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A PHONOLOGICAL ANALYSIS OF MRO KHIMI

by

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Bachelor of Arts, Purdue University, 2007

A Thesis
Submitted to the Graduate Faculty

of the

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for the degree of

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May

2012

This thesis, submitted by Christina Scotte Hornéy in partial fulfillment of the requirements for the Degree of Master of Arts from the University of North Dakota, has been read by the Faculty Advisory Committee under whom the work has been done and is hereby approved.

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Chair

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This thesis meets the standards for appearance, conforms to the style and format requirements of the Graduate School of the University of North Dakota, and is hereby approved.

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TABLE OF CONTENTS

LIST OF FIGURES

FIGURE PAGE

LIST OF TABLES

ABBREVIATIONS

(n)	Noun
(v)	Verb
3SG	Third person singular
Apprx.	Approximant
C	Consonant
CFP	Clause-final particle
INTR	Intransitive verb
H	Hi tone
L	Lo tone
M	Mid tone
OCP	Obligatory Contour Principle
SF	Surface form
SSP	Sonority Sequencing Principle
TBU	Tone bearing unit
TR	Transitive verb
UF	Underlying form
V	Vowel
V slot	Vowel slot
vd.	Voiced
vl.	Voiceless

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ABSTRACT

This thesis provides an overview of the phonology of Mro Khimi, particularly with regard to tone. Mro Khimi is a Southern Chin language, belonging to the Kuki-Chin-Naga branch of the Tibeto-Burman language family (Lewis 2009).

Mro Khimi is distinct from other Chin languages in that it has a voiceless velar fricative and that, like Burmese, it distinguishes between an aspirated and unaspirated voiceless sibilant. Furthermore, the velar nasal /ŋ/ is conspicuously absent, except as a rare variant of /n/.

Mro Khimi also has three front round vowels /y ʏ ø/ that are not found in the vowel inventories of Proto-Chin or other Chin languages. These vowels correspond to the Proto-Chin diphthongs /u̯i o̯i u̯a/. Among Chin languages, only Mro Khimi and Kaang have central vowels, while only Mro Khimi and Mara do not have consonant codas.

Mro Khimi has two contrastive tones, H and L, which form four tone melodies used for both nouns and verbs: H L LH HL. Tone melodies associate to the root of the noun or verb and are assigned left to right, one to one. If there are more TBUs than tones, the final tone will spread to the right. If there are more tones than TBUs, the final tone will be left floating since contour tones are not permitted. Affixes are underlyingly toneless. The root melody either associates or spreads onto suffixes. Prefixes are normally assigned polar tone; if polar tone is blocked, the tone of the root spreads to the prefix. A H tone is phonetically lowered between a L and another H, giving the surface pattern LMH. Tone melodies do not cross root boundaries in compound nouns and verbs.

CHAPTER 1

LINGUISTIC AND SOCIAL BACKGROUND

This thesis presents a sketch of the phonology of Mro Khimi [cmr]. My purpose in writing this thesis is to provide Mro Khimi speakers with an analysis of the phonology of their language.

Mro Khimi is a Southern Chin language, belonging to the Kuki-Chin-Naga branch of the Tibeto-Burman language family (Lewis 2009). Mro Khimi is distinct from other Chin languages in that it has a voiceless velar fricative and that, like Burmese, it distinguishes between an aspirated and unaspirated voiceless sibilant. Furthermore, the velar nasal /ŋ/ is conspicuously absent, except as a rare variant of /n/.

Mro Khimi also has three front round vowels /y ʏ ø/ that are not found in the vowel inventories of Proto-Chin or other Chin languages. The central vowels /y ʏ ø/ correspond to the Proto-Chin diphthongs /u͡i o͡i u͡a/. Among Chin languages, only Kaang and Mro Khimi have central vowels. Only Mara and Mro Khimi do not have consonant codas.

Mro Khimi has two contrastive tones, H and L, which form four tone patterns for both nouns and verbs: H L LH HL. Affixes are underlyingly toneless. While there are only four underlying patterns, these patterns are affected by a series of rules resulting in complex tone sequences on the surface.

In this chapter I first provide an overview of the location and population of Mro Khimi. I then discuss second languages and dialects of L1 Mro Khimi speakers.

The Mro Khimi people are located in the Southern Chin Hills of Myanmar, mostly in the plains of Rakhine (Arakan) State and one township in Chin State (Hartmann 2001). The location of Rakhine and Chin states within Myanmar is shown in Figure 1.

Figure 1: Chin State and Rakhine State
http://www.travel-myanmar.net/myanmar-destinations.html

The Chin township is Paletwa; Rakhine townships include Buthitaung, Kyauktaw, Maungdaw, Mrauk-U, Pauktaw, Ponnagyun, Rathedaung, and Sittwe. Most of these townships are shown in Figure 2. (Pauktaw and Ponnagyun townships, not shown, are northeast of Sittwe.)

