

# Phonology of East Caucasian languages

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part of the online course on East Caucasian languages

last version of the presentation is available here: [tinyurl.com/y2foeo9g](https://tinyurl.com/y2foeo9g)



# Outline of the talk

Introduction

Data

Methods

Inventory size

Frequency analysis

Compare 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 part 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

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# Languages

- Nakh
  - Chechen
  - Ingush
  - Tsova-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
  - Tsovedi-Tush  
(Bats, Batsbi)
- Tsezic (Didoic)
  - Tsez
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## Languages not present in [Kibrik and Kodzasov 1990]

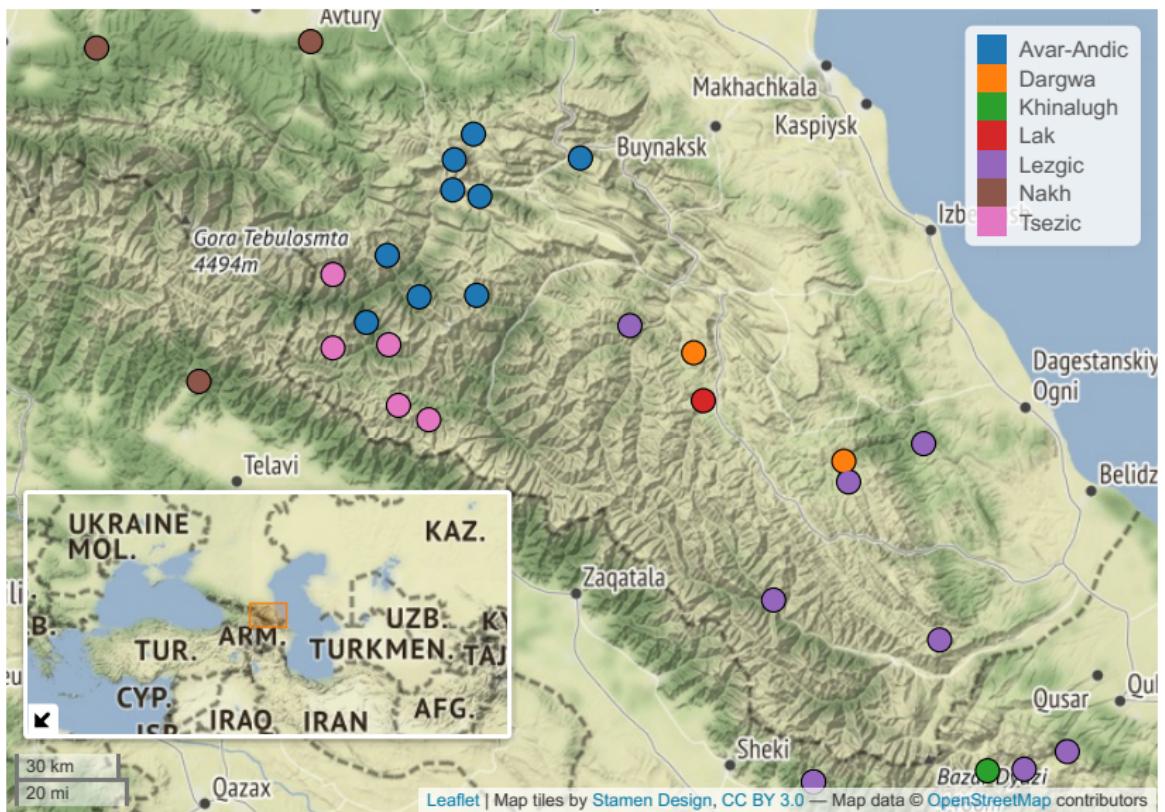
- Andic, Bagvalal [Kibrik et al. 2001]
- Andic, Botlikh [Alexeyev and Verhees Fort]
- Andic, Godoberi [Moroz et al. Fort]
- Andic, Karata [Magomedbekova 1971]
- Dargwa, Mehweb [Moroz 2019]
- Nakh, Chechen [Nichols 1994a]
- Nakh, Ingush [Nichols 1994b]
- Nakh, Tsoved-Tush [Holisky and Gagua 1994]

# Data

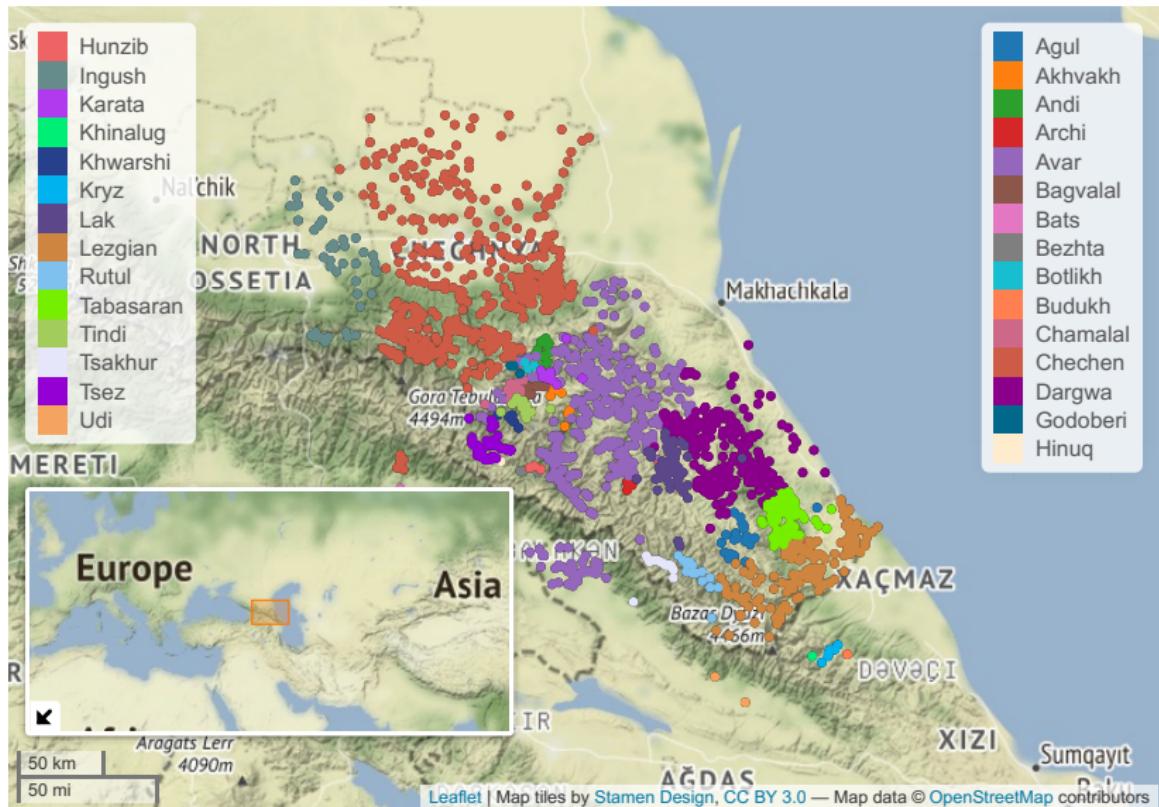
1905 × 9 **table** with the following columns:

- id
- branch
- language
- segments\_IPA
- segments\_source
- sound\_type
- source
- comments
- glottocode

# Data (language view)



# Data (village view)



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# Phonology of East Caucasian languages can be presented like this...

	Stops				Fricatives			Affricates				Son.
	Voiced	Voiceless			Voiced	Voiceless		Voiced	Voiceless			
			Gem.	Ej.			Gem.			Gem.	Ej.	
Lab.	b ɓ	p ń										w ń m ń
Den.	d ڏ	t ڻ	t: tt	t' ڻI	z ڙ	s c	s: cc		c ڦ	c: ڦڻ	c' ڻI	n ڻ
Alv.					ž ڇ	š ڻ	š: ڻڻ	ڇ ڏڇ	č ڇ	č: ڇڻ	č' ڻI	r p
Lat.						ł ڻ	ł: ڻڻ			ł ڻI	ł' ڻI	l l
Pal.												j ڻ
Vel.	g ڻ	k ڻ	k: kk	k' ڻI			x x̥					
Uv.		q x̥		q' ڻI	v g̥	χ x	χ: xx					
Ph.					f rI	h xI						

# Phonology of East Caucasian languages can be presented like this...

	Stops			Fricatives			Affricates			Son.	
			plosives			fricatives		affricates			sonorant
			asp	ej	vcd	asp	vcd	asp	ej	vcd	
Lab.	labial		p		b						w, m
	dental	-gem	t	t'	d	s	z	c	c'		n
Den.		+gem				s:		c:	c':		
alveolar	-gem				š	ž	č	č'	č̄	r	
	Alv.		+gem				š:		č:	č':	
lateral					ł (ł:)		ł	ł'		ł	
Lat.	palatal					ç, çʷ					j
	velar	-gem	k, kʷ	k', k'ʷ	g, gʷ						
Vel.		+gem	k:, k:ʷ	k':,							
Uv.	uvular	-gem		q', q'ʷ		χ, χʷ	χ, χʷ	qχ, qχʷ			
		+gem				χ:					
Ph.											

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	Stops			Fricatives			Affricates			Son.
	plosives			fricatives		affricates			sonorant	
	asp	ej	vcd	asp	vcd	asp	ej	vcd		
Lab.	labi									
		labial	dental	alveolar	palatal	velar	uvular	pharyngeal	epig	
Den.	den					-lab	+lab	-lab	+lab	-lab
		+v	b	d		g	g <sup>w</sup>			
Alv.	plosive	-v	p	t		k	k <sup>w</sup>	q	q <sup>w</sup>	(?)
	alvc	ej	p'	t'		k'	k' <sup>w</sup>	q'	q' <sup>w</sup>	
Lat.	fricative	+v		z	ž	(y)		š	š <sup>w</sup>	
	late	-v		s	š	x	x <sup>w</sup>	χ	χ <sup>w</sup>	h
Pal.	pal:	+v		(ʒ)	(ʒ)					
	affricate	-v		c	č					
Vel.	ej			c'	č'					
	vel:	sonorant	m, w	n, l, r	j					
Uv.		---	--	--	--					
	uvular	-gem		q', q" <sup>w</sup>		χ, χ <sup>w</sup>	š, š <sup>w</sup>	qχ, qχ <sup>w</sup>		
Ph.		+gem				χ:				

This way is...

- boring,

## This way is...

- boring,
- mechanical,

## This way is...

- boring,
- mechanical,
- it is hard to make generalisations (at least, on the fly)

# Phonology of East Caucasian languages can be presented like this...

Nakh-Daghestanian: Essential background, what's distinctive... (Johanna Nichols)



## The N-D phonological signature

Complex consonant inventories. Typically:

3 or more manners. t t' d tt /t/ usually [t<sup>h</sup>]

Uvular, sometimes lateral, sometimes pharyngeal series

Vowel systems vary in size:

3 or 4 vowel qualities: Lak, several Dargwa

5 Avar, most Andic

6-8 most Tsezic, most Lezgian; Nakh

9-10 Kryz, Budukh, Khinalug



± length, nasalization

Pharyngealization

Epiglottalization vs. true pharyngealization

Segment? syllabic feature? consonant feature? vowel feature?

