Cwyzhy Abkhaz

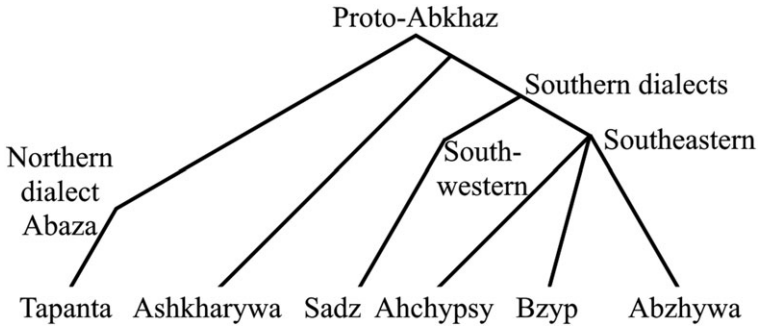
Samuel Andersson
Yale University
samuel.andersson@yale.edu

Bert Vaux
Cambridge University
bv230@cam.ac.uk

Zihni Pysipa (Şener)/Зиҳни Пҵысиҵа (Шьенер)

In this Illustration we describe the Cwyzhy (also Tswydzhy) dialect of Abkhaz, the native language of the third author. In Cwyzhy, the language Abkhaz is called /apʰsaʃʷa/ [ˈapʰsæʃᵘæ] аҧсашəа.[1] Abkhaz (ISO-639-3 abk) belongs to the Northwest Caucasian family of languages, and the Abkhaz dialects are related as shown in (1) (adapted from Chirikba 2012: 36):

(1) *Relationships between Abkhaz varieties*



Cwyzhy is a sub-dialect under the Sadz node in (1). All of the language varieties dominated by the 'Proto-Abkhaz' node are mutually intelligible (Chirikba 1996b: ii). Though T'ap'anta and Ashkharywa are spoken by a politically distinct Abaza people who live in the North Caucasian republic of Karachaj–Cherkessia (ibid.: ii), linguists who work on Abkhaz (e.g. Chirikba 1999, 2003; Hewitt 2006) generally consider them to be varieties of Abkhaz.

Abkhaz proper (i.e. all of the varieties under the node labelled 'Southern dialects' in (1), save for Ashkharywa) has four main dialects: Bzyp, Abzhywa, Sadz, and Ahchypsy (Chirikba 1996a). The two literary dialects, Bzyp and Abzhywa, are relatively well-studied (see Uslar 1887, Bgazhba 1964 on Bzyp; Aristava et al. 1968, Hewitt 1979, 1989, 1999, 2010,

[1] Throughout this Illustration we present Cwyzhy forms where possible in the order (i) /broad transcription/ – (ii) [narrow transcription] – (iii) Cwyzhy orthography employed by Mr. Pysipa. All glosses are based on Mr. Pysipa's variety, and sometimes differ significantly from the meanings of the same forms in the standard dialects.

Journal of the International Phonetic Association (2023) 53/1
doi:10.1017/S0025100320000390

First published online 31 March 2021

Arsthaa & Chkadua 2002, Chirikba 2003, and Jakovlev 2006 on Abzhywa; Genko 1957, Chirikba 1994, 1996b, 2012 on the Abkhaz varieties collectively). Sadz has received limited scholarly attention to date (Chirikba 1994, 1996a, b, 1997, 2014, to appear; Vaux & Pysipa 1997; Kilba 2000, 2012). According to Chirikba (1996a: 68 and to appear: 2), Sadz has two subdialects, Khaltsys and Cwyzhy; the latter is the focus of the present article. Mr. Pysipa mentions two other Sadz varieties surviving in Turkey, C'abal and Ahchypsy; Chirikba (2003: ii) considers the former to be an archaic form of Abzhywa and the latter to form a dialect branch separate from Sadz, as depicted in (1). In what follows, 'Cwyzhy' refers specifically to the Cwyzhy dialect spoken by Mr. Pysipa unless stated otherwise.

Cwyzhy was originally spoken along the Kudepsta River, just north of the present border between Abkhazia and Russia (Chirikba 1996a: 67). After the exodus from the Russian Empire to Anatolia in the 1860s, Cwyzhy was spoken until recently in three villages near Bilecik in northwestern Turkey: Elmabahçe, Künceğiz, and Hasandere (Chirikba 1996a: 69). Figure 1 shows where these three villages are located.

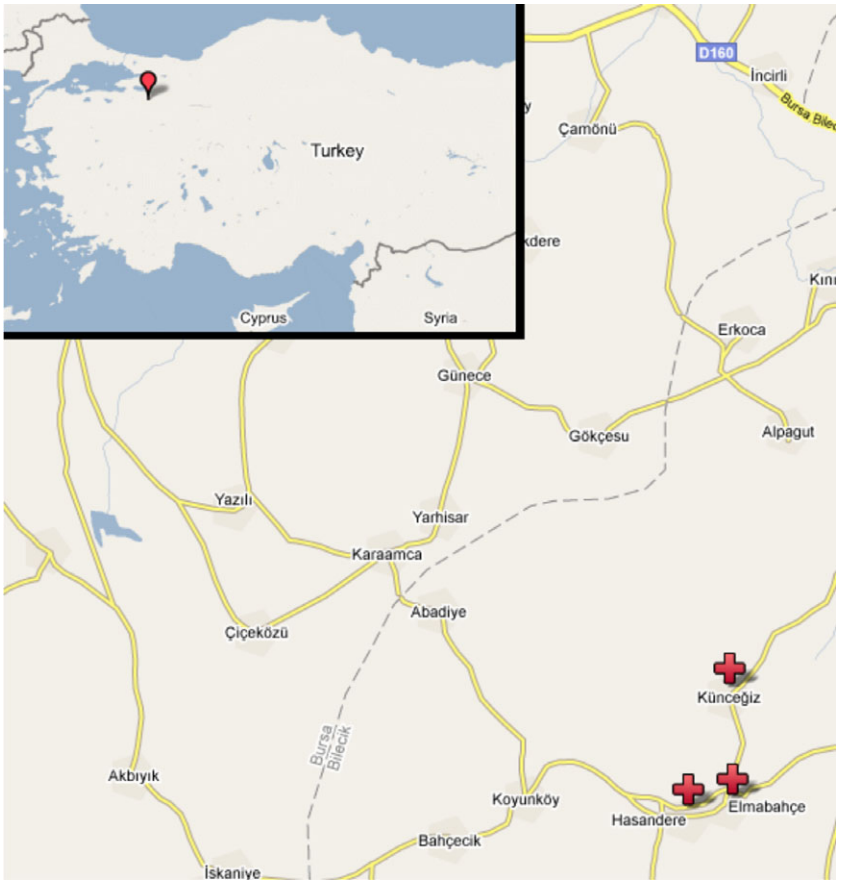


Figure 1 (Colour online) Map of villages in which Cwyzhy is spoken.

According to Mr. Pysipa, in 1993 Elmabahçe had 20 speakers of Cwyzhy and Künceğiz 65; Chirikba 1996a states that Elmabahçe no longer contains any Cwyzhy speakers. Mr. Pysipa's mother hails from Elmabahçe, and his father from Künceğiz; Mr. Pysipa himself was born in 1954 and moved to the United States in 1990 before returning to Turkey in 2004.

https://doi.org/10.1017/S0025100320000390 Published online by Cambridge University Press

Consonants

		Bilabial	Labiodental	Dental	Postalveolar	Palatal	Velar	Uvular	Pharyngeal
Plosive	Plain	p^h b		t^h d			k^h g		
	Labialized			t^{hw} d^w			k^{hw} g^w		
	Palatalized						k^{hj} g^j		
Affricate	Plain			ts^h dz	$tʃ^h$ dʒ				
	Labialized			ts^{hw} dz^w					
	Palatalized				$tʃ^{hj}$ $dʒ^j$				
Ejective	Plain	p’		t’			k’	q’	
	Labialized			t^w’			k^w’	q^w’	
	Palatalized						k^j’	q^j’	
Ejective affricate	Plain			ts’	tʃ’				
	Labialized			ts^w’					
	Palatalized				$tʃ^j$’				
Nasal		m		n					
Tap				ɾ					
Fricative	Plain		f v	s z	ʃ ʒ			χ ʁ	ħ
	Labialized			s^w z^w	$ʃ^w$ $ʒ^w$			$χ^w$ $ʁ^w$	$ħ^w$
	Palatalized				$ʃ^j$ $ʒ^j$			$χ^j$ $ʁ^j$	
Approximant		w				j			
Lateral approximant				l					