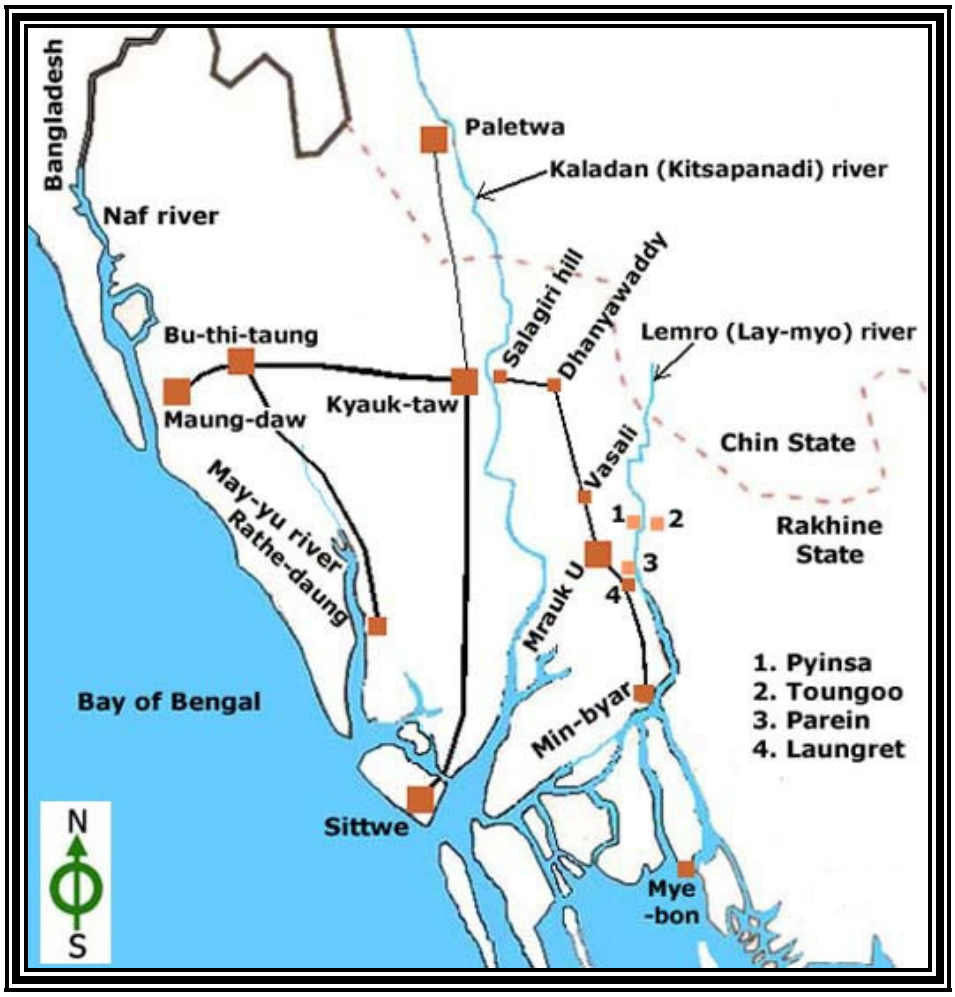


Figure 2: Locations of Mro Khimi townships (Map not to scale)
http://www.tourpagan.itgo.com/mrauk-u2.html

In 2000, the Mro Khimi population in Rakhine State was estimated to be 138,000 (Lewis 2009).

Other mother tongues spoken in the Mro Khimi area are Burmese and Rakhine (Arakanese). The Mro Khimi people are the second largest group in Rakhine State; the

largest population are the Rakhine with 730,000 speakers (Lewis 2009). Because of this, most Mro Khimi have some degree of fluency in Rakhine as well as Burmese. Khumi Chin, a neighboring Southern Chin language, is also a second language for Mro Khimi speakers towards the north.

Wakun is the largest Mro Khimi dialect. There are also many other dialects, including Aryn, Dau, Khuitupui, Likhy, Pamnau, Tuiron, Xautau, and Xienau. Originally, the dialect groups lived in separate areas (clusters of villages), but now there has been more intermingling, with multiple dialects in the same village. According to Helga So-Hartmann, the Mro Khimi still know which dialect is the predominant group in each village.

CHAPTER 2

FIELD METHODOLOGY

In this chapter I discuss the selection and background of my language consultants, as well as differences in consultant pronunciation patterns. I then provide a description of the language materials used for recording and conclude with a synopsis of the recording procedure.

2.1 Mro Khimi language consultants

Five Mro Khimi language consultants (hereafter “consultants”) were selected, four of whom speak the Wakun dialect and one of whom speaks the Xautau dialect. Three of the Wakun consultants, to whom I will refer as W1, W2, and W3, were between 20 and 35 years of age; two were female and one was male. The elder Wakun consultant, to whom I will refer as WE, was between 50 and 60. The Xautau consultant, to whom I will refer as X, was between 20 and 30.

Since I was recording outside of the Mro Khimi area, consultant selection was limited. Each consultant had spent childhood through adolescence in the Mro Khimi area, but left for reasons of education. Most had returned to live in the Mro Khimi area at various times. Although they currently live outside of the Mro Khimi area, all of my language consultants speak Mro Khimi in their households and Mro Khimi appears to be very stable.

As a result of having lived outside the Mro Khimi area for a longer period of time, W1, W2, and W3 conferred with family members about less common lexical items.[1] In spite of this, some of the elicited forms are obviously loan words. Almost all loan words collected were items for trade and commerce, or things not originally found in the Mro Khimi area, such as 'nail', 'copper', '(electric) light', and 'hare, rabbit'.

W1, W2, and W3 showed little difference in their pronunciation patterns. X differed most notably in the realization of diphthongs, further discussed in 3.2.1. W1, W2, and W3 had vowels that differed systematically from those of WE, as also discussed in 3.2.1, and also had less perceived nasalization on nasalized vowels.

2.2 Language materials used for recording

For each speaker I recorded the sounds for the letters of alphabet, based on the current orthography, and the Swadesh-40 wordlist. I then recorded an expanded 1700 item wordlist[2] with W1, W3, and WE, and 1614 of those words with W2. Because of time limitations, I recorded only the first 525 words of the 1700 item wordlist with X.

