Creaky and pharyngealised vowels in Sangdam Tibetan*

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Summary

This article primarily describes the phonemic status of creaky and pharyngealised vowels in Sangdam Tibetan, a lesser-known Khams Tibetan dialect spoken in the northernmost area of Kachin State, Myanmar, and provides a brief analysis from a historical and typological perspective. From a synchronic perspective, the evidence for the distinctiveness of the creaky voice may be weak; however, there are a few minimal pairs. In terms of diachronic perspective, the creaky voice does not seem to have an obvious Written Tibetan (WrT) origin, whereas pharyngealisation can be tracked back to two clear origins: WrT *r* in all positions in a syllable and the coalescence of two syllables.

Key words: Khams Tibetan, phonation, creaky, pharyngealisation, coalescence

1.   Introduction

This article primarily attempts to provide a phonetic description of creaky and pharyngealised sounds in Sangdam Tibetan and discuss their phonemic status, followed by a brief historical and typological discussion of these sounds. Sangdam is the name of a village located in the northernmost area of the Union of Myanmar, around the bottom of Hkakabo Razi. The region is home to approximately 300 speakers of Sangdam Tibetan (data obtained in 2010; see Suzuki 2012a). Despite limited reports in the anthropological literature (such as Ozaki 1997, Rabinowitz 2002, Klieger 2003, 2006, Lasi Bawk Naw 2003, 2007, Eimer 2019), the presence of Tibetans in Myanmar is less-known in the fields of Tibetic dialectology and Tibeto-Burman linguistics. Suzuki (2012a) described several linguistic features of Sangdam Tibetan, including the sound system and lexical characteristics, in which the language has two noticeable phonetic phenomena: creaky phonation and pharyngealised vowels.

The Tibetan speakers in Myanmar live in the northernmost region of Kachin State. Their villages belong to Dazundam Village Tract, Pannandin Subtownship, Nogmung Township, Putao District, Kachin State, a 14–17 days' walk from Putao Town, from where one can fly to Myitkyina, the capital of Kachin State. Ethnic Rawangs mainly inhabit this area, and the lingua franca among the different ethnic groups is generally Rawang, while education is conducted in Burmese. The Tibetans, therefore, are usually trilingual. Education in Written Tibetan (WrT) is unavailable. According to the oral tradition of the local Tibetans, their ancestors migrated to this region about 160 years ago from rDzayul, today's rDzayul (Chayu) County in China, which is north of Kachin State. They still maintain contact with their relatives in rDzayul.

There are at least four Tibetan hamlets, among which I investigated the dialect of the Sangdam hamlet. This name is likely to have a Rawang origin; the second syllable *dam* is related to the word form for 'plain' in Rawang. The variety spoken in this hamlet, Sangdam Tibetan, is grammatically similar to the Mogrong and mBathang dialects of Khams Tibetan, spoken in sMarkhams (Mangkang) and mBathang (Batang) Counties, respectively. It possesses a distinctive pitch account as well. According to the Burmese Tibetans, their dialect is more similar to the Bodgrong (Bingzhongluo) dialect (Suzuki 2014a, 2014b) spoken in Gongshan County of Nujiang Prefecture, Yunnan Province, than the dialects spoken in rDzayul.

The language collaborator of Sangdam Tibetan is male and in his twenties. In our communication, I tried to use several dialects of Khams Tibetan, such as mBathang (Southern Route group; sKal-bzang 'Gyur-med 1985), Mogrong (Southern Route group), Derge (Northern Route group; Häsler 1999) and nJol (spoken in Deqin County; sDerong-nJol group). The most intelligible dialect among them is the mBathang dialect. Currently, Sangdam Tibetan is analysed as a language that likely belongs to the Southern Route group of Khams

