

Phonology of East Caucasian languages

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Outline of the talk

Introduction

Data

Methods

Inventory size

Frequency analysis

Comparison to other databases

Suprasegmental features

About phonology of East Caucasian languages

- phonology
 - [Kibrik and Kodzasov 1990]
 - The indigenous languages of the Caucasus: [Job and Smeets 1994], [Smeets 1994]
 - Yaziki mira: [Alekseev et al. 2001] and predecessor projects
 - [Grawunder 2017]
 - The Oxford Handbook of Languages of the Caucasus: [Beguš 2021], [Boris 2021a], [Boris 2021b]
 - Handbook of Caucasian Languages: [Koryakov and Maisak Fort]
 - and phonological parts in more general descriptions of East Caucasian languages
- historical-comparative phonetics
 - S. M. Gasanova, G. Kh. Ibragimov, P. T. Magomedova, U. A. Meylanova, B. B. Talibov, S. M. Khaydakov, A. E. Alekseev, Ju. D. Desheriev, B. K. Gigineishvili, D. S. Imnaishvili, J. Nichols, S. L. Nikolayev, S. A. Starostin, A. S. Kasyan, N. A. Ardoteli, O. A. Mudrak

The main goal of this lecture

During the talk we will:

- discuss the size of consonant and vowel inventories of East Caucasian languages
- explore sounds that are typical for East Caucasian languages
- try to figure out what a typical inventory consists of
- compare with typological databases (PHOIBLE [[Moran and McCloy 2019](#)], Eurasian phonological inventories [[Nikolaev et al. 2015](#)])

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Languages

- Nakh
 - Chechen
 - Ingush
 - Tsoved-Tush
(Bats, Batsbi)
- Tsezic (Didoic)
 - Tsez
 - Hinuq
 - Bezhta
 - Hunzib
 - Khwarshi-Inkhoqwari
- Avar-Andic
 - Avar
 - Andi
 - Botlikh
 - Godoberi
 - Chamalal
 - Karata
 - Tindi
 - Bagvalal
 - Akhvakh
 - Dargwa
 - Lak
- Lezgic
 - Archi
 - Tabasaran
 - Aghul
 - Lezgian
 - Udi
 - Budukh
 - Kryz
 - Rutul
 - Tsakhur
 - Khinalug

Languages not present in [Kibrik and Kodzasov 1990]

- Nakh
 - Chechen
 - Ingush
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 - Tsakhur
 - Khinalug

Languages not present in [Kibrik and Kodzasov 1990]

- Andic, Bagvalal [Kibrik et al. 2001]
- Andic, Botlikh [Alexeyev and Verhees Fort]
- Andic, Godoberi [Moroz et al. Fort]
- Andic, Karata [Magomedbekova 1971]
- Dargwa, Mehweb [Moroz 2019]
- Nakh, Chechen [Nichols 1994a]
- Nakh, Ingush [Nichols 1994b]
- Nakh, Tsoved-Tush [Holisky and Gagua 1994]

Data

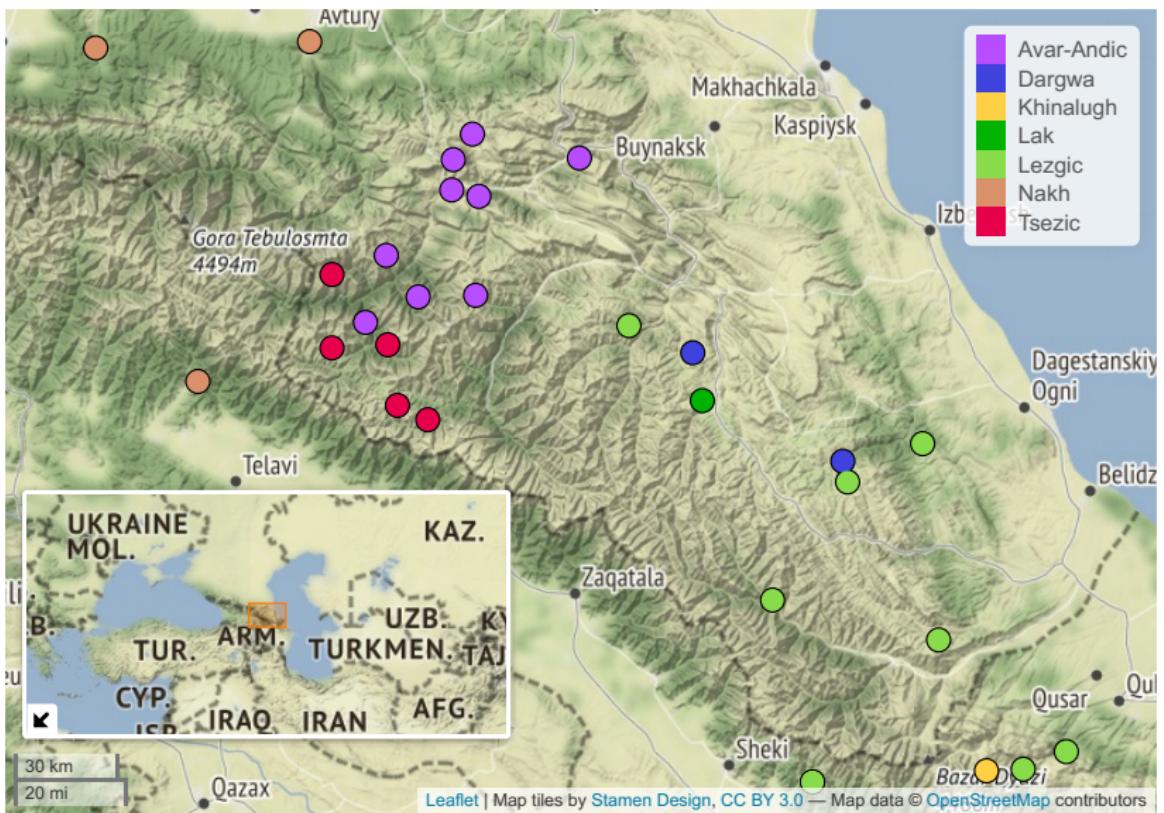
1905 × 9 **table** with the following columns:

- id
- branch
- language
- segment IPA
- segment source
- source
- sound type
- comments
- glottocode

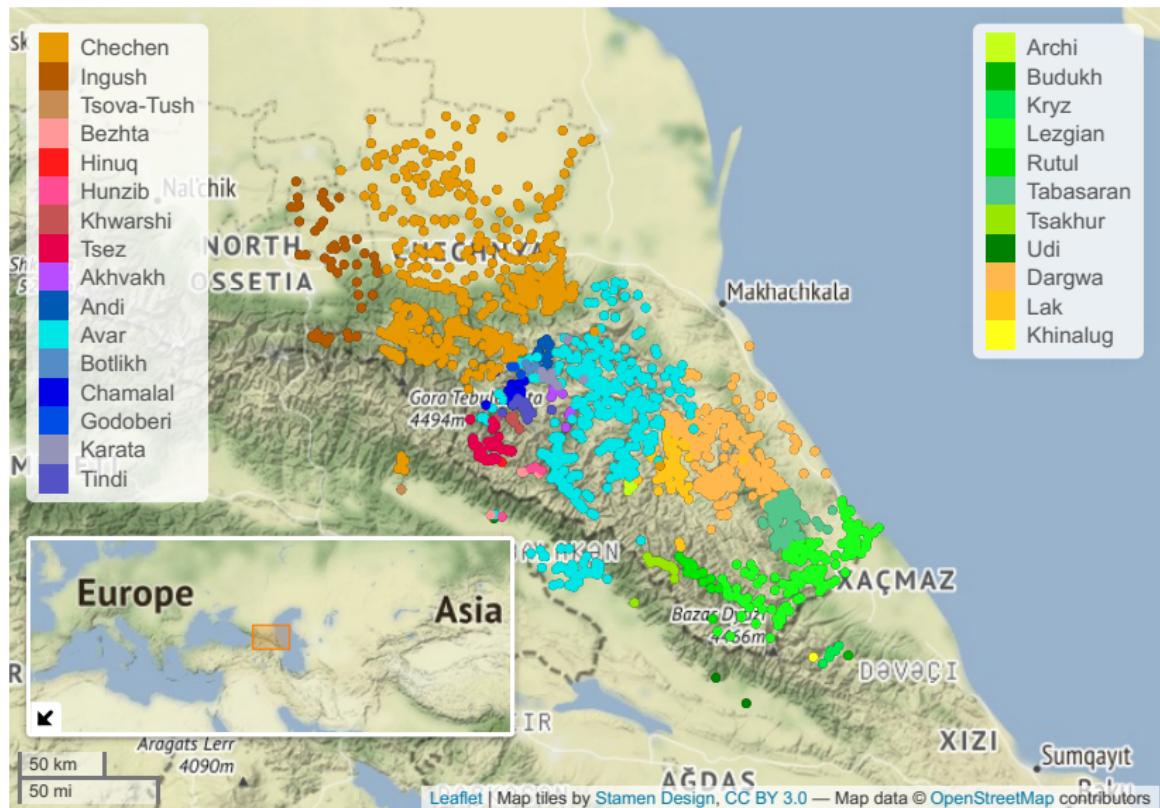
1905 × 9 **table** with the following columns:

- id – 1407
- branch – Lezgic (possible values are Avar-Andic, Dargwa, Khinalugh, Lak, Lezgic, Nakh, Tsezic)
- language – Tsakhur
- segment IPA – tʃ:
- segment source – č
- source – [Kibrik, Kodzasov 1990: 343-344]
- sound type – consonant (possible values are consonant, vowel, diphthong)
- comments – rare sound
- glottocode – [tsak1249](#)

Data (language view)



Data (village view)



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- List all inventories one by one
 - boring,
 - mechanical,
 - hard to make generalizations (at least, on the fly)

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 - some of them can be visualised with a map
 - some of them can be gathered via frequency and combinatorics analysis

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- Maybe similar generalizations can be made with a data driven analysis?
 - some of them can be visualised with a map
 - some of them can be gathered via frequency and combinatorics analysis
 - this is not something new, more or less the same thing has been done for Australian languages [[Gasser and Bowern 2014](#)]