Syllable structure fairly simple: mostly CVRC

Tones ...

▶ ⏴ 🔊 37:24 / 1:30:04



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(If you have not seen it, go and watch our previous lecture!)

## These ways are...

- To list all inventories
  - boring,
  - mechanical,
  - hard to make generalisations (at least, on the fly)
- To present generalisations
  - restricted to peculiarities,

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- May be these conclusions could be data driven?

## These ways are...

- To list all inventories
  - boring,
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- To present generalisations
  - restricted to peculiarities,
  - you need to be a specialist
- May be these conclusions could be data driven?
  - some of them can be visualised with a map
  - some of them can be gathered via frequency and combinatorics analysis

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Methods

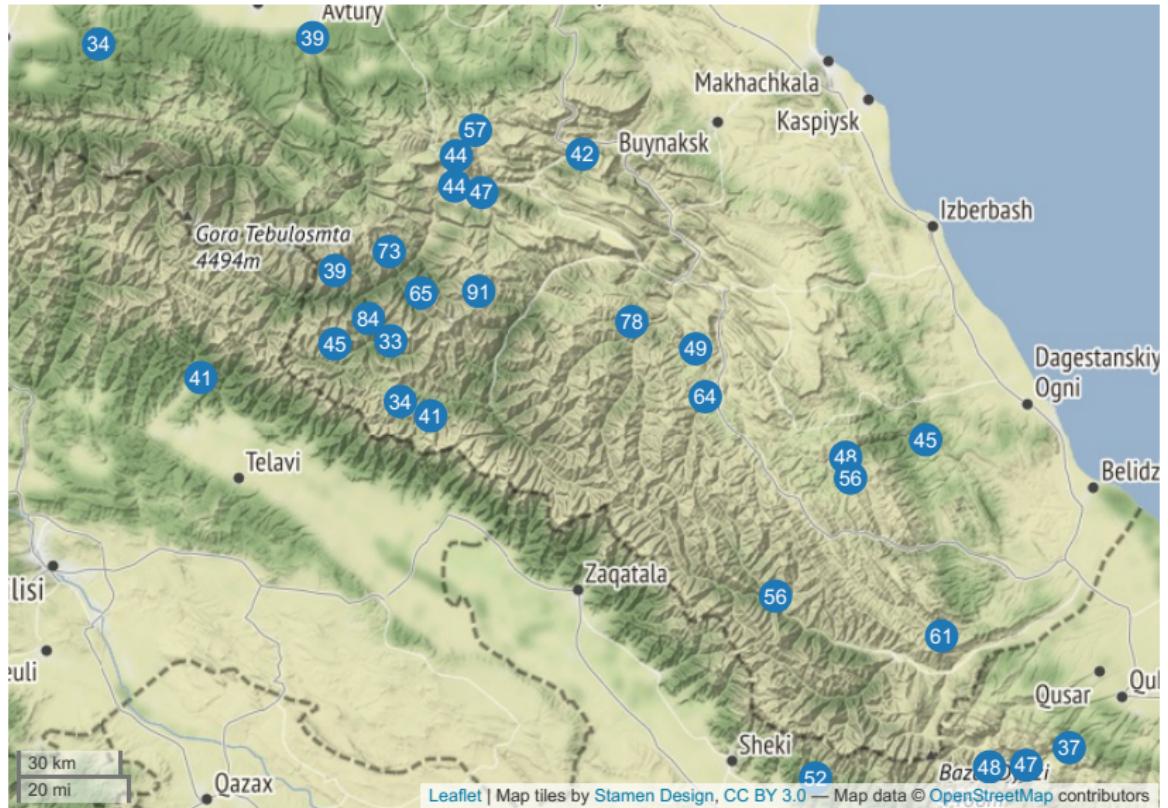
**Inventory size**

Frequency analysis

Compare to other databases

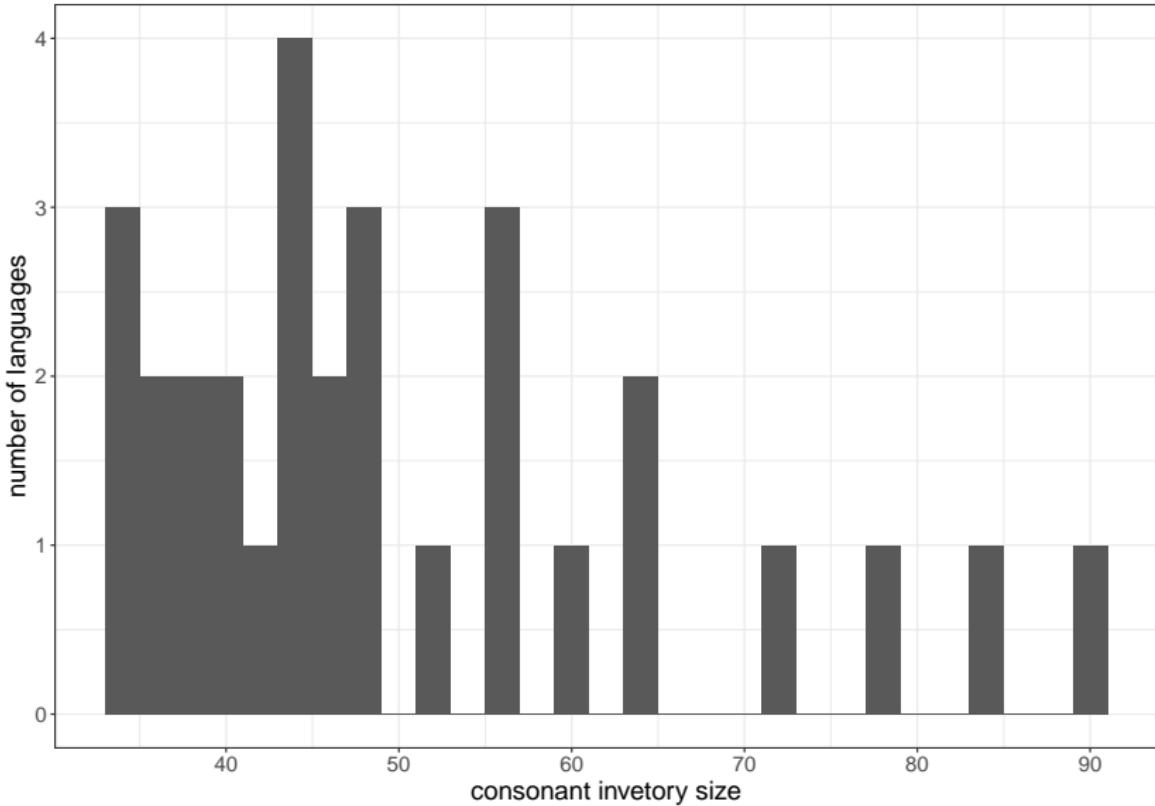
Suprasegmental features

# Consonants



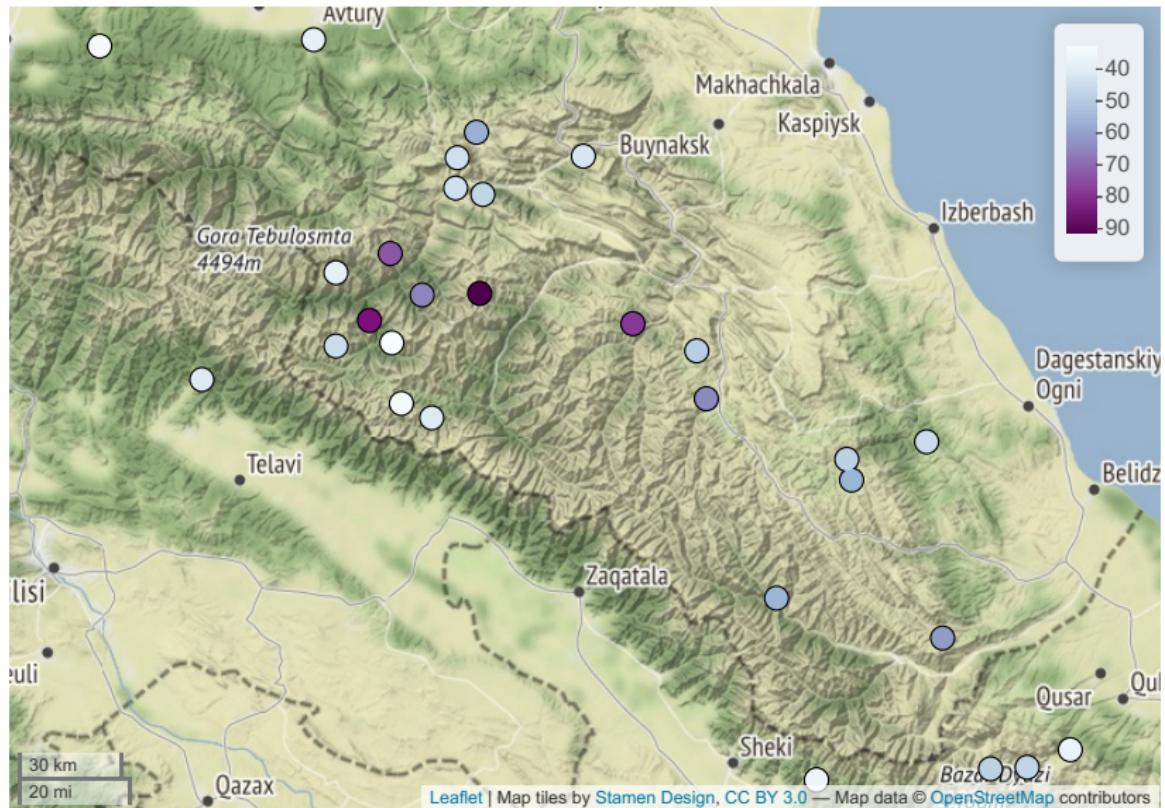
Languages ranges from 33 to 91 consonants.

# Consonants



Most of the languages have  $42 \pm 5$  consonants.