I also developed a list of 243 words which included minimal pairs showing contrast between various tonemes and phonemes by asking WE and W1 for relevant forms, as well as by consulting a Mro Khimi lexicon database developed by Helga So-Hartmann. I asked W2 and WE to create sentences using a representative sample of 40 of these words, including nouns, verbs, adjectives, adverbs, and grammatical particles. They

[1] One of the three grew up bilingual in Mro Khimi and Rakhine and one had not returned to the Mro Khimi area after leaving for a university education.

[2] The wordlist is based upon the expanded 1700 Africa-Area Wordlist developed by Keith Snider and James Roberts (Snider & Roberts 2006), and adapted for Southeast Asia by Paulette Hopple (2008).

created 70 sentences which I then recorded along with the 243 item wordlist with W1, W2, and WE. With each Wakun consultant I also recorded a short story taken from a Mro Khimi text. I later had W1 re-record the 243 item wordlist with the citation form of each verb, that is, the verb stem followed by the clause-final particle, and the plural form for each noun, as well as with a whistled tone melody for each word. The whistled tone melody helped me perceive tone patterns, while the citation form of the verb and the plural form of the noun allowed me to create paradigms to analyze those tone patterns.

2.3 Recording procedure

Recording took place in Yangon, Myanmar, in the quietest room at my residence. The room was always in a small freestanding wooden building, which helped reduce noise; however, windows did allow some wildlife noise and machine noise to enter. While recording with W2 and W3, it was not possible to obtain a room without another person also at work in the room. At times, the recording quality was sacrificed for the sake of a fan. I recorded into Speech Analyzer in WAV format, first with a laptop microphone and later with a Zoom H2 digital recorder with a 16-bit, 22kHz sampling rate.

Each consultant was shown the equipment and had the procedure explained. Before beginning the session, the consent form was read orally to each consultant and the consultant's consent was then recorded.

The Swadesh-40 wordlist used for elicitation was in English, while the 1700 item wordlist was in English with Burmese glosses for most terms. For many terms describing the human body, natural phenomena, flora, and fauna, an accompanying

photo wordlist was also used. The 243 item wordlist, 70 sentences, and the text were elicited using the current Mro Khimi orthography.

CHAPTER 3

MRO KHIMI SEGMENTAL PHONOLOGY

In the first part of this chapter I provide an overview of the Mro Khimi consonant inventory, compare current data with previous research, and give a detailed description of Mro Khimi consonants and the phonological processes that affect them. In the second part of this chapter, I provide an overview of the Mro Khimi vowel inventory, compare current data with previous research, and give a detailed description of Mro Khimi vowels and the phonological processes that affect them.

3.1 Consonants

According to my analysis, Mro Khimi has 21 phonemic consonants, as shown in Table 1, comprised of three series of plosives with three contrastive points of articulation (bilabial, alveolar, and velar), two nasals, six fricatives, one lateral, two non-lateral approximants, and an intervocalic glottal stop, all of which appear in syllable-onset position.

Table 1: Mro Khimi Consonants

		Labial	Labio-dental	Alveolar	Palatal	Velar	Labial-velar	Uvular	Glottal
Plosive	vl.	p		t		k			ʔ
aspirated	vl.	p^h		t^h		k^h			
	vd.	b		d		g			
Nasal		m		n					
Fricative	vl.		f	s				χ	h
aspirated	vl.			s^h					
	vd.		v						
Lateral Apprx.				l					
Approximant				ɹ	j				

Gregerson (1997) produced a preliminary phonological analysis of Mro Khimi in which he listed graphemes and the phonetic representation of each grapheme. There is a one-to-one correspondence between his graphemes and my phonemes. The phonetic realizations of his graphemes agree with the phonetic realization of my phonemes in all but three instances: /s^h ɹ j/. I will mention his phonetic realizations when I discuss the three phonemes in question. The differences can probably be accounted for by the fact that although we worked with the same consultant, WE, I was able to spend more time with this consultant as well as with other consultants. I was also able to work with more words and consulted with phonetician Sigrid Lew afterward.

3.1.1 Description of the consonant system

There are three voiced plosives in Mro Khimi, /b d g/, any of which can be partially devoiced.[3] They can be phonetically realized as [b d g] or as the voiced

[3] Additional input was provided here by Sigrid Lew.

implosives [ɓ ɗ ɠ]. These realizations are in free variation, as also observed by Gregerson (1997). The voiceless plosives /p t k/ can be realized either as the voiceless plosives [p t k] or as slack devoiced plosives [b̥ d̥ g̊]. A slack consonant is produced when a lowering of the larynx causes the vocal folds to slacken (Ladefoged & Maddieson 1996).

The voiced velar plosive [g] occurs with limited frequency, in current data as well as in Gregerson's (1997) research. Because there is less time and space to build up air pressure in the mouth behind the point of constriction, voiced dorsal consonants require greater articulatory effort than voiced labial or coronal consonants. On the basis of articulatory effort, /g/ is predicted to be the least likely of the voiced obstruents to occur in syllable onset position. Probably for this reason, the majority of Chin languages do not have voiced dorsal plosives (Thang 2001).

According to Maddieson (1984), the majority of languages with an inventory of four fricatives will have the pairs /f v/ and /s z/. Moreover, the pair /f v/ is slightly more common than the pair /s z/ in languages with one pair of fricatives, as is the case in Mro Khimi, which has /f v s/, but no /z/. In Kaang and Khumi, the Proto-Chin /z/ becomes /j/ before back vowels (Thang 2001). In Mro Khimi, the Proto-Chin /z/ is realized as /j/, which sometimes becomes the fricative [j̝] before high vowels. In Mro Khimi, the interdental fricative /v/ is the only voiced fricative.