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Methods

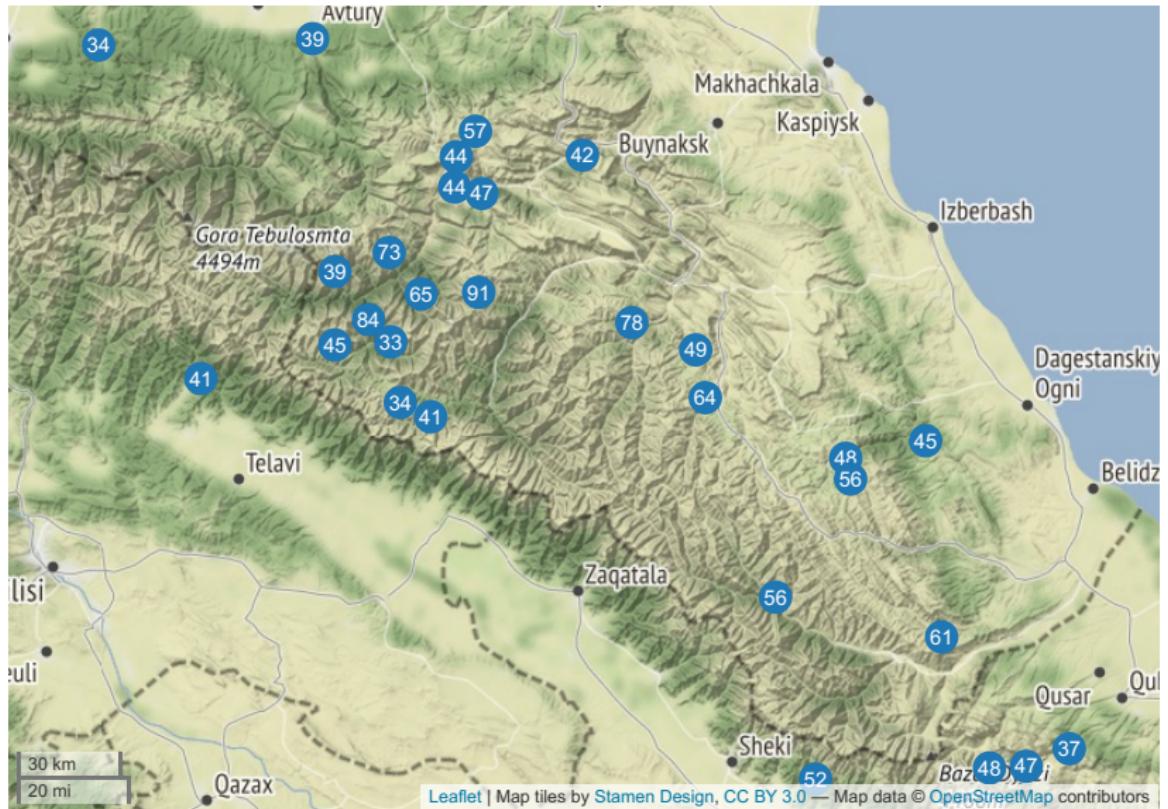
Inventory size

Frequency analysis

Comparison to other databases

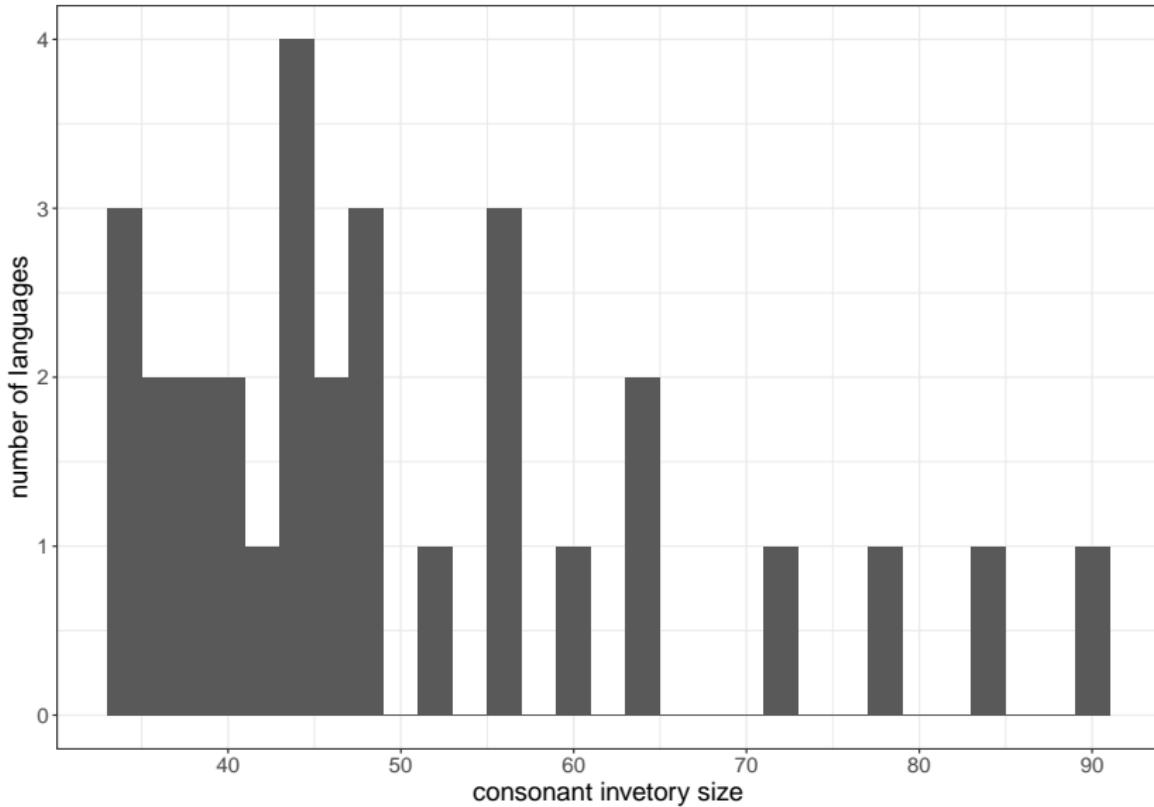
Suprasegmental features

Consonants



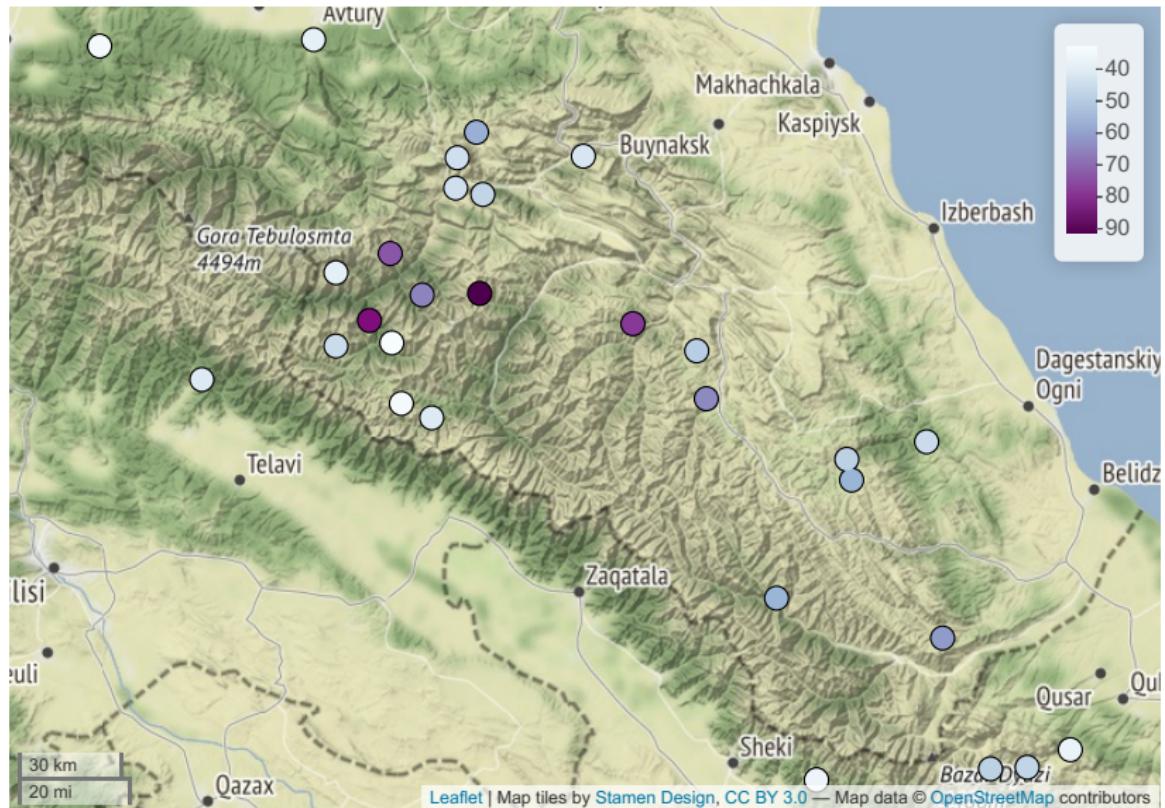
Consonant inventories range from 33 to 91 consonants.

Consonants



Most of the languages have 42 ± 5 consonants.

Consonants



Most of the huge systems are represented in Andic and grouped together.

Consonants

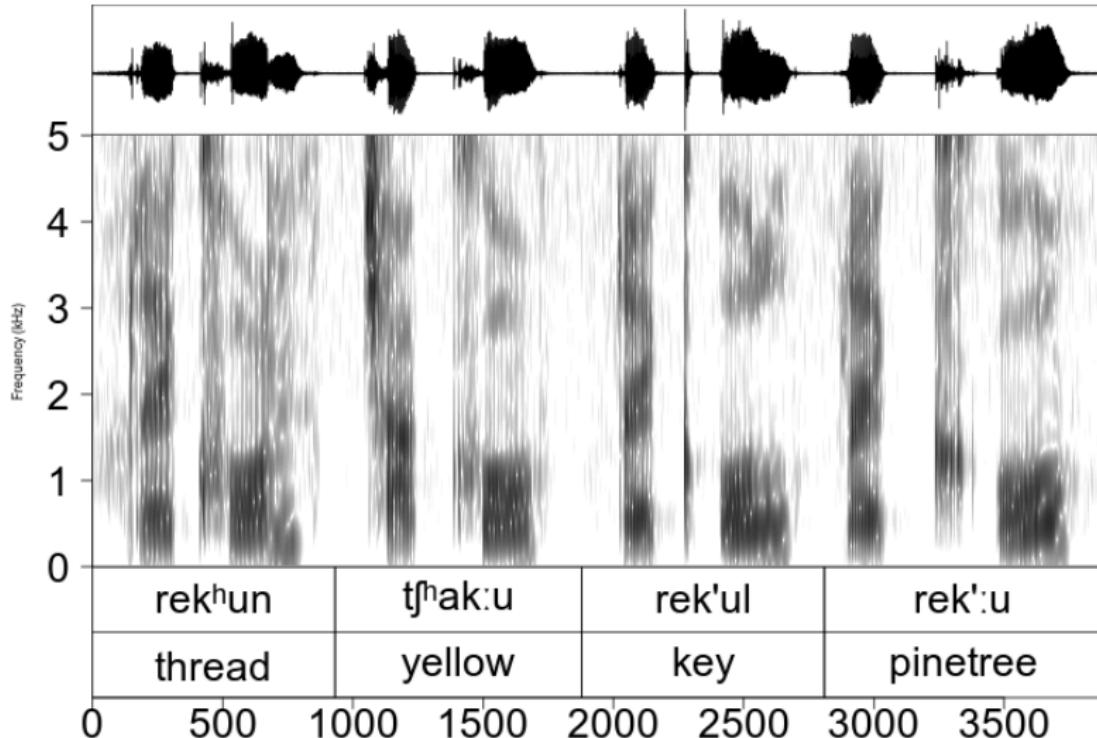
- Akhvakh (Andic) – 91
- Tindi (Andic) – 84
- Chamalal (Andic) – 73
- Archi (Lezgic) – 78
- ...
- Ingush (Nakh) – 34
- Bezhta (Tsezic) – 34
- Inkhoqwari (Tsezic) – 33
- ejectives
- gemination (fortis)
- labialization