# Consonants



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

# Consonants

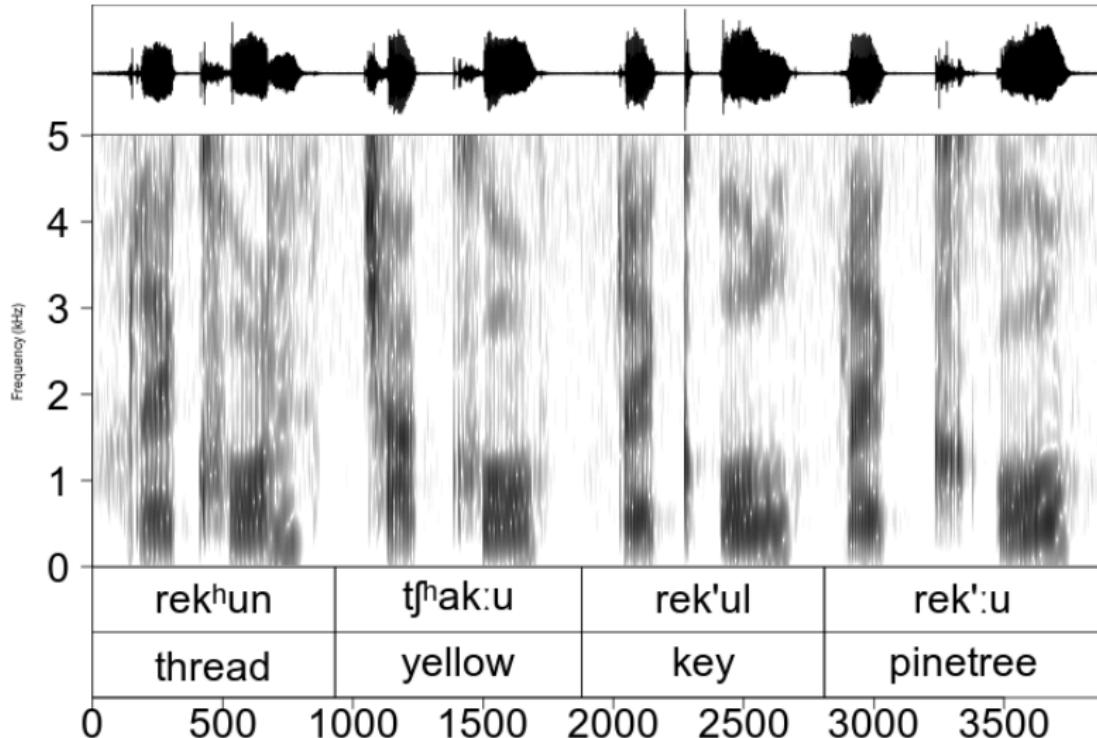
- Akhwakh (Andic) – 91
- Tindi (Andic) – 84
- Chamalal (Andic) – 73
- Archi (Lezgic) – 78
- ...
- Ingush (Nakh) – 34
- Bezhta (Tsezic) – 34
- Inkhoqwari (Tsezic) – 33
- ejectives
- gemenation (fortis)
- labialization

# Consonants: Akwakh vs. Inkhoqwari

b	d			dʒ				g					
	d <sup>w</sup>			dʒ <sup>w</sup>				g <sup>w</sup>					
p <sup>h</sup>	t <sup>h</sup>	ts	ts:	tʃ	tʃ:	tɬ	tɬ:	k	k:	q	q:		?
	t <sup>hw</sup>	ts <sup>w</sup>	ts: <sup>w</sup>	tʃ <sup>w</sup>	tʃ: <sup>w</sup>	tɬ <sup>w</sup>	tɬ: <sup>w</sup>	k <sup>w</sup>	k: <sup>w</sup>	q <sup>w</sup>	q: <sup>w</sup>		? <sup>w</sup>
p'	t'	ts'	ts: <sup>'</sup>	tʃ'	tʃ: <sup>'</sup>	tɬ'	tɬ: <sup>'</sup>	k'	k: <sup>'</sup>	q'	q: <sup>'</sup>		
	t <sup>w</sup>	ts <sup>w</sup>	ts: <sup>w</sup>	tʃ <sup>w</sup>	tʃ: <sup>w</sup>	tɬ <sup>w</sup>	tɬ: <sup>w</sup>	k <sup>w</sup>	k: <sup>w</sup>	q <sup>w</sup>	q: <sup>w</sup>		
		z		ʒ						β			ɸ
		z <sup>w</sup>		ʒ <sup>w</sup>						β <sup>w</sup>			
		s	s:	ʃ	ʃ:	ɸ	ɸ:	x	x:	χ	χ:	h	h
		s <sup>w</sup>	s: <sup>w</sup>	ʃ <sup>w</sup>	ʃ: <sup>w</sup>	ɸ <sup>w</sup>	ɸ: <sup>w</sup>	x <sup>w</sup>	x: <sup>w</sup>	χ <sup>w</sup>	χ: <sup>w</sup>		h <sup>w</sup>
m	n												
w	r					l		j					

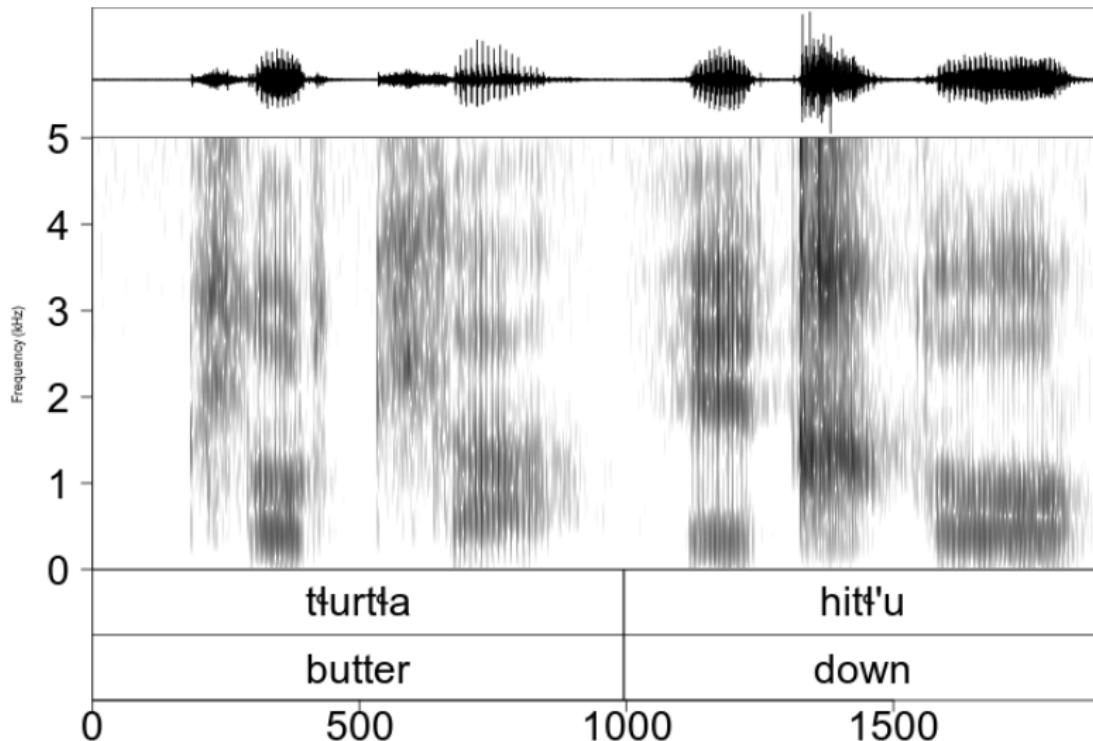
b	d		dʒ		g			
p <sup>h</sup>	t <sup>h</sup>	ts	tʃ	tɬ	k	q		?
p'	t'	ts'	tʃ'	tɬ'	k'	q'		
		z	ʒ		β	ɸ		
		s	ʃ	ɸ	χ	h		
m	n							
w	r			l	j			

## Gemination and ejectives (example from Zilo Andi)



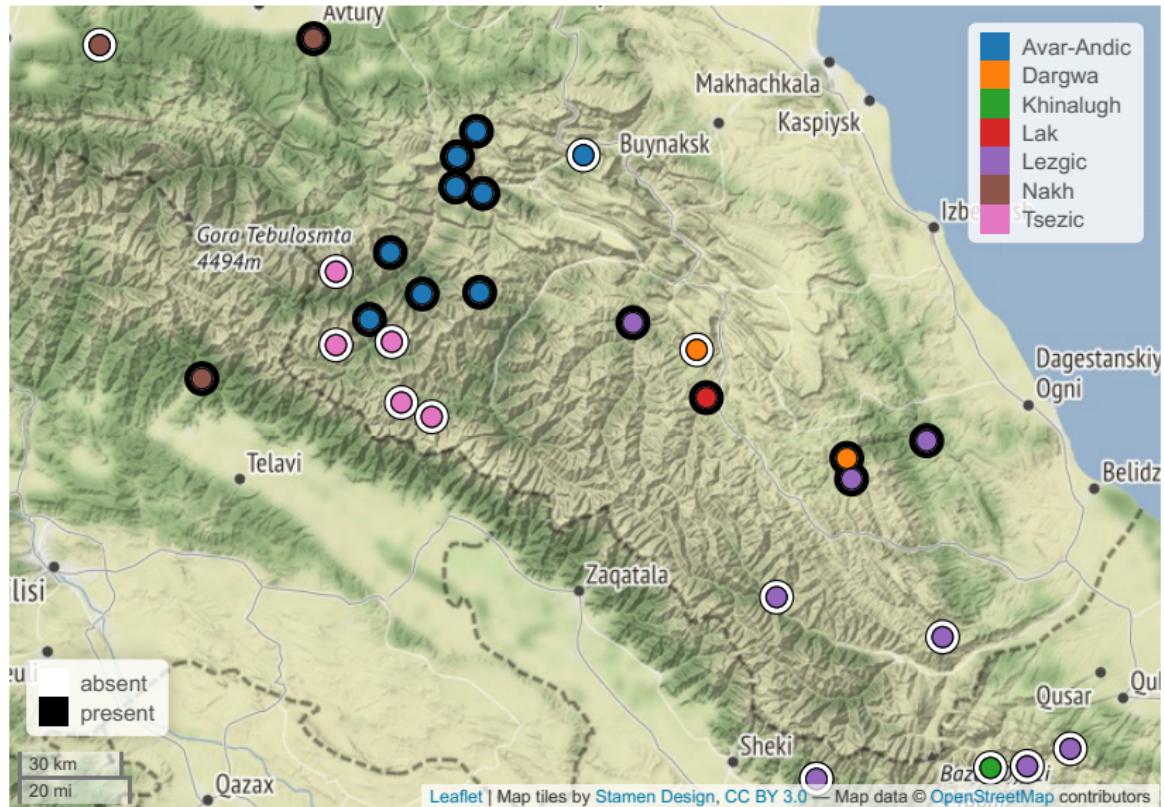
- Geminated aspirated have longer closure.
- Geminated ejectives have longer burst.

