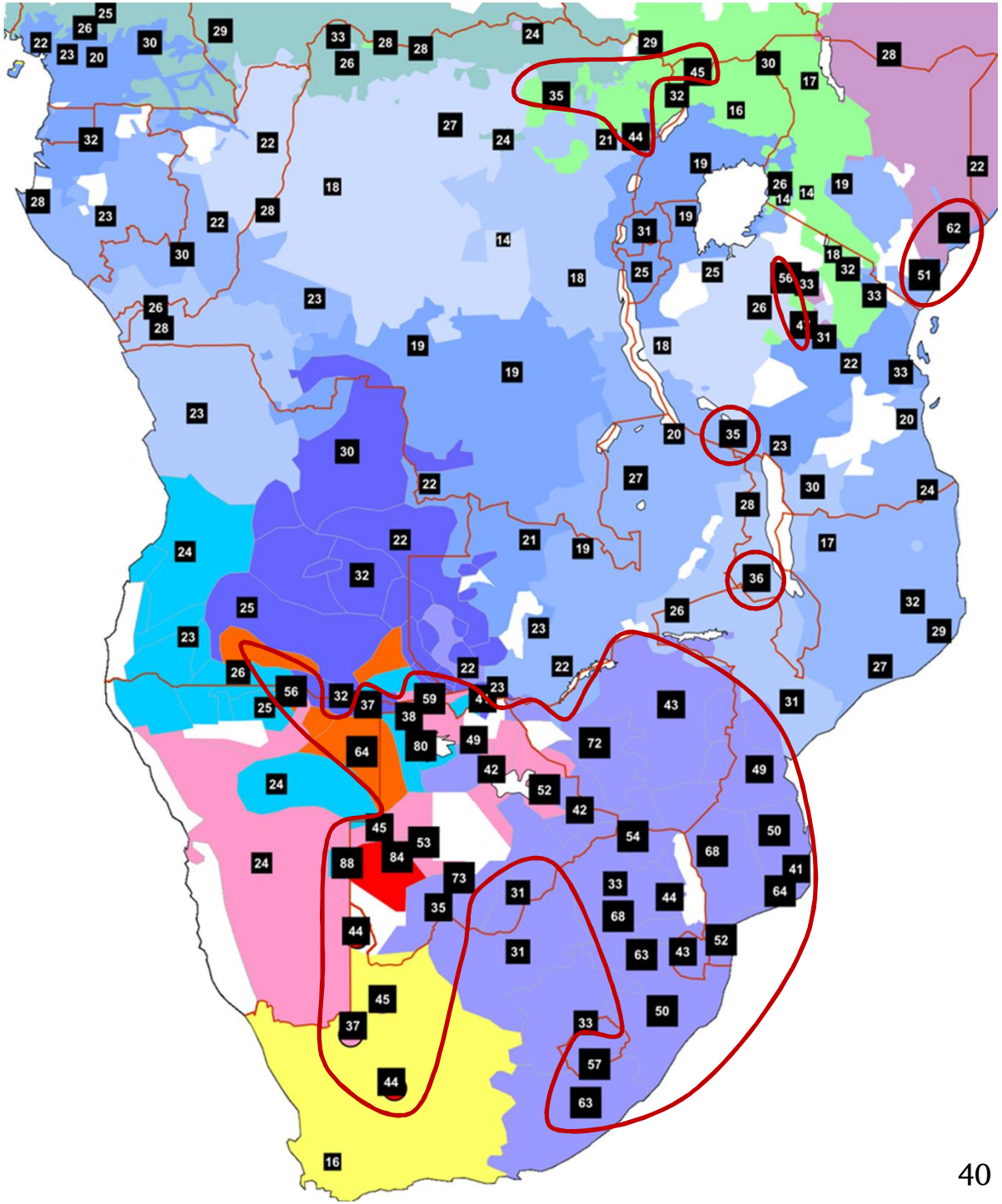
Southern Africa

large C inventory

large consonantal inventory
(> 33 phonemic consonants)