Consonants: Akhvakh vs. Inkhoqwari

b	d			dʒ				g					
	d ^w			dʒ ^w				g ^w					
p ^h	t ^h	ts	ts:	tʃ	tʃ:	tɬ	tɬ:	k	k:	q	q:		?
	t ^{hw}	ts ^w	ts: ^w	tʃ ^w	tʃ: ^w	tɬ ^w	tɬ: ^w	k ^w	k: ^w	q ^w	q: ^w		? ^w
p'	t'	ts'	ts: [']	tʃ'	tʃ: [']	tɬ'	tɬ: [']	k'	k: [']	q'	q: [']		
	t ^w	ts ^w	ts: ^w	tʃ ^w	tʃ: ^w	tɬ ^w	tɬ: ^w	k ^w	k: ^w	q ^w	q: ^w		
		z		ʒ						β			ɸ
		z ^w		ʒ ^w						β ^w			
		s	s:	ʃ	ʃ:	ɸ	ɸ:	x	x:	χ	χ:	h	h
		s ^w	s: ^w	ʃ ^w	ʃ: ^w	ɸ ^w	ɸ: ^w	x ^w	x: ^w	χ ^w	χ: ^w		h ^w
m	n												
w	r					l		j					

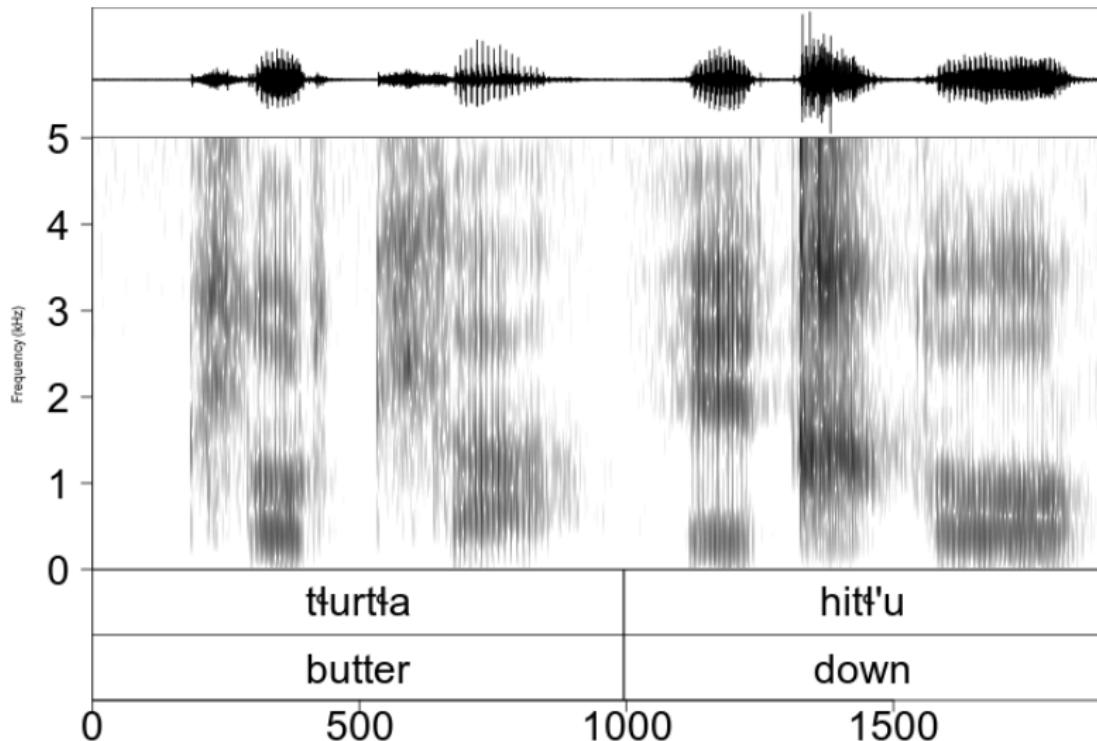
b	d		dʒ		g			
p ^h	t ^h	ts	tʃ	tɬ	k	q		?
p'	t'	ts'	tʃ'	tɬ'	k'	q'		
		z	ʒ			β	ɸ	
		s	ʃ	ɸ		χ	h	h
m	n							
w	r			l	j			

Gemination and ejectives (example from Zilo Andi)



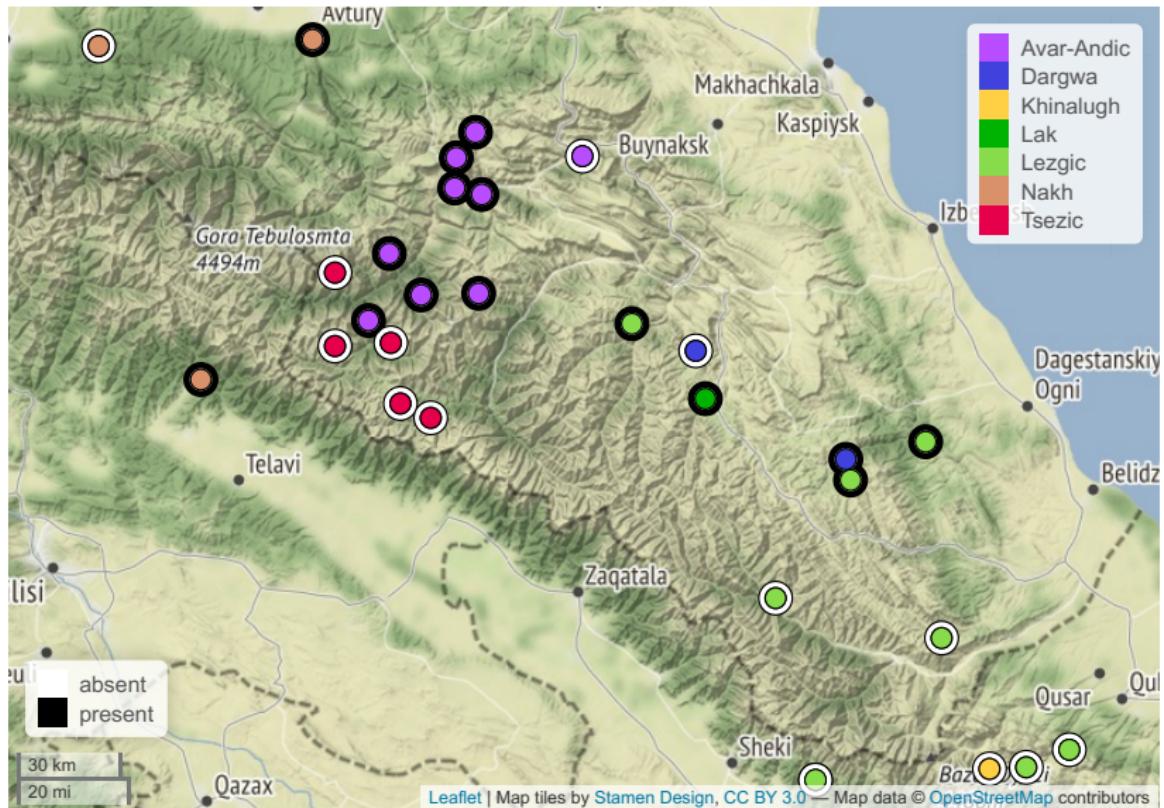
- Geminated aspirated have longer closure.
- Geminated ejectives have longer burst.

Laterals (example from Zilo Andi)



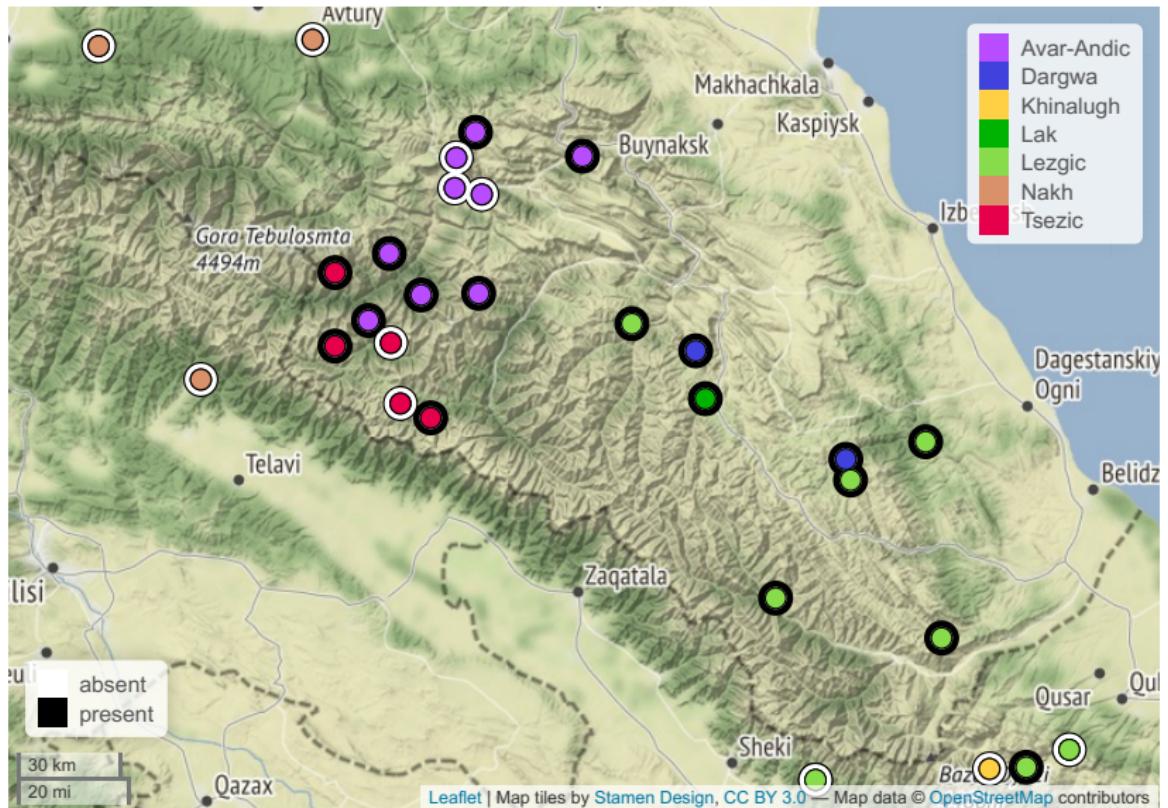
Looks like it is not t̪ but t̪: in Andic...