## Laterals (example from Zilo Andi)



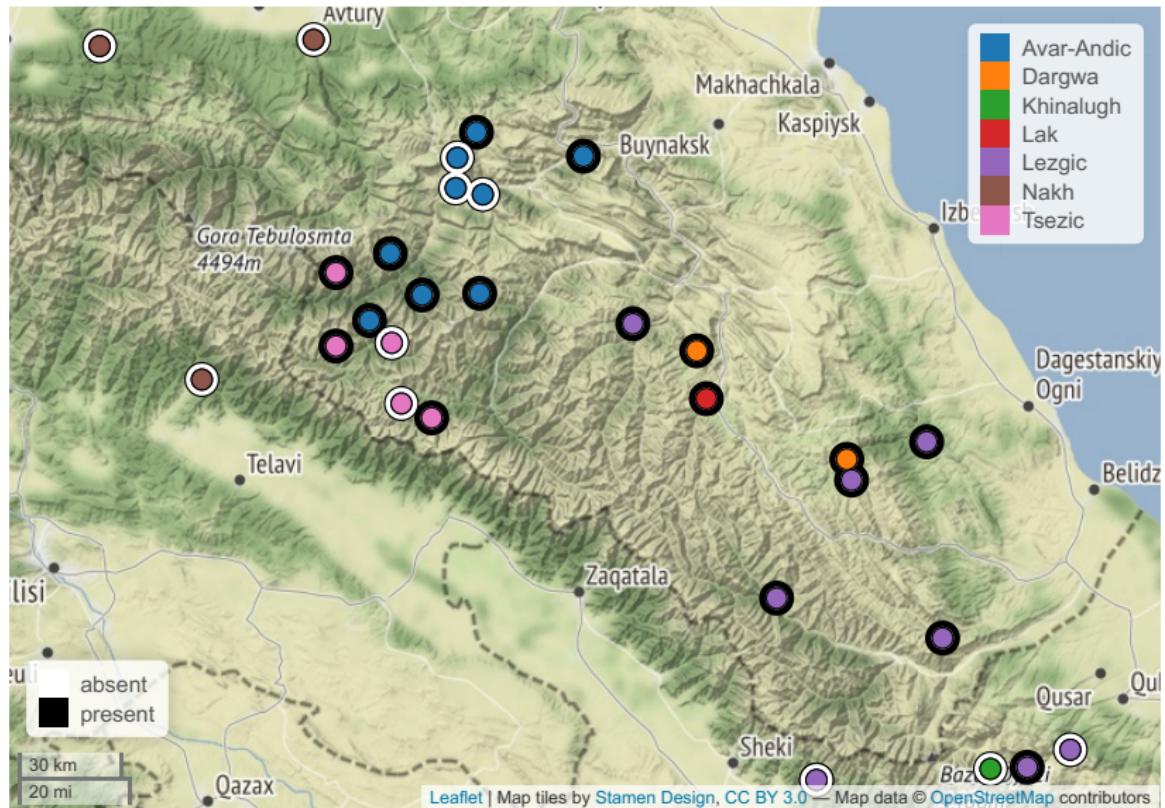
Looks like it is not t̪ but t̪: in Andic...

# Geminate consonants



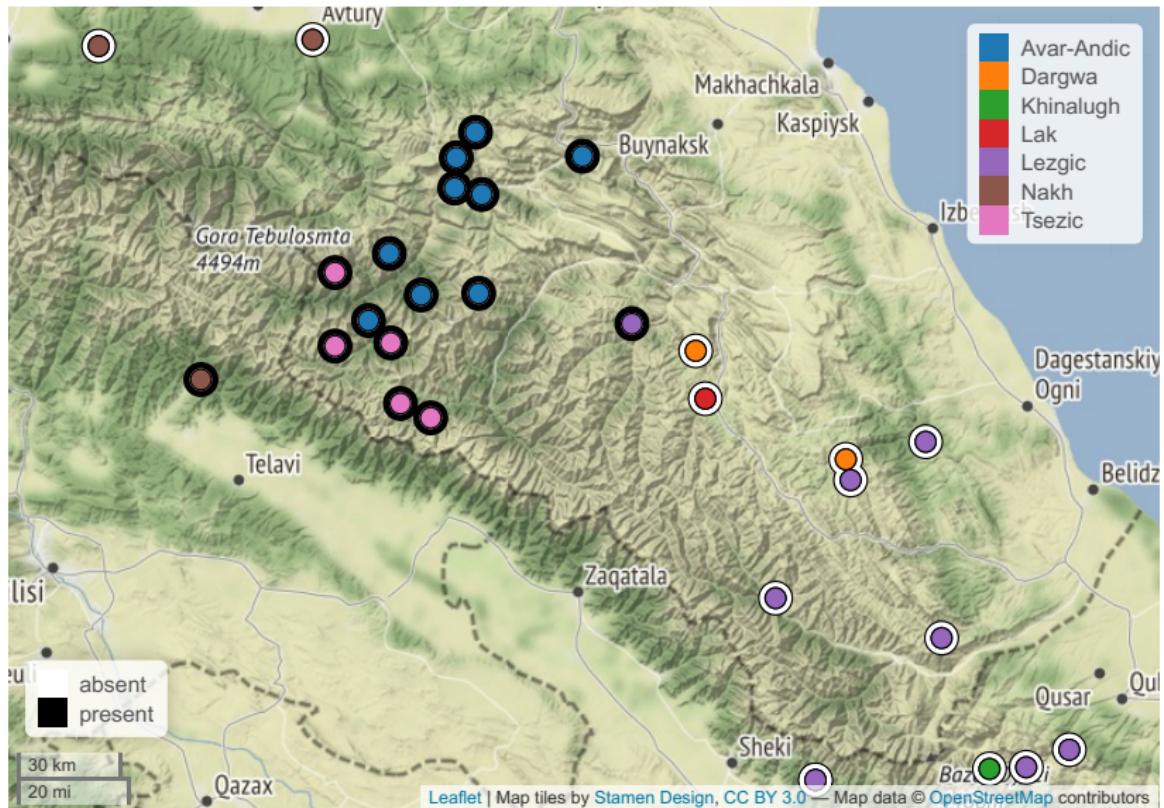
Geminate consonants are absent in Tsezic and most Lezgic.

# Labialised consonants



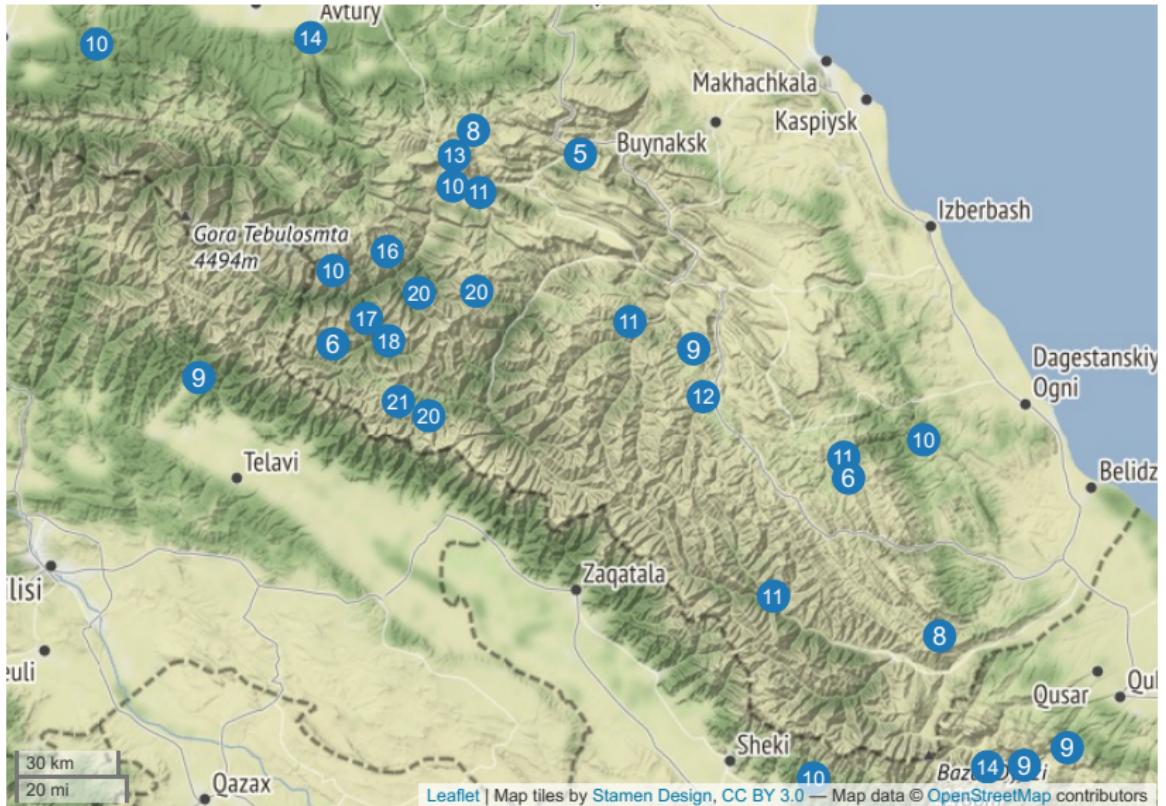
Labialised consonants are absent in Nakh, but more or less common through other branches.

# Lateral consonants



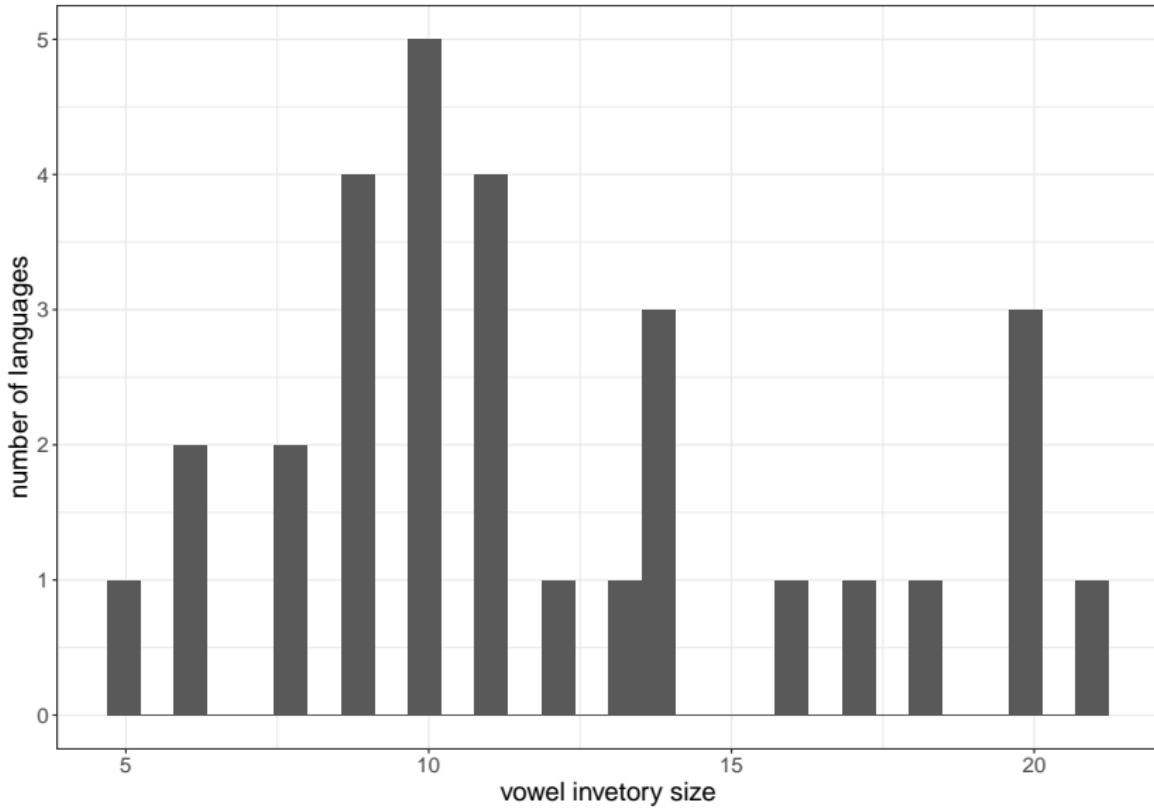
It looks like an areal pattern: all Avar-Andic and Tsezic, but also Tsova-Tush and Archi.