Below we illustrate near-minimal pairs for consonants in the frame /CəC(C)(C)/. Because /ə/ surfaces as [a] after /ħ/, this consonant is shown with a following [a] instead. As the surface representations demonstrate, the vowel /ə/ has many allophones. The allophony is governed by neighboring consonants and discussed further in the section Vowels. For all of the words below, the suffix /-k’/ is the indefinite article. Some of these forms may be loans from standard Abkhaz in Mr. Pysipa’s speech, and may differ slightly from the corresponding forms in other varieties of Abkhaz (Chirikba, p.c., Hewitt p.c.). Cwyzhy has a larger consonant inventory than Abzhywa due to additional coronal contrasts. For example, Abzhywa does not contrast /s^w $ʃ^w$/ as Cwyzhy does (Hewitt 1979). The larger coronal inventory is shared with Bzyp (Chirikba 2003). Chirikba (2014: 298) states that Cwyzhy also possesses pharyngealized voiceless uvular fricatives /χ’/ and /$χ^w$’/, but Mr. Pysipa’s variety lacks these. Apart from this the Cwyzhy consonants presented here are identical to those Chirikba (1996a) describes for Sadz dialects.

https://doi.org/10.1017/S0025100320000390 Published online by Cambridge University Press

Broad	Narrow	Spelling	Translation
pʰətʰ-k’	pʰətʰ	ҧыҭк	a little bit
bərg-k’	bərgk’	быргк	a respected old man
p’ərtʃ’-k’	p’ərtʃ’	пырҿк	a chewing sound
məskʰʲ-k’	məskʰʲk’	мысқьк	a musk, good-smelling soap
fə-k’	fək’	фык	a lightning bolt
və-k’	vək’	вык	a letter v
tʰəʁʲ-k’	tʰɪʁ̞ʲk’	ҭыҕьк	a male goat
dəd-k’	dəd	дыдк	a thunderclap
tsʰəpʰχʲ-k’	tsʰəpʰχʲk’	цыҧхьк	a spark
dzə-k’	dzək’	ӡык	a (unit, e.g. cup, of) water
t’ə-k’	t’ək’	тык	an owl
ts’ədz-k’	ts’ədzk’	ҵыӡк	a louse
nəs-k’	nəsk’	ныск	a piece of evidence
ɾəmdz-k’	ɾəmdzk’	рымӡк	a pitcher, a (unit of) urine
sə-k’	tsʰək’	сык	a (unit of) snow
zə-k’	zək’	зык	a gall bladder
ləm-k’	ɬəmk’	лымк	a lion
tʰʷə-k’	t͡pʰək’	ҭәык	a full one
dʷə-k’	d͡bək’	дәык	a field
tsʰʷə-k’	tɕʰᶣək’	цәык	a bull
dzʷə-k’	dʑᶣək’	ӡәык	a person
tʷ’ə-k’	t͡p’ək’	тәык	a slave
tsʷ’ə-k’	tɕᶣ’ək’	ҵәык	a tip, point, skewer
sʷə-k’	ɕᶣək’	шәык	a freezing, a frostbitten one
zʷə-k’	ʑᶣək’	жәык	an old thing
tʃʰə-k’	tʃʰək’	ҽык	a horse
dʒə-k’	dʒək’	џык	a piece of dirt
tʃ’ətsʰ-k’	tʃ’ətsʰk’	ҿыцк	a new one
ʃədz-k’	ʃədzk’	шыӡк	an (outbreak of) typhoid fever
ʒə-k’	ʒək’	жык	an excavation
ʃʷə-k’	ʃᶣʏk’	шәык	a bruise
ʒʷə-k’	ʒᶣək’	жәык	a cow

https://doi.org/10.1017/S0025100320000390 Published online by Cambridge University Press

tʃʰʲəgʷ-k’	tʃʰʲɪgʷk’	чыгэк	a haystack
dʒʲə-k’	dʒʲɪk’	цьык	an oak tree
tʃʲ’əgʷ-k’	tʃʲ’ɪgʷk’	цыгэк	a well-organized person
ʃʲə-k’	ʃʲək’	шьык	a shushing
ʒʲə-k’	ʒʲək’	жьык	a piece of meat
jə-ˈχa	jɪˈχa	иыха	his head
ɥə-k’	ɥʏk’	ѡык	a wine
kʰəzʷ-k’	kʰɪʑʱk’	къжэк	a male sheep
gə-k’	gək’	гык	a deficiency
k’ə-k’	k’ək’	кык	a one
kʰʷətsʰ-k’	kʰʷətsʰk’	къэцк	a wiping out/off
gʷə-k’	gʷək’	гэык	a heart
kʷ’əχʲ-k’	kʷ’ɪχʲk’	кэыхьк	cold leftover food, a cold person
wə-k’	wək’	уык	a tall one
kʰʲəʃʷ-k’	kʰʲɪʃʱk’	къышэк	a lip
gʲə	gʲɪ	гьы	and, also, even
kʲ’əb-k’	kʲ’ɪbk’	кьыбк	a ladder
q’əz-k’	q’əzk’	қызк	a goose
χə-k’	χək’	хык	a bullet
ʁəʁ-k’	ʁəʁk’	ғығк	a dry brittle thing
qʷ’əd-k’	qʷ’ədk’	қэыдк	a bean
χʷə-k’	χʷək’	хэык	a meal
ʁʷə-k’	ʁʷək’	ғэык	a board
qʲ’ə-k’	qʲ’ɪk’	қьык	a turd, pile of shit, shitty person
χʲə-k’	χʲɪk’	хьык	a gold one
ʁʲə-k’	ʁʲɪk’	ғьык	a very fast one
ħəˈbəq’awa	ħaˈbəq’oː	ҳабықоу	we are
ħʷə-k’	ħʱək’	ҳэык	a curled one

Realization of consonants

In word-initial position the voiced stops to our ears sound slightly imploded in Mr. Pysipa’s speech, and the non-ejective voiceless stops and affricates are heavily aspirated. In word-final position, voiced stops may be devoiced and aspirated, so that /a-kʰalbad/ ақалбад ‘sock’ can surface as [akʰaɬˈbatʰ]. Some final stops, particularly ejectives, may have a relatively weak

https://doi.org/10.1017/S0025100320000390 Published online by Cambridge University Press

final release (noted for Sadz dialects by Chirikba 1996a: 67). The labialized anterior fricatives and affricates, /sʷ zʷ tsʰʷ tsʷʼ dzʷ/, are slightly palatal, as seen in the transcriptions above. Mr. Pysipa's /ɾ/ has a degree of pharyngealization, and may also surface as an approximant, especially when geminated. The fricatives which we transcribe /ʃ ʃʲ/ for Cwyzhy Abkhaz correspond to /ʂ ʃ/ respectively in the literary Abzhywa dialect. Unlike Abzhywa, Cwyzhy does not have any appreciable retroflexion in either of these consonants.

Abkhaz has long consonant clusters, which we illustrate in the spectrograms and waveforms below with CCC clusters consisting only of obstruents. They are representative of a general pattern in the language where each consonant is released separately, and consonants are not typically elided in these circumstances. However, in fast speech, there may sometimes be no acoustic evidence for particular consonants. Examples can be seen in the narrow transcriptions in the list of minimal pairs above. The absence of acoustic evidence does not imply that no articulatory movements for the relevant consonants are being performed.

The waveforms in Figures 2 and 3 show that compared to aspirated stops, ejectives typically have a louder and shorter release burst.

Labialization

Labialization has three different realizations in Cwyzhy:

i. The labialized coronal stops, /tʰʷ dʷ tʷʼ/, are coarticulated with a labial stop, as in /tʷʼə-kʼ/ тәык 'a slave', realized as [t͡pʼək'].

ii. The labialized coronal fricatives and affricates, /sʷ zʷ ʃʷ ʒʷ tsʰʷ dzʷ tsʷʼ/, and /ħʷ/, have a front rounded secondary articulation, as in /zʷə-kʼ/ жәык 'an old thing', realized as [ʑᵘək'].

iii. All other labialized segments have a back rounded secondary articulation, as in /qʷʼəd-kʼ/ ҟәыдк 'a bean', realized as [qʷʼədk'].

A fourth type of labialization, labiodentalization, is found in some varieties (see Catford 1972, Chirikba, to appear), but is absent from Mr. Pysipa's speech.

Labial–coronal double articulations as shown in (i) are extremely rare cross-linguistically, and have previously been hypothesized not to exist (Maddieson 1983, 1987). Ladefoged & Maddieson (1996: 343–348), however, argue that true labial–coronal sounds occur either allophonically or phonemically in a handful of languages. Concerning the Caucasian cases, including Abkhaz, they say that 'it might be more justifiable to consider this gesture as phonetically a secondary articulation' (Ladefoged & Maddieson 1996: 344), a conclusion that we do not think follows from the descriptions cited. Catford is explicit that these stops involve 'complete labial closure' (Catford 1972: 681), and the closure is also described as 'complete' by Hewitt (1979: 256). As the degree of stricture is the same at labial and coronal places of articulation, we feel that the term 'double articulation' is justified.