Tibetan (Suzuki 2023b). However, the exact place within this group remains unclear due to limited data, including the absence of relevant information on the multiple vernaculars spoken in rDzayul. (see also Song et al. 2019, Tashi Nyima and Suzuki 2019, Suzuki 2021, 2023, and Tournadre and Suzuki 2023). In addition, language contacts with non-Tibetic languages, such as Dza (a.k.a. Zakhring; Liu 2021), K'man (Li 2002), Idu (Jiang 2005), Songlin (Song et al. 2019; Suzuki 2023a), and gSerkhu (Tashi Nyima and Suzuki 2019), should also be considered. See Figure 1 for the geographic distribution of the languages; see Endo et al. (2021) and Suzuki et al. (2023) for the language distribution in a larger scope.
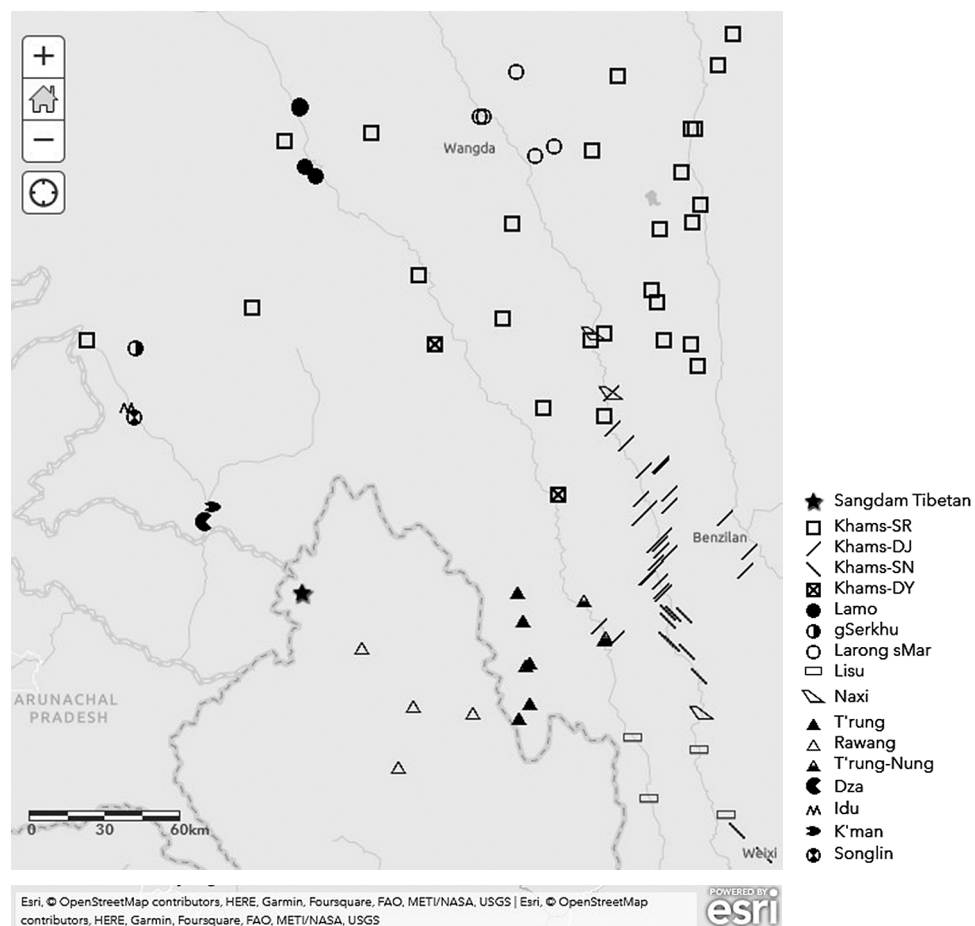

Figure 1 Geographic distribution of the languages around Sangdam Tibetan; locations of Sinitic, Jinghpaw, and the languages in Arunachal Pradesh are omitted.

N.B. SR: Southern Route; DJ: sDerong-nJol; SN: Sems-kyi-nyila; DY: rDzayul

Examining the target phonetic realisation, creaky and pharyngealised sounds, it is found that creaky phonation of vowels is a common phenomenon among Tibeto-Burman languages, particularly attested in Lolo-Burmese languages and Jinghpaw (Dai 1958). Okell (1969: 11) identified the presence of a creaky tone in Yangon Burmese, while Kato and Khin Pale (2010) described a glottalised vowel in Myeik Burmese, manifested as a short vowel with a glottal constriction. Pharyngealised vowels are comparatively rare, attested in Axi and Azha Lolo (Iwasa 2003), Hongyan Qiang (Evans 2006), Sanba Naxi (Suzuki 2013a), Zhollam Tibetan (Suzuki 2011b), the Myeik dialect of Burmese (Kato and Khin Pale 2010), and Darmdo Minyag (Dawa Drolma and Suzuki 2016) among the Tibeto-Burman languages. However, both creaky and pharyngealised sounds are unreported in Rawang (Straub 2016), functioning as a *lingua franca* around the Sangdam Tibetan-speaking area.

This article explores synchronic phonetic analysis with a primary phonological treatment essential for Tibetic dialectology. The phonemes are described with strict phonetic symbols, including the set of International Phonetic Alphabet with some additional phonetic symbols adopted for Sino-Tibetan languages, such as those listed in Zhu (2010) and Suzuki (2016). In this way, any possible confusion can be avoided when referring only to the forms provided in the respective monographs of individual dialects for comparative study (cf. Zhu 2008: 303; Zhang 2009: 358). Pharyngealisation has also been observed in other languages, such as Sanba Naxi (Suzuki 2013a, He 2015) and rGyalthang Tibetan (Hongladarom 1996, Suzuki 2019).

The article follows an essential phonemic treatment with minimal or near minimal pairs and does not attempt to discuss the advantages of one specific theory over another. Some may argue on distributional grounds for an alternative of the vowels, but I prefer to have the phonemic analysis reflect a phonetic realism even though this leads to a proliferation of phonemes with relatively limited distributions. The data employed in the article was obtained only by elicitation.

Section 2 describes the vocalism of Sangdam Tibetan with a display of minimal or near-minimal pairs of each vowel. Section 3 mainly presents phonetic variants of creaky and pharyngealised vowels and describes their phonemic characteristics. Finally, Section 4 provides a historical and typological perspective for these two articulations.

2.   Vocalism of Sangdam Tibetan

This section presents the vocalic system of Sangdam Tibetan with primary phonological treatment. For syllable structure, consonants, and tones, see the Appendix at the end of the article.