Number of distinctive consonants
14 – 88

clicks: cf. above



5. Results: Southern Africa

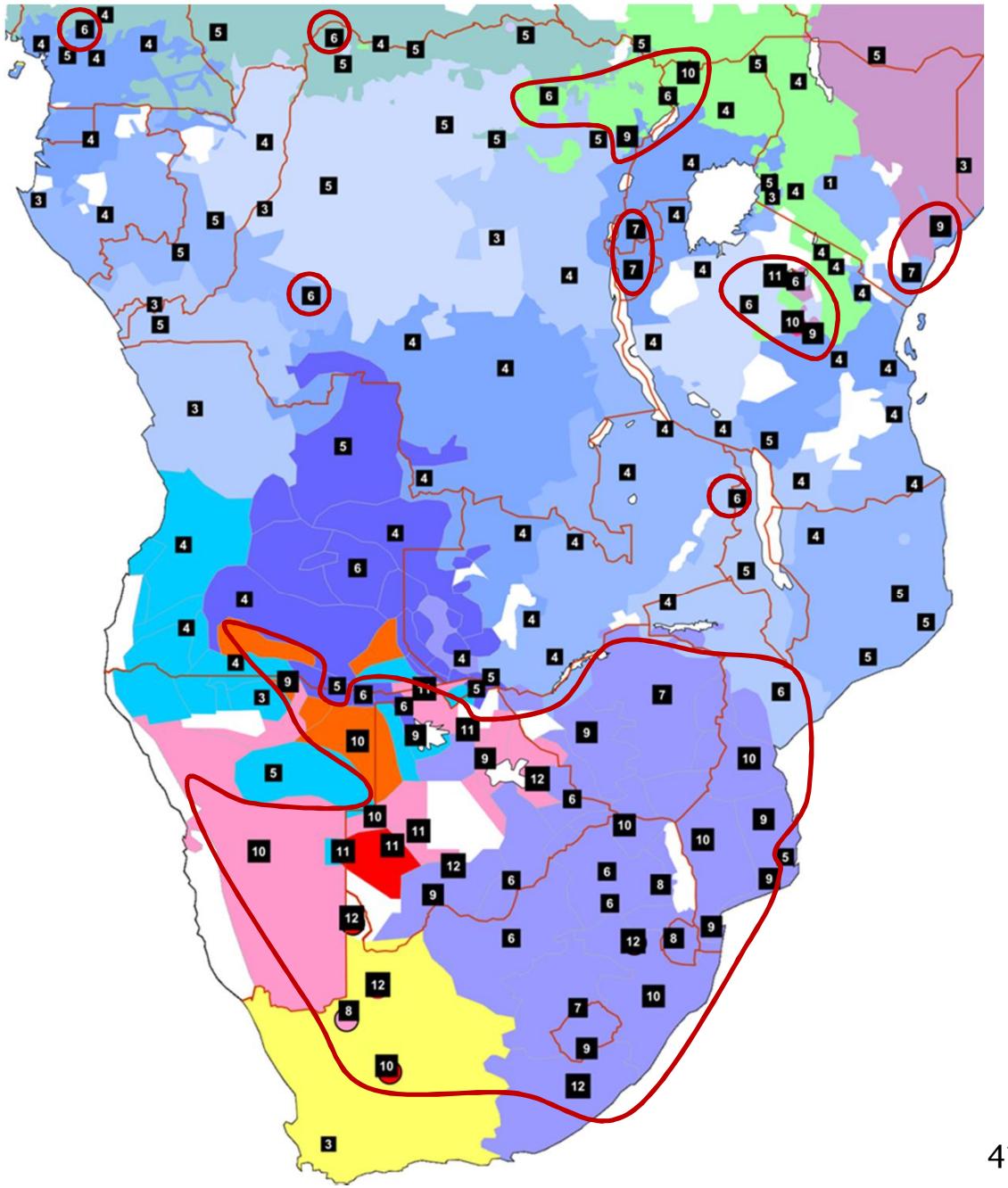
> 5 plain stops

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



5. Results: Southern Africa

aspirated stops

presence of aspirated stops contrastive with plain series,

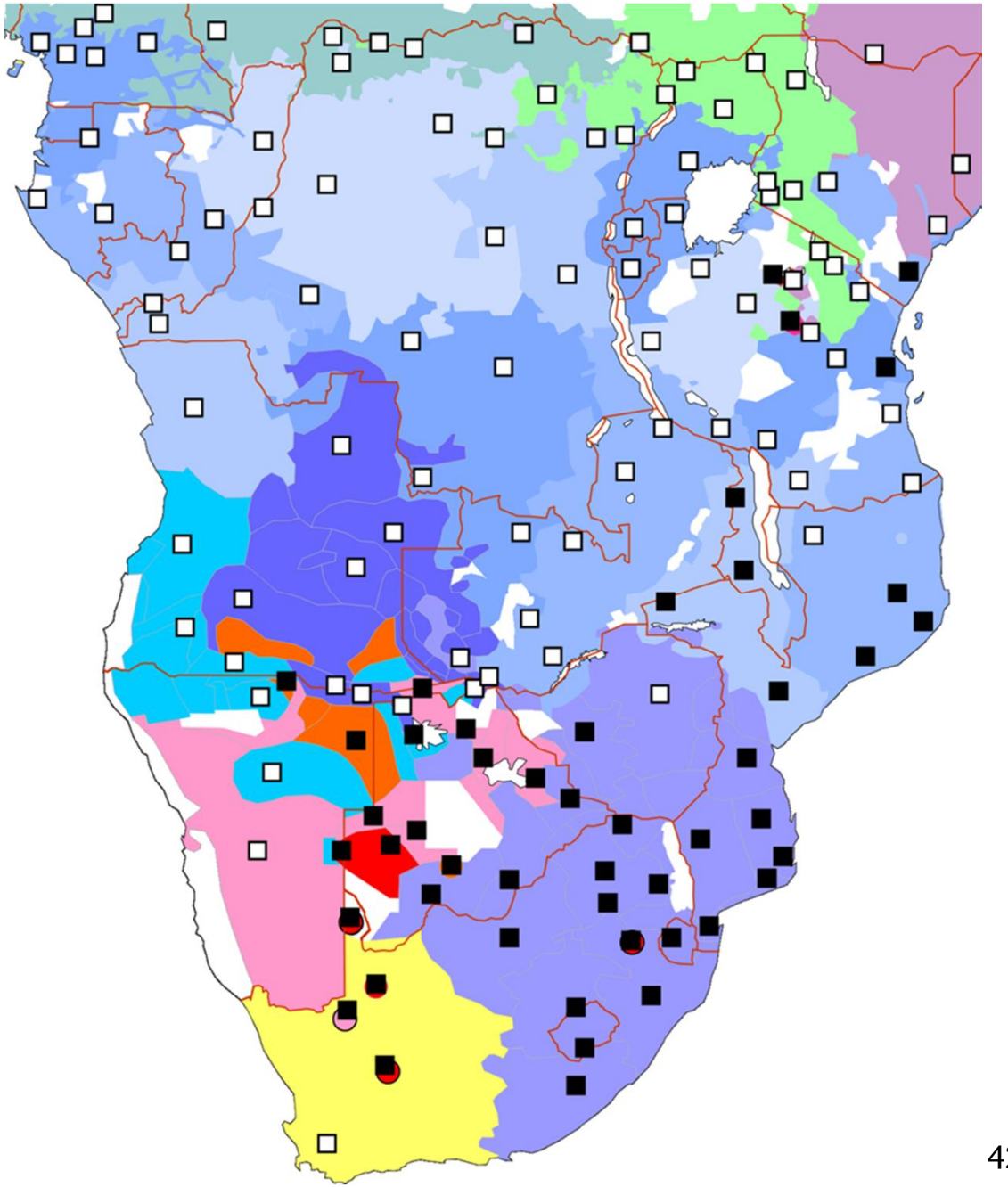
e.g. /p^h, t^h/ vs. /p, t/

Presence of aspirated stops

☐ no

■ yes

Ejectives: cf. above



5. Results: Southern Africa

UV or KX

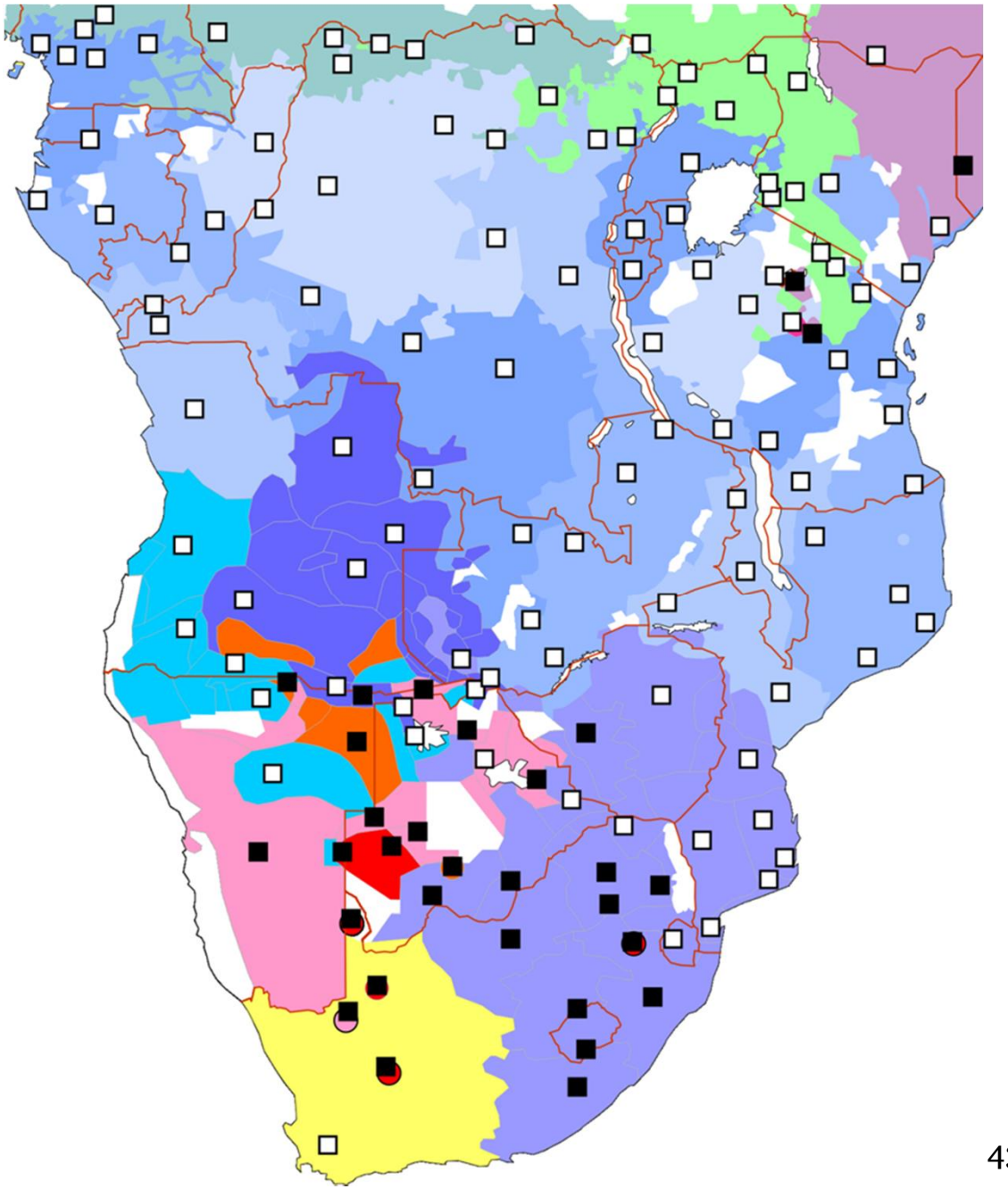
presence of uvular obstruents or dorsal affricates,