# Vowels



Languages ranges from 5 to 21 vowels.

# Vowels



Most of the languages have  $10 \pm 5$  vowels.

# Vowels

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

# Vowels

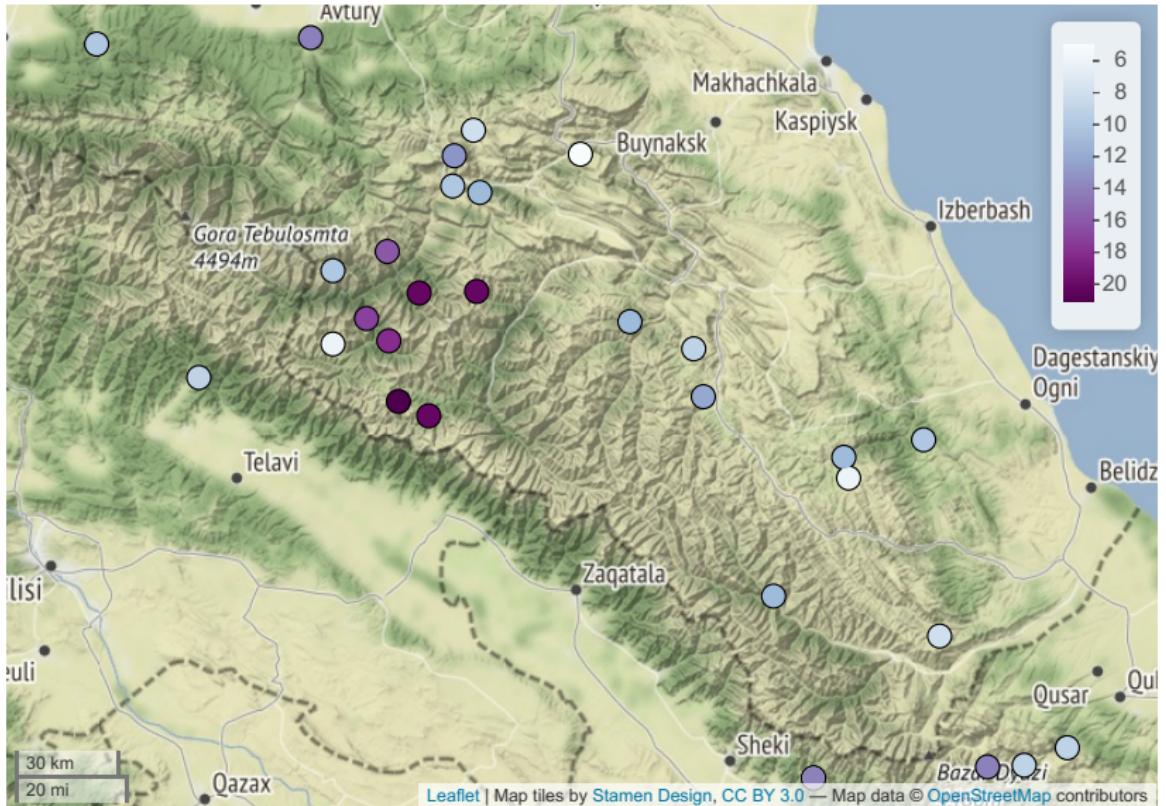
- Bezhta

i	i:	i <sup>n</sup>	y	y <sup>n</sup>				u	u:	u <sup>n</sup>
e		e <sup>n</sup>	ø					o	o:	o <sup>n</sup>
æ	æ:	æ <sup>n</sup>								
					a	a:	a <sup>n</sup>			

- Avar

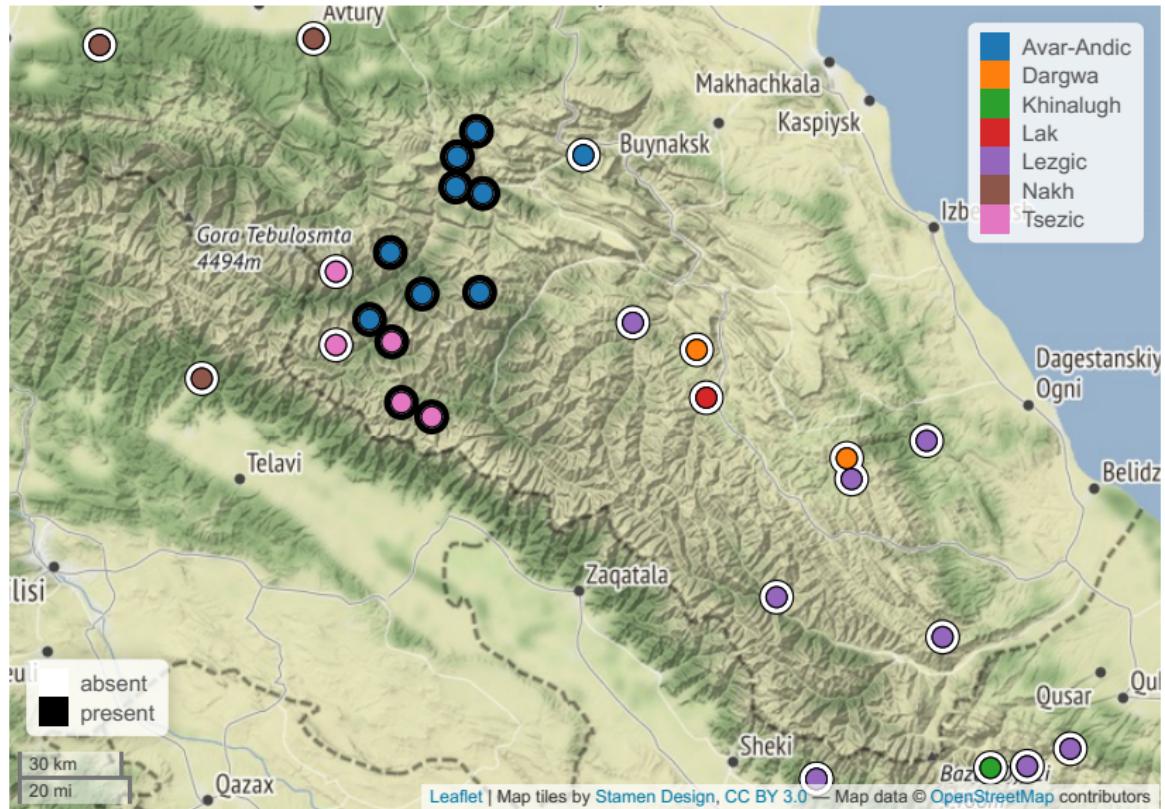
i		u
e		o
	a	

# Vowels



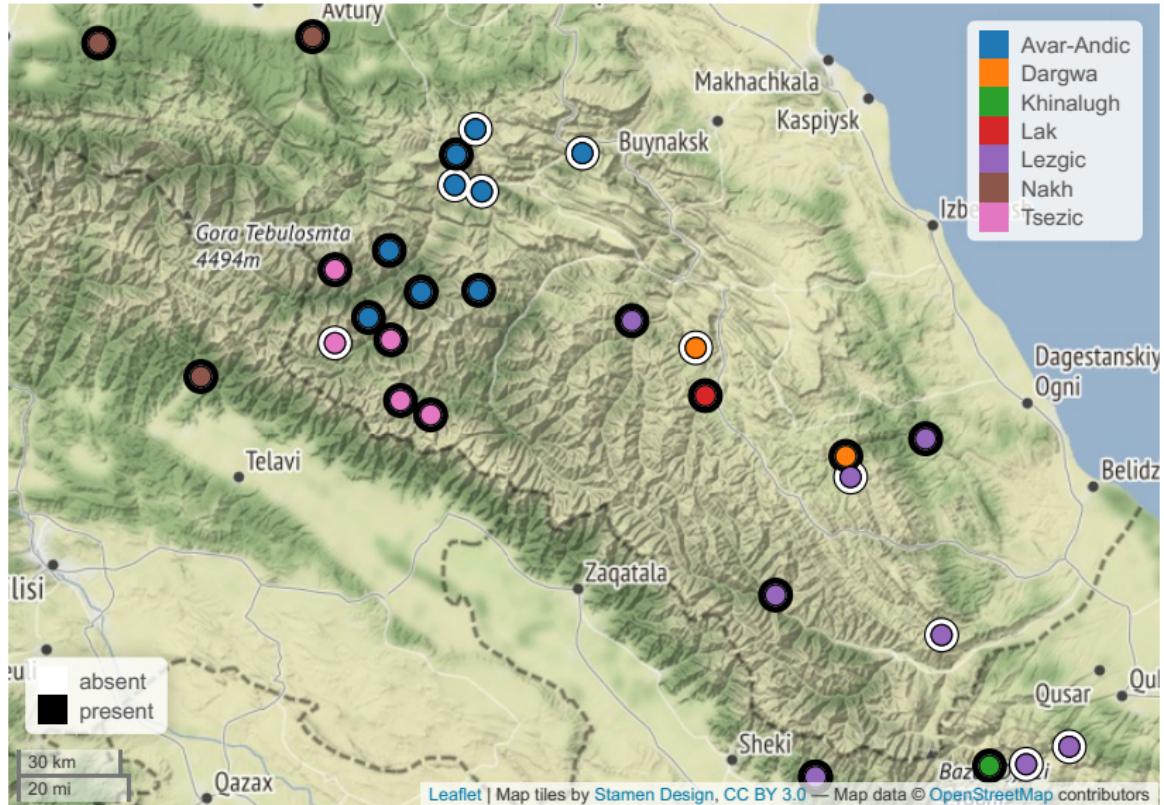
Most of the huge systems are presented in Tsezic and Andic.