2.1 Vowel inventory

The vowel inventory with and without specific secondary articulations is displayed in Table 1. These vowels can generally occur in four types of syllables: short, long, nasalised, or checked with /ʔ/. It is possible to analyse these syllable types as features of the coda, but here, vowel length and nasalisation are presented as features of the main vowel.

Table 1 Vowel inventory of Sangdam Tibetan

plain	i	e	ɛ	a	ɐ	ɑ	ʌ	ɔ	o	u	ɯ	ʉ	ə	ɵ
creaky	i.	e.		a.					o.					
pharyngealised		eˤ	ɛˤ	aˤ	ɐˤ			ɔˤ	oˤ				əˤ	ɵˤ

The short vowels /ʉ/ and /ɛ/ seldom appear solely as an open rhyme. The number of words with /ɛ/, /ɛː/ and /ɛ̃/ is small, and some of them could have changed from /a/ because /ɛ/ in some words can be pronounced as [æ] or [a] other than [ɛ], whereas /a/ is pronounced as [a]; therefore the necessity of description of /ɛ/ exists in spite of its marginal distribution. Words with short /ɔ/ in an open rhyme are relatively rare and mostly occur in the middle of a word, consistently realised as [ɔ]. The occurrence of /ʌ/ and /ɯ/ is also limited in an open rhyme, but they do not form any supplementary distributions with other vowels. The vowel /ʌ/ has no long counterpart. The vowel /ɑ/ can appear only as a nasalised /ɑ̃/, and the non-nasalised [ɑ] can occur as a conditional variant of /ɐ/ in /ɐʔ/.

As mentioned above, I consider creakiness and pharyngealisation secondary articulations of a vowel, not a part of a realisation of a tone or an independent phonation. An explanation of this analysis is provided in Section 3.

2.2 (Pseudo-)minimal pairs

The articulatory contrast of each vowel can be displayed with minimal pairs, as shown in Table 2. Apparently, there are only a few complete minimal pairs; hence, almost all contrasts are best illustrated with pseudo-minimal pairs. Detailed discussions on phonetic and phonological accounts of creaky and pharyngealised vowels are provided in Section 3.

Table 2 (Pseudo-)minimal pairs of plain, creaky, and pharyngealised vowels

	plain		creaky		pharyngealised	
i	/ˉᵑkʰiː ma./	'kidney'	/ˊˉni. lɛ̆/	'dream'	n/a	
e	/ˊkʰeː tsõ/	'yesterday'	/ˊˉhtse./	'play'	/ˉhẽˤ daˤʔ/	'shopkeeper'
ɛ	/ˊlɛː ʰkɔ̃/	'thigh'	n/a		/ˊˉhɕɕɛˤʔ/	'iron'
a	/ˉkʰaː/	'upper'	/ˋkʰa./	'mouth'	/ˊraˤ/	'goat'
ə	/ˊkə nɐ/	'where'	n/a		/ˆpə tɕʰəˤʔ/	'wipe'
ɐ	/ˊkɐ jiʔ/	'fork'	/ˋŋɐ./	'drum'	/ˉⁿdɐˤː/	'moon'
ɑ	/ˉhkɑ̃ bo/	'dry'	n/a		n/a	
ɔ	/ˊkʰɔː sʰɐ/	'Burmese noodle'	n/a		/ˊᶠdɔˤʔ/	'cut down'
ʌ	/ˉhkʌ bə/	'foot'	n/a		n/a	
o	/ˉᵑkʰoː wa/	'reincarnation'	/ˊɦo. ma/	'milk'	/ˊxoˤː/	'paper'
u	/ˋkʰuː/	'sick'	n/a		n/a	
ɯ	/ˉkʰɯː/	'tailor'	n/a		n/a	
ʉ	/ˉhkʉ ma/	'thief'	n/a		n/a	
ɵ	/ˋkʰa ˋhkɵː/	'turn'	n/a		/ˊˉhpɵ̃ˤ/	'officer'

3. Phonetic description of creaky and pharyngealised vowels in Sangdam Tibetan

This section describes phonetic aspects of creaky and pharyngealised vowels in Sangdam Tibetan. Examples with a phonetic notation are first presented, and then a discussion on the phonemic status of these two articulations is provided. To facilitate a historical analysis, WrT forms are provided for each example. WrT forms are transliterated following de Nebesky-Wojkowitz (1956).

Phonetic descriptions in the item 'range of pronunciations' below, as well as throughout this article, are presented using simplified phonetic symbols that do not account for minor articulatory differences in tongue position, such as [ə] and [ɛ], or tones, unless necessary for specific description. An asterisk (*) is used to indicate unacceptable phonetic representations.

3.1 Examples
3.1.1 Creaky vowels
Generally, the phonetic realisation of the creaky vowel is weaker, and sometimes lost. A creaky vowel is not described as /V̰/ but as /V./. The former, a well-known phonetic symbol, cannot distinguish the degree of creakiness (strong from weak); the latter uniquely

presents a weak creakiness based on its usage in Burmese studies, such as Cornyn and Roop (1968) and Yabu (1970). Thus for the sake of simplicity, I use the former as a strong creakiness and the latter as a weak counterpart.