Interestingly, the voiceless inter-dental fricative /f/ is realized in only five of the 1310 words analyzed, which raises the question of whether /f/ and /v/ are in allophonic variation. However, /f/ and /v/ contrast in analogous environments in the words 'tooth' [ʔàfʰá] and 'bird' [tàvá]. Since /f/ and /v/ contrast here, /f/ is considered a separate phoneme of Mro Khimi. In fact, all Chin languages have /v/, but

only a few, such as Mizo and Hakha, have /f/. So although labiodental fricatives are rare in Mro Khimi, their existence is attested in related languages, as is the existence of the phoneme /v/ without a corresponding voiced alveolar fricative.

Unique to Mro Khimi among Chin languages is the absence of the velar nasal /ŋ/, except as a rare variant of /n/, as discussed below in 3.1.2. Also, among other northern Chin languages the voiceless uvular fricative /χ/ is only found as a historic allophone of /r/ in coda position (Thang 2001). Moreover, in no other Chin language is there a contrast between /s/ and /s^h/. This contrast is attested, however, in Burmese and Karenic languages from the same greater Tibeto-Burman language family as Mro Khimi, although it is universally very rare.

Excluding loan words, in word stems voiced obstruents are found in only 200 of the 1310 words analyzed for this study. The voiced obstruents are distributed as follows: /b/ 83, /d/ 68, /g/ 10, and /v/ 39.

In the following section, 3.1.2, I give examples for each consonant phoneme in word-initial and intervocalic position, since syllables in Mro Khimi do not have a coda. Two of the approximants, /ɹ/ and in loan words /j/, can occur in C_2 position in C_1C_2 sequences. Where these consonant clusters are possible, examples are also provided. Further details of the syllable structure are provided in 4.1.1.

3.1.2 Examples

/p/ voiceless bilabial plosive [p]

/pá/[4] [pá] ‘clan’

/ʔà-pɛ́/ [ʔàpɛ́] ‘who’

/t-pɹí-dɛ̀/ [tə́pɾídɛ̀] ‘break off’

/p^h/ voiceless aspirated bilabial plosive [p^h]

/p^há/ [p^há] ‘mat for drying’

/ʔà-p^há/ [ʔàp^há] ‘friend’

/t-p^hɹí-dɛ̀/ [tə́p^hɹídɛ̀] ‘pluck (feathers)’

/b/ voiced bilabial plosive ~ voiced bilabial implosive [b]~[ɓ]

/bā́/ [bā́] ‘five’

/ʔà-bā́/ [ʔàbā́] ‘branch’

/bɹú-dɛ́/ [ɓɾúdɛ́]~[bɾúdɛ́] ‘bewitch’

Allophones [b]~[ɓ] are in free variation, as are the allophones [d]~[ɗ] and [g]~[ɠ]; however, the voiced implosives are less frequent than the voiced plosives. There is, then, an optional postlexical rule of Ingression in which a voiced stop is articulated with ingressive air, formulated in (1).

(1) / b d g / → [+ constr] / __

For example, the /b/ in the underlying form of /bí-dɛ́/ ‘be hot’ can be phonetically realized as /ɓ/ in the surface form [ɓídɛ́].

[4] The tone marks in the phonemic forms will be changed in Chapter 5 when I analyze the underlying tone patterns in Mro Khimi.

/t/ voiceless alveolar plosive [t]

/tý/ [tý] ‘sweet’

/ʔḭ̀-tű/ [ʔḭ̀tű] ‘beam of a house’

/ʔà-ná-tɪ̰ɯ̰̃/ [ʔànátɾɯ̰̃] ‘nose’

/t^h/ voiceless aspirated alveolar plosive [t^h]

/t^hɔ̰̀/ [t^hɔ̰̀] ‘whitewash’

/ʔà-t^hé/ [ʔàt^hé] ‘fruit’

/kà-t^hø̄-dé/ [kàt^hø̄dé] ‘boast’ (v)

/d/ voiced alveolar plosive / voiced alveolar flap [d]~[ɗ]~[ɾ]

/dé/ [dé] ‘camp’

/dɑ́-dè/ [ɗɑ́-dè] ‘get, obtain’

/ʔá-dè/ [ʔáɾè] ‘harvest (rice)’ (v)

/vɑ́-dǿ/ [vɑ́dǿ] ‘together’

The allophones [d]~[ɗ] are in free variation. There is an optional postlexical rule of Ingression, formulated in (1). The voiced alveolar flap, as seen in the following examples, is an allophone of the voiced alveolar plosive when preceded by a back vowel.

/mɯ̃́-dè/ [mɯ̃́ɾè] ‘blow’ (v)

/k^hý-p^hɔ́-dè/ [k^hýp^hɔ̄ɾè] ‘harvest honey’ (v)

There is, then, a postlexical Flapping rule, formulated in (2), in which a voiced alveolar plosive becomes a voiced alveolar flap when preceded by a back vowel.

(2) /d/ → [ɾ] / V ___
[+back]

The /d/ in the underlying form for /mű̃-dɛ̀/ ‘blow’ is preceded by the back vowel /ɯ̃/, which causes the /d/ to undergo the process of flapping. The surface form is therefore realized as [mű̃ɾɛ̀].