Geminate consonants



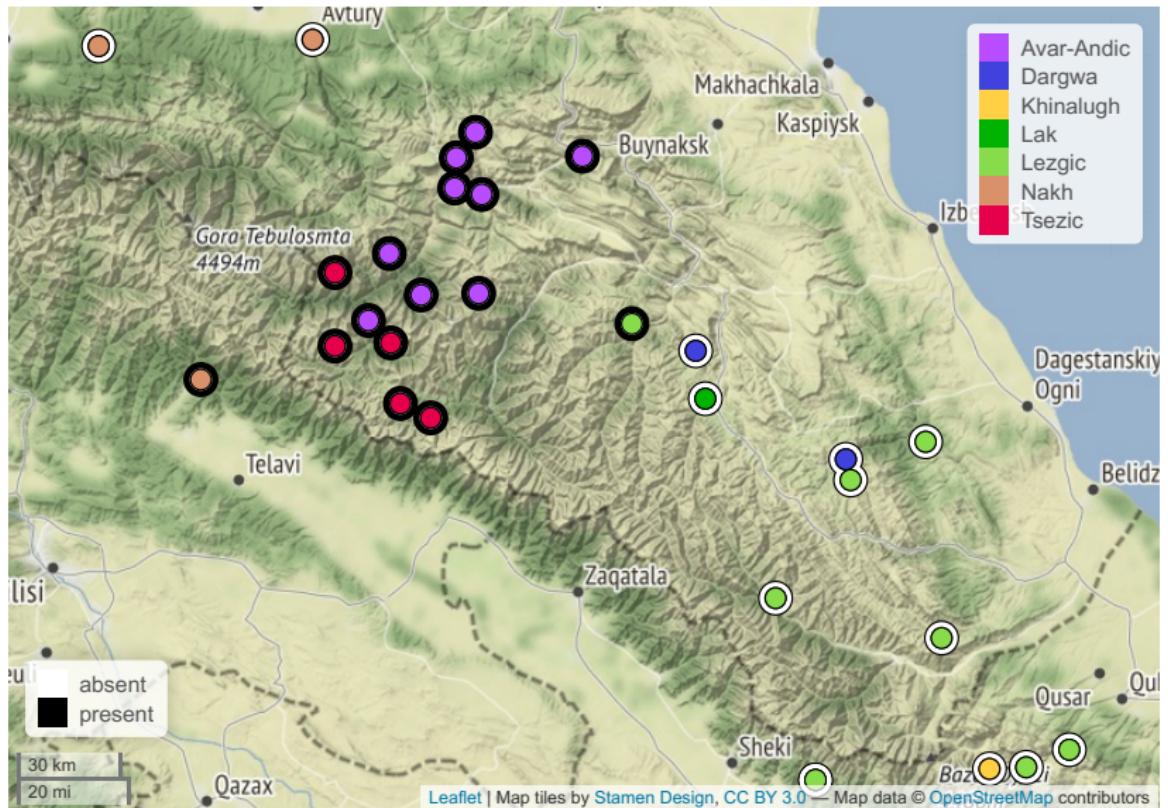
Geminate consonants are absent in Tsezic and most Lezgic.

Labialized consonants



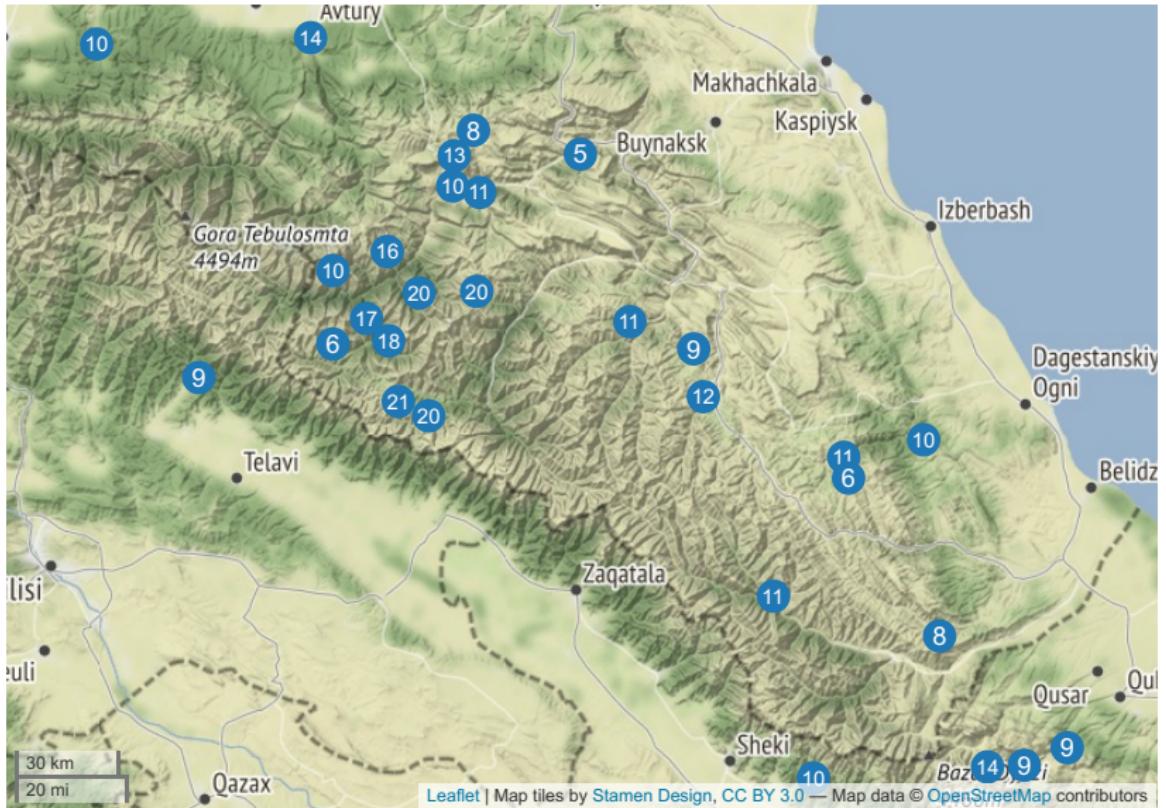
Labialized consonants are absent in Nakh, but more or less common through other branches.

Lateral consonants



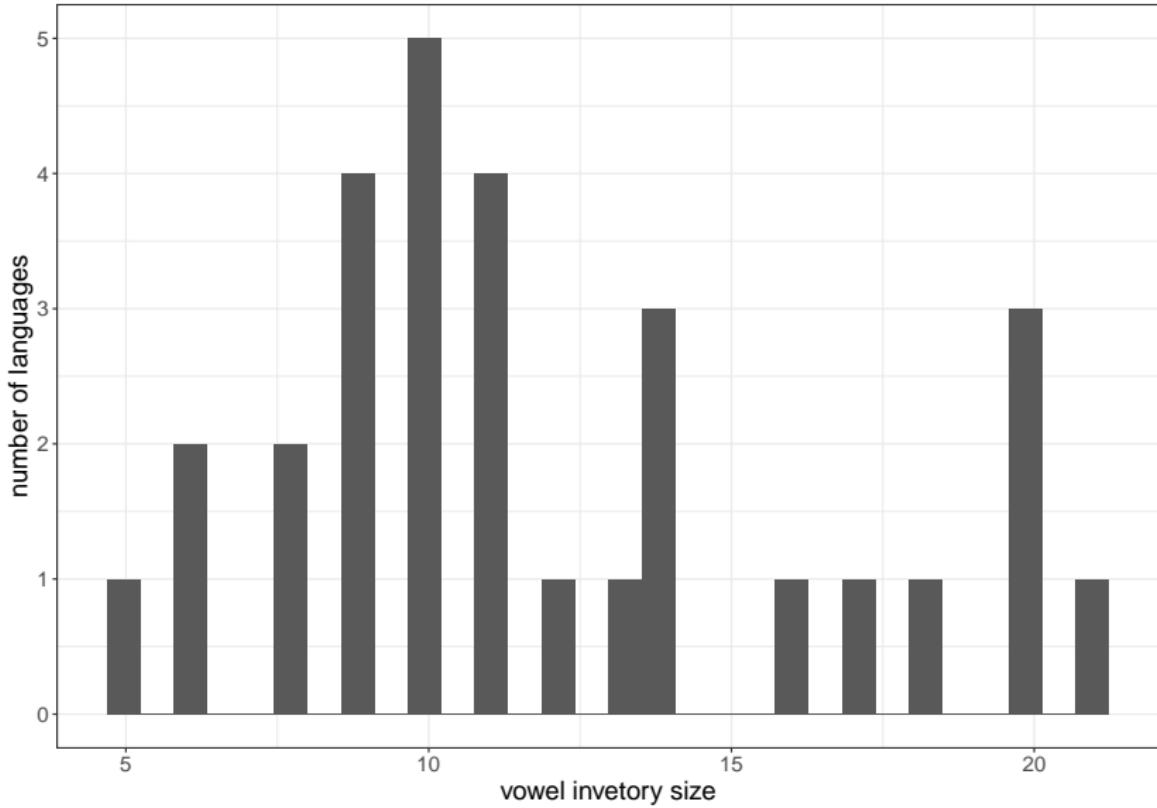
It looks like an areal pattern: all Avar-Andic and Tsezic, but also Tsvoa-Tush and Archi.

Vowels



Languages ranges from 5 to 21 vowels.

Vowels



Most of the languages have 10 ± 5 vowels.