The creakiness is manifested throughout the entire articulation of the vowel and is accompanies by a slight lowering of pitch. Long vowels do not occur with creaky phonation. Additionally, an extra short vowel is attested as a phonetic variant, consistently without a glottal stop final. Creaky vowels generally occur at the end of a word without a final consonant.

Examples (1)–(4) in Table 3 indicate that no relation is found between the creaky voice and pitch-tone pattern. Based on these examples, the creaky voice cannot be regarded as a part of a realisation as a tone, but rather as part of a segmental feature, that is, secondary articulation of a vowel.

Table 3   Tonal contrast of creaky vowels

	WrT	Sangdam	Meaning	Range of pronunciations
(1)	*dka'*	/˧ʰka./	'tired'	[ʰka̰^{54}], *[ʰka̰^{52}]
(2)	*bka'*	/˩ʰka./	'command'	[ʰka̰^{52}], *[ʰka̰^{54}]
(3)	*rkya*	/˧ʰtɕa./	'ride'	[ʰtɕa̰^{54}], *[ʰtɕa̰^{52}]
(4)	*skya*	/˩ʰtɕa./	'carry'	[ʰtɕa̰^{52}], *[ʰtɕa̰^{54}]

Table 4 illustrates the range of pronunciations of /a./ in combination with three-way obstruent initials (5)–(7) and resonant initials (8, 9). Example (5) shows a similarity to those in Table 3. Examples (6, 7) present that the creaky feature cannot be replaced by a checked syllable, that is, a syllable with a final glottal stop, even with a creaky voice. This case suggests that a creaky feature is independent of a glottal stop. Example (8) exhibits a similarity to (6, 7) in that it does not permit the presence of a final glottal stop, either in addition to or instead of creaky voice. It also demonstrates that a creaky vowel should be short. Example (9) displays a possibility of a resonant initial with a creaky feature, but it cannot be pronounced as a preinitial glottal stop. In summary, a creaky feature does not appear as a glottal stop in any way.

Table 4   Contrast of creaky vowels depending on initials

	WrT	Sangdam	Meaning	Range of pronunciations
(5)	*khra*	/˩ʈʰa./	'sparrow hawk'	[ʈʰa̰^{52}], *[ʈʰa̰^{54}]
(6)	*brgya*	/˩ɦdʑa./	'hundred'	[ɦdʑa̰], [ɦdʑa], *[ɦdʑa̰ʔ], *[ɦdʑaʔ]
(7)	*rus pa*	/ˊrɯ ʰpa./	'bone'	[ʰpa̰], [ʰpa], *[ʰpa̰ʔ], *[ʰpaʔ]
(8)	*nyi ma*	/ˊnə ma./	'sun'	[ma̰], [mă], [ma], *[ma̰ʔ], *[ma̰ˑ]
(9)	*la*	/˧la./	'hillside'	[la̰^{54}], [la̰^{54}], *[ʔla̰^{54}], *[la̰ʔ^{54}]

The vowel /a./ most often occurs as a creaky vowel, as displayed in (1)–(9) above. Examples of other vowels can be found in Table 5. Example (10) shows the same restriction as (2, 4, 5). Examples (11, 12) show that no falling pattern is allowed at a word-medial position. This is a common feature in Tibetic languages with tonal distinction (Kitamura 1977; Suzuki 2022a), and the creaky vowels in Sangdam Tibetan are likely to follow this restriction.

Table 5 Creaky vowels other than /a./

	WrT	Sangdam	Meaning	Range of pronunciations
(10)	*rnga*	/ˋŋɐ./	'drum'	[ŋɐ̰⁵²], *[ŋa̰⁵⁴]
(11)	*rmi lam*	/ˉni. lɛ̃/	'dream'	[ni̠⁵⁵ lɐ̰⁵⁵], *[ni̠⁵⁴ lɐ̰⁵⁵]
(12)	*'o ma*	/ˊɦo. ma/	'milk'	[ɦo̰²⁴ ma⁴⁴], *[ɦo̰²⁴³ ma⁴⁴]

3.1.2   Pharyngealised vowels

A pharyngealised vowel is articulated as an approach of the tongue root to the pharynx during the vocalic articulation. Other phonetically prominent features of the secondary articulation, for example, retroflex of the tongue tip, velarised or uvularised gestures, are not observed, although the acoustic feature that lowers F3 is common to these articulations (Ladefoged 2006: 224–226; Suzuki 2011c, 2013a). A pharyngealised vowel is described as /Vˤ/. Note that during the pharyngealised articulation, a weak creaky sound may be produced simultaneously.

Examples of monosyllabic words with an open rhyme are presented in Table 6. Only a pharyngealised vowel is accepted in (13)–(15), whereas the non-pharygealised counterpart is also accepted in (16)–(19). A synchronic pattern for predicting which words exhibit optional or obligatory pharyngealisation has not been identified in the research conducted. Similar to a creaky voice, pharyngealisation appears without any relation to the tone and is also a part of a segmental feature.