e.g. *q, χ, kx, or qχ'*

Presence of uvular obstruents or dorsal affricates

□ 0

■ > 0



5. Results: Southern Africa

dorsal fricatives

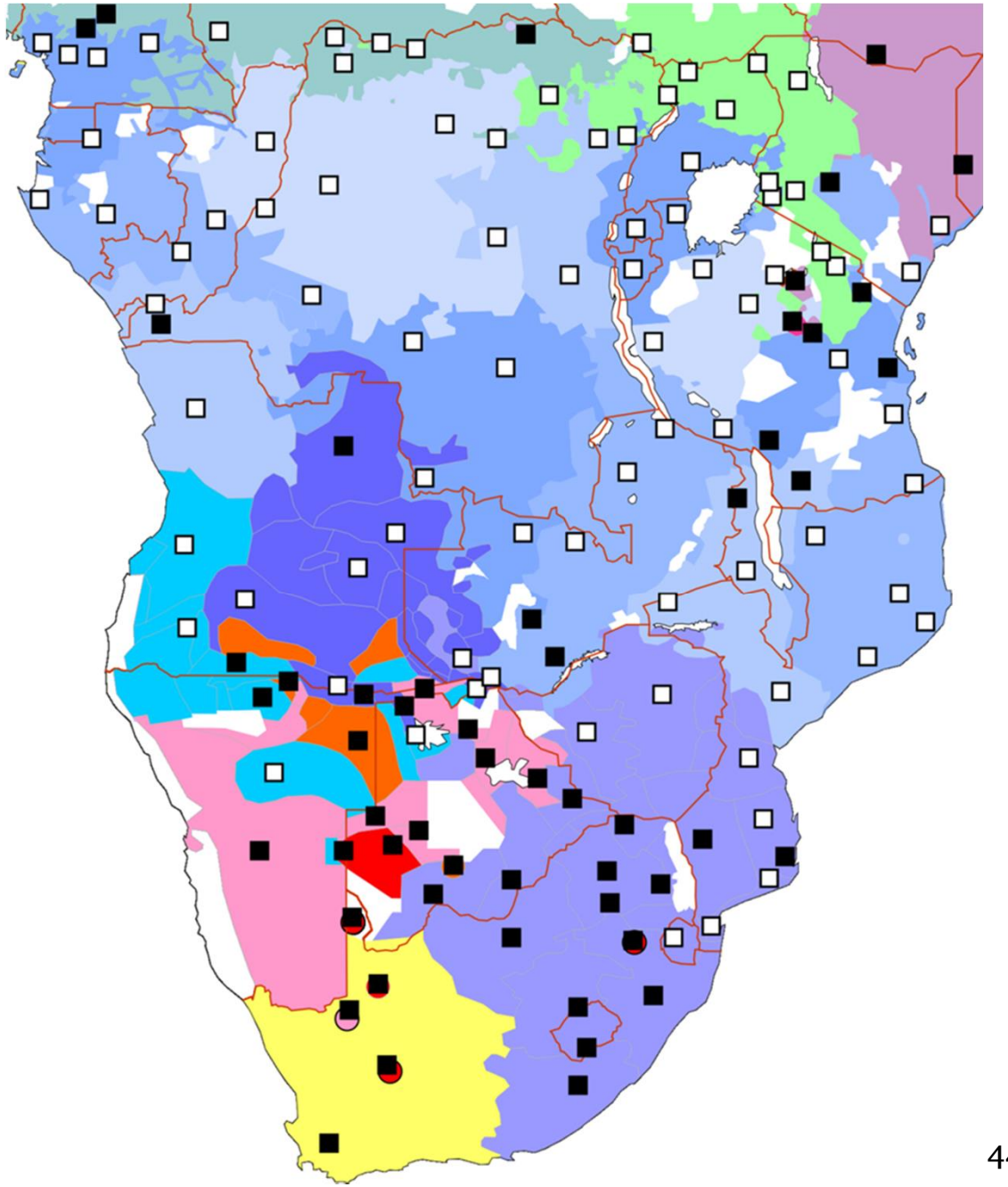
presence of velar or uvular fricatives,

e.g. *x, ɣ, χ, ʁ*

Presence of dorsal fricatives

☐ absent

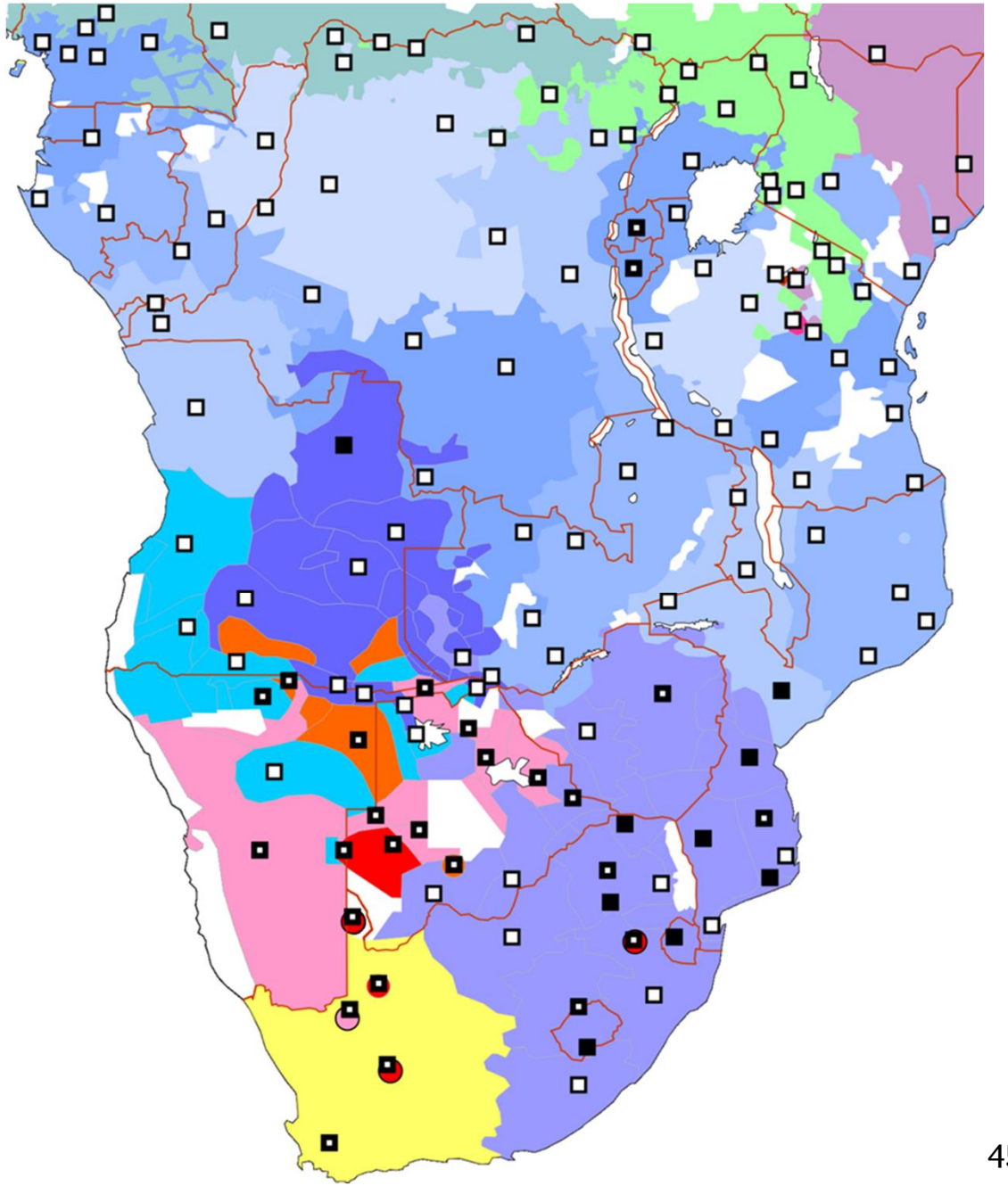
■ present



5. Results: Southern Africa

double obstruent onsets
presence of double obstruent onsets disregarding simple labial-velars (k͡p), clicks (|) and whistled obstruents (t͡sᵛ),

e.g. labial-coronal, labial-dorsal, or coronal-dorsal double articulations or clusters such as *ps, bg, tf* or *|χ*