Vowels

- Bezhta (Tsezic) – 21
- Akhvakh (Andic) – 20
- Hunzib (Tsezic) – 20
- Bagvalal (Andic) – 20
- ...
- Aghul (Lezgic) – 6
- Tsez (Tsezic) – 6
- Avar – 5

Vowels

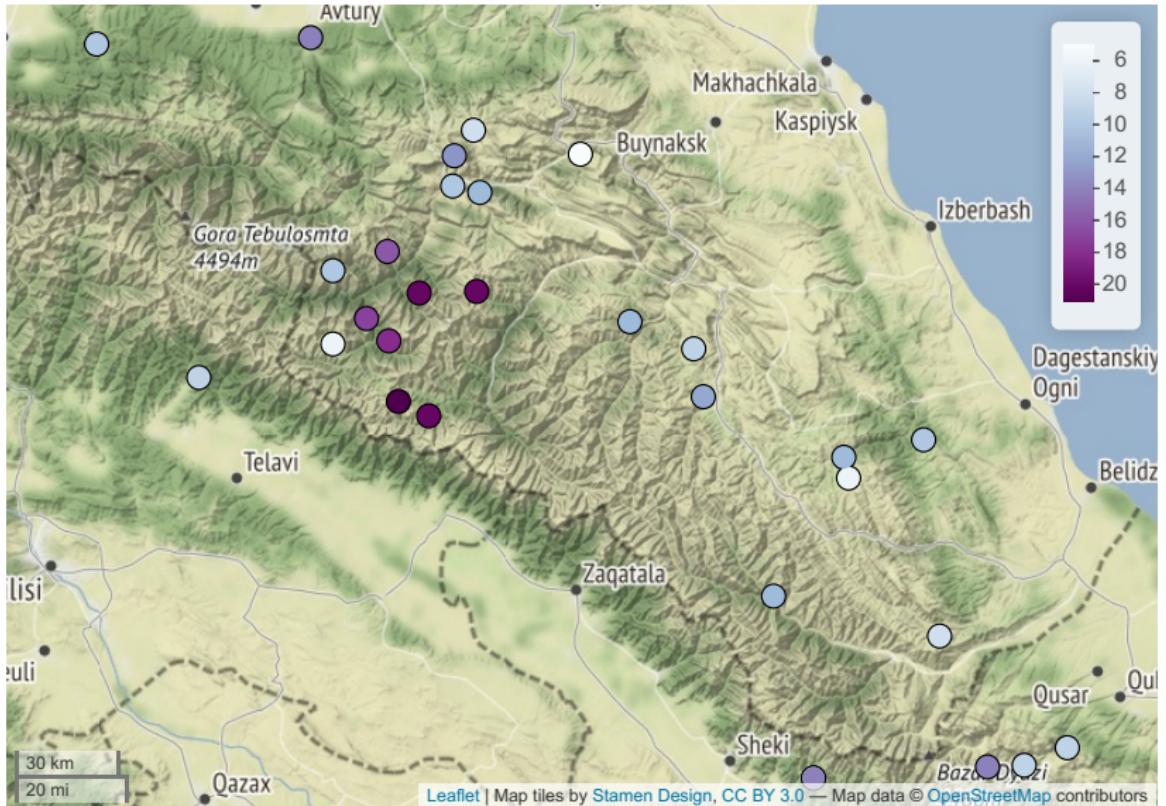
- Bezhta

i	i:	i ⁿ	y	y ⁿ				u	u:	u ⁿ
e		e ⁿ	ø					o	o:	o ⁿ
æ	æ:	æ ⁿ								
					a	a:	a ⁿ			

- Avar

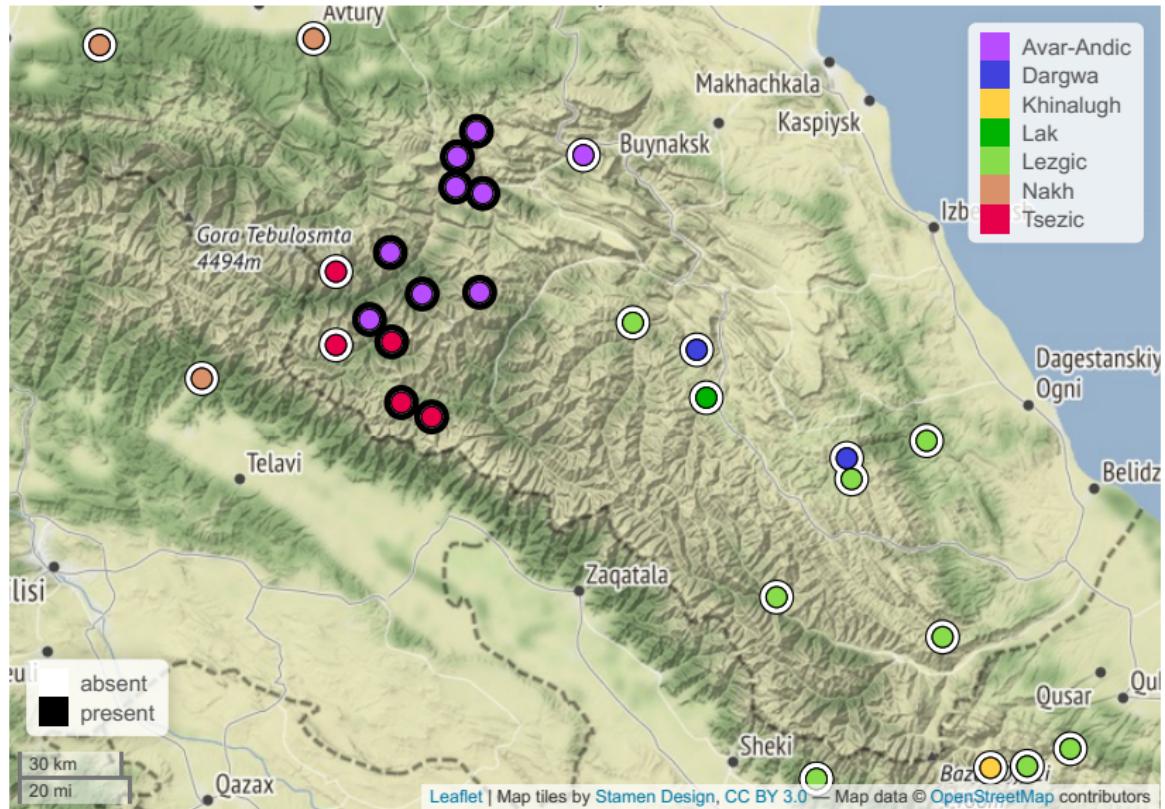
i		u
e		o
	a	

Vowels



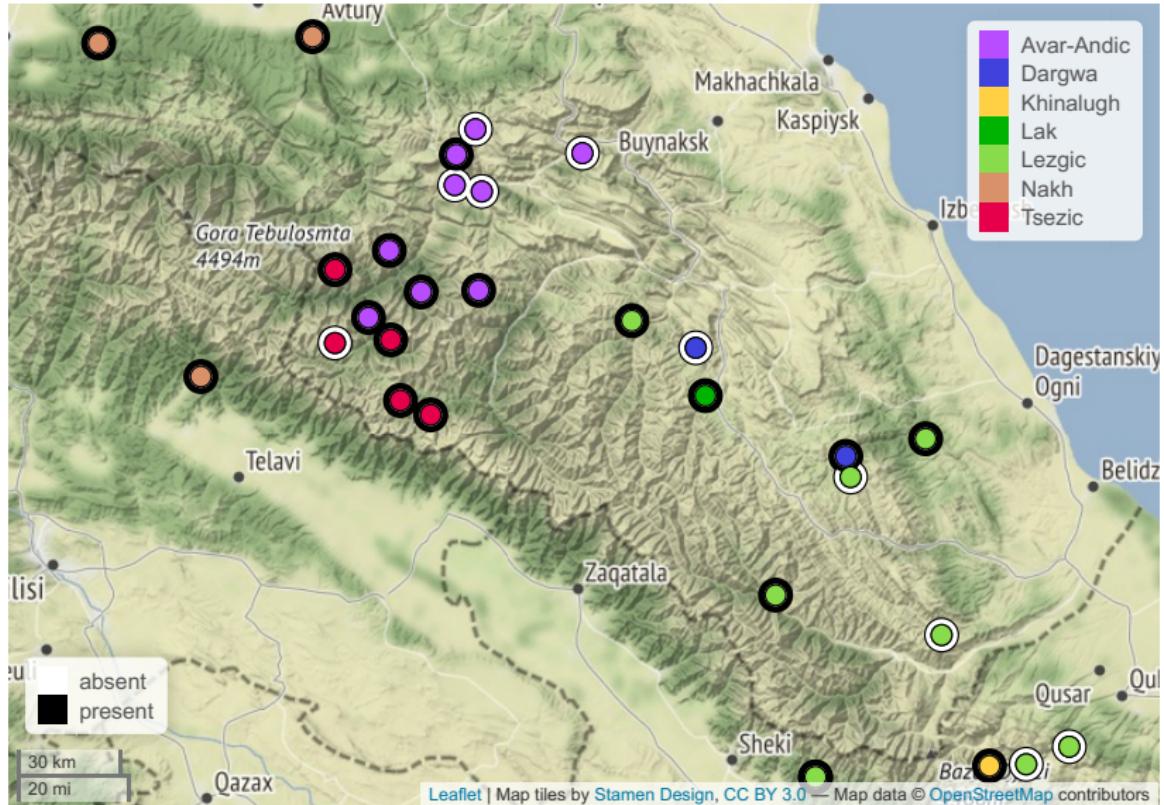
Most of the huge systems are presented in Tsezic and Andic.

Nasal vowels



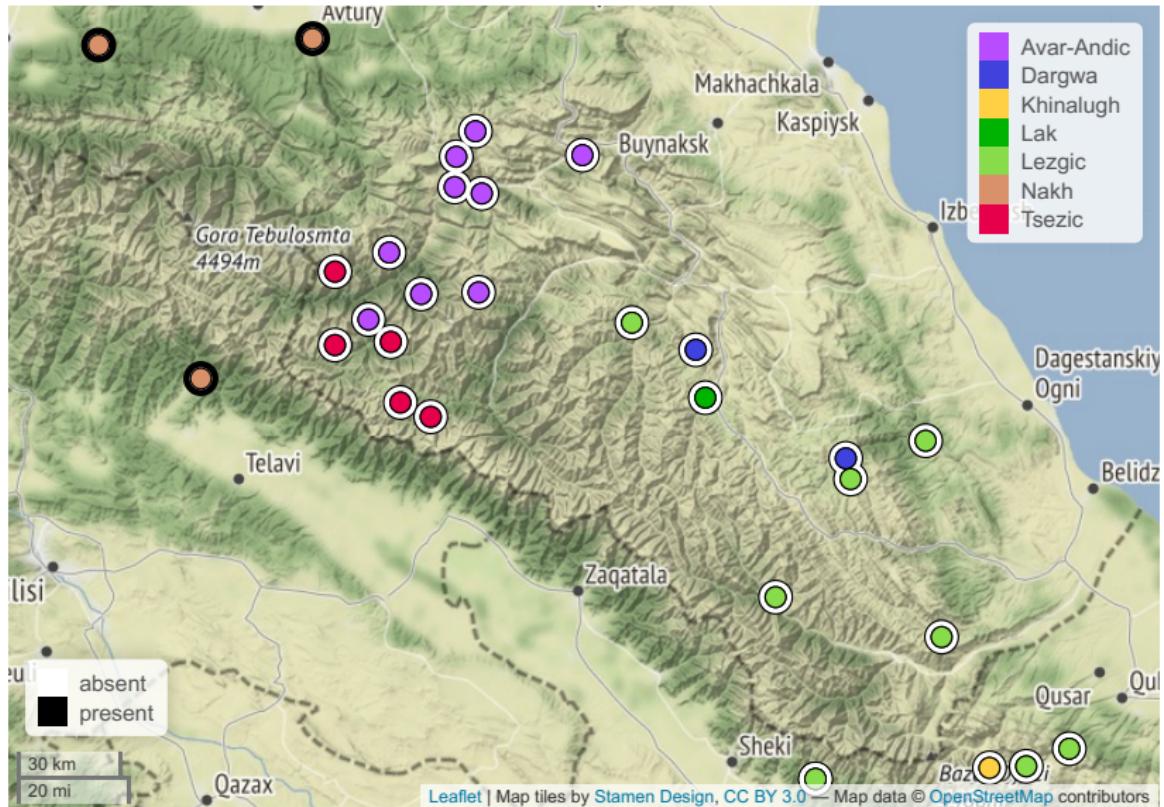
From Andic and Tsezic only Avar, Hinuq, and Tsez lack nasalized vowels.