/k/ voiceless velar plosive [k]

/kḗ/ [kḗ] ‘waist’

/ʔà-kɤ́/ [ʔàkɤ́] ‘body’

/t-kɹ̄ī-dɛ́/ [tə̀kɹ̄ī́dɛ́] ‘curse’ (v)

/k^{h}/ voiceless aspirated velar plosive [k^{h}]

/k^{h}ǿ/ [k^{h}ǿ] ‘country(side)’

/ʔá-k^{h}ɤ̀/ [ʔák^{h}ɤ̀] ‘younger brother’

/kà-t-k^{h}ɔ́-dɛ̀/ [kàtə̀k^{h}ɔ́dɛ̀] ‘capsize’

/g/ voiced velar plosive [g]~[ɠ]

/gɔ́-là/ [gɔ́là] ‘foreigner from India’

/ʔɑ́̃-g-dé/ [ʔɑ́̃gə̀dé] ‘plaster’

/jà-gú/ [jàgú] ‘soft sticky rice’

/k-lɛ́ nà gə̀ hɣ́/ [kə̀-lɛ́nàɠə̀hɣ́] ‘plaster’ (n)

The allophones [g]~[ɠ] are in free variation. There is an optional postlexical rule of Ingression formulated in (1).

/ʔ/ voiceless glottal stop [ʔ]

/ʔí-dɛ̀/ [ʔídɛ̀] ‘plant’ (v)

/lì-ʔí/ [lìʔí] ‘bag’

/kà-ʔē-dɛ́/ [kàʔēdɛ́] ‘oppose, debate’ (v)

/k-ʔɪ́̃-dɛ̀/ [kə̀ʔɪ́̃dɛ̀] ‘tie together’

The glottal stop always occurs phonetically in word-final position following a Hi tone, as seen in ‘soft’ [pə̀dɛ́ʔ]. However, it is not contrastive with the absence of glottal stop in this environment.

/m/ bilabial nasal [m]

/mý/ [mý] ‘fish’

/ʔà-má/ [ʔàmá] ‘3SG’

/kə́-mà/ [kə́mà] ‘Lord’[5]

/n/ alveolar nasal [n]

/nɛ́-pý-dí/ [nɛ́pýdí] ‘woman’

/ʔà-ná/ [ʔàná] ‘meat’

/ká-né-dɛ́/ [kánédɛ́] ‘lean against’

The velar nasal /ŋ/ appears as a phoneme in loan words, such as [ŋápʰjá] ‘malaria’ from Burmese. With the exception of loan words, there is only one other example of a velar nasal phone in my data. The alveolar nasal of the Mro Khimi morpheme /nɑ/ ‘dwelling’ is velarized when preceded by /u/, as seen in the following example.

/kà-jű nà/ [kàjű ŋà] ‘tree dwelling’

However, it is not velarized when preceded by /ɔ/, as seen in the next example.

/ʔɔ́ ná/ [ʔɔ́ ná] ‘shelter (n), inhabitant’

The phoneme /n/ is also never velarized in other morphemes following /u/, such as [ʔàfʰá kátù nà] ‘toothbrush’ below.

/ʔà-fá ká-tù nà/ [ʔàfʰá kátù nà] ‘toothbrush’

Given my data, I cannot account for the velarization of /n/ in [kàjű ŋà] ‘tree dwelling’. I could claim that ‘dwelling’ is /ŋà/, with a rule changing /ŋ/ to /n/ after non-high or

[5] Mro Khimi word with the literal meaning ‘master’.

non-back vowels. The problem with this analysis is that the rule environment is disjunctive, and this would be the only native morpheme with /ŋ/. Therefore, I will not be formulating a rule to account for the alternation of [n] and [ŋ]. The alveolar and velar nasals, then, do not generally contrast in native words.

/f/ voiceless aspirated interdental fricative [fʱ]

/k-hà fú-dɛ̀/ [kəhà fʱúɾɛ̀] ‘pant’ (v)

/ʔà-fá/ [ʔàfʱá] ‘tooth’

According to Ladefoged (2003: 166-167), aspiration should not be surprising, “This period of aspiration, with or without a sharply defined spike, is a common finding in spectrograms of fricatives. It probably occurs because there is a momentary complete closure…followed by a burst of noise…and another short gap before the vocal folds start vibrating.” Since the aspirated [fʱ] does not contrast with an unaspirated [f], I will represent the phoneme as /f/.

/v/ voiced inter-dental fricative [v]~[w]

/vɑ́/ [vɑ́] ‘large basket’

/t-vá/ [təvá] ‘bird’

/kàvīdɛ́/ [kàwīdɛ́] ‘turn round’

/kʰɔ̀-ví kɔ̀-ví/ [kʰɔ̀ví kɔ̀ví] ‘crippled person’

In the example [kʰɔ̀ví kɔ̀ví] ‘crippled person’, shown above, frication of the intervocalic [v] is weaker than most other examples of [v] in my data. The labial-velar approximant [w], as shown in /kàvīdɛ́/ [kàwīdɛ́] ‘turn round’, is realized by W1 in three out of 1310 words and in two or fewer words by all other speakers in the current study. Neither [w] nor /w/ are found in any other Chin language (Thang 2001). In Mro Khimi, [w] is always realized in an intervocalic position adjacent to a back vowel alternating with

/v/, either within the speech of a single speaker or from speaker to speaker. For example, /kàvīdɛ́/ ‘turn round’ is realized as [kàwīdɛ́] by W1, [kàvýdɛ́] by W2, [kàvīdɛ́] by W3, and [ʔàvīdí] by X. However, WE realized /kàvīdɛ́/ as [kàvȳdɛ́] in five out of six repetitions and [kàwīdɛ́] in one out of six repetitions. This is summarized in (3).