Catford does mention that the closure is between the inner surfaces of the lips (endolabio–endolabial in Catford's (1977) terminology), unlike for plain labial stops, where the contact is typically between the outer surfaces (exolabio–exolabial). These descriptions match our impression of the labial–dental stops in Cwyzhy, from video footage of Mr. Pysipa and his mother. We illustrate the contrast between Mr. Pysipa's [pʼ] and [t͡pʼ] in Figure 4.

The closure of the lips on the left appears slightly less dark. As the closure for [pʼ] is between the outer surfaces, the typical dark vermilion zone of the lips is obscured. When the inner surfaces form the closure, as on the right, the vermilion zone is more visible, leading to a darker appearance. However, this visual evidence is also consistent with an incomplete closure for [t͡pʼ]. Articulatory work is necessary to shed additional light on exactly how [pʼ] and [t͡pʼ] are distinguished.

https://doi.org/10.1017/S0025100320000390 Published online by Cambridge University Press

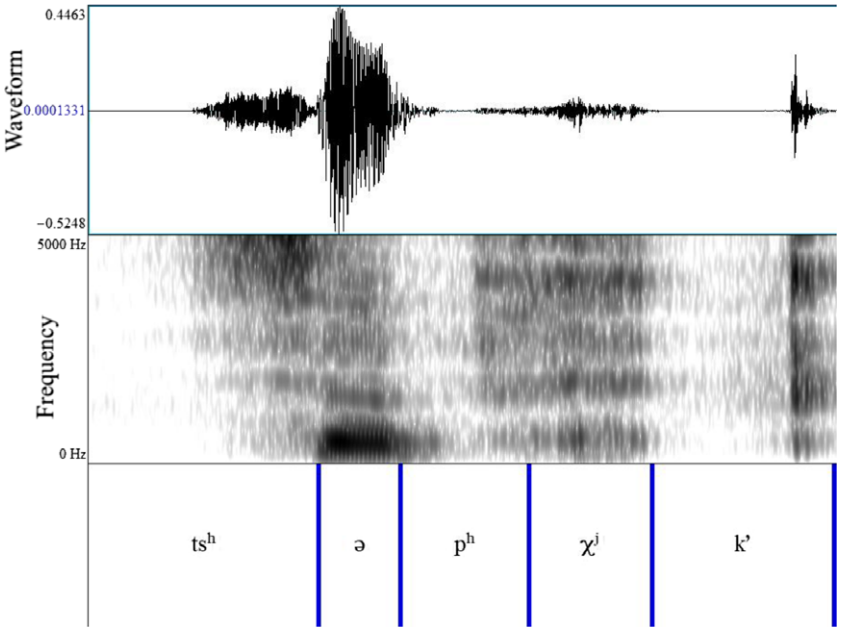


Figure 2 (Colour online) Waveform and spectrogram of [tsʰəpʰχʲkʼ] 'a spark'.

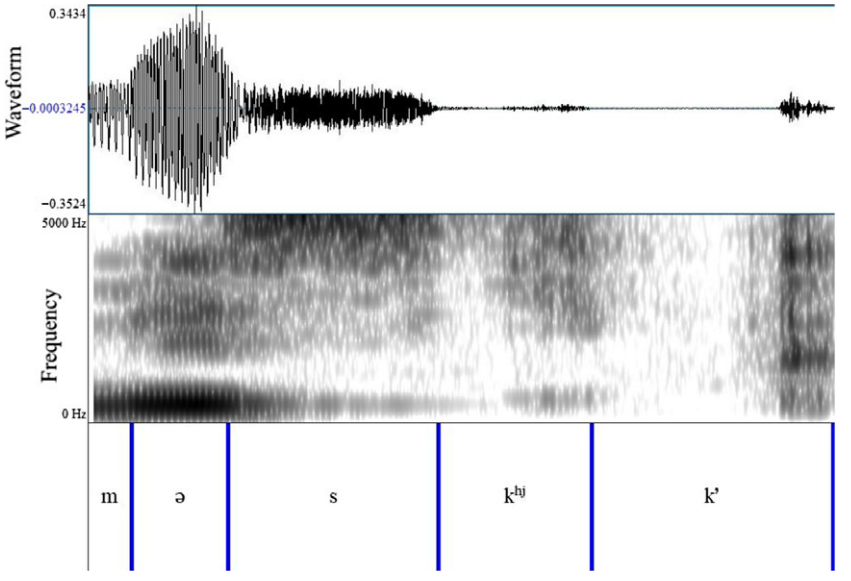


Figure 3 (Colour online) Waveform and spectrogram of [məskʰʲkʼ] 'a musk, good-smelling soap'.

https://doi.org/10.1017/S0025100320000390 Published online by Cambridge University Press

Figure 4 (Colour online) Left: lip closure for [pʼ] in [ˈdaːjzaːpʼ] 'he came'. Right: lip closure for [t͡pʼ] in [iːuːˈzəmɪtʃʰʲħaʁat͡pʼə] 'as hard as he could'.

Consonant length and syllabicity

Unlike the literary dialects, Cwyzhy possesses a robust phonemic length contrast in consonants:

(2) *Consonant gemination*

BROAD	NARROW	SPELLING	TRANSLATION
/a-ʃə-ˈra/	[aʃəˈra]	ашыра	get angry
/a-ʃːə-ˈra/	[aʃːəˈra]	ашшыра	fence in, build a fence around something

Chirikba (1996a: 74; 2014: 300–302) claims that the only consonants which exist as geminates are /l pʰ s ʃ ʃʷ tsʰ χ χʲ χʷ/. However, Mr. Pysipa's variety features geminates of all but 21 consonants.[2] It is possible that some or all of these 21 consonants can also appear as geminates, and merely fail to do so in the data available to us.

Geminates reduce to singletons word-initially (*pace* Chirikba 1996a: 74), producing alternations like the following:

(3) *Word-initial degemination*

BROAD	NARROW	SPELLING	TRANSLATION
/a-ˈlːa/	[aˈɬːa]	алла	the dog
/adʷaˈtʃʼə ˈlːakʼ əzˈbəjtʼ/	[ad͡baˈtʃʼə ˈɬakʼ əzˈbiːtʼ]	Адəаҿылак ызбит	I saw a dog outside

[2] The 21 consonants are /pʰ b tʰ d tsʰʷ dʒ pʼ m n v sʷ zʷ j kʰ g gʲ kʲʼ qʲʼ ʁ ʁʲ ħʷ/.

https://doi.org/10.1017/S0025100320000390 Published online by Cambridge University Press

In some consonant clusters, consonants may be syllabic. This applies to both sonorants and obstruents:

(4) *Syllabic consonants*

Broad	Narrow	Spelling	Translation
/mts'-k'/	[m̩ts'k']	мцк	a type of fly
/ʒʲ-k'/	[ʒ̩ʲk']	жьык	a piece of meat

In words such as these, there is also the possibility of epenthesizing a schwa, which then serves as the syllable nucleus. The same word can thus be pronounced with a syllabic consonant at one time and with an epenthetic vowel at another (see Spruit 1986: 83):

(5) *Variable epenthesis*

Broad	Narrow	Spelling	Translation
/ʒʲ-k'/	[ʒʲək'], [ʒ̩ʲk']	жьык	a piece of meat

Lateral allophony

Andersson (2017) reports on an acoustic study of lateral allophony in Georgian and Cwyzhy, on which the current section builds. Variation in /l/ has not previously been reported for Abkhaz, but impressionistically [l] and [ɬ] both occur. We therefore decided to study how the backness of intervocalic /l/ is affected by the backness of preceding and following vowels. The data are taken from previous Cwyzhy recordings (Vaux & Pysipa 2020). While the recordings do contain full sentences, most of the data consists of single words elicited orthographically from English and Turkish translations. The style is therefore most closely comparable to wordlist speech. Nevertheless, it is important to note that the data are less controlled than single words recorded in a carrier sentence, for example. Care must therefore be taken when interpreting the data, which we have not been able to control for factors such as utterance length and phrasal position.

We extracted 54 tokens of the lateral, with as many preceding and following vowel qualities as possible. Only intervocalic tokens were studied. Because of the small vowel inventory of Abkhaz, as well as the nature of vowel coloring (see the Vowels section), it is relatively rare to find /l/ in certain contexts. For example, the sequence [iːliː] requires an underlying sequence of five segments /əjləj/. Because of this it was necessary to include some repeated tokens of the same word. The 54 tokens come from a set of 33 words.