5. Results: Southern Africa

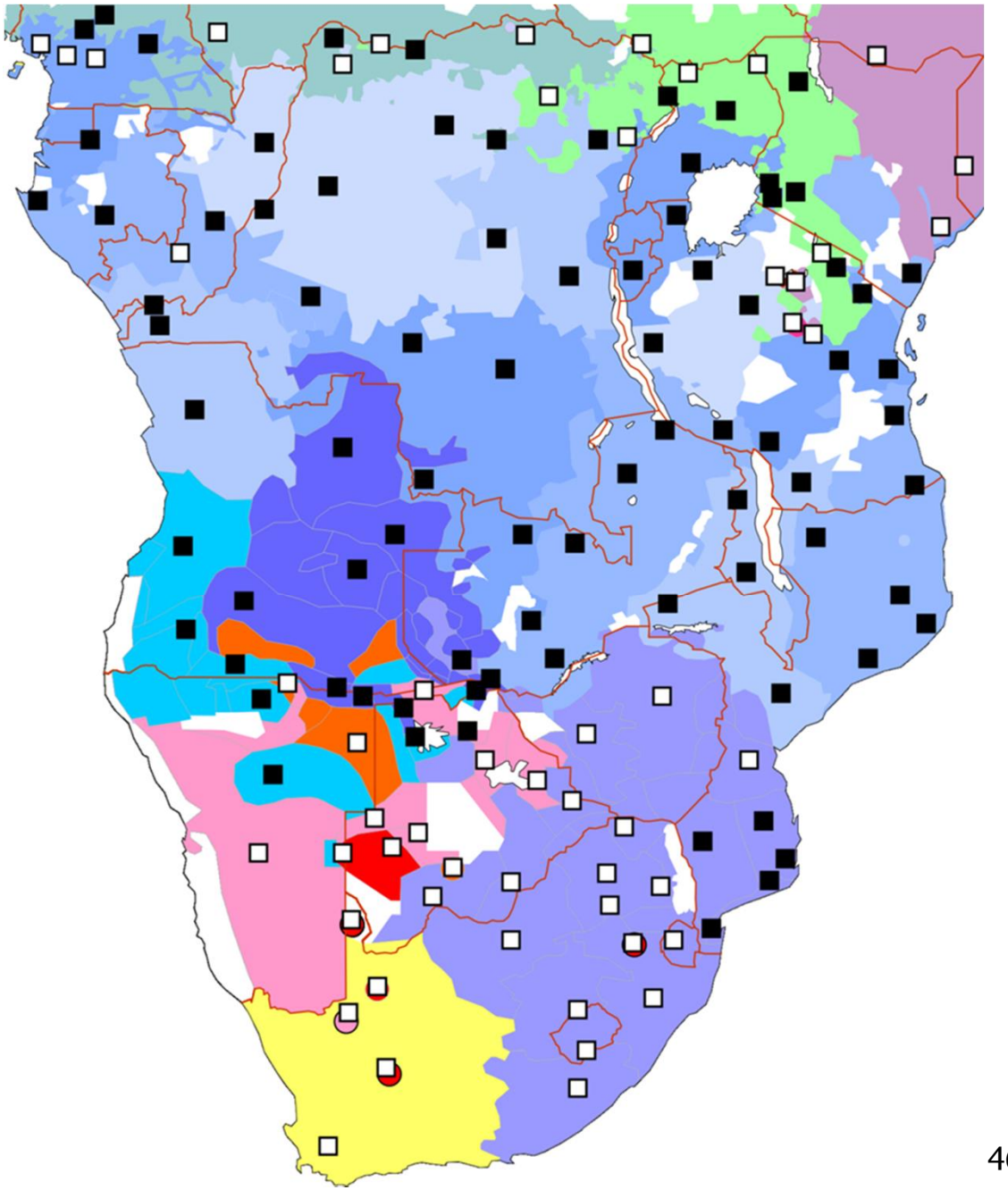
no C + y

absence of clusters C + /j/

Presence of clusters C + /j/

☐ absent

■ present



5. Results: Southern Africa

Southern Africa: 10 typical features

- large C inventory: large consonantal inventory (> 33 phonemic consonants)
- clicks: presence of ingressive stops (clicks), e.g |, ǃ or ǂ
- > 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. /$b^{ɦ}$/ or /b̤/
- UV or KX: presence of uvular obstruents or dorsal affricates, e.g. *q, χ, kx, or qχ'*
- dorsal frics: presence of dorsal fricatives, e.g. *x, χ, ɣ*
- double obstruent onsets: presence of double obstruent onsets disregarding simple labial-velars (k͡p), clicks (|) and whistled obstruents (t͡s^{ʋ}), e.g. labial-coronal, labial-dorsal, or coronal-dorsal double articulations or clusters such as *ps, bg, tf* or |χ
- no C+y: absence of obstruent + /j/ onset clusters

other potential features (more local distributions or secondary?)

- presence of voiceless, breathy or slack voiced nasals (cf. below)
- palatalization of dental/alveolar coronal series (t > c; cf. below); palatalization more generally?
- presence of palatalized units (C^j)

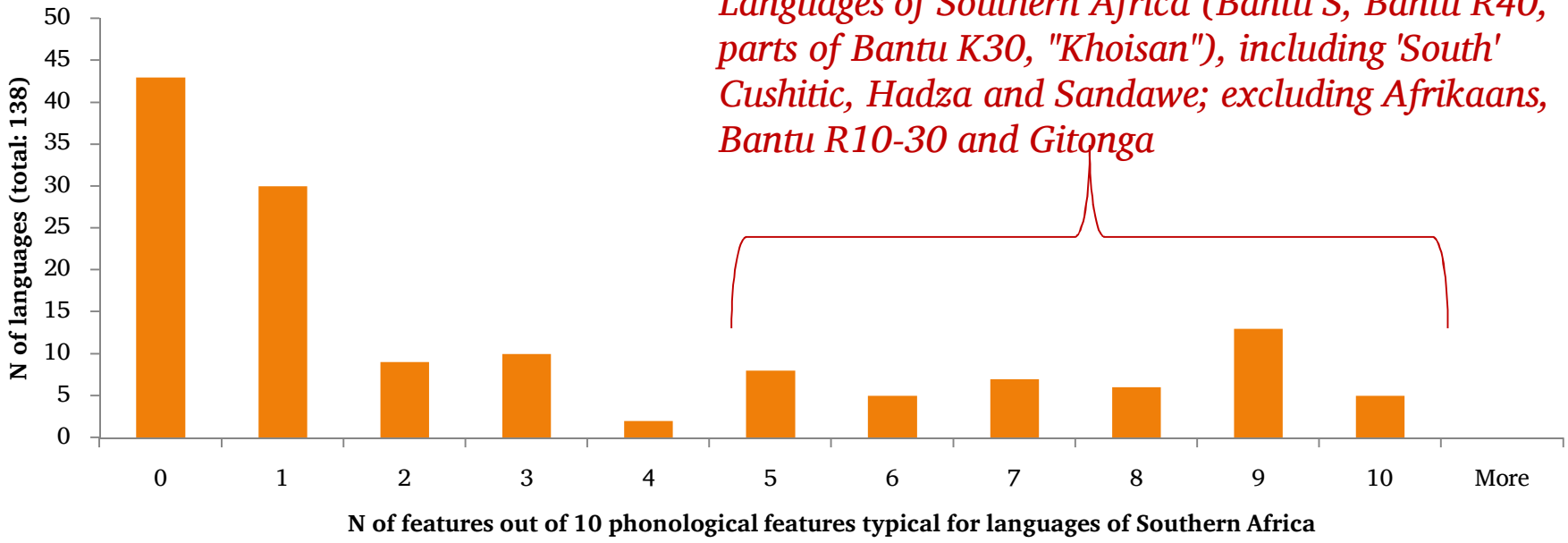
5. Results: Southern Africa

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"?!

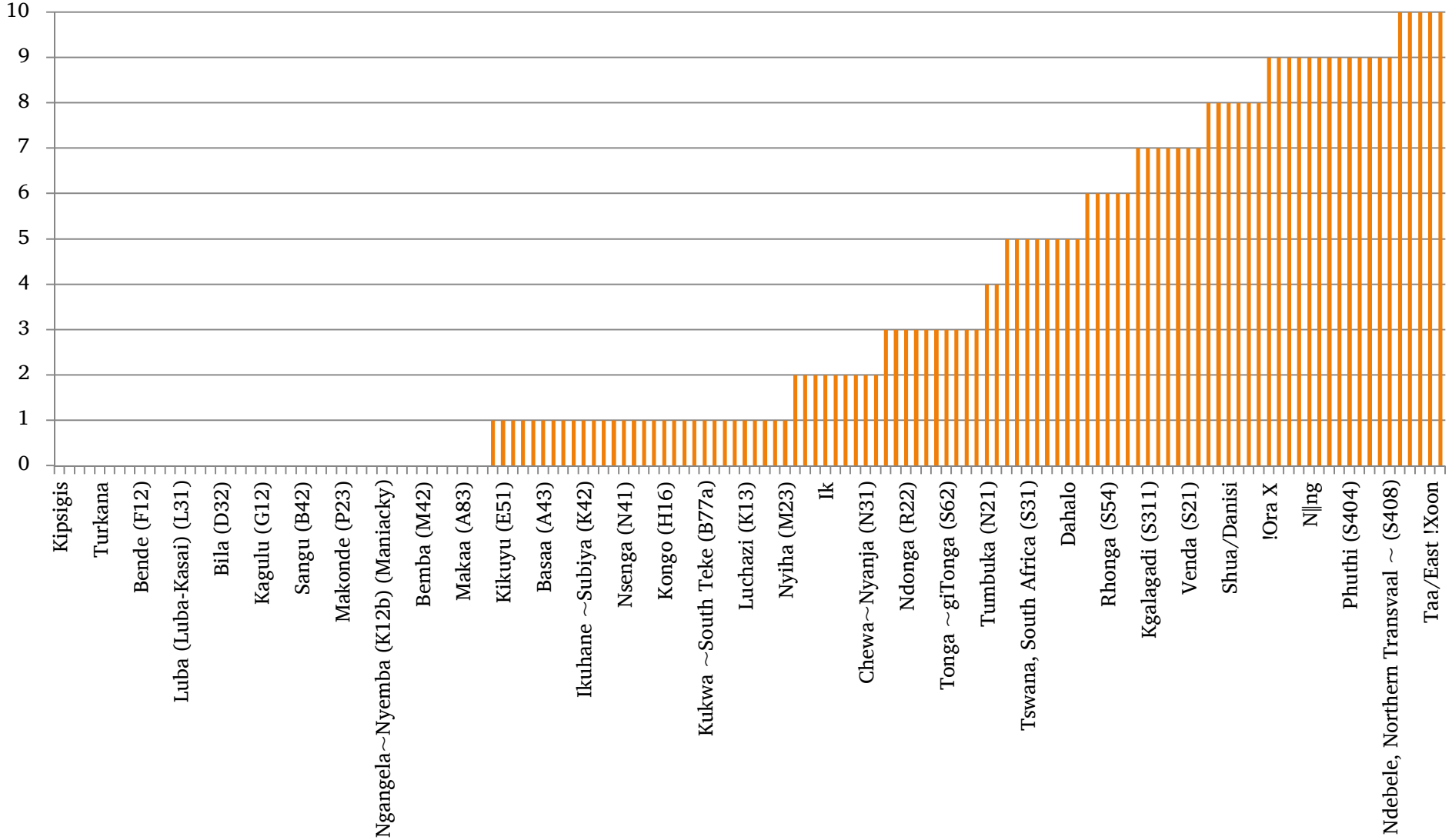
Histogram

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



5. Results: Southern Africa

Features by language



5. 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	1
Nilotic (6)	0	0	0.167	0	0	0	0	0	0	0.167
Kuliak (1)	0	0	0	0	1	0	0	0	0	1
Moru-Mangbetu (3)	1	0	1	0	0	0	0	0	0	1
"Ubangian" (8)	0	0	0.125	0	0	0	0	0	0.125	0.625
N-Bantu Bantoid (1)	0	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	0.05
Germanic (Afrikaans afr)	0	0	0	0	0	0	0	1	1	1
'South' Cushitic (3)	0.33	0.33	1	0	1	0	0.67	0	0.67	1
Sandawe, Hadza (2)	1	1	1	1	1	0	0	0	0.5	1
Bantu K30 (3)	0.67	1	0.67	0	0	0	0.33	0	0.67	0
Bantu R40 (1)	1	1	1	1	1	0	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	1
Bantu S60 (2)	1	0.5	0.5	1	0.5	0	0	0.5	0.5	0
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	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
0: wrong/no; <0.26 infrequent, 0.26 - 0.74 common, >0.74 very frequent; 1: true/yes										
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