(3) /kàvīdɛ́/ ‘turn round’

W1 [kàwīdɛ́]	WE [kàvȳdɛ́]~[kàwīdɛ́]
W2 [kàvýdɛ́]	X [ʔàvīdí]
W3 [kàvīdɛ́]	

Similarly, /kúvādɛ̀/ ‘crawl’ (v) is realized by W1 and W3 as [kúwādɛ̀], by W2 as [kúwà hà lʊ̀dɛ́], and by X as [kúwādì]. WE again shows variation, producing [kúvādɛ̀] in four out of six repetitions and [kúwādɛ̀] in the other two. This is summarized in (4).

(4) /kúvādɛ̀/ ‘crawl’

W1 [kúwādɛ̀]	WE [kúvādɛ̀]~[kúwādɛ̀]
W2 [kúwà hà lʊ̀dɛ́]	X [kúwādì]
W3 [kúwādɛ̀]	

[w] is more frequently realized in /kúvādɛ̀/ ‘crawl’ than in /kàvīdɛ́/ ‘turn round’, most likely because the /v/ in /kúvādɛ̀/ is preceded by [u] in addition to being adjacent to the back vowel [ɑ]. In the final example, ‘zebra’, I elicited the term [kə́wá bɔ́ bànʊ̋ sə̀p^{h}ú] (literally, ‘striped horse’) from only one speaker, W1. Based upon the two previous examples, I posit the underlying form to be /k-vá bɔ́ bànʊ̋ s-p^{h}ú/.

/s/ voiceless alveolar sibilant [s]

/sʉ̀/ [sʉ̀] ‘poison’

/ʔà-sɒ́/ [ʔàsɒ́] ‘amulet’

/m-sø̄-dɛ́/ [màsø̄dɛ́] ‘transfer’

/s^h/ voiceless aspirated alveolar sibilant [s^h]

/s^hɒ́/ [s^hɒ́] ‘chisel’

/ʔà-s^hì/ [ʔàs^hì] ‘evil thing’

/kà-s^hø̄-dɛ́/ [kàs^hø̄dɛ́] ‘move away’ (v)

Gregerson (1997) had described the phoneme /s^h/ as the phonetic voiceless alveo-palatal fricative [ɕ]. However, Sigrid Lew, a phonetician, agreed with my description of the phoneme from my data as the phonetic voiceless aspirated alveolar sibilant [s^h].

/χ/ voiceless uvular fricative / voiceless velar fricative [χ] ~[x]

/χá/ [xá] ‘yam’

/ʔà-χá/ [ʔàxá] ‘leaf’

/kà-χý-dɛ̀/ [kàχýdɛ̀] ‘run’ (v)

The uvular fricative [χ] and the velar fricative [x] are for the most part in complementary distribution. [χ] is slightly more common than [x] and almost always precedes the vowels [y ʏ ø ɛ ɯ ə], that is vowels that are [+high] or [-low, -back]. Examples include [kàχýdɛ̀] ‘run’, [χý] ‘gold’, [məχǿ] ‘necklace’, [χídɛ̀] ‘share’ (v), [χídɛ̀] ‘drag, scrape’, [tỳ χédɛ̀] ‘draw water’, [χɛ́mɛ̰̀] ‘widow, widower’, [χúdɛ̀] ‘cut down’, [χʊ́nʊ̃̀] ‘grow up’, and in [χədɛ́] ‘mat for sleeping’.

Likewise, the velar fricative almost always precedes the vowels [ɑ ɒ ɔ ʏ], that is vowels that are [-high, +back]. Examples include [sɔ̀ xà χì lʊ̄dɛ́] ‘limp’ (v), [ʔàxá] ‘leaf’, [bú kəxɒ̄dɛ̀] ‘be hungry’, [təxɔ́dɛ̀] ‘apply, besmear’, and [təxʏ̄dɛ́] ‘roast’. The open

central unrounded vowel [a] is rare in my data, and I found no examples where [χ] or [x] precedes [a].

This variation can be accounted for by a postlexical (allophonic) rule in which a phonemic voiceless uvular fricative is realized as a phonetic voiceless velar fricative before a vowel that is [-high, +back], as formulated in (5).

(5) /χ/ → [x] / ___ V[-high, +back]

For example, the rule does not apply to the /χ/ in /m-χý/ 'snake' because it precedes the high front vowel /y/, and the surface form is [məχý]. Likewise, the rule does not apply to the /χ/ in /χú-dɛ̀/ 'cut down' because it precedes the high back vowel /u/, and the surface form is /χúdɛ̀/. However, the rule does apply to the /χ/ in /m-χà/ 'cotton' because it precedes the low back vowel /ɑ/, and the surface form is therefore realized as [mə́-xà].

In my data there are a few forms which violate this rule, as shown in the examples below.

/ʔɛ́-χá ʔɔ̀-nʉ̋/	[ʔɛ́χá ʔɔ̀nʉ̋]	'be selfish'
/χʊ̋ kɹá-nʉ̃̀/	[xʊ̋ kɹánʉ̃̀]	'scratch'
/tí-χù/	[tíxù]	'thief'

The rule seems to be both over- and under-applied. It does not apply in [ʔɛ́χá ʔɔ̀nʉ̋] 'be selfish' even though it should. The only occurrences of the uvular fricative before nonhigh back vowels are before /ɑ/.[6] The rule overapplies in [xʊ̋ kɹánʉ̃̀] 'scratch' and [tíxù] 'thief'. The form [xʊ̋ kɹánʉ̃̀] 'scratch' is the only one in which the velar fricative

[6] In my corpus of data I have 26 instances of a velar fricative preceding /ɑ/, as well as 7 instances of a velar fricative preceding /ɑ̃/. I have only 2 instances of a uvular fricative preceding /ɑ/ and no instances of the uvular fricative preceding /ɑ̃/.

precedes a nonback vowel. The form [tíxù] ‘thief’ is one of six instances in which a velar fricative precedes a high back vowel, as opposed to fifteen instances in which the uvular fricative precedes a high back vowel. These distribution patterns may depend on the speaker; another one of the six instances is the word /ʔà-χú/ [ʔàxú] ‘bone’ found in ‘bone marrow’, but in four compound words with ‘bone’ recorded by the same speaker, /ʔà-χú/ is realized with the velar fricative as [ʔàχú].