Praat (version 6.0.29, Boersma & Weenink 2017) was used to analyse the recordings. The segmentation criteria employed for the lateral are given in (7). The list draws heavily on Skarnitzl's (2009) work on Czech, which Andersson (2017) found to be applicable to Georgian and Cwyzhy.

(7) *Segmentation criteria for the lateral*

a. weak F2 (relative to surrounding vowels)
b. lower intensity in higher frequency ranges (2 kHz and above)
c. amplitude dip in the waveform
d. simplification of the shape of the waveform
e. antiformant between 2 kHz and 3 kHz
f. visible release of tongue tip contact

https://doi.org/10.1017/S0025100320000390 Published online by Cambridge University Press

In some cases, these criteria did not clearly identify the beginning and end points of the lateral. In such cases, a conservative segmentation was chosen, giving the lateral a shorter duration rather than a longer one. The surrounding vowels were segmented using standard segmentation criteria (Peterson & Lehiste 1960).

The measure chosen for backness was F2 at the midpoint of the lateral (see Recasens, Fontdevila, & Dolors Pallarés 1995, Andrade 1999, Carter & Local 2007, Yuan & Liberman 2009). For the surrounding vowels, F2 at the midpoint was again used. Measurements were made automatically in Praat. Each token was inspected manually to confirm that Praat's formant tracking was accurate. Where it was not, the formant tracking settings were adjusted to obtain an accurate automatic measurement, following the methodology used by Frisch & Wodzinski (2016).

It is clear that there are some tokens with relatively clear [l] (brighter shade), especially when preceding and following vowels are front (top right of Figure 5). Similarly, when both preceding and following vowels are back (bottom left of Figure 5), a more velarized [ɬ] (darker shade) appears. Example waveforms and spectrograms illustrating clear and velarized laterals are shown in Figures 6 and 7.

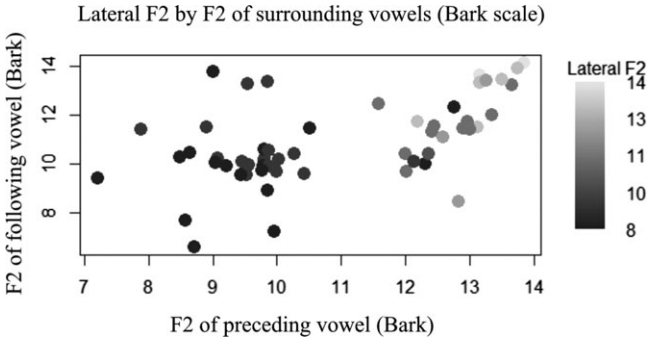
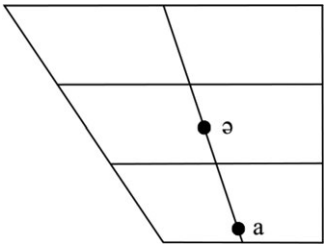


Figure 5 F2 (Bark) of the lateral (color gradient) by F2 (Bark) of preceding (x-axis) and following (y-axis) vowels. Figure made in R (R Core Team 2019) with a modified version of the function CGSPlot from Brinda (2020).

Vowels

Varieties of Abkhaz and other Northwest Caucasian languages are usually analysed with two underlying vowel phonemes, viz. /a/ and /ə/ (see Spruit 1986: 81–82 for discussion), and Cwyzhy is no different in this respect (see Chirikba 1996a on Sadz dialects generally). If unaffected by neighboring consonants, these two vowels surface as [a] and [ə] (see below for more detailed phonetic data).



However, each vowel typically acquires the additional vocalic features [high], [back], [round] from the features of the immediately preceding and following consonants, if they are present.

https://doi.org/10.1017/S0025100320000390 Published online by Cambridge University Press

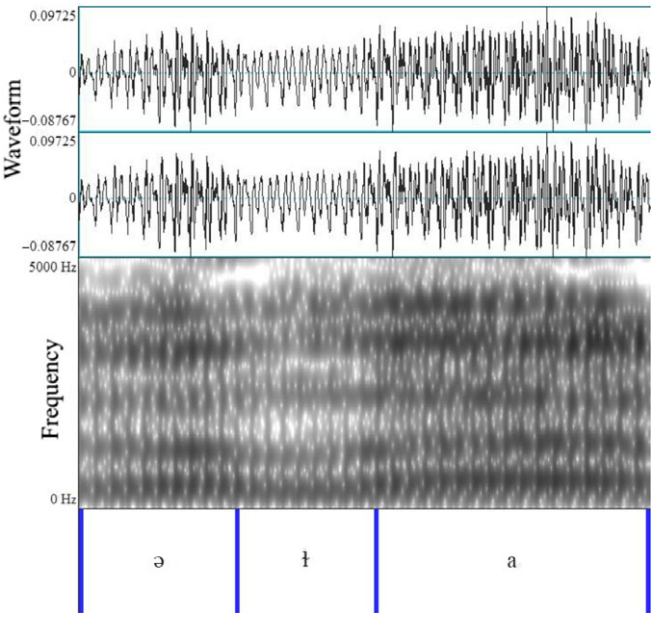


Figure 6 (Colour online) Spectrogram of a velarized lateral between central vowels in [aːˈgəɬaɾa] 'to stop'. The duration of the [əɬa] sequence is 266 ms.

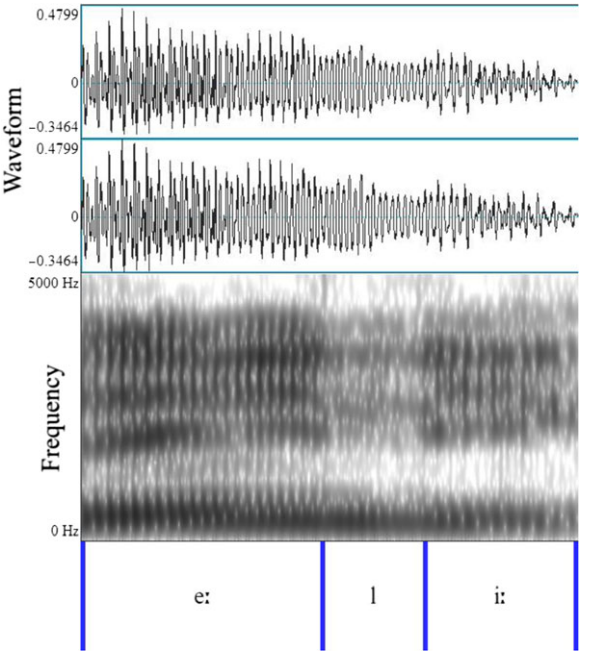
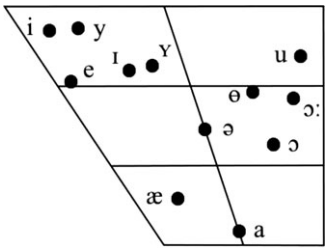


Figure 7 (Colour online) Spectrogram of a clear, non-velarized lateral between front vowels in [aˈnejliːkʼaː] 'the message'. The duration of the [eːliː] sequence is 302 ms.

https://doi.org/10.1017/S0025100320000390 Published online by Cambridge University Press

This gives rise to a much larger inventory of vowels on the surface. Some works do not transcribe these allophones (e.g. Spruit 1986), but where details are given (e.g. Hewitt 2010), they generally agree with what we present for Cwyzhy below. Very similar patterns of allophony can also be found in other Northwest Caucasian languages (e.g. Kabardian; Kuipers 1960, Allen 1965, Anderson 1978, Choi 1991, Colarusso 1992, Wood 1994).