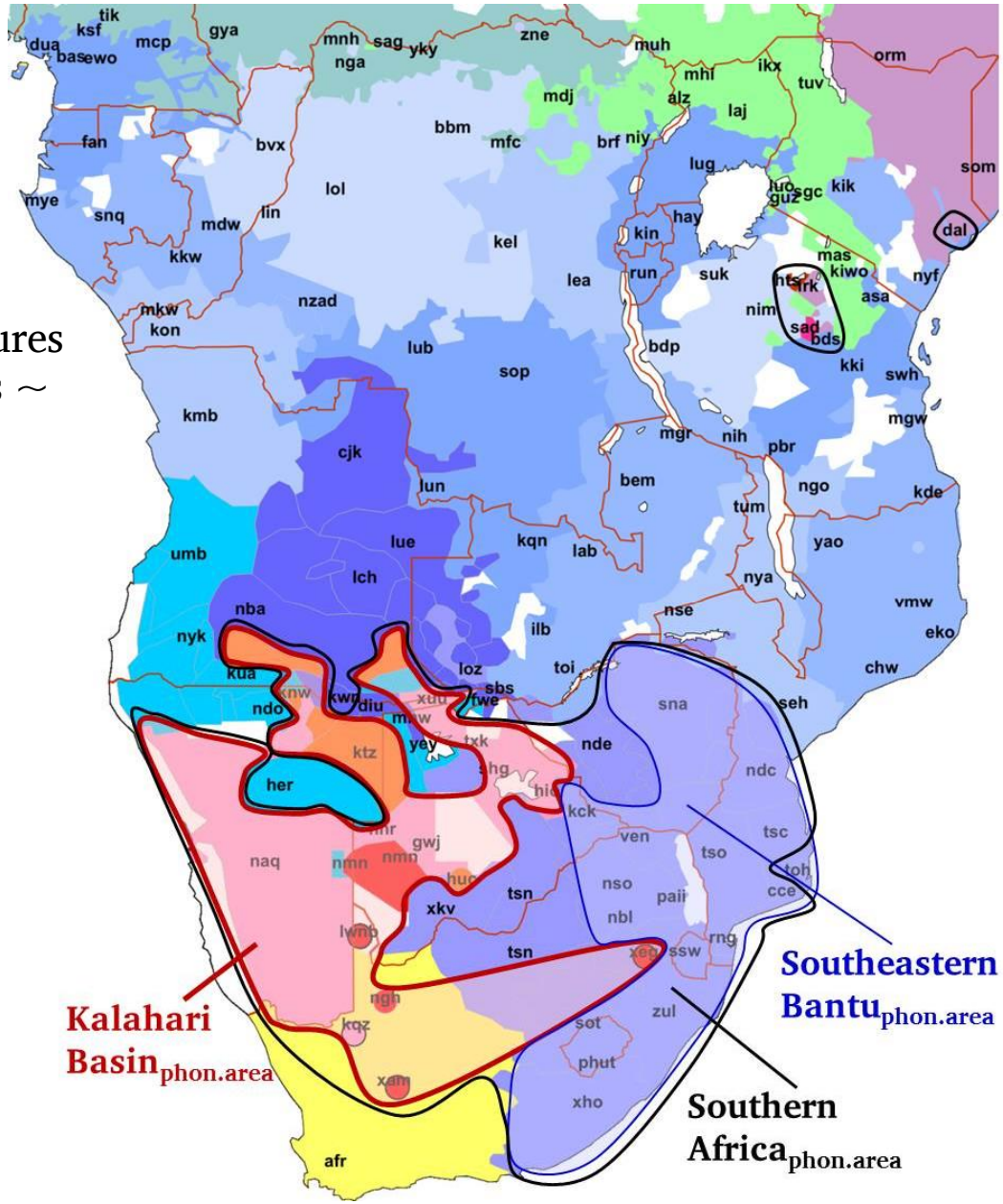
5. Results: Intermediate summary

3 phonological areas

- Kalahari Basin: best

- Southern Africa: recognizable; Kalahari Basin languages with most complying features; several features related to features of Kalahari Basin (e.g. presence of clicks ~ large number of clicks)
  - if 'contiguous area' is not a criterion: Sandawe, Hadza, and South Cushitic included!

- Southeastern Bantu: weakest; strong genealogical component (shared innovations?) cannot be excluded



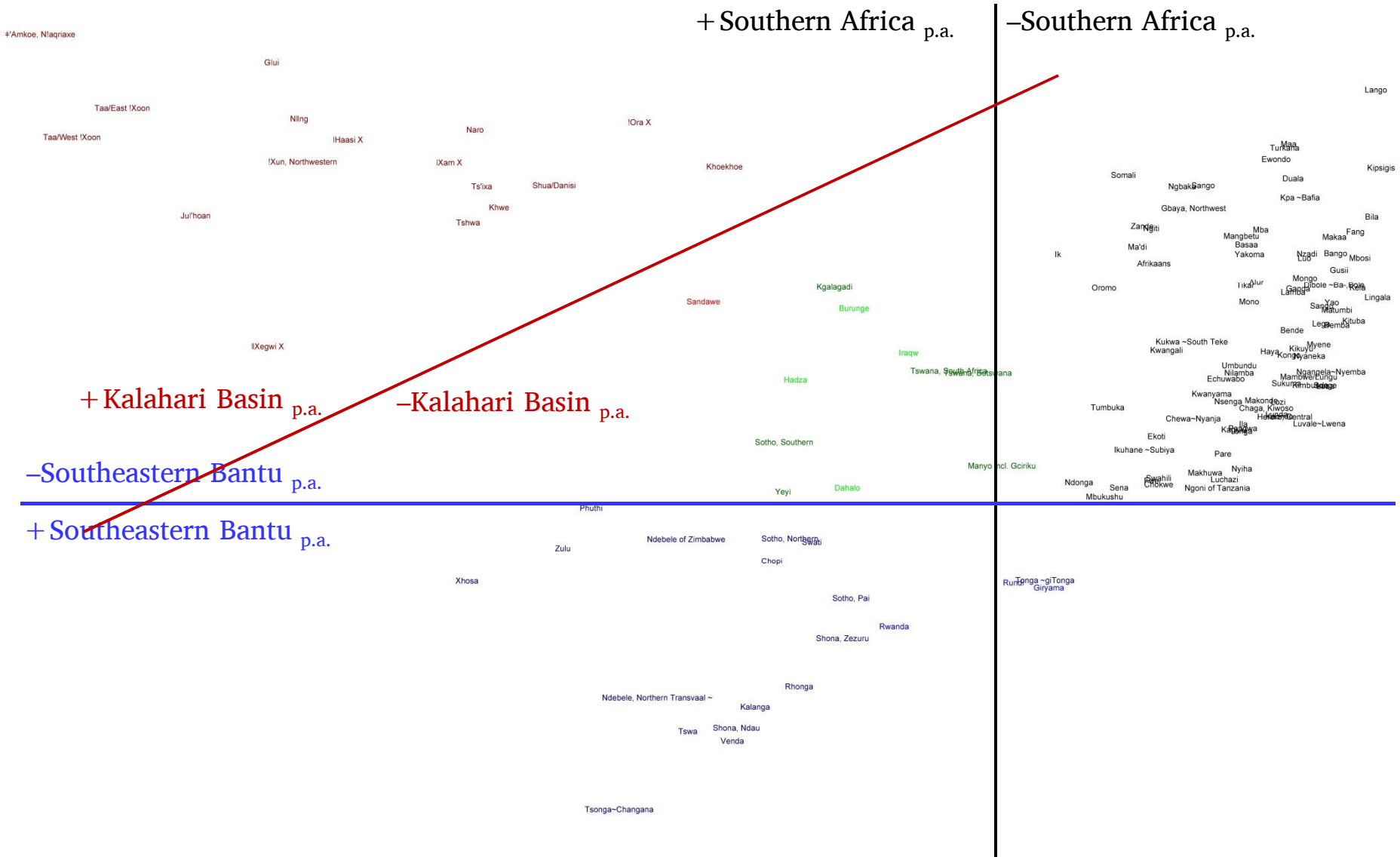
6. Results: MDS

Multidimensional scaling (MDS) and k-means clustering

- based on 59 (/81) features with areal distributions in subequatorial Africa
- including features NOT relevant for Southern Africa, e.g. labial-velar consonants (k͡p), non-sibilant dental fricatives (θ, ð), or bilabial rhotics (ⱱ, ʙ)
- probably biased to Southern Africa, however:
  - several features related to clicks
    - presence of double-articulated consonants (incl. clicks, k͡p, p͡k, etc.)
    - presence of ingressive consonants (clicks)
    - number of click types (ʘ, ǀ, ǃ, ǃǃ, ǂ, ǁ)
  - only one feature related to implosives
    - presence of implosives