/h/ voiceless glottal fricative [h]

/hɔ́-dɛ̀/ [hɔ́dɛ̀] ‘say’

/l-hɔ̋/ [làhɔ̋] ‘lion’

/ká-hʊ̋-dɛ̀/ [káhʊ̋dɛ̀] ‘shiver’ (v)

/l/ alveolar lateral [l]

/lɒ́/ [lɒ́] ‘mountain field’

/ʔà-lú/ [ʔàlú] ‘head’

/kà-lú-dɛ̀/ [kàlúdɛ̀] ‘jump’ (v)

/ɹ/ alveolar approximant / alveolar flap [ɹ]~[ɾ]

/ɹɛ̃̀-dɛ́/ [ɹɛ̃̀dɛ́] ‘talk about’

/ʔá-ɹɒ̀/ [ʔáɹɒ̀] ‘mad person’

/sʰɣ́-ɹà/ [sʰɣ́ɹà] ‘nasal mucous’

/t-pɹí-dɛ̀/ [tə́pɾídɛ̀] ‘break off’

Gregerson (1997) had described the /ɹ/ phoneme as a phonetic voiced alveolar flap [ɾ] and a voiced retroflex fricative [ʐ] in free variation; however, I did not perceive a voiced retroflex fricative. The voiced alveolar flap [ɾ] is an allophone of the voiced alveolar approximant /ɹ/, although it is less frequent than the allophone [ɹ]. The most

usual position for the allophone [ɾ] is the second member in a consonant cluster, as shown in Table 2.

Table 2: Distribution of allophones of /ɹ/

	$ __	$ C __	Total
[ɾ]	4	14	18
[ɹ]	37	19	56

In only four out of eighteen examples is [ɾ] realized in syllable onset position, whereas [ɹ] is in syllable onset position in thirty-seven out of fifty-six examples.

Consonant clusters in Mro Khimi are composed of the phoneme /ɹ/ preceded by /p t k b/. Similar consonant clusters are also attested in Khumi, where the alveolar trill /r/ follows /p/ or /k/ and the lateral approximant /l/ follows /t/ or /t^h/ (Thang 2001).

Unlike the Flapping rule, in which the phoneme /d/ is realized as the flap [ɾ] following a back vowel, I have no examples in which /ɹ/ is realized as [ɾ] after a back vowel. In my data, the realization of the phoneme /ɹ/ as the flap [ɾ] occurs most commonly in the second position of a cluster, and less commonly in word initial position or following a vowel that is [-back].

The older generation pronounces some words such as /s-kɹá-dɛ́/ ‘descend’ and /k-kɹɔ́/ ‘change of state’ (v), a rarer term recorded by WE, as [sə̀kχūdɛ́] and [kə̀kχɔ́], respectively, with [χ] as an allophone of /ɹ/ between a velar stop and a back vowel. According to WE, the majority language in the Mro Khimi area, Rakhine, does not have the uvular fricative, so younger Mro Khimi people do not use it (in consonant clusters). I do not know if the second word is in use by the younger generation.

/j/ palatal approximant / palatal fricative [j]~[ʝ]

/jí-dɛ̀/ [ʝídɛ̀] ‘slice’ (v)

/ʔɑ́-jɛ̀/ [ʔɑ́jɛ̀] ‘elder sister’

/kɔ̀-jǿ-dɛ̀/ [kɔ̀jǿdɛ̀] ‘pick’ (fruit) (v)

A speaker will pronounce a word containing the palatal approximant [j] before a high vowel with varying degrees of frication, sometimes realizing /j/ as the voiced palatal fricative [ʝ], as accounted for by the optional postlexical Spirantization rule in (6).

(6) /j/ → [ʝ] / ___ V
[+high]

For example, the /j/ in the underlying form of ‘slice’ (v), /jí-dɛ̀/, precedes the high front vowel /i/ which can trigger the optional spirantization rule. When spirantization applies, the surface form is realized as [ʝídɛ̀], as illustrated in (7).

(7) /jí-dɛ̀/ UF

ʝidɛ Spirantization

[ʝídɛ̀] SF

Gregerson (1997) had described this phoneme as a phonetic palatal approximant [j] and a voiced alveo-palatal fricative [ʑ] in free variation. In my perception, and in consultation with Sigrid Lew, the allophonic variation is between a phonetic palatal approximant [j] and a voiced palatal fricative [ʝ], not a voiced alveo-palatal fricative [ʑ]. Also, while [j] and [ʝ] are in free variation before high vowels, [ʝ] does not occur before other vowels.

According to Thang (2001), Proto-Chin has the alveolar fricative /z/, but no palatal approximant /j/. However, in other Southern Chin languages such as Khumi and Kaang, the palatal approximant is present, but not the voiced alveolar fricative.

The voiced alveolar sibilant [z], the voiceless palato-alveolar affricate [tʃ], and the voiced palato-alveolar affricate [dʒ] are found in loan words from Burmese, such as [zì] ‘market’, [mɛ́tʃà^{u}] ‘(electric) light’, and [dʒɔ́] ‘flour’.