# Nasal vowels



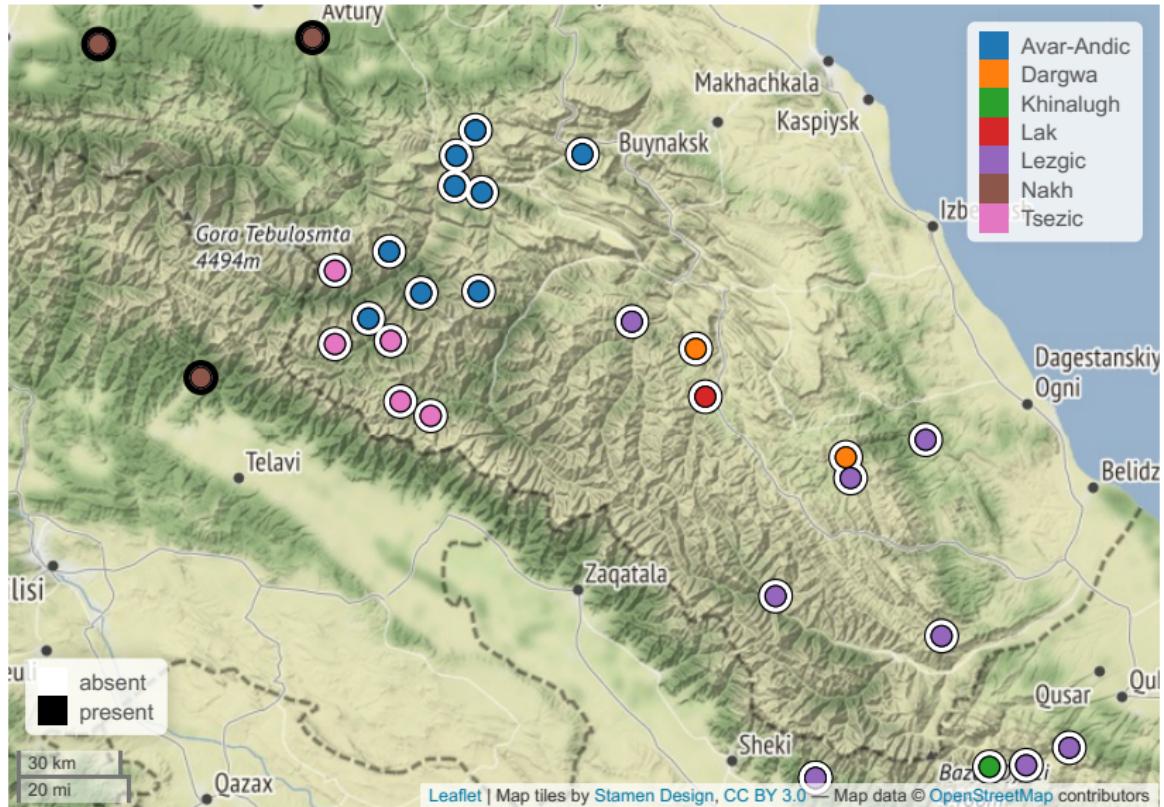
From Andic and Tsezic only Avar, Hinuq, and Tsez lack nasalized vowels.

# 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 <sup>h</sup>	t <sup>h</sup>					k <sup>h</sup>	?
		3					
	s	f					h
m	n						
	r		l	j			

- Where are the famous ejectives?

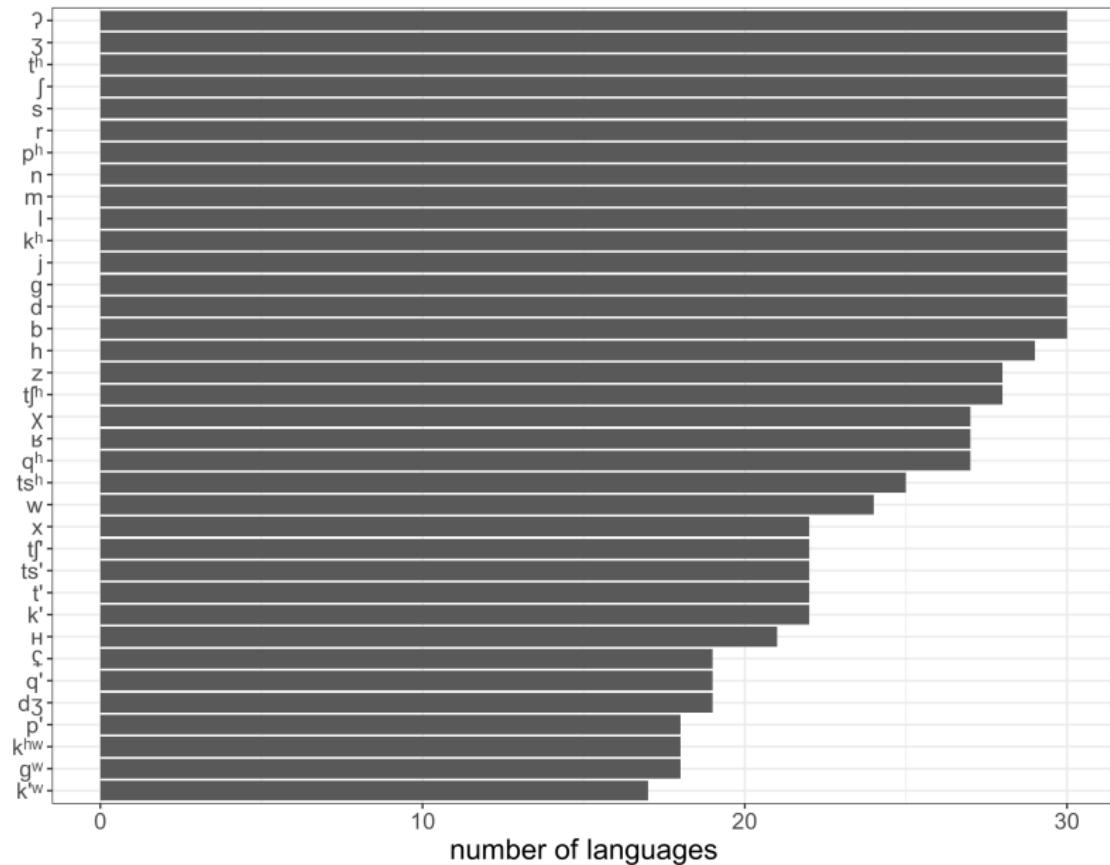
# Segments present in all languages

b	d					g	
p <sup>h</sup>	t <sup>h</sup>					k <sup>h</sup>	?
		z					
	s	f					h
m	n						
	r		l	j			

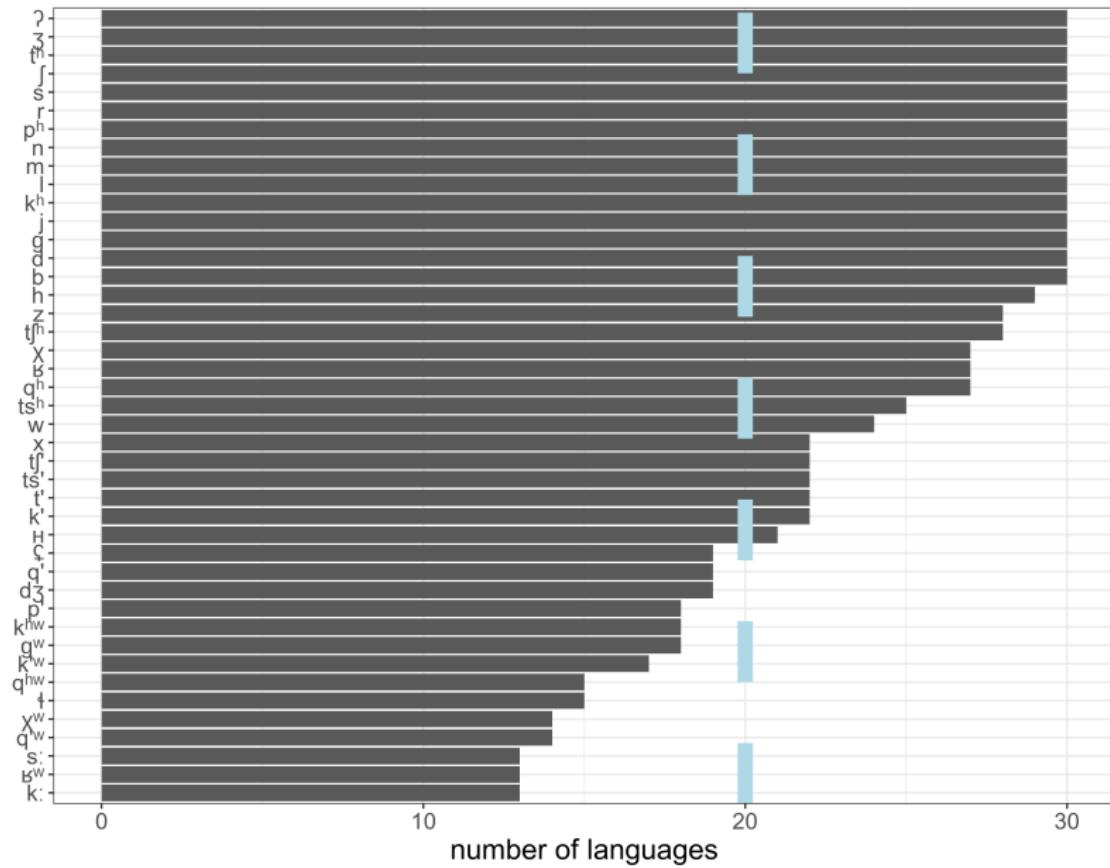
- Where are the famous ejectives? Udi:

b	d	dz	dʒ			g	
p <sup>h</sup>	t <sup>h</sup>	ts <sup>h</sup>	tʃ <sup>h</sup>			k <sup>h</sup>	q <sup>h</sup>
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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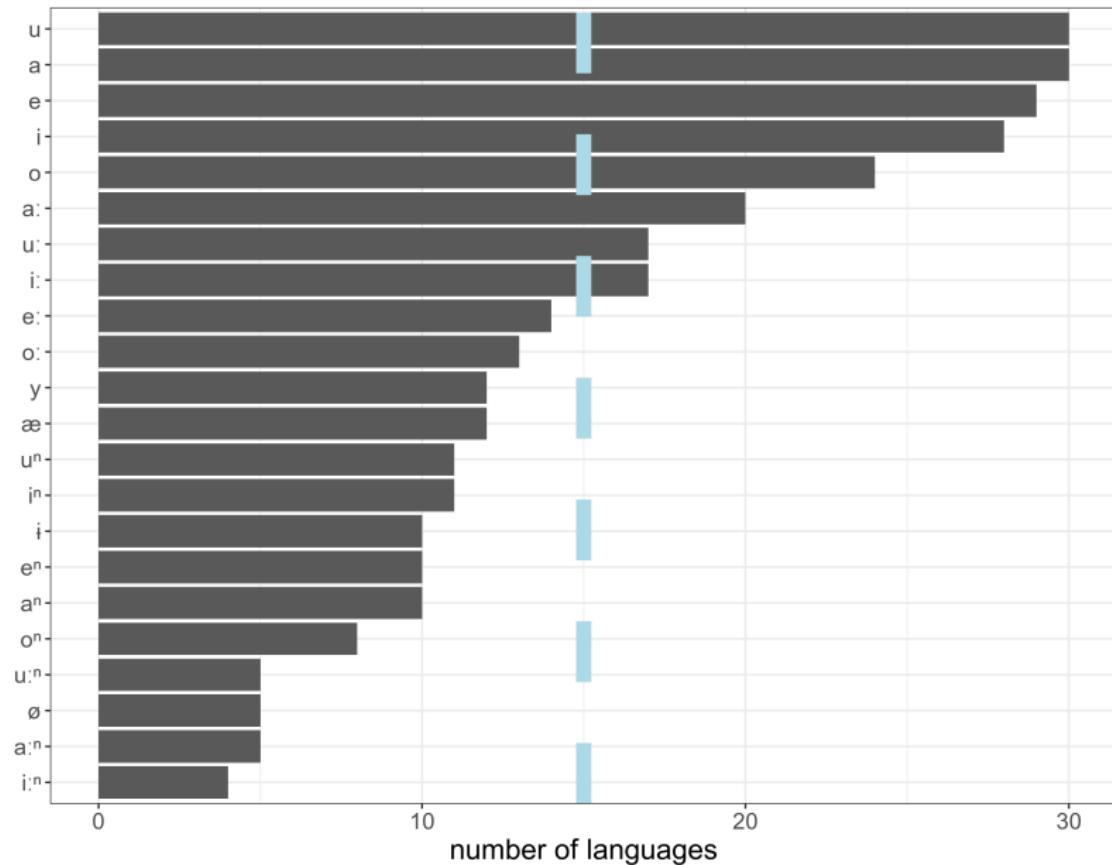
# Consonants: typical inventory

b	d					g			
p <sup>h</sup>	t <sup>h</sup>	ts	tʃ <sup>h</sup>			k <sup>h</sup>	q <sup>h</sup>		?
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:

- labialisation
- gemination
- laterals
- pharyngealisation

## Vowels: typical inventory



# Vowels: typical inventory

i	iː			u	uː
e				o	
		a	aː		

For more vowels:

- length
- nasalization
- pharyngealization

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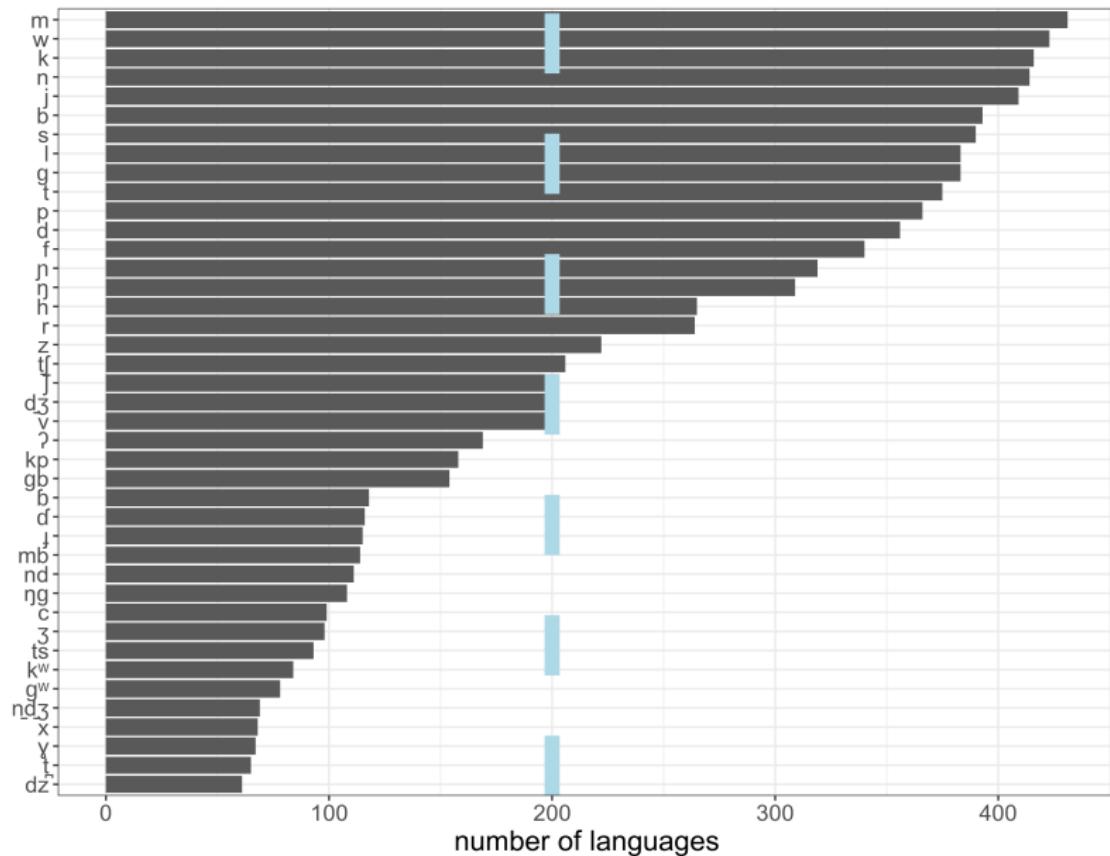
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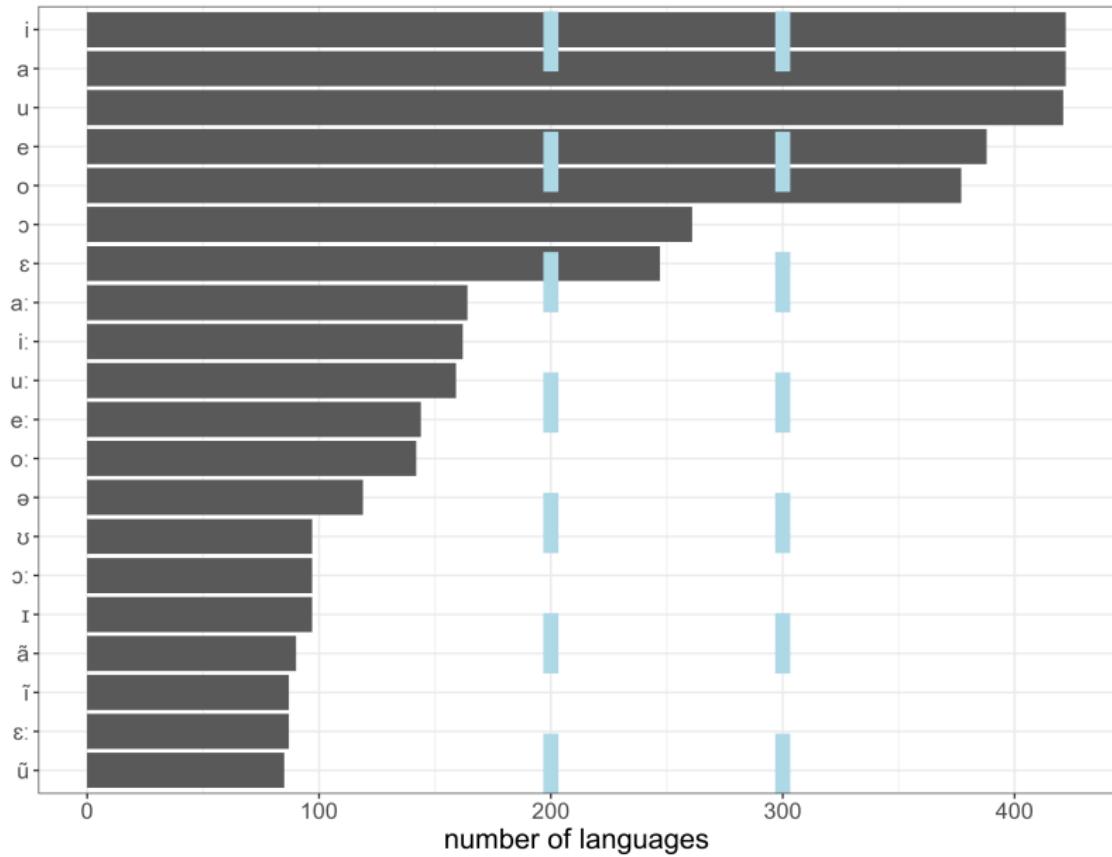
## PHOIBLE [Moran and McCloy 2019]: consonants



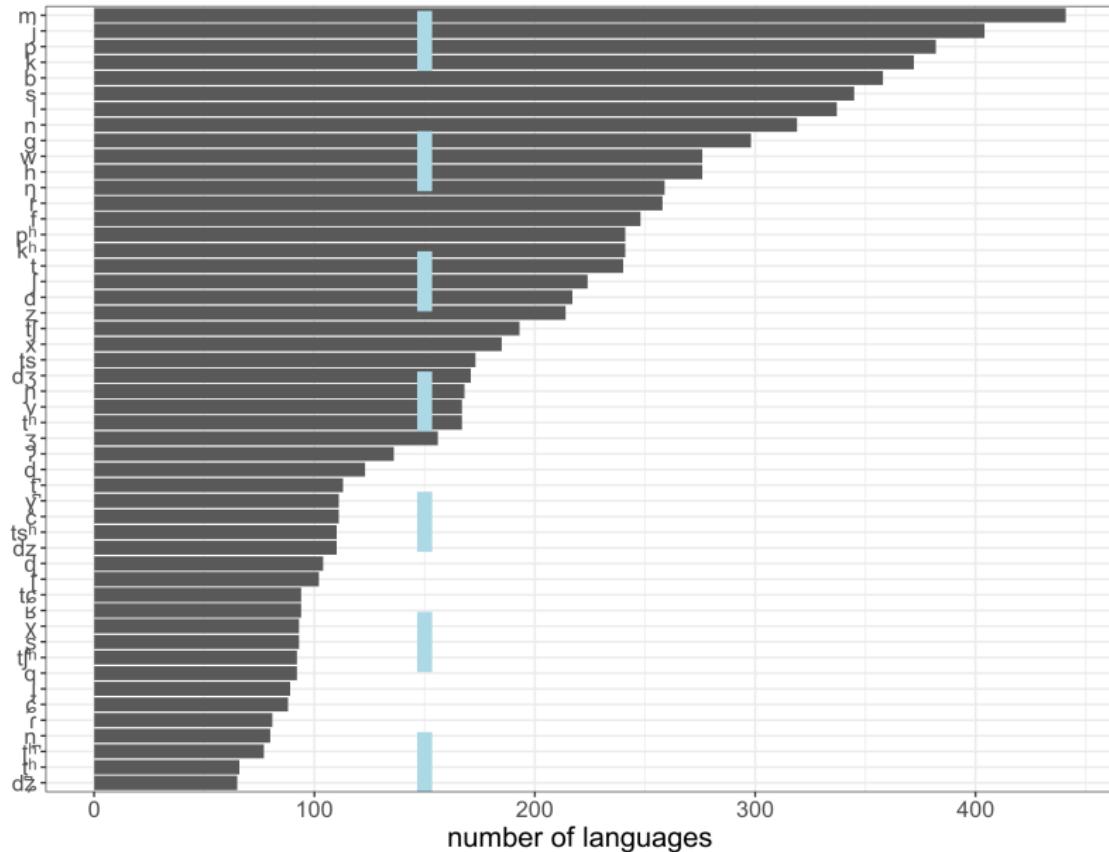
## PHOIBLE [Moran and McCloy 2019]: consonants