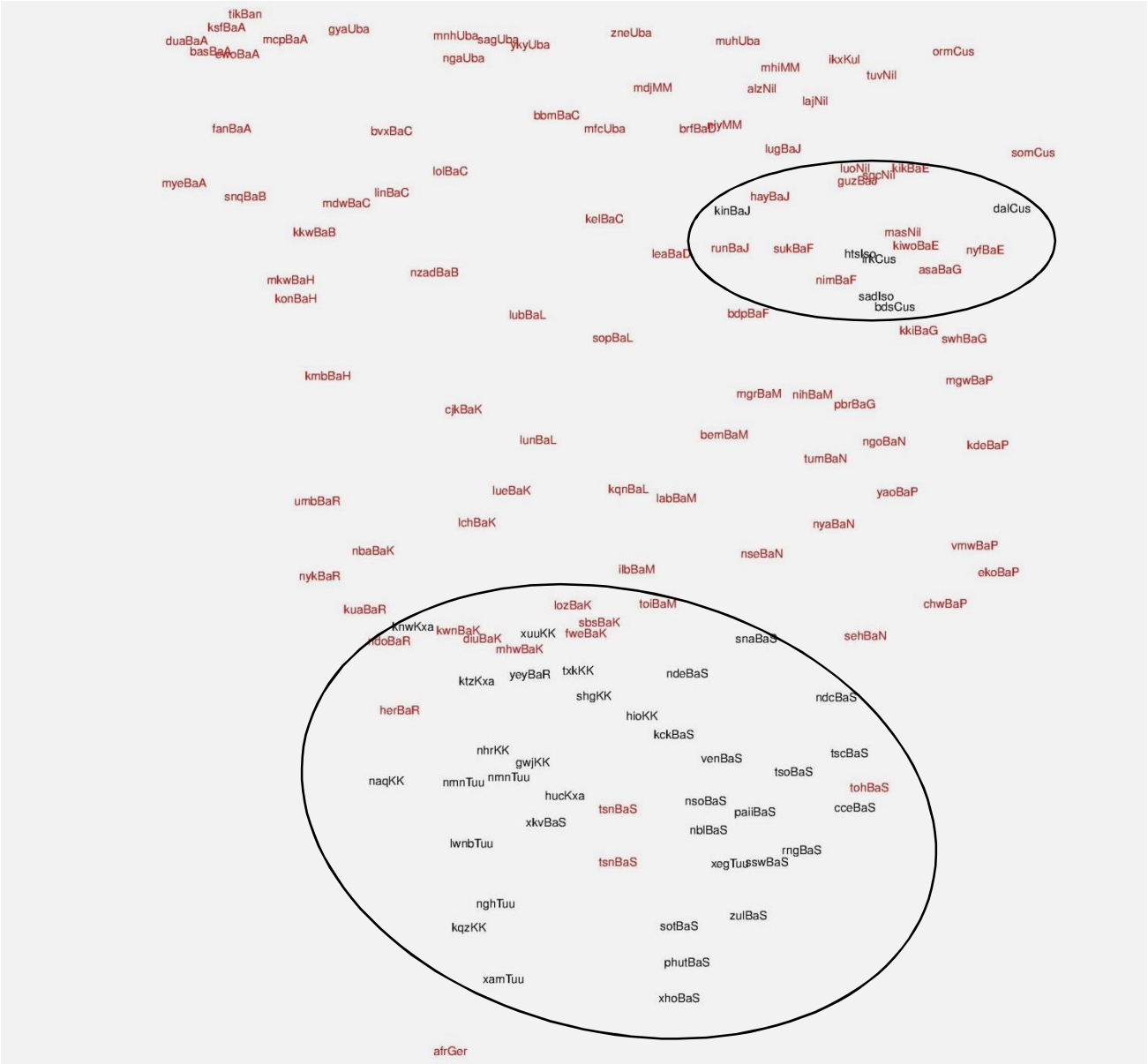
6. Results: MDS

MDS plot



6. Results: MDS

k-means clustering (2)



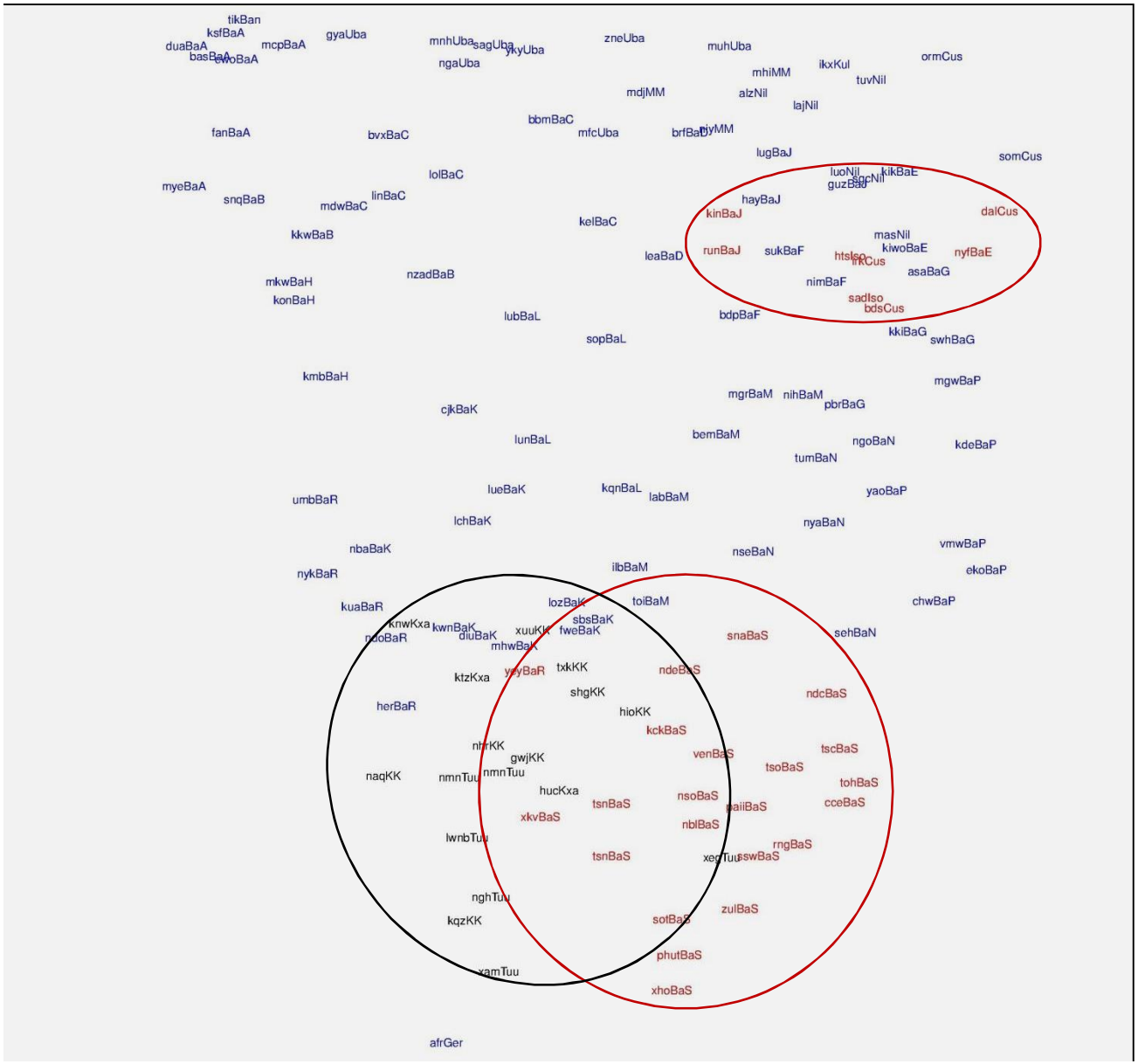
Subequatorial Africa

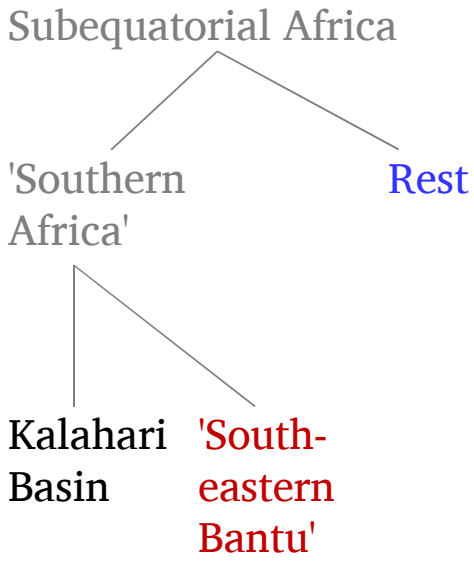
'Southern Africa'