Table 6 Monosyllabic words with a pharyngealised vowel

	WrT	Sangdam	Meaning	Range of pronunciations
(13)	*rtsa*	/ˋʰtsaˤ/	'root'	[ʰtsaˤ], *[ʰtsa]
(14)	*rma*	/ˉmaˤ/	'wound'	[maˤ], *[ma]
(15)	*ra*	/ˊraˤ/	'goat'	[raˤ], *[ra]
(16)	*rta*	/ˉʰtaˤ/	'horse'	[ʰtaˤ], *[ʰta]
(17)	*dra*	/ˊʈaˤ/	'net'	[ʈaˤ], [ʈa]
(18)	*ba*	/ˊpaˤ/	'cow'	[paˤ], [pa]
(19)	*dpon*	/ˋʰpə̃ˤ/	'officer'	[ʰpə̃ˤ], [ʰpə̃]

Examples of disyllabic words with pharyngealised vowels in an open rhyme are in Table 7. This type contains a phonological pharyngealised vowel; however, some examples accept even a non-pharyngealised variant, as in (20) and (21). Examples (22)–(24) only allow vowels to be pharyngealised. Note that, as shown in (20), a variant with a glottal stop is not accepted even though the vowel is always pharyngealised. This implies that no relationship exists between pharyngealisation and the final glottal stop. It is exceptional as the word form is derived from a Literary Tibetan form with a final obstruent consonant *g*, which generally corresponds to a final glottal stop (Suzuki 2012a); see Section 4.

Table 7 Disyllabic words with pharyngealised vowels in an open rhyme

	WrT	Sangdam	Meaning	Range of pronunciations
(20)	*nag nag*	/´naˤ naˤ/	'black'	[naˤ naˤ], [na na], *[naˤʔ naˤʔ]
(21)	*gra ma*	/´ʈaˤ ma./	'awn'	[ʈaˤ], [ʈa
(22)	*mna' ma*	/‾naˤ maˤ/	'daughter-in-law'	[naˤ maˤ], *[na ma]
(23)	*'dam bag*	/ˆⁿdãˤ ba/	'mud'	[ⁿdãˤ], *[ⁿdã]
(24)	n/a	/´tsaˤ tsaˤ/	'small'	[tsaˤ tsaˤ], *[tsa tsa]

Table 8 shows examples with a final glottal stop. Essentially, the type with a glottal stop final does not accept a variant without its final (an exception is found; see (40) and the explanation), and some examples do not allow the vowel to be plain (non-pharyngealised), as shown in (25)–(27). The type /εˤʔ/ can alter its vowel with [a], as in (26) and (29). Examples (28) and (29) can have a non-pharyngealised variant.

Table 8 Words with a pharyngealised vowel and a final glottal stop

	WrT	Sangdam	Meaning	Range of pronunciations
(25)	*a rag*	/‾ʔa raˤʔ/	'liquour'	[raˤʔ], *[raʔ]
(26)	*lcags*	/‾ʰcçεˤʔ/	'iron'	[ʰcçεˤʔ], [ʰcçæˤʔ], [ʰcçaˤʔ], *[ʰcçεʔ]
(27)	*'phyags*	/ˆpə tɕʰəˤʔ/	'wipe'	[tɕʰəˤʔ], *[tɕʰəʔ]
(28)	*phag*	/‾pʰaˤʔ/	'pig'	[pʰaˤʔ], [pʰaʔ], *[pʰεˤʔ]
(29)	*grag*	/-ʈεˤʔ/, /-ʈaˤʔ/	sensory evidential marker	[ʈεˤʔ], [ʈaˤʔ], [ʈεʔ], [ʈaʔ]

Table 9 presents examples with long vowels, revealing that pharyngealisation remains consistent on long vowels, with no other variants observed, except for example (36), which has a disyllabic variant without any pharyngealised vowels.

Table 9 Words with a long pharyngealised vowel

	WrT	Sangdam	Meaning	Range of pronunciations
(30)	*par*	/ˉpaˤː/	'photograph'	[paˤː], *[paː]
(31)	*gser*	/ˋʰsaˤː/	'gold'	[ʰsaˤː], *[ʰsaː]
(32)	*sbyar*	/ˉɦɣaˤː/	'paste'	[ɦɣaˤː], *[ɦɣaː]
(33)	*rtswa*	/ˋʰtsɐˤː/	'grass'	[ʰtsɐˤː], *[ʰtsɐː]
(34)	*zla ba*	/ˉⁿdɐˤː/	'moon'	[ⁿdɐˤː], *[ⁿdɐː]
(35)	*skyag pa*	/ˉʰçɐˤː/	'excrement'	[ʰçɐˤː], *[ʰçɐː]
(36)	*shog bu*	/ˊxoˤː/, /ˉxəɥ wo/	'paper'	[xoˤː], *[xoː]

Overall, most examples of pharyngealisation have the vowels /a/ and /ɐ/. Some examples alternate between a pharyngealised vowel and a non-pharyngealised counterpart. Note that in some examples, it is acceptable to leave out the pharyngealisation.

3.2   Phonemic status of creakiness and pharyngealisation

Plain, creaky, and pharyngealised vowels are phonetically distinguished from each other; however, as described in 3.1, in some cases creakiness and pharyngealisation exhibit variants without these features. Example (37) shows the distinction among plain, creaky, and pharyngealised vowels at the second syllable /ma/.