BROAD	NARROW	SPELLING	TRANSLATION
/wəj/	[w**iː**]	уыи	3.SG PERSONAL/DEMONSTR. PRONOUN
/ˈsə-χʲəʒ/	[ˈsɪχʲɪʒ]	сыхьыз	my name
/aˈkʼːə-ɥ-ba/	[aˈkʼː**yː**bæ]	аккыɷба	a few, some
/tsʷʼaˈɥə/	[tɕᵘʷˈæˈɥʏ]	цəаɷы	curve, turn
/ajˈʱa/	[**ej**ˈʱa]	еиҳа	more
/ˈtsʰəpʰχʲadza/	[ˈtsʰəpʰχʲ**æ**dza]	цыпҧхьаʒа	per …, for each …
/ˈa-χaɾa/	[ˈɑχ**ɑ**ɾɑ]	ахара	far
/aχʷ ʃaˈqʼawzj/	[aχʷ ʃaˈqʼ**ɔ**ːzɪ]	ахə шаҟаузи	how much is the price?
/ˈa-χʷaʃʷ/	[ˈaχʷ**ɔ**ʃᵠ]	ахəашə	medicine
/sə-ˈgʷaqʼa-wa-jtʼ/	[səˈgʷaqʼ**o**ːtʼ]	сыгəаҟоут	I'm in a hurry
/s-tʰaˈχʷə-wpʼ/	[stʰaˈχʷ**u**ːpʼ]	сҭахəыуп	I want, I want it/them
/ɾə-tʃʰʲˈχʷəɾtʰa/	[ɾɪtʃʰʲˈχʷ**ɵ**ɾtʰa]	рычхəырҭа	their toilet
/a-aːˈgəla-ɾa/	[aːˈg**əɬ**aɾa]	аагылара	to stop

We extracted three tokens of each of the 13 words above from the materials in Vaux & Pysipa 2020. These are subject to the same constraints and limitations as the lateral data from the same source that were discussed earlier. As some vowels appear only after back consonants, words were generally chosen which had the relevant vowel after a velar or uvular. Occasional exceptions had to be made, either due to restrictions based on coarticulation (see below), or because of a lack of relevant words in our materials. In almost all cases, we used three repetitions of the same word but in some cases morphologically related forms of a word were used to get three tokens. The vowels were segmented in Praat using standard segmentation criteria for vowels (Peterson & Lehiste 1960). F1 and F2 were measured at the midpoint of each vowel in Praat. All tokens were manually inspected to verify the automatic measurements. Where errors were present, the formant tracking settings were adjusted so that an accurate automatic measurement could be made. Figure 8 shows the realization of the surface vowels of Cwyzhy.

https://doi.org/10.1017/S0025100320000390 Published online by Cambridge University Press

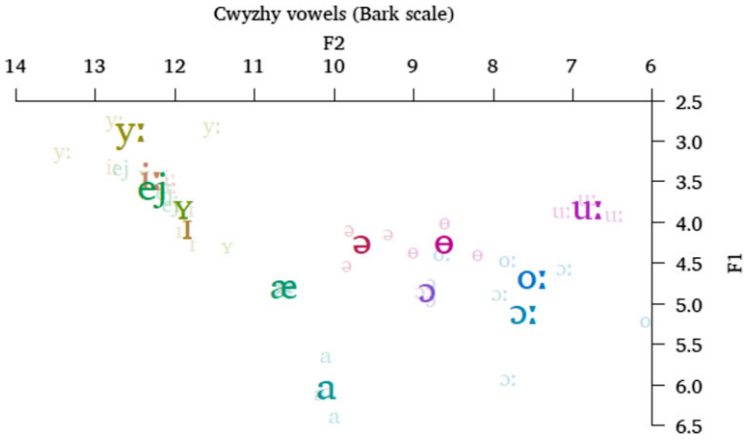


Figure 8 (Colour online) F1–F2 plot (Bark scale) for Cwyzhy vowels.

The relationship between the two contrastive vowels, and the thirteen realizations that we have identified, is shown in Table 1.

Table 1 Variation in vowels conditioned by surrounding consonants.

Phoneme(s)	Allophone	Environment(s)
		Adjacent to palatalized consonants
	[æ]	Unstressed and word-final
/a/	[ɔ]	After back labialized consonants
	[e]	Before /j/ when not preceded by another /a/ or a /ħ/ (may result in [eː])
/aa/	[a]	When the two /a/ phonemes are separated by a word boundary
/aw/	[ɔː]	When not preceded by another /a/ or a /ħ/
/a-wa(-j)/	[oː]	When /-wa-/ is the dynamic verb suffix, and when not preceded by /ħ/
		After /j/
	[ɪ]	Adjacent to palatalized consonants
/ə/		After /w/
	[ɵ]	Adjacent to labialized consonants where labialization is realized as [^{w}]
		After /ɥ/
	[ʏ]	Adjacent to labialized consonants where labialization is realized as [^{ɥ}]
	[a]	After /ħ/
/əj/	[iː]/[ɪː]	In all environments
/əw/	[uː]/[ʊː]	In all environments
/əɥ/	[yː]/[ʏː]	In all environments

Note that the allophony of Cwyzhy is variable, and as our phonetic transcriptions throughout the article suggest, for many of the given environments, the [a] and [ə] qualities may also appear.

https://doi.org/10.1017/S0025100320000390 Published online by Cambridge University Press

In some cases the glides /j w ɥ/ appear to surface as long vowels when syllabic: [iː]/[ɪː], [uː]/[ʊː], and [yː]/[ʏː], respectively. For example, when /-j/ 'and' is attached to a consonant-final noun, the result is a long vowel:

(8) *Apparent syllabic glides*

BROAD	NARROW	SPELLING	TRANSLATION
/bərtʰ/	[bərtʰ]	Бырҭ	Bert
/bərtʰ-j/	[ˈbərtʰiː]	Бырҭи	... and Bert

However, these syllabic glides occur in precisely the environments where we would independently expect epenthetic [ə] (see Spruit 1986: 83). An alternative analysis, therefore, would derive these long vowels from the sequence [ə] + glide which arises from epenthesis. Vowel coloring by glides is independently motivated in this environment (see Table 1), and produces the correct surface forms with long vowels.

Some may feel that a two-vowel analysis is needlessly abstract. Why, for example, would we think that [sˈtsʰoːt'] сыцоит 'I am going' is really derived from /s-tsʰa-ˈwa-jt'/ (Chirikba 1996a: 76)? It is worth pointing out that while many allophonic rules assume fairly abstract underlying forms, vowel coloring is productive across morpheme boundaries and is sometimes found even across word boundaries:

(9) *Justification for vowel coloring*

BROAD	NARROW	SPELLING	TRANSLATION
/ˈamaɾa/	[ˈamaɾa]	амара	the sun
/ˈamaɾa-j/	[ˈamaɾej]	амараи	… and the sun
/jaˈχʲa/	[jæˈχʲæ]	иахьа	today
/aˈɾəj jaˈχʲa jtsʰarˈməʃʲ/	[aˈɾɪː jæˈχʲe_jtsʰarˈmɪʃʲ]	ари иахьа иыцармишь	Will this go out today?

Some have attempted to reduce the vowel inventories of Northwest Caucasian languages further, to one vowel (Allen 1965 on Abaza, with discussion of Kabardian and Abkhaz, Anderson 1978 on Abaza and Kabardian), or even no vowels at all (Kuipers 1960 on Kabardian). We use two vowel phonemes in light of minimal pairs for the two vowels, both of which contrast with the absence of a vowel:

(10) *Minimal pairs for vowels*

BROAD	NARROW	SPELLING	TRANSLATION
/ˈa-χaɾa/	[ˈaχaɾa]	axapa	far
/ˈa-χɾa/	[ˈaχɾa]	axpa	the forest (standard Abkhaz [ˈabna])
/a-ˈχʷːa/	[aˈχʷːa]	axəxəa	the peak
/a-ˈχʷːə/	[aˈχʷːɵ]	axəxəы	the feather
/a-z/	[az]	aз	brown
/a-ˈzə/	[aˈzə]	aзы	for it

https://doi.org/10.1017/S0025100320000390 Published online by Cambridge University Press

For further discussion of the contrast between /ə/ and the absence of a vowel, and other ways of accounting for it, see the section on stress, below. Some argue for a third vowel phoneme, long /aː/, in the related Circassian languages (Appelbaum & Gordon 2013: 14 and references therein). Cwyzhy also has a phonetic long [aː], and there are some phonological arguments for analysing it as a single phoneme rather than a sequence /aa/. While the sequences [aj] or [aw] do not appear because of vowel coloring, [aːj] and [aːw] appear freely:

(11) *Differences between long and short /a/*

Broad	Narrow	Spelling	Translation
/ˈamaɾa-j/	[ˈamaɾej]	амараи	… and the sun
/jəsˈzaːjtʼ/	[jɪsˈzaːjtʼ]	иысзааит	it came to me
/aχʷ ʃaˈqʾawzj/	[aχʷ ʃaˈqʾɔːzɪ]	ахə шаҟаузи	how much is the price?
/sajˈləwkʾaːw/	[sejˈluːkʾaːw]	сеилыукааy	did you (M.SG) understand me?

Despite this, we believe that [aː] should be analysed as a sequence /aa/ at the phonological level. In some cases, the underlying geminate status is clear from morphological considerations. For example, in [aːˈgəɬaɾa] аагылара 'to stop', the first /a/ is a separate morpheme, which together with a suffix /ɾa/ marks the verb as nonfinite. Moreover, the second /a/ of an /aa/ sequence can bear stress independently of the first, as in /aˈalagəjtʼ/ [aˈaɬagiːtʼ] ааалагыит '. . . began.' This form would begin with /j-/ 'it, they' in isolation, but when the subject of the verb immediately precedes it, this agreement marker is not present.