Long vowels



Long vowels are common to all branches.

Diphthongs



Diphthongs are present only in Nakh.

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Segments present in all languages

b	d					g	
p ^h	t ^h					k ^h	?
		3					
	s	f					h
m	n						
	r			l	j		

- Where are the famous ejectives?

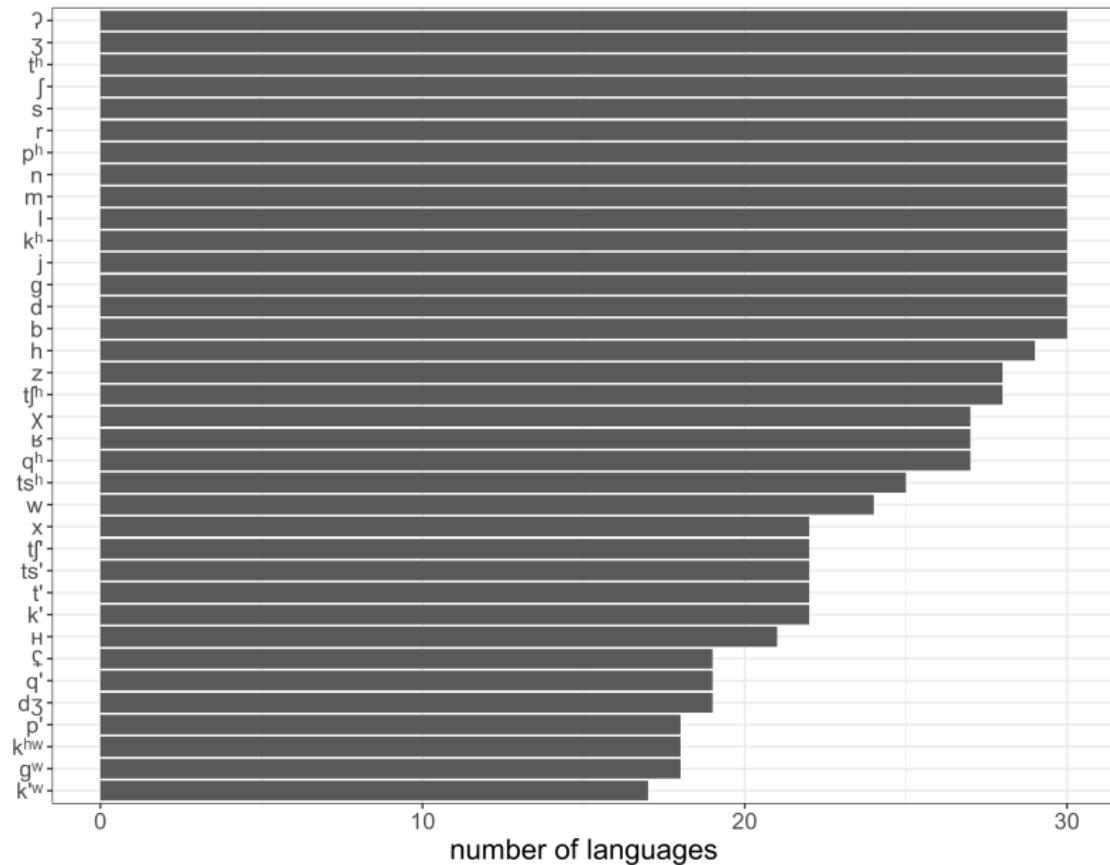
Segments present in all languages

b	d					g	
p ^h	t ^h					k ^h	?
		z					
	s	f					h
m	n						
	r		l	j			

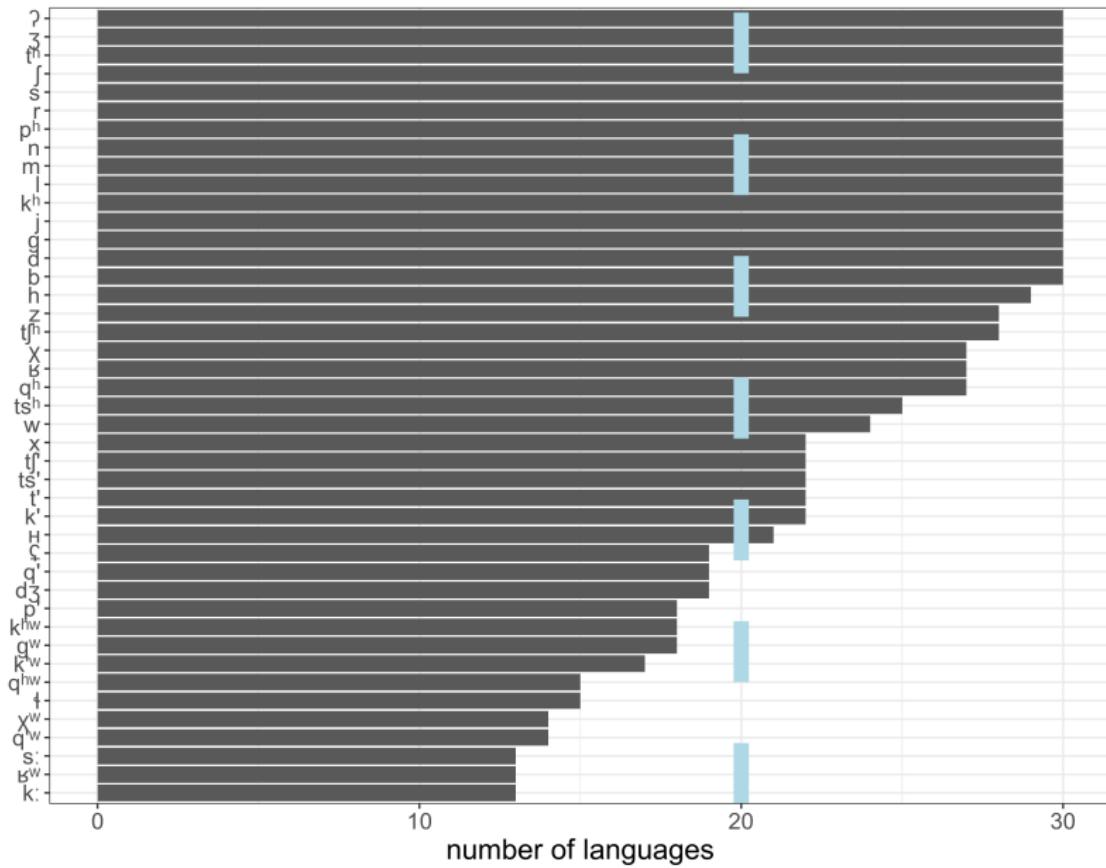
- Where are the famous ejectives? Udi:

b	d	dz	dʒ			g	
p ^h	t ^h	ts ^h	tʃ ^h			k ^h	q ^h
p	t	ts	tʃ			k	q
v		z	ʒ				β
f		s	f			χ	h
m	n						
w	r			l	j		

Consonants: typical inventory



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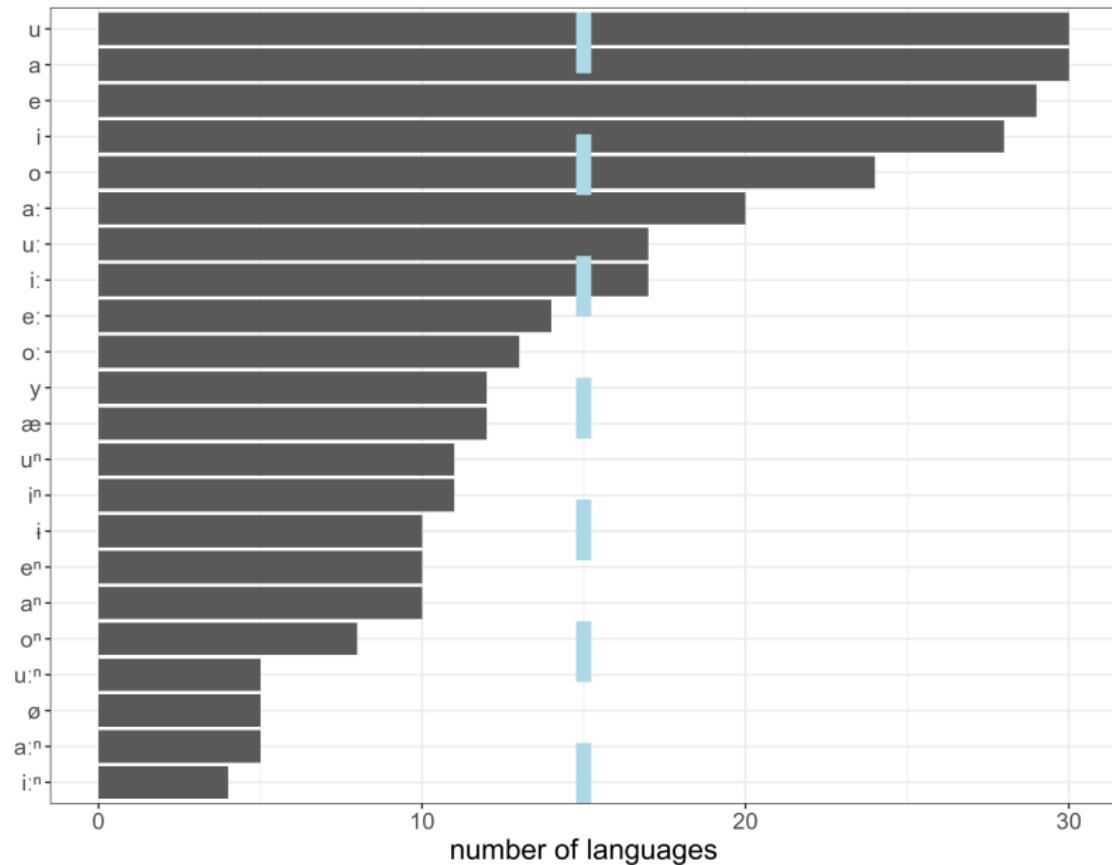
Consonants: typical inventory

b	d					g			
p ^h	t ^h	ts	tʃ ^h			k ^h	q ^h		?
p'	t'	ts'	tʃ'			k'	q'		
		z	ʒ				v	f	
w		s	ʃ			x	χ	h	h
m	n								
	r			l	j				