(37)   set of a minimal pair according to the vocalic quality
       Creaky: /ˊnə ma̰./   'sun' (WrT *nyi ma*)
       Plain: /ˉŋẽ ma/   'to sound good' (WrT *snyan ma*)
       Phayngealised: /ˉnaˤ maˤ/ 'daughter-in-law' (WrT *mna' ma*)

While the examples in (37) do not form a minimal pair, it is evident that the second syllable in each of them is distinctly articulated in the speech of the native speaker, indicating that the difference in articulation cannot be neglected.

3.2.1   Creakiness

The creakiness itself hardly forms a distinction between two lexical forms. There is, however, a pair of cognates with a clear distinction, as in (38).

(38)   /ˊnə ma̰./   'sun'
       /ˊnə ma/   'day'

The distinction between these two words becomes clearer when they are followed by some morphemes, such as case marker and numeral, as in (39).

(39)   /ˊnə ma. ⁻ʰcɕəɥʔ/   'one sun' :   [ma̰], [mă], *[ma], *[ma·]

        /ˊnə ma ⁻ʰcɕəɥʔ/   'one day' :   [ma], [ma·], [mă], *[ma̰]

This is a rare case, and most examples with the creakiness have a free variant without the creakiness. However, the distinction is clearly demonstrated in examples (38) and (39). Therefore, based on the present data set, the creaky voice should be marked as a phonemic state, even though the creakiness is marginal.

3.2.2   Pharyngealisation

In terms of the distribution of pharyngealised vowels, pharyngealisation appears in more vowels than creakiness, as shown in Table 2. Of these, /aˤ/ and /ɐˤ/ occur most frequently, as described in 3.1.2.

Concerning a rhyme /aˤʔ/, several examples alternate between a pharyngealised vowel and a non-pharyngealised counterpart, as in (28) and (29), and the phonemic combination /aʔ/ rarely occurs. Based on these facts, it may not be necessary to postulate a pharynge-alised /aˤʔ/, but to consider a pharyngealised variety as a variant of /a/ with a final /ʔ/. However, this assumption does not hold based on the set of examples (40).

(40)   /⁻pʰaˤʔ/   'pig' :   [aˤʔ], [aʔ]

        /⁻paʔ pa./ 'skin' :   [aʔ], [aː], *[aˤʔ]

        /ˊtsaˤ tsaˤ/ 'small' : [aˤ], [a]

An obvious distinction among [aˤʔ], [aʔ] and [aˤ] is found in (40). Furthermore, by observing variants in natural speech, it is found that /aˤʔ/ can be pronounced [aˤː] in phrases and sentences and that it can be distinguished from [ɐˤː] (/ɐˤː/, as attested in (33)–(35)). Using the words in (40), variants of the first syllable of a compound (41) are observed.

(41)   /⁻pʰaˤʔ ˊtsaˤ tsaˤ/ 'small pig, piglet' : [pʰaˤʔ], [pʰaʔ], [pʰaˤː], *[pʰaː]

In (41), the pharyngealisation must occur when the final glottal stop is lost. Based on this observation, the phonetic [aˤʔ] should be described phonemically as /aˤʔ/. In addition, /ɐˤʔ/ is also attested as in /⁻ᶠⁱlɐˤʔ/ 'feed', which contrasts with the second syllable of the word /ˊcɕa laˤʔ/ 'thing' as a pseudo-minimal pair. Additionally, non-pharyngealised rhymes are also attested in /ˊjaʔ/ 'do' and /^ᶠⁱlɐʔ/ 'teach'.

It should be noted that a relationship between creakiness and pharyngealisation is attested, as in (42). The examples in (42) reveal that the same morpheme is realised in different secondary articulations. This phenomenon will be related to the historical development of each articulation, which will be discussed in Section 4.

(42)   /ˊʔa pa./   'father'
       /ˊʔa ma./   'mother'
       /ˉpʰaˤ maˤ/   'parents'

4.   Historical and typological remarks

This section presents a brief historical and typological account of the development of the two secondary articulations, especially on the pharyngealised vowel, from the perspective of Tibetic dialectology.

4.1 Historical accounts

4.1.1 Creaky voice

In general, creaky sounds are not associated with obvious WrT origins. However, WrT *r*, including an initial position, can be associated with creakiness. Examples (3), (5), (6), (10) and (11) contain WrT *r* in the initial position; see 3.1.1. Several languages are reported by Suzuki (2005, 2007b, 2008, 2022b) in which the creaky voice functions as a distinctive feature of the suprasegmental system. This analysis correlates with the theoretical framework proposed by Zhu (2010). Of these previous works, Suzuki (2005) concludes that it is difficult to characterise creaky voice using the framework of the sound correspondence with WrT.

While it may be tempting to assume that the creaky sound in Sangdam Tibetan is influenced by the Burmese falling tone due to its similar appearance condition, observations from the research collaborator's speaking the Myitkyina dialect of Burmese reveal that the creaky sound is not as clear and often weaker compared to Sangdam Tibetan.

Thurgood (1976) suggests multiple origins for the Burmese creaky tone, some of which are Lolo-Burmese proto-tone 3 (proto-Tibeto-Burman *s-prefix), the juxtaposition of certain roots and a specific particle, and deverbal nouns. However, none of these origins can be verified in Sangdam Tibetan. As shown in examples (1)–(4), creakiness in Sangdam Tibetan is not part of suprasegmentals but a secondary articulation of vowels. This analysis implies that creakiness was acquired after the formation of tonal distinctions in this dialect. Considering the only minimal pair 'sun' and 'day' in (38) and (39), the origin of the creaky voice could be associated with Burmese, because the distinction between 'sun' and 'day' being with or without creakiness resembles the case of Burmese, in which 'sun' and 'day' are /ne/ and /ne./, respectively.