Stress[3]

Word-level stress is contrastive in Abkhaz, as in the minimal pair in (12):

(12) *Minimal pair for stress*

Broad	Narrow	Spelling	Translation
/ˈa̲-χʷːa/	[ˈaχʷːa]	аҳəхəа	the ash(es), the handle
			(Abzhywa /a̲-χʷa/ has only the first meaning;
			'the handle' is a-χʷə́)
/a̲-ˈχʷːa/	[aˈχʷːa]	аҳəхəа	the peak
			(Abzhywa /a̲-χʷə̲/ 'the top'(Hewitt, p.c.),
			'the hill' (Chirikba, p.c.))

Stress in Abkhaz has not previously been studied acoustically, although intensity is claimed to be one important cue (Arshba 1979: 7). The spectrograms in Figure 9 show a near-minimal pair for stress, where the stressed syllable has higher pitch and intensity. Stressed vowels also appear to be slightly longer. Future work studying stress more systematically is needed to test how representative these patterns are of the language.

[3] In addition to the sources cited in this section, treatments of Abkhaz stress include Arshba 1979; Dybo 1989, 2000, 2007; Trigo 1992, and Yanagisawa 2000.

https://doi.org/10.1017/S0025100320000390 Published online by Cambridge University Press

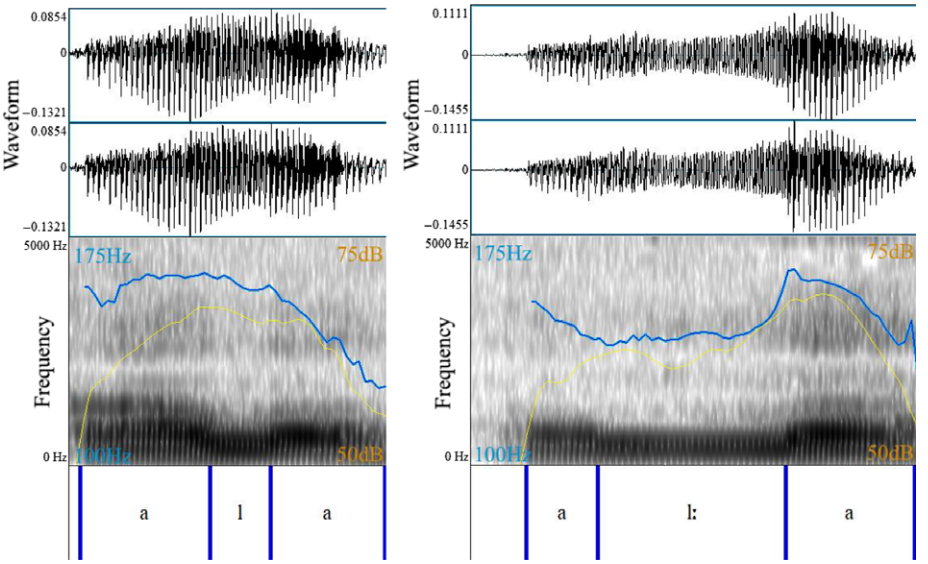


Figure 9 (Colour online) Initial stress on [ˈala] 'the eye' (left), and final stress on [aˈlːa] 'the dog' (right). Pitch (100–175 Hz) is shown in blue, and intensity (50–75 dB) in yellow.

Segments in Abkhaz are underlyingly specified as either accented (marked with an underscore) or unaccented (Kathman 1992: 211).[4] The stress is then determined in most cases by Dybo's Rule (Dybo 1977). In Spruit's (1986) formulation, Dybo's Rule says: Assign word stress to the leftmost accented segment not immediately followed by another accented segment. If a string contains no such segments (either because all segments are accented, or because none are), assign final stress.

For example, in [ˈaχʷːa] 'the ash(es)' above, the root /χʷːa/ contains no lexical accents. The prefix /a̲-/ is accented, so it is the leftmost accented segment not followed by an unaccented segment. By Dybo's Rule, the prefix is therefore stressed. By contrast, the vowel and consonant in the root /χ̲ʷːa̲/ 'peak' bear lexical accents. Since the word /a̲-χ̲ʷːa̲/ 'the peak' contains only accented segments, the word has final stress: [aˈχʷːa].

Lexical accent and stress are relevant to the status of underlying /ə/ in Abkhaz. Consider the minimal pair given for the /ə/–Ø contrast in (10) above, repeated here for convenience:

(13) /ə/–Ø

BROAD	NARROW	SPELLING	TRANSLATION
/a-z/	[az]	аз	brown
/a-ˈzə/	[aˈzə]	азы	for it

Note that the second word, unlike the word for 'brown', has stress on the schwa rather than the [a]. On an analysis that takes lexical accent into account, this is not a coincidence. For Spruit

[4] The accented segments have also been called 'dominant', and the unaccented ones 'recessive' (Hewitt 2010: 14, following Spruit 1986). As far as we can tell, these terms are used interchangeably for Abkhaz, and do not denote different lexical specifications. The terminology thus contrasts with that used elsewhere in the literature on phonetics and phonology, e.g. for Tokyo Japanese, argued to have both dominant accented and dominant unaccented suffixes (Alderete 2001). In this article we only mark lexical accents (with an underscore) where relevant to the point at hand.

https://doi.org/10.1017/S0025100320000390 Published online by Cambridge University Press

(1986), both words end underlyingly in /z/. The difference between the two lies in lexical accent: [aˈzə] 'for it' has two accents, /a-z/, and the accented /z/ triggers schwa epenthesis. [az] 'brown' has its only accent on the prefix, /a-z/, so there is no epenthesis. In our Cwyzhy data, all /ə/–Ø minimal pairs differ in stress in this way, which might make it possible to analyse the language with only one underlying vowel. Whether or not such an analysis is viable depends on the status of unstressed schwa. Yanagisawa (2005) argues that unstressed schwas are also predictable from general phonotactic constraints, while Vaux & Samuels (2018) argue that they are not fully predictable in Cwyzhy.

Transcription of recorded passage

We provide phonemic, phonetic, and orthographic transcriptions of 'The North Wind and the Sun' in the Cwyzhy dialect, translated from the Turkish version (Zimmer & Orgun 1992) by Mr. Pysipa. 'The North Wind and the Sun' has also been translated into the literary Abzhywa dialect by Zaira Khiba (published by Hewitt 1978). In the phonemic transcription, as elsewhere in this article, we treat /ə/ as underlying even in cases where it could be analysed as epenthetic.

As is common in Abkhaz storytelling, this story uses evidential endings on verbs. We have not translated the evidential meaning here, retaining the traditional English translation of the story.

Phonemic transcription

apʰʃatʼlakʷʼj amaɾaj ħawa ɾajħa amətʃʰʲ əzmada ħʷa əʃajmaɾkʼːawaz jəwapʼa əʃʷənə nəqʷʼaɥəkʼ daajzaapʼ jakʰʷʃaħatʰχəjtʼ ɾəwa ɾapʰχʲa anəqʷʼaɥə jəwapʼa əjʃʷəzərχəz ɾajħa amətʃʰʲ ʃəjmaw azə. nas apʰʃatʼlakʷʼ aalagəjtʼ asɾa əjəwzəmətʃʰʲħaɾatʷʼə. apʰʃatʼlakʷʼ asəpʰχʲadza anəqʷʼaɥə jəwapʼa ajħagʲə jətʃʰalajħʷawa dalagazaapʼ. atsʼəχʷazə apʰʃatʼlakʷʼ aqʷʼətsʼzaapʼ asɾa. wəj aʃʲtʰaχʲ amaɾa jəkʼaχːaw awaɥə jəkʰəpʰχaw jalagazaapʼ. anəqʷʼaɥə gʲə jəwapʼa aajʃʷəjχzaapʼ. abɾəj ala apʰʃatʼlakʷʼ akʰʷʃaħatʰχazaapʼ amaɾa amətʃʰʲ ɾajħa jəʃəʁʷːawa ala.