Rest

6. Results: MDS

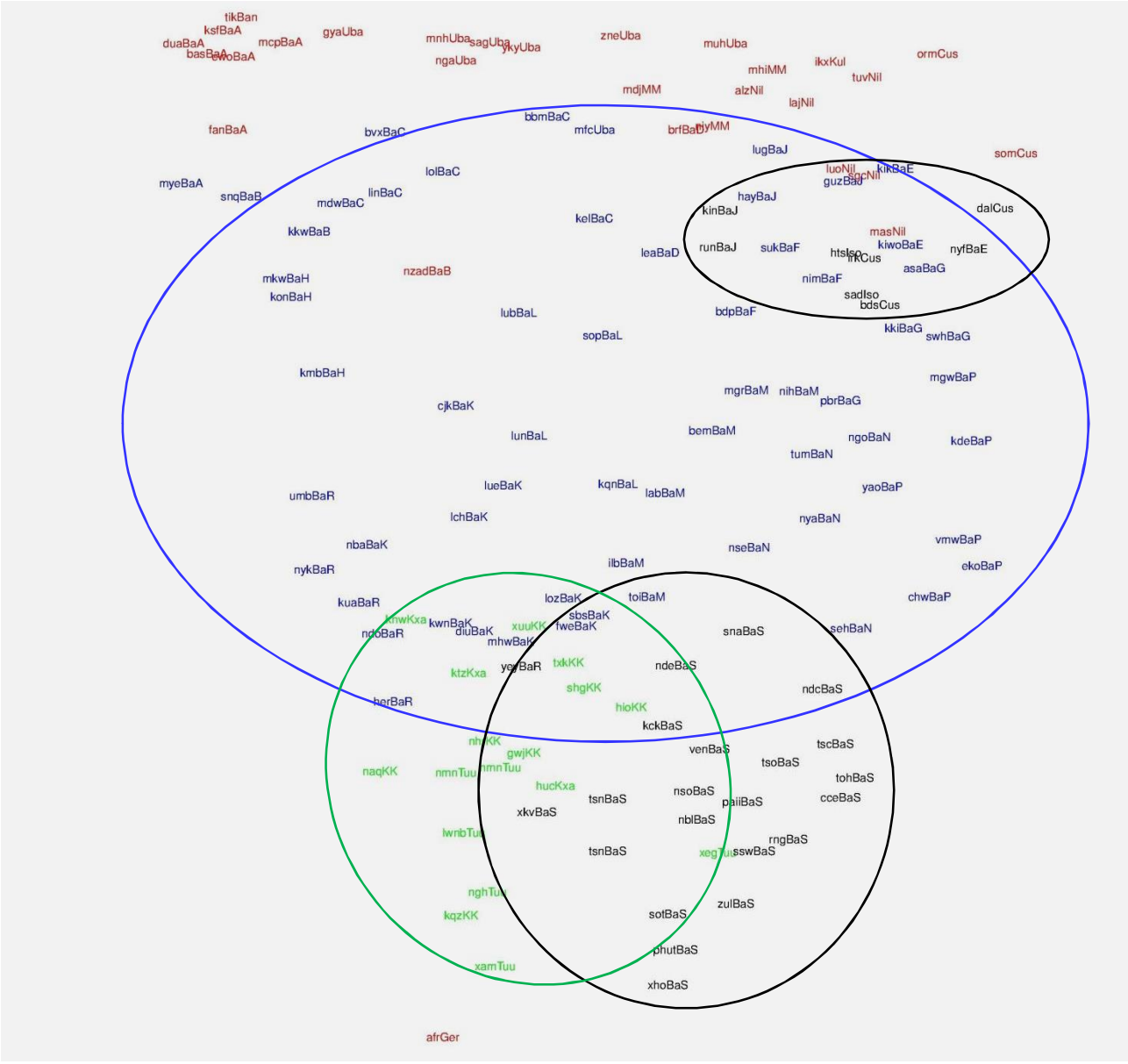
k-means clustering (3)

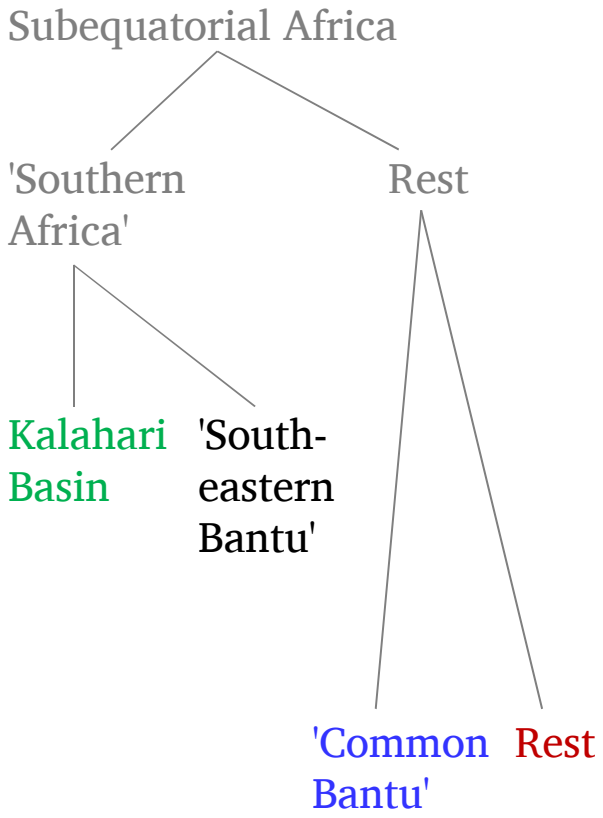




6. Results: MDS

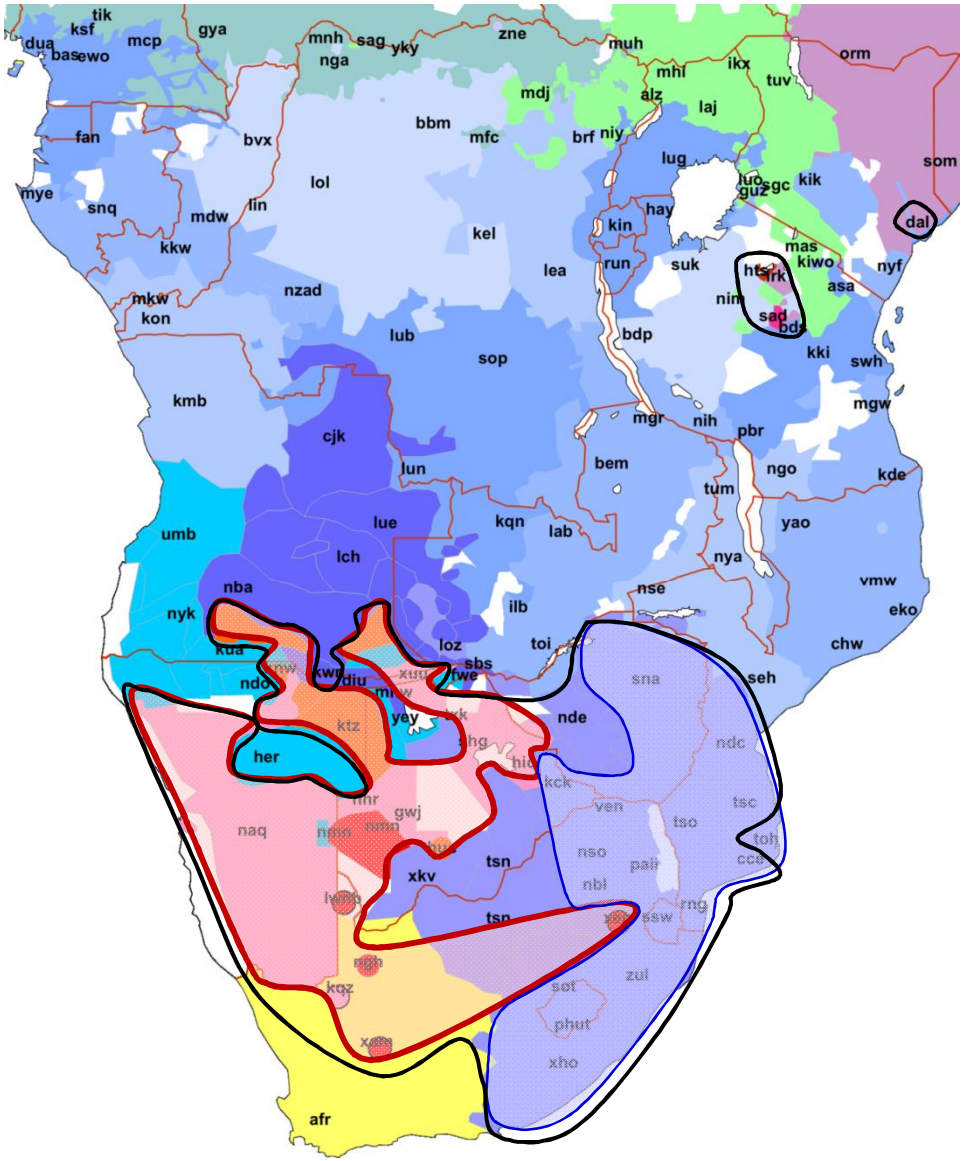
k-means clustering (4)