For more consonants:

- labialization
- gemination
- laterals
- pharyngealization

Vowels: typical inventory



Vowels: typical inventory

i	iː			u	uː
e				o	
		a	aː		

For more vowels:

- length
- nasalization
- pharyngealization

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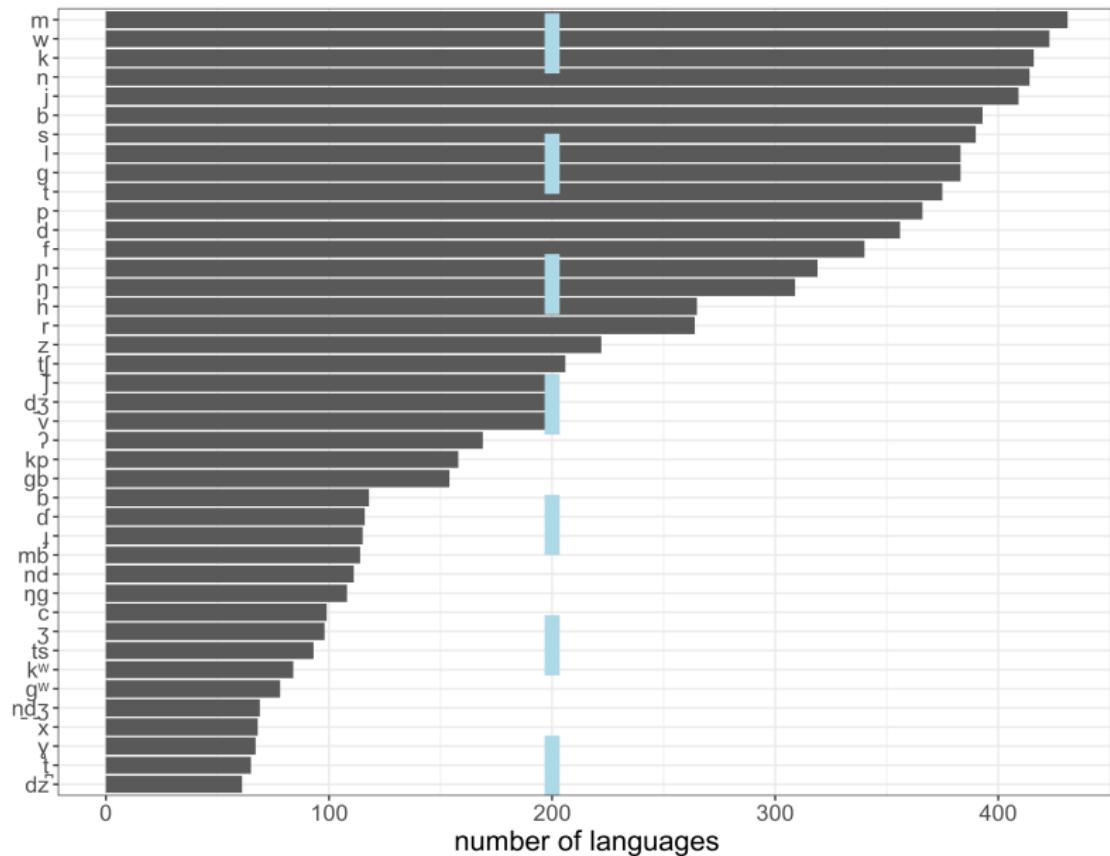
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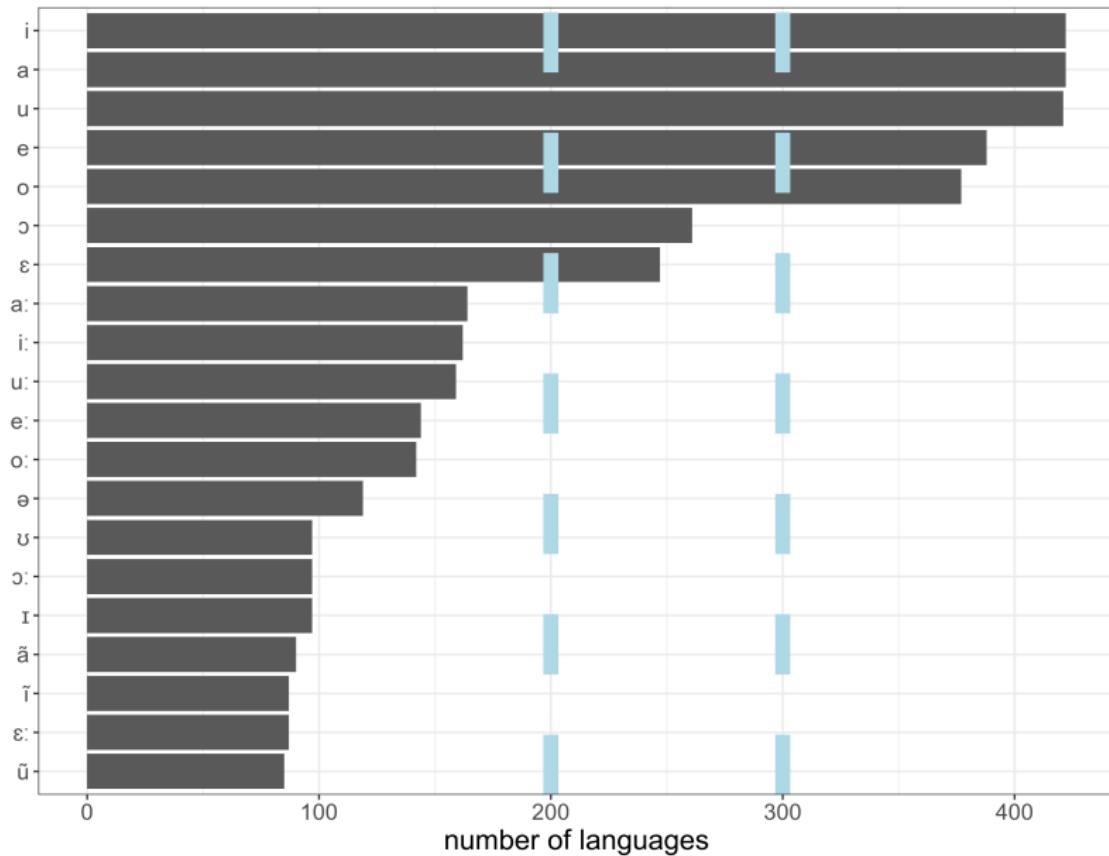
PHOIBLE [Moran and McCloy 2019]: consonants



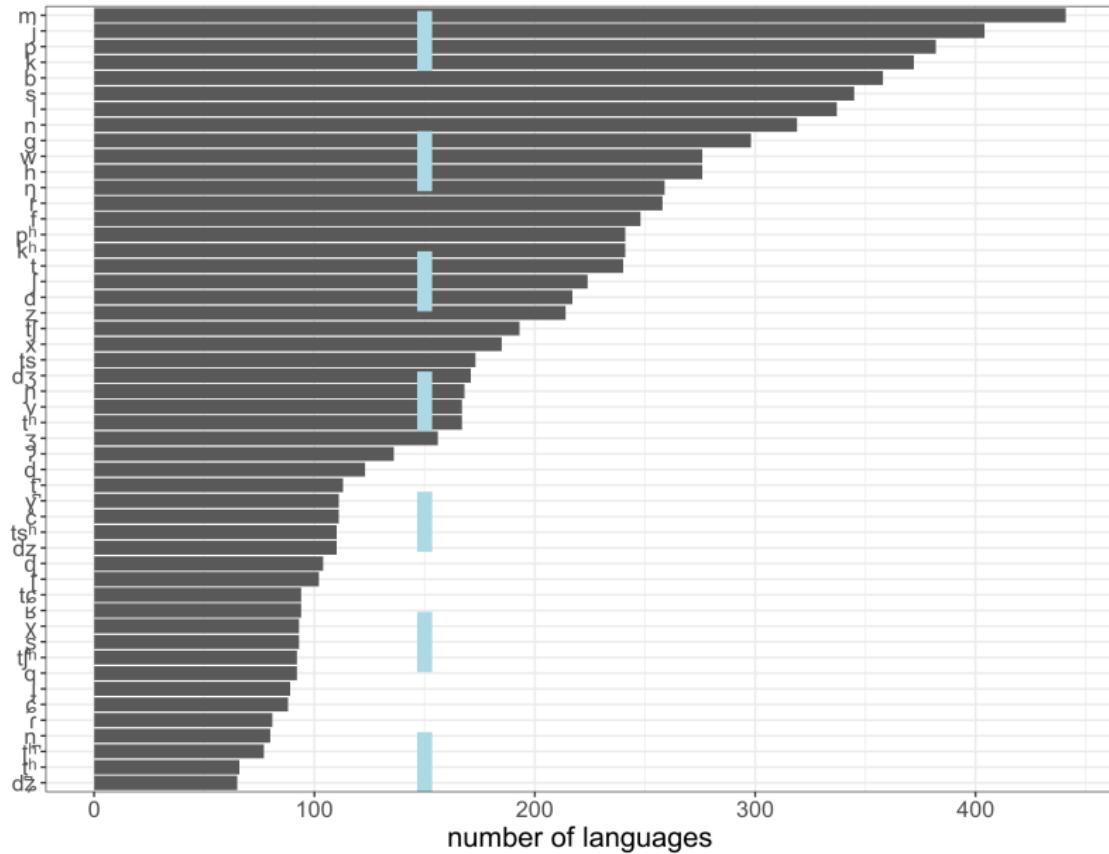
PHOIBLE [Moran and McCloy 2019]: consonants