Phonetic transcription

apʰˈʃatʼɬakʷʼɪː ˈamaɾej ‖ ˈʰawa ɾejħa ˈʔamɪtʃʰʲ ɪzˈmadæ ħᵘæ ‖ ɪˈʃejmaɾkʼːɔːz̥ ‖ jɪˈwapʼa ɪʃᵘʏˈnə ‖ ˈnəqʷʼaɥʏkʼ ˈdaːjzaːpʼ ‖ ˈjakʰʷʃaħatʰχɪːtʼ ‖ ˈɾʊːa ˈɾapʰχʲæ aˈnəqʷɔɥɪ jɪˈwapʼæ iːʃᵘʏˈzərχəz̥‖ ɾejˈʰ͡amɪtʃʰʲ ˈʃiːmɔː azə ‖ ˈnas apʰˈʃatʼɬakʷʼ aˈaɬagiːtʼ asɾæ iːuːˈzəmɪtʃʰʲħaɾt͡pʼaˈə ‖ apʰˈʃatʼɬakʷʼ ˈasəpʰχʲædzæ aˈnəqʷʼɔɥʏ jɪˈwapʼa ejħaˈjɪ jɪˈtʃʰaɬejħᵘɔː ˈdaɬagazaːpʼ ‖ aˈtsʼəχʷazə apʰˈʃatʼɬakʷʼ aˈqʷʼətsʼzaːpʼ asɾæ ‖ ˈwɪː aʃʲtʰæχʲ ‖ ˈamaɾa ‖ jɪkʼaˈχːɔː ‖ awɔˈɥʏ ˈjɪkʰəpʰχɔː ˈjaɬagazaːpʼ ‖ aˈnəqʷʼaɥʏ gʲɪ jɪˈwapʼ͡aːj ʃᵘiːʁzaːpʼ‖ aˈbɾiː æɬæ ‖ apʰˈʃatʼɬakʷʼ ‖ ˈakʰʷʃaħatʰχazaːpʼ ‖ ˈamaɾa ˈamɪtʃʰʲɾejˈʰha jɪʃəʁʷːɔː aɬa

https://doi.org/10.1017/S0025100320000390 Published online by Cambridge University Press

Orthographic version

Аҧшатлакәи амараи «Ҳауа реиҳа амыч иызмада ҳәа» иышеимарккоуз иыуапа ишәыны ныҟәаҩык дааизаап. Иаҟәшаҳаҭхыит: «Рыуа раҧхьа аныҟәаҩы иыуапа иыишәызырхыз» реиҳа амыч шиымоу азы. Нас, аҧшатлакә аалагыит асра, иыыузымыҷҳаратәы. Аҧшатлакә асыҧхьаҙа аныҟәаҩы иыуапа аиҳагьы ыҕealаиҳәоу далагазаап. Аҵыхәазы аҧшатлакә аҟәыҵзаап асра. Уыи ашьҭахь амара иыкаххоу ауаҩы иыҟәыҧхоу иалагазаап. Аныҟәаҩыгь иыуапа ааишәихзаап. Абри ала аҧшатлакә ақәшаҳаҭхазаап амара амыч реиҳа иышыҧәҧәоу ала.

English translation

The North Wind and the Sun were disputing which was the stronger, when a traveler came along wrapped in a warm cloak. They agreed that the one who first succeeded in making the traveler take his cloak off should be considered stronger than the other. Then the North Wind blew as hard as he could, but the more he blew the more closely did the traveler fold his cloak around him; and at last the North Wind gave up the attempt. Then the Sun shined out warmly, and immediately the traveler took off his cloak. And so the North Wind was obliged to confess that the Sun was the stronger of the two.

Acknowledgements

The authors would like to thank James Clackson, Patrick Taylor, and especially Slava Chirikba, George Hewitt, and Zaira Khiba for helpful comments on earlier drafts of this article. We also thank the reviewers for their comments, and the editorial team for their work.

We dedicate this study to the memory of Mr. Pysipa, who worked tirelessly and generously on documenting his language with Ken Hale and us for more than twenty-five years until his unexpected passing at the beginning of 2018.

Supplementary material

To view supplementary material for this article (including audio files to accompany the language examples), please visit https://doi.org/10.1017/S0025100320000390.

References

Alderete, John. 2001. Dominance effects as transderivational anti-faithfulness. *Phonology* 18(2), 201–253.

Allen, William Sidney. 1965. On one-vowel systems. *Lingua* 13, 111–124.

Anderson, Stephen R. 1978. Syllables, segments, and the Northwest Caucasian languages. In Alan Bell & Joan B. Hooper (eds.), *Syllables and segments*, 47–58. Amsterdam: North Holland.

Andersson, Samuel. 2017. Lateral allophony in Georgian and Cwyzhy Abkhaz. Ms., Yale University.

Andrade, Amália. 1999. On /l/ velarization in European Portuguese. In John J. Ohala, Yoko Hasegawa, Manjari Ohala, Daniel Granville & Ashlee C. Bailey (eds.), *14th International Congress of Phonetic Sciences* (ICPhS XIV), Berkeley, University of California, vol. 1, 543–546.

Appelbaum, Ayla & Matthew Gordon. 2013. A comparative phonetic study of the Circassian languages. In Chundra Cathcart, Shinae Kang & Clare S. Sandy (eds.), *Proceedings of the 37th Annual Meeting of the Berkeley Linguistics Society: Special Session on Languages of the Caucasus* (BLS 37), 3–17. Retrieved from https://escholarship.org/uc/item/16x641q4 (24 November 2020).

Aristava, Shota, Khukhut Bgazhba, Mirian Tsikolia, Lidia Chkadua & Konstantin Shakryl. 1968. *Grammatika abxazskogo jazyka: fonetika i morfologija* [A grammar of the Abkhaz language: Phonetics and morphology]. Sukhumi: Alashara.

Arshba, Nelli. 1979. *Dinamicheskoje udarenie i redukcija glasnyx v abxazskom jazyke* [Dynamic stress and vowel reduction in Abkhaz]. Tbilisi: Mecniereba.

Arsthaa, Shota & L. Chkadua. 2002. *Aphsua literaturatw byzshwa agrammatika* [A grammar of the Abkhaz literary language]. Akwa: [n.p.]

Bgazhba, Xuxut Solomonovich. 1964. *Bzybskij dialekt abxazskogo jazyka* [The Bzyb dialect of the Abkhaz language]. Tbilisi: Izdatel'stvo Akademij Nauk Gruzinskoj SSR.

Boersma, Paul & David Weenink. 2017. Praat: Doing phonetics by computer. Version 6.0.29.

Brinda, William D. 2020. *Data analysis with R: The big picture*. Online resource available at http://quantitations.com/static/books/Data-Analysis-with-R.pdf.

Carter, Paul & John Local. 2007. F2 variation in Newcastle and Leeds English liquid systems. *Journal of the International Phonetic Association* 37(2), 183–199.

Catford, J. C. 1972. Labialization in Caucasian languages, with special reference to Abkhaz. In André Rigault & René Charbonneau (eds.), *Proceedings of the Seventh International Congress of Phonetic Sciences* (ICPhS VII), 679–682. Mouton: The Hague.

Catford, J. C. 1977. *Fundamental problems in phonetics*. Bloomington, IN: Indiana University Press.

Chirikba, Viacheslav. 1994. Abxazo-abazinskaja dialektologija i rekonstrukcija praabxazskoj fonemnoj sistemy [Abkhaz-Abaza dialectology and the reconstruction of the Proto-Abkhaz phonemic system]. In Asker Gadagatl & Ruslan Khadzhebiekov (eds.), *Nartskij epos i kavkazskoe jazykoznanie (The Nart Epic and Caucasology). Societas Caucasologica Europaea, Vith Colloquium, 23–25 June 1992, Maikop*, 331–342. Maikop: Adygheian Academy of Sciences.

Chirikba, Viacheslav. 1996a. Sadz, an Abkhaz dialect in Turkey. In Howard Aronson (ed.), *NSL 8: Linguistic Studies in the Non-Slavic Languages of the Commonwealth of Independent States and the Baltic Republics*, 67–81. Chicago, IL: Chicago Linguistic Society.

Chirikba, Viacheslav. 1996b. *A dictionary of Common Abkhaz*. Leiden: [n.p.].

Chirikba, Viacheslav. 1997. Distribution of Abkhaz dialects in Turkey. In Ayşe Sumru Özsoy (ed.), *Proceedings of the Conference on Northwest Caucasian Linguistics, 10–12 October 1994* (Studia Caucasologica III), 63–88. Oslo: Novum forlag.

Chirikba, Viacheslav. 1999. The West Caucasian material in *The North Caucasian Etymological Dictionary* by S. L. Nikolayev & S. A. Starostin. In Helma van den Berg (ed.), *Studies in Caucasian linguistics: Selected papers of the Eighth Caucasian Colloquium*, 152–170. Leiden: CNWS Publications.

Chirikba, Viacheslav. 2003. *Abkhaz*. Munich: Lincom Europa.

Chirikba, Viacheslav. 2012. Abxazskij jazyk [The Abkhaz language]. In Jurij D. Anchabadze & Jurij Argun (eds.), *Abxazy: Izdanie vtoroe, ispravlennoe* [Abkhaz, 2nd edn., revised], 23–39. Moskva: Nauka.

Chirikba, Viacheslav. 2014. Sadzskij dialekt abxazskogo jazyka i ego govory [The Sadz dialect of Abkhaz and its subdialects]. In Shalva D. Inal-Ipa (ed.), *Sadzy: Istoriko-etnograficheskie ocherki* [Sadz: Historical-ethnographical essays], 2nd edn., 274–374. Sukhumi: [n.p.].