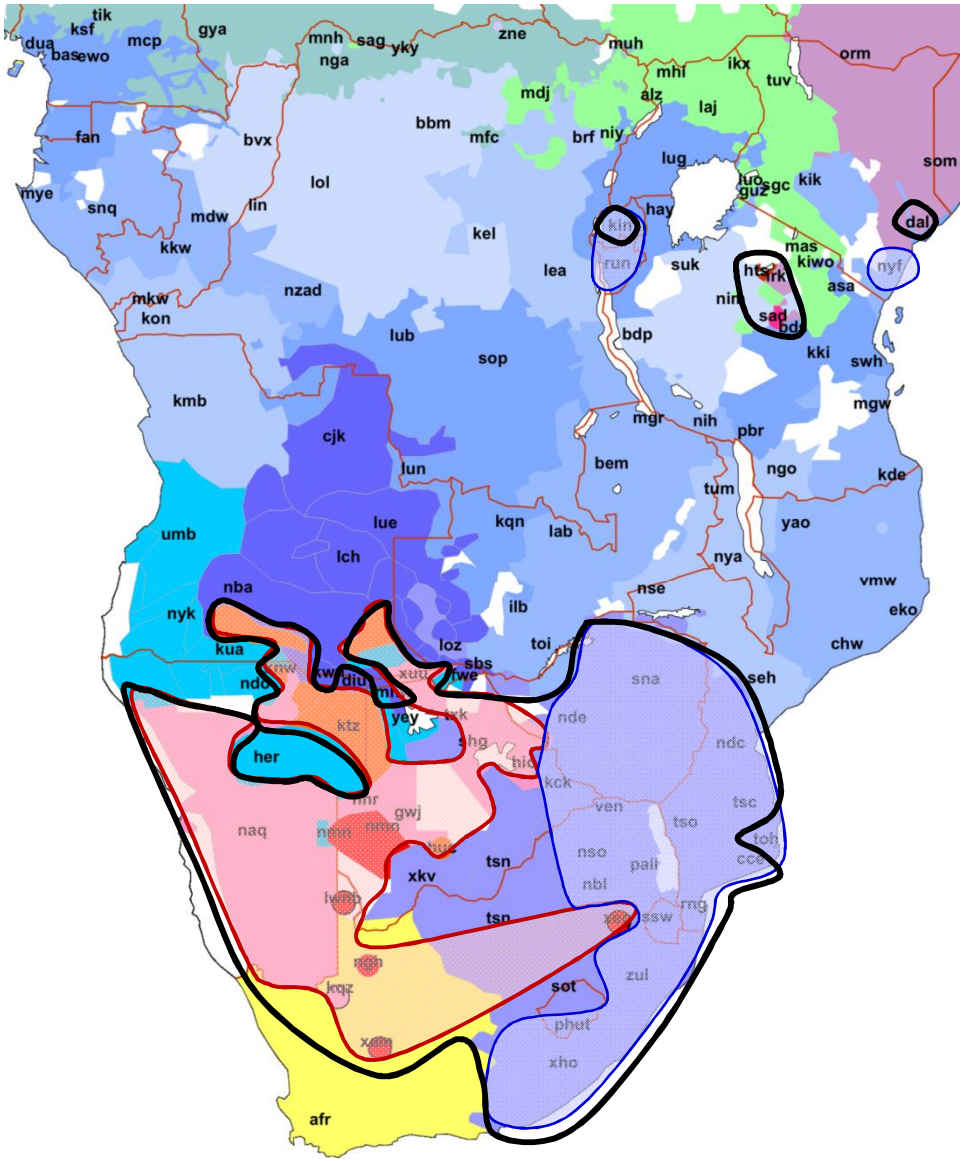


6. Results: MDS

'Hand-made' analysis



Similar: MDS-based analysis



7. Summary

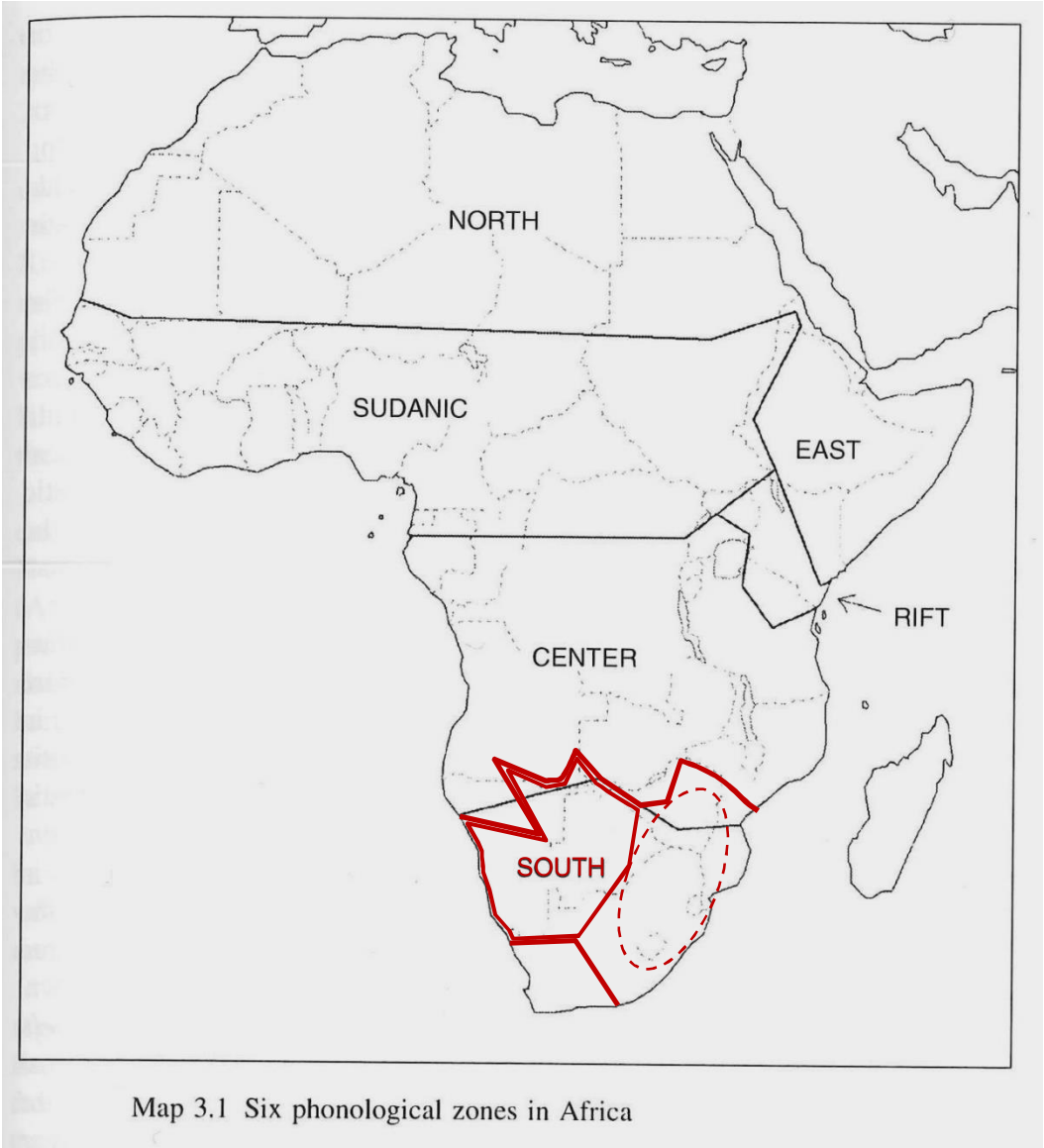
Conclusions

- 3 phonological areas: Kalahari Basin, Southeastern Bantu (?), Southern Africa
  - *'Southern Africa' related to the 'Kalahari Basin' (>Khoisan substrate as main factor?)*
- Kalahari Basin ≈ pronounced linguistic area (clear boundary/ definition)
  - *but: only second to 'Southern Africa' in MDS and k-means clustering*
- 'Southeastern Bantu' – apparent subarea, but weakest and questionable
  - *largely excluding Sotho-Tswana*
  - *multiple relations to East African languages?*
- Southern Africa
  - *Kalahari Basin + SE Bantu + Sotho-Tswana + Yeyi + Bantu K.30? (+East Africa)*
  - *primary phonological area within subequatorial Africa > Southern Bantu languages DO constitute one phonological area with Kalahari Basin (+partially E.Africa)*
  - *some Southern African languages outside the phonological area*
    - Lozi (Sotho-Tswana language)
    - Herero, Wambo languages
    - Afrikaans
  - *various relations to East African languages < multiple relations? (Sandawe - Khoe-Kwadi?, S.Bantu - E.Bantu, especially Shona - Rundi/Kinyarwanda and Gitonga - Mijikenda?)*
  - *> due to (?)*
    - *Khoisan substrate*
    - *increased network of relations*
    - *repeated historical relations to East Africa*

7. Summary

Conclusions

- Å vs. Clements & Rialland (2008):
  - generally valid
  - Shona group (S10) belonging to the phonological area of Southern Africa
  - Wambo and Herero groups (R20, R30) and Afrikaans (and Lozi) excluded
  - 'core': Kalahari basin/'South African Khoisan'
  - (probable second southeastern nucleus)
  - somehow related to "Rift"



Map 3.1 Six phonological zones in Africa

Figure: Clements & Rialland (2008: 37)

Acknowledgements

Å Linda Gerlach (sharing unpublished data)

Å Anne-Maria Fehn (sharing unpublished data)

Å Tom Güldemann (sharing his library, comments)

Å (Hans-Jörg Bibiko !)

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