b	d		dʒ			g	
p	t		tʃ			k	
		z	ʃ				
f		s					h
m	n				jɪ	ɪj	
w	r			l	j		

PHOIBLE [Moran and McCloy 2019]: vowels



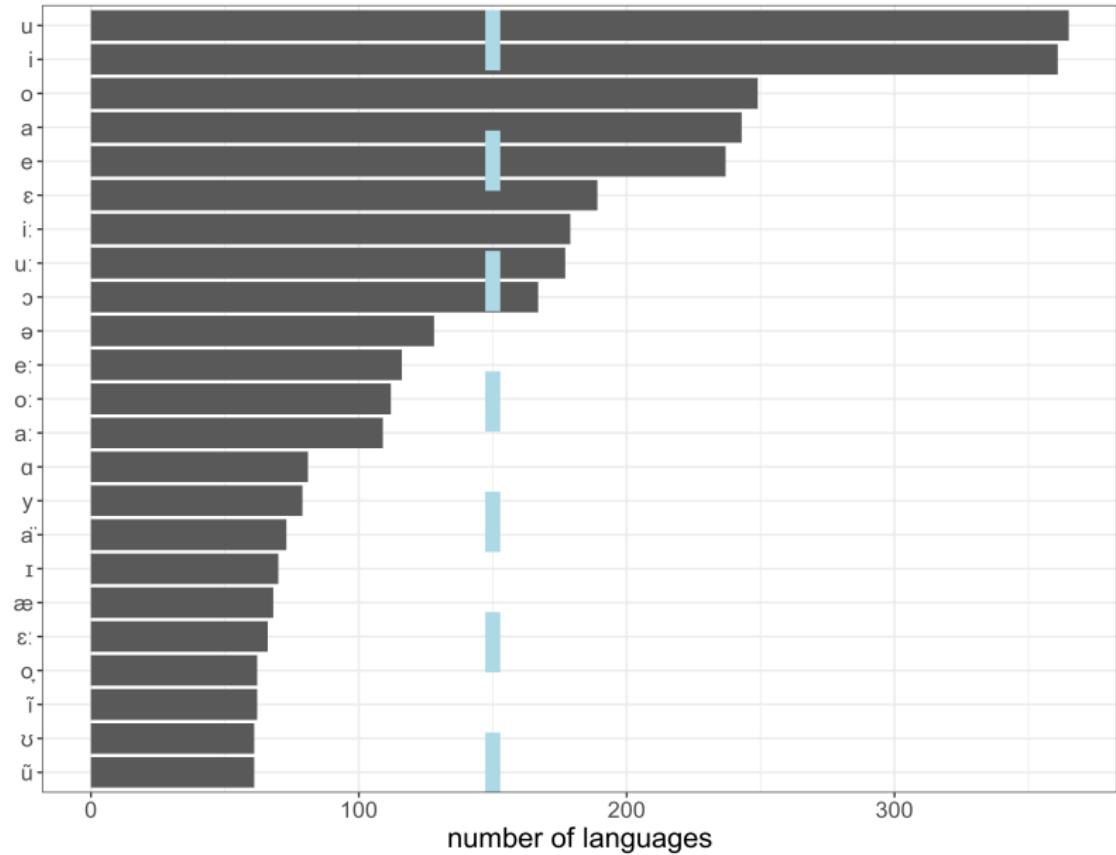
Eurasian phonological inventories [Nikolaev et al. 2015]: consonants



Eurasian phonological inventories [Nikolaev et al. 2015]: consonants

b	d		dʒ			g	
p	t	ts	tʃ			k	
p ^h	t ^h					k ^h	
		z	ʒ				
f	v	s	ʃ			x	h
m	n				jn	ŋ	
w	r			l	j		

Eurasian phonological inventories [Nikolaev et al. 2015]: vowels



Conclusions

- East Caucasian consonant systems are more or less typical

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 - except uvular and laryngeal consonants
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Conclusions

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- East Caucasian vowel systems are typical
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Conclusions

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 - except uvular and laryngeal consonants
 - except ejective consonants
 - except laterals in Avar-Andic and Tsezic branches
 - except labialization
 - except gemination
- East Caucasian vowel systems are typical
- All these conclusions were data driven
- But you need to have a good data...

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Syllable structure and suprasegmental features

Syllable structure CVCC, sometimes CVL (L – sonorant or *b*).

A lot of East Caucasian languages have stress:

- some languages has more o less fixed stress (e. g. Mehweb)
- some languages has a tendency to have stress on first three syllables (Andic languages)
- a lot of languages distinguish morphological meanings via stress (e.g. plural marker in Dargic languages)

pharyngealization – mysterious feature (absent in Andic branch).

d-irʔ-an

npl-gather:ipfv-hab

‘gathers them’

d-irʔ-a^fn /d-irʔ^f-an/

npl-gather:ipfv-hab

‘gathers them’

ħa-d-irʔ-an

neg-npl-gather:ipfv-hab

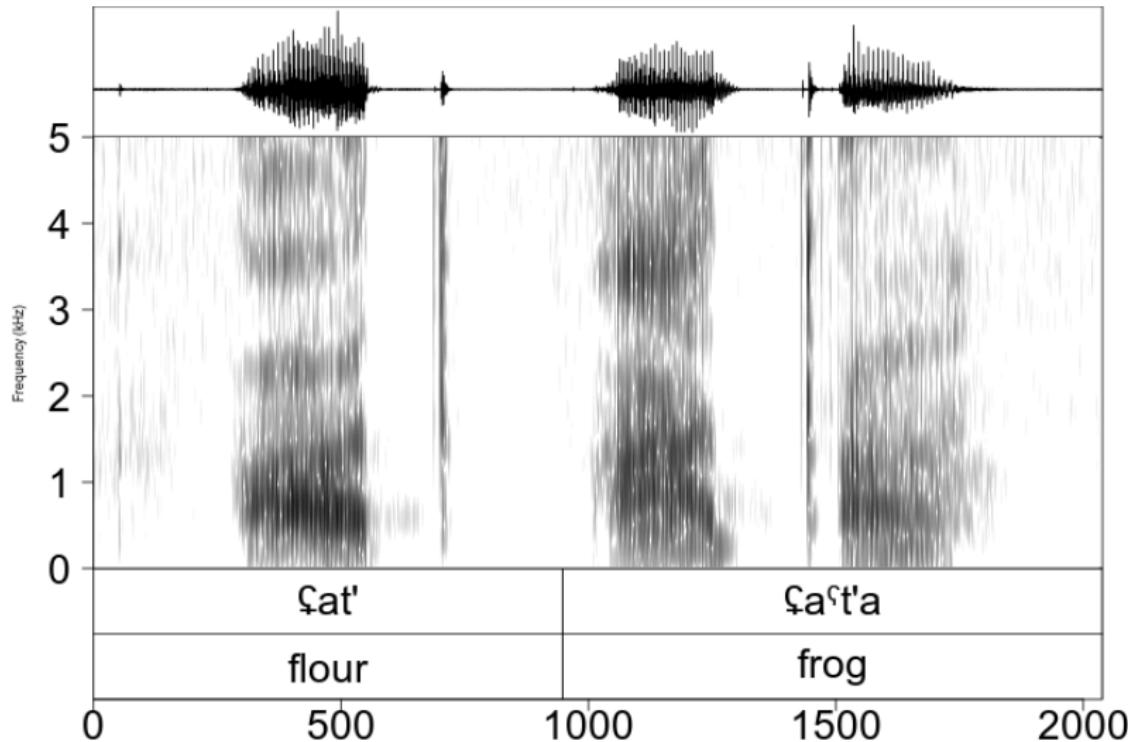
‘does not gather them’

ħa^f-d-irʔ-a^fn

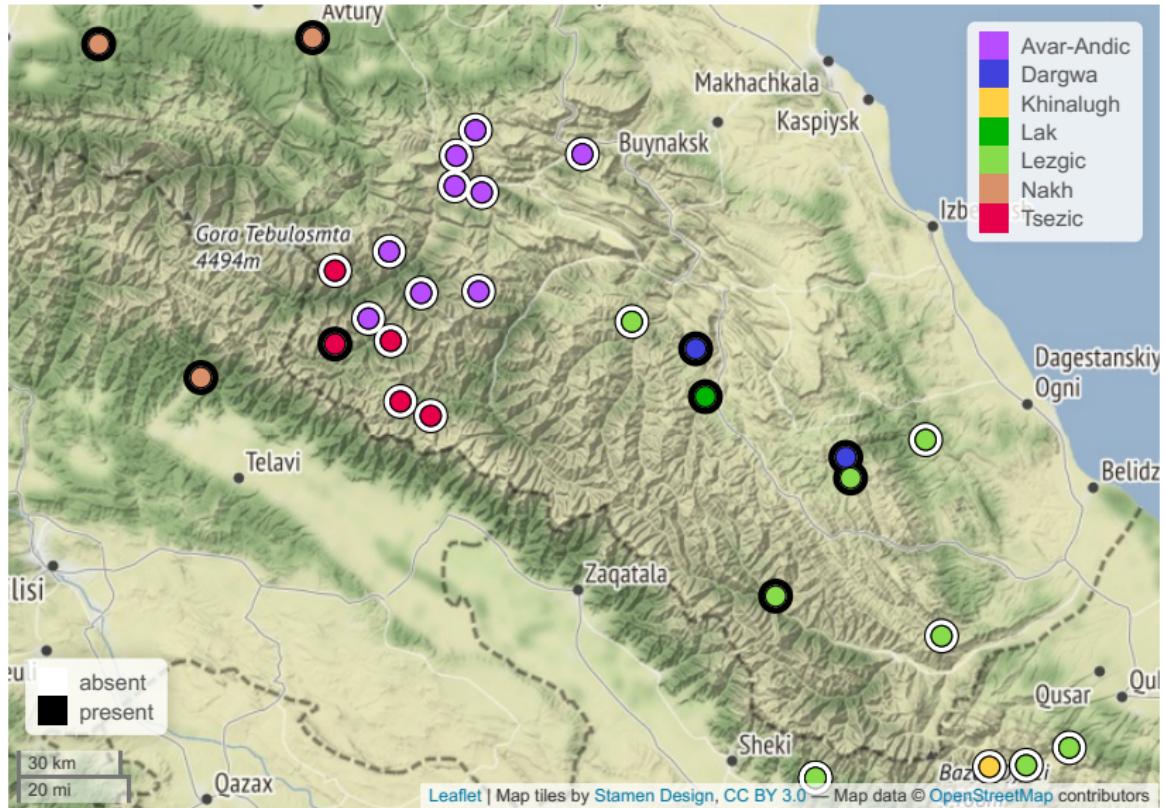
neg-npl-freeze:ipfv-hab

‘they are not freezing’

Pharyngealization (example from Mehweb Dargwa)



Pharyngealization



There are two enclaves: Nakh and Lak-Dargwa.

Thanks

- to the teams of researchers who collected all the data
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 - and YOU for your attention
-
- if you like the presented maps, see [lingtypology](#) [Moroz 2017]
 - spectrograms were created with [phonfieldwork](#) [Moroz 2020]
 - this presentation was made with [rmarkdown](#) [Xie et al. 2018] and [ggplot2](#) [Wickham 2016]; source code and data for this presentation are available online: <https://tinyurl.com/y2oh9sg8>

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Yazyki mira. Kavkazskiye yaziki. Academia.
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