Therefore, it is most likely that the distinction of creakiness in Sangdam Tibetan was acquired through contact with Burmese-speaking people after the migration from rDzayul. However, evidence for the origin of creakiness cannot be confirmed at this stage, except in the case of some words with WrT *r*, which is related to pharyngealisation (see 4.1.2).

4.1.2 Pharyngealisation

Pharyngealised sounds have clearer origins than the creaky counterparts. As in the examples cited in Section 3, three sound correspondences of Literary Tibetan can be observed, each of which will be examined in detail.

1. WrT rhyme *ag*: (20), (25)–(29), (35), (36)
2. WrT *r* element in any positions of a syllable: (13)–(17), (21), (25), (29)–(33)
3. coalescence of two WrT syllables: (34)–(36)

WrT rhyme *ag*

Most examples with a WrT origin of *ag* correspond to a pharyngealised vowel /aˤʔ/. The final consonant of WrT *g* generally corresponds to a velar approximant /ɰ/, often with a glottal stop /ɰʔ/ except for WrT *ag*, as in (43). The velar feature /ɰ/ is analysed as a glide between a vowel and a final consonant and not a secondary articulation as a velarised vowel.

(43)　examples with a WrT final *g* except for *ag*
　　　/ˉnəɰʔ/ 'eye' *mig* (Old Tibetan *dmyig*)
　　　/ˉⁿɖɔɰʔ/ or /ˉⁿɖɯɰʔ/ 'dragon' *'brug*
　　　/ˊpə pʰoɰʔ/ 'be on the target' *phogs* (N.B.: The first syllable of this form is a marker employed in the perfect aspect and imperative mode. Its origin is unknown, but it is widely used in the southern area of Khams; see Suzuki 2021, Tournadre and Suzuki 2023)

This means the final *g*, associated with /k/ or /ʔ/, has principally changed into a velar approximant in the development of a rhyme, while the tongue root has been attracted to a pharynx in the case of /a/, a front low tongue position, which is the most distant place from the velum. The formation of a tongue position for [a] and that for the pharyngealisation has little relation, because the former is mainly posed with a tongue surface and the latter with a tongue root. The combination /aɰ/ is thus not attested.

It is also noteworthy that WrT *a* in the rhyme *ag* maintains a front low tongue position [a] (/a/) at the end of a word. At least in Khams Tibetan, there are only a few dialects that have such a sound correspondence; instead, a back vowel /ɑ/ appears more often (see Suzuki et al. 2022).

WrT *r*

The relationship between WrT *r* and a pharyngealised vowel is less frequently attested than that of WrT *ag*. Table 10 shows a correspondence of the WrT *r* element with word forms in Sangdam Tibetan. It displays that WrT *r* is associated with both the pharyngealisation and creaky voice, wherever WrT *r* is located in the syllable.

Table 10   Relationship between vowels and WrT *r*

	Pharyngealised	Creaky	Plain
preinitial	/⁻ʰtaˤ/ 'horse' *rta*	/ˆɦdʑa./ 'hundred' *brgya*	/ˊɦdʑa/ 'Han Chinese' *rgya*
initial	/ˊraˤ/ 'goat' *ra*	n/a	/ˊrə/ 'mountain' *ri*
glide	/ˊʈaˤː/ 'split' *bral*	/⁻ʰʈa./ 'hair' *skra*	/ˆⁿdə ⁿɖa/ 'like this' *'di 'dra*
final	/ˆʰsaˤː/ 'gold' *gser*	n/a	/ˊmeː/ 'butter' *mar*

Upon examining the examples with plain vowels, a tendency can be observed where pharyngealisation tends to occur more frequently when the vowel is either /a/ or /ɐ/. However, one exception exists: /ˊɦdʑa/ 'Han Chinese'. At this stage, it is difficult to establish a rule for the sound correspondence.

Several examples with a creaky vowel correspond to WrT *r* as in (3), (5)–(7), (10) and (11). They may imply that the creaky voice and pharyngealisation have some phonetic relations, which seems to be the phonetic description of the tense vowel attested in many Lolo-Burmese languages. Dai (1958: 36) states, 'Sometimes a tense vowel can be articulated in such a way that not only the glottis and vocal cords tense, but also the pharynx and oral muscles simultaneously' (translation mine). However, it is noted that Sangdam Tibetan, unlike Lolo-Burmese languages, has a distinction between a creaky voice and pharyngealisation.

Coalescence of two WrT syllables

Sangdam Tibetan has a few examples indicating a coalescence of two WrT syllables triggering a pharyngealised vowel in a monosyllabic word. This understanding is supported by example (36), which has two spoken forms with and without a pharyngealisation for one word: /ˊxoˤː/ and /⁻xɐɰ wo/ 'paper', derived from WrT *shog bu*. Stable monosyllabic words were found that were derived from WrT disyllabic forms in examples (34) and (35).