Chirikba, Viacheslav. To appear. The Sadz dialect of Abkhaz. In Yuri Koryakov & Yury Lander (eds.), *The Caucasian languages: An international handbook*, vol. 1. Berlin: Mouton de Gruyter.

Choi, John. 1991. An acoustic study of Kabardian vowels. *Journal of the International Phonetic Association* 21, 4–12.

Colarusso, John. 1992. *A grammar of the Kabardian language*. Calgary: University of Calgary Press.

Dybo, Vladimir. 1977. Zapadnokavkazskaja akcentnaja sistema i problema ee proisxozhdenija [The North-West Caucasian accent system and the problem of its origin]. *Konferencija "Nostraticheskie jazyki i nostraticheskoe jazykoznanie", tezisy dokladov* [Book of abstracts from the Nostratic Languages and Nostratic Linguistics Conference], 41–45. Moskva: Institut Slavjanovedenija i Balkanistiki.

Dybo, Vladimir. 1989. Tipologija i rekonstrukcija paradigmaticheskix akcentnyx sistem [Typology and reconstruction of paradigmatic accentual systems]. In Rimma Bulatova (ed.), *Istoricheskaja akcentologija i sravnitel'no-istoricheskij metod* [Historical accentology and the historical comparative method], 7–145. Moscow: Nauka.

Dybo, Vladimir. 2000. Abxazskaja akcentnaja sistema [The Abkhaz accentual system]. In Vladimir A. Dybo (ed.), *Morfonologizovannye paradigmaticheskie akcentnye sistemy. T. I. Tipologija i genezis* [Morphophonologized paradigmatic accentual systems, vol. 1: Typology and genesis], 660–734. Moscow: Jazyki slavjanskoj kultury.

Dybo, Vladimir. 2007. Zapadnokavkazskaja akcentologicheskaja rekonstrukcija [West Caucasian accentological reconstruction]. *Lingvisticheskaja komparativistika v kul'turnom i istoricheskom aspektax* [Comparative linguistics in cultural and historical aspects], 88–113. Moscow: Moscow State University.

Frisch, Stefan & Sylvie Wodzinski. 2016. Velar–vowel coarticulation in a virtual target model of stop production. *Journal of Phonetics* 56, 52–65.

Genko, Anatolij. 1957. Foneticheskie vzaimootnoshenija abxazskogo i abazinskogo jazykov [The interrelation between the phonetics of Abkhaz and Abaza languages]. *Trudy Abxazskogo instituta jazyka, literatury i istorii* 28, 177–225.

Hewitt, Brian George. 1978. The North Wind and the Sun in literary Abkhaz. *Bedi Kartlisa* 36, 266–274.

Hewitt, Brian George. 1979. *Abkhaz: A descriptive grammar*. Amsterdam: North Holland.

Hewitt, Brian George. 1989. Abkhaz. In Brian G. Hewitt (ed.), *The indigenous languages of the Caucasus*, vol. 2. Delmar & New York: Caravan.

Hewitt, Brian George. 1999. Language. In Brian G. Hewitt (ed.), *The Abkhazians: A handbook*, 167–175. Richmond, England: Curzon.

Hewitt, Brian G. 2006. Abkhaz. In Keith Brown (ed.), *The Elsevier encyclopedia of language & linguistics*, 2nd edn., 7–9. Oxford: Elsevier.

Hewitt, Brian George. 2010. *Abkhaz: A comprehensive self-tutor*. Munich: Lincom Europa.

Jakovlev, Nikolaj. 2006. *Grammatika abxazskogo literaturnogo jazyka* [A grammar of the Abkhaz literary language]. Sukhumi: Alashara.

Kathman, David. 1992. Stress and accent in Abkhaz. In Germán Westphal, Benjamin Ao & Hee-Rahk Chae (eds.), *ESCOL '91: Proceedings of the Eighth Eastern States Conference on Linguistics*, 210–221. Columbus, OH: The Ohio State University.

Kilba, Èmma K. 2000. O dialektnoj baze rechi batumskix (ferijskix) abxazov. K probleme sadzskogo dialekta [On the dialectal source of the speech of the Batumi (Fier) Abkhaz: On the problem of the Sadz dialect]. *Abxazovedenie: Jazyk, fol'klor, literature* [Abkhaz Studies: Language, folklore, literature], vol. 1, 39–45. Sukhumi: Alashara.

Kilba, Èmma. K. 2012. K probleme rekonstrukcii istoricheskogo sadzskogo dialekta abxazskogo jazyka [On the problem of reconstruction of the historical Sadz dialect of the Abkhaz language]. In Denis Chachxalia (ed.), *Dzhigetskij sbornik*, vol. 1: *Voprosy etnokul'turnoj istorii Zapadnoj Abxazii ili Dzhigetii* [Jighet collection, vol 1: Ethnocultural issues in the history of Western Abkhazia or Jighetia], 106–113. Moscow: AKVA–Abaza.

Kuipers, Aert. 1960. *Phoneme and morpheme in Kabardian*. The Hague: Mouton.

Ladefoged, Peter & Ian Maddieson. 1996. *The sounds of the world's languages*. Oxford & Cambridge, MA: Blackwell.

Maddieson, Ian. 1983. The analysis of complex phonetic elements in Bura and the syllable. *Studies in African Linguistics* 14, 285–310.

Maddieson, Ian. 1987. The Margi vowel system and labiocoronals. *Studies in African Linguistics* 18(3), 327–355.

Peterson, Gordon E. & Ilse Lehiste. 1960. Duration of syllable nuclei in English. *The Journal of the Acoustical Society of America* 32(6), 693–703.

R Core Team. 2019. R: A language and environment for statistical computing. Vienna: R Foundation for Statistical Computing. https://www.R-project.org/.

Recasens, Daniel, Jordi Fontdevila & Maria Dolors Pallarès. 1995. Velarization degree and coarticulatory resistance for /l/ in Catalan and German. *Journal of Phonetics* 23, 37–52.

Skarnitzl, Radek. 2009. Challenges in segmenting the Czech lateral liquid. In Anna Esposito & Robert Vích (eds.), *Cross-modal analysis of speech, gestures, gaze and facial expressions*, 162–172. Berlin: Springer.

Spruit, Arie. 1986. *Abkhaz studies*. Leiden: [n.p.].

Trigo, Loren. 1992. Abkhaz stress shift. In Brian G. Hewitt (ed.), *Caucasian perspectives*, 191–235. Unterschleissheim & Munich: Lincom Europa.

Uslar, Pjotr Karlovich. 1887. *Etnografija Kavkaza. Jazykoznanie. Abxazskij Jazyk* [Caucasian ethnography. Linguistics: The Abkhaz language]. Tiflis: Tipografija kanceljarii Glavnonachal'stvujushchego grazhdanskoj chastiju na Kavkaze [Printing House of the Office of the Chief Civil Unit in the Caucasus].

Vaux, Bert & Zihni Pysipa. 1997. The Cʷəž′ə dialect of Abkhaz. In Susumu Kuno, Bert Vaux & Steve Peter (eds.), *Harvard Working Papers in Linguistics* 6, 193–208.

Vaux, Bert & Zihni Pysipa. 2020. The Cwyzhy dialect of Abkhaz. Ms., Cambridge University.

Vaux, Bert & Bridget Samuels. 2018. Abstract underlying representations and prosodic structure. In Diane Brentari & Jackson L. Lee (eds.), *Shaping phonology*, 146–181. Chicago, IL: The University of Chicago Press.

Wood, Sidney. 1994. A spectrographic analysis of vowel allophones in Kabardian. *Working Papers* 42, 241–250. Lund: Lund University Department of Linguistics.

Yanagisawa, Tamio. 2000. Abkhaz verb accent: A review of V. A. 'Dybo's Law' of Abkhaz accent. *Nagoya Working Papers in Linguistics* 16, 41–65. Nagoya: Department of Linguistics, University of Nagoya.

Yanagisawa, Tamio. 2005. Schwa in Abkhaz. *Japanese Slavic and East European Studies* 26, 23–36.

Yuan, Jiahong & Mark Liberman. 2009. Investigating /l/ variation in English through forced alignment. *Proceedings of Interspeech 2009*, 2215–2218. Retrieved from https://www.isca-speech.org/archive/archive_papers/interspeech_2009/papers/i09_2215.pdf (retrieved 11 October 2020).

Zimmer, Karl & Orhan Orgun. 1992. Turkish. *Journal of the International Phonetic Association* 22(1–2), 43–45.

https://doi.org/10.1017/S0025100320000390 Published online by Cambridge University Press