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



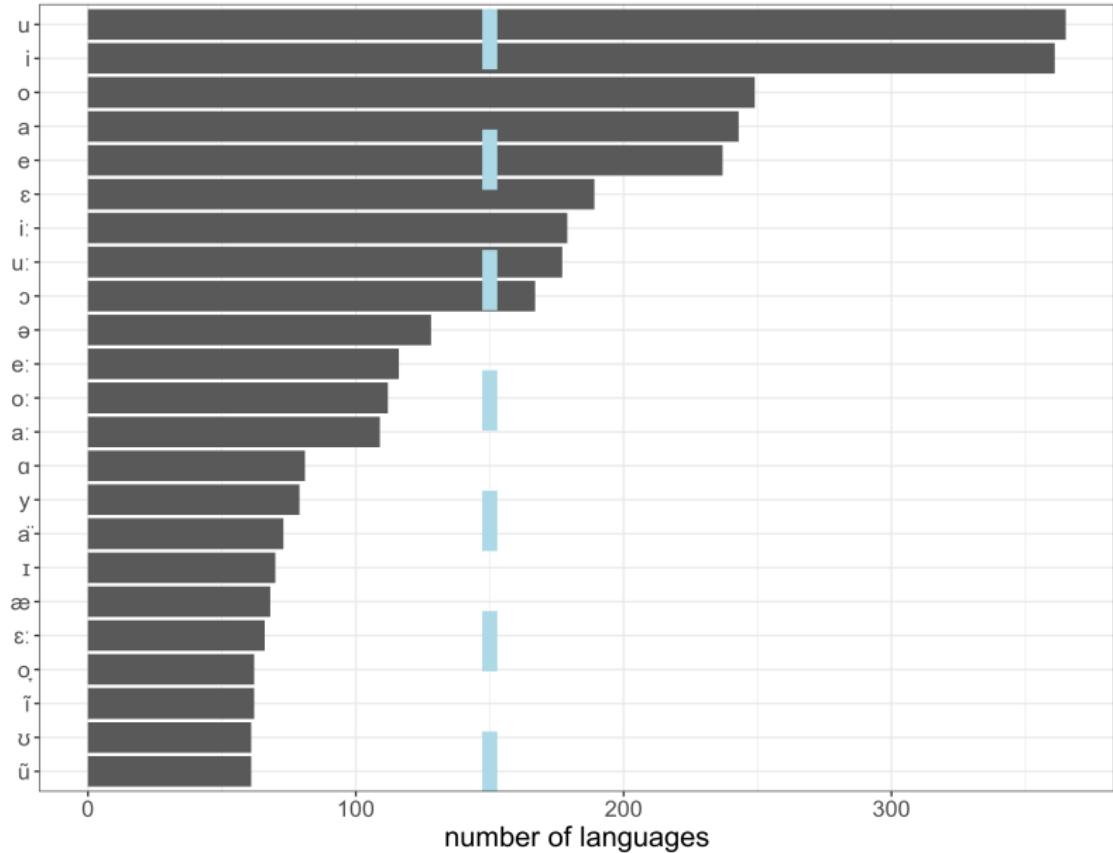
## Eurasian phonological inventories [Nikolaev et al. 2015]: consonants



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

b	d		dʒ			g	
p	t	ts	tʃ			k	
p <sup>h</sup>	t <sup>h</sup>					k <sup>h</sup>	
		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
  - except ejective consonants
  - except laterals in Avar-Andic and Tsezic branches
  - except labialisation
  - except gemination

# Conclusions

- East Caucasian consonant systems are more or less typical
  - except uvular and laryngeal consonants
  - except ejective consonants
  - except laterals in Avar-Andic and Tsezic branches
  - except labialisation
  - except gemination
- East Caucasian vowel systems are typical

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# Syllable structure and suprasegmental features

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

A lot of East Caucasian languages has 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<sup>f</sup>n /d-irʔ<sup>f</sup>-an/

npl-gather:ipfv-hab

‘gathers them’

ħa-d-irʔ-an

neg-npl-gather:ipfv-hab

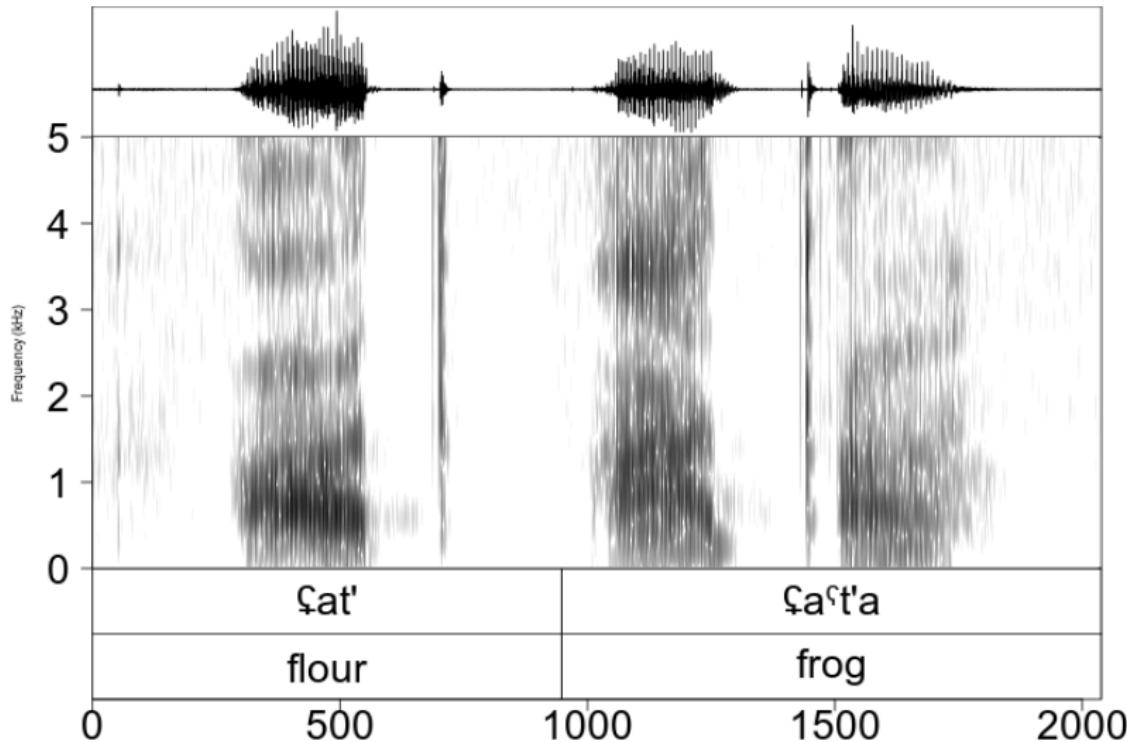
‘does not gather them’

ħa<sup>f</sup>-d-irʔ-a<sup>f</sup>n

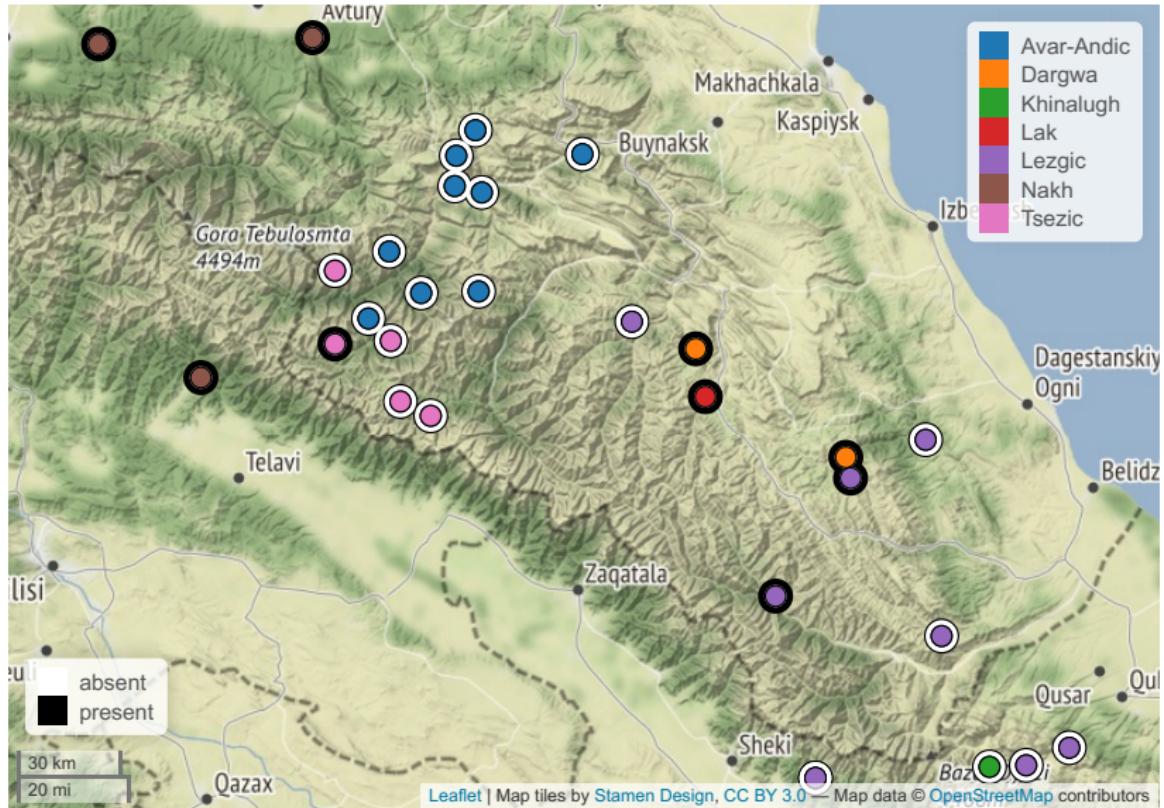
neg-npl-freeze:ipfv-hab

‘they are not freezing’

## Pharyngealization (example from Mehweb Dargwa)



# Pharyngealization



There are two enclaves: Nakh and Lak-Dargwa.

# Thanks

- to reasercher teams who collected all data
- to Viola Ivanova for helping with digitalisation of [Kibrik and Kodzasov 1990]
- to Linguistic Convergence Laboratory for organising this course

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- 
- if you like presented maps, see [lingtypology](#) [Moroz 2017]
  - spectrograms were created with [phonfieldwork](#) [Moroz 2020]
  - this presentation 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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