See example (33), /ˆʰtsɐˤː/ 'grass' (WrT *rtswa*). Although the WrT form *rtswa* is monosyllabic, it originates from the coalescence of two syllables. First, Hill (2006: 83–85) provided evidence for the pronunciation of *w* in Tibetic varieties (particularly Western) and in philology. Second, the WrT glide *w* corresponds to a glide /w/ and even an initial of the second syllable in a limited number of Khams Tibetan varieties spoken in the southern Khams, especially in Yunnan (Suzuki 2007a: 261, 2012b, 2014a, 2021). However, no further evidence for the pronunciation of WrT *w* has been found in Sangdam Tibetan itself.

4.2   Typological accounts of the pharyngealisation in Tibetic and Sino-Tibetan

While pharyngealisation is relatively uncommon in the Tibetic languages, it is attested in Zhollam Tibetan. Similar to Sangdam Tibetan, pharyngealisation in Zhollam Tibetan also has its origins in WrT *r* as a main initial and as a glide, as well as in the coalescence of two syllables (Suzuki 2011b). Table 11 shows some lexical contrasts among WrT, Sangdam, and Zhollam.

Table 11 Lexical contrasts among WrT, Sangdam, and Zhollam regarding pharyngealisation

	Meaning	WrT	Sangdam	Zhollam
(44)	'goat'	*ra*	/ˊraˤ/	/ˊɦaˤː/
(45)	'eagle'	*khra*	/ˆʈʰaˤ/	/ˉkʰaˤ/
(46)	'mountain'	*ri*	/ˊrə/	/ˊɦɜˤː/
(47)	'gold'	*gser*	/ˆʰsaˤː/	/ˆʰsɛj/

No common words exist that originated from the coalescence of two syllables between Sangdam and Zhollam. As in (44), the pharyngealised vowel appears in both dialects; however, there are also differences in (45)–(47). In Sangdam, WrT *r* in all positions influences the development of a pharyngealised vowel, and the pronunciation of *r* itself can maintain or influence the development of a retroflex initial in (45), whereas in Zhollam only the initial *r* contacting a vowel can influence the development of a pharyngealised vowel and lose its phonetic realisation as a /r/-like consonantal sound even on the main initial *r*, as in (44) and (46).

It is clear that the element *r* in the WrT form affects the formation of the pharyngealised vowel. The dialects of the Melung subgroup, including Zhollam Tibetan, which belongs to this subgroup (Suzuki 2011b), exhibit at least three articulations that have the same origin, namely the WrT *r* initial: pharyngealisation (Suzuki 2011b, 2013a), retroflexion (Suzuki and Tshering mTshomo 2009; Suzuki 2009a, 2010, 2011a, 2011b, 2013a, 2013b), and velarisation (Suzuki 2010), as well as omission (Suzuki 2009b).

The variation attested in the Melung subgroup with respect to WrT *r* reflects the phonetic theory that F3 falls through the given secondary articulations, as mentioned in 3.1.2. Recent studies suggest that pharyngealisation is part of the sound system of Middle Chinese (Gong 2018), and uvularisation is part of the sound system of Rmaic (Evans et al. 2016) and Tangut (Gong 2020). In particular, Evans et al. (2016: 1) state that uvularisation is represented acoustically by the raising of vowel F1, lowering of F2, and in the raising of the difference F3-F2. An acoustic approach can be used to study the pharyngealisation of Sangdam Tibetan in more detail.

In terms of acoustic features, pharyngealisation is unlikely to be related to a creaky voice, contrary to the categorical similarity that both function as a sound system in Tibeto-Burman languages characterised by the term 'tense-throated' or *jinhou* in Chinese (Zhu 2010, Suzuki 2011c). The case of Sangdam Tibetan implies a relationship between pharyngealisation and creaky voice; however, the creaky feature is more likely to have been acquired through language contact with Burmese as an intrusive language, based on the present data shown in Section 3.

5.   Conclusion

This article described two remarkable phonetic features, creaky voice and pharyngealisation, attested in Sangdam Tibetan, and provided a brief analysis from historical and typological perspectives. From a synchronic viewpoint, speakers distinguish these two sounds from each other; however, the evidence for the distinctiveness of the creaky voice may still be weak because of the small number of minimal pairs. However, the presence of minimal pairs suggests that creaky voice is potentially becoming phonemic, even if it currently holds a marginal status.

From a diachronic viewpoint, the following was found: on the one hand, creakiness has no obvious origin in WrT, and on the other hand, pharyngealisation has two obvious origins: WrT *r* in all positions of a syllable and the coalescence of two syllables. These origins of pharyngealisation are similar to Zhollam Tibetan, which systematically possesses pharyngealised vowels, and this proximity of origin suggests a new process of sound change in Tibetic languages.

The co-occurrence of creakiness and pharyngealisation as distinct phonemic features is typologically idiosyncratic. However, Kato and Khin Pale (2010) reported a Burmese dialect called Myeik, in which creaky and pharyngealised vowels are distinctive. These two sounds are attested in numerous examples, and appear to be more systematic than Sangdam Tibetan, with a clear origin. This supports the possibility of co-occurrence of two distinctive secondary articulations within one language system.

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