3.2 Vowels

There are differences in Mro Khimi vowels between older and younger speakers of Wakun, and between Wakun and Xautau dialects. In section 3.2.1 I present the vowel system along with these differences. Then, in section 3.2.2 I compare my system with that of Gregerson (1997). Finally, in sections 3.2.3 and 3.2.4 I describe the oral and nasal vowels of Mro Khimi.

3.2.1 Variation in the vowel system

Younger Wakun speakers of Mro Khimi have 15 vowel phonemes, shown in Figure 3, comprising four unrounded front vowels /i ɪ e ɛ/, three rounded front vowels /y ʏ ø/, one unrounded central vowel /a/, three unrounded back vowels /ɯ ɤ ɑ/, and four rounded back vowels /u o ɔ ɒ/. At least 13 of the vowels, all but /y ʏ/, also occur as nasal vowels. In addition, there is a phonetic [ə] which will be analyzed in 4.1.2. The 15 oral vowels are shown in Figure 3.

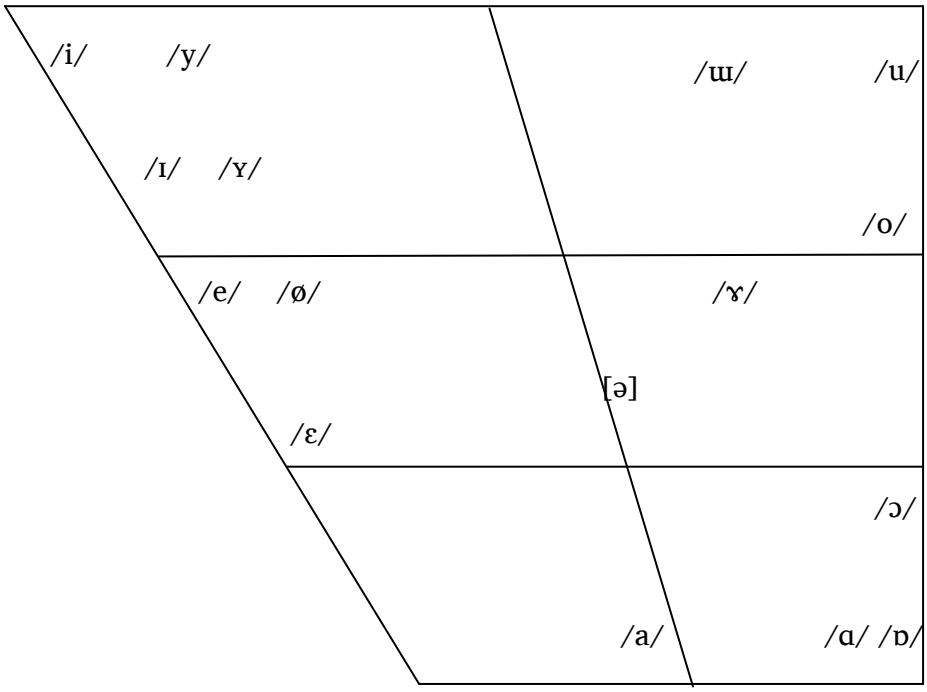


Figure 3: Mro Khimi vowels

Although there are no diphthongs in the Wakun dialect, the diphthongs /a͡i / and /a͡u/ are present in Xautau. According to Lindau, et al. (1985), 30% of all languages have diphthongs. Moreover, 75% of languages with diphthongs have /a͡i /, and 65% of languages with dipthongs have /a͡u/. The presence of these diphthongs in Xautau, then, is not unusual. Diphthongs are also attested in most other Chin languages and in Proto-Chin (Thang 2001). The correspondence between the diphthongs of the Xautau dialect and the vowels of the Wakun dialect is shown in Table 3.

Table 3: Diphthong correspondence

Wakun	Xautau	Gloss
[ʔájɔ̀]	[ʔáj**à͡u**]	abdomen
[ʔásɔ̀]	[ʔás**à͡u**]	breast
[kɪ́̃]	[ʔák**à͡ɪ̃**]	waist
[mək^{h}ɪ̰́dɛ̀]	[mək^{h}**á͡i**dì]	gnaw
[mə̀lédɛ̀]	[mə̀l**á͡i**dì]	lick

In the Xautau dialect, /a͡i / corresponds to the near close front unrounded vowel /ɪ/ or the close-mid front unrounded vowel /e/ in Wakun, and /a͡u/ in Xautau corresponds to the open-mid back unrounded vowel /ɔ/ in Wakun, as illustrated in Table 3.

W1 produced an isolated word from the Xienau dialect, [tá͡ũkʰì] ‘sickle’, in which the diphthong /a͡u/ also occurs. However, further research is needed to determine the correspondence between Xienau diphthongs and Wakun vowels.

The dipththongs /a͡u/and /a͡i/ do occur in the Wakun dialect in Burmese loan words such as [mɛ́tʃa̰͡u] ‘(electric) light’ and [dà͡i] ‘shield’.

According to Thang (2001), the front round vowels /y ʏ ø/ of Mro Khimi are not found in the vowel inventories of Proto-Chin or other Chin languages. However, /y ʏ ø/ correspond to the Proto-Chin diphthongs /u͡i o͡i u͡a/ maintained in Tedim Chin, as seen in Table 4. Except for Mro Khimi entries, all data in Table 4 is taken from Thang (2001).

Table 4: Proto-Chin diphthong correspondences

Proto-Chin	Gloss	Tedim	Khumi	Kaang	Mro Khimi
u͡i	water	[tù͡ːí]	[tú͡i]	[tû͡i]	[tỳ]
o͡i	good	[hò͡iʔ]	[a.hō͡i]	N/A	[hý]
u͡a	rain	[gù͡aʔ]	[kʰúː]	[kʰô͡aː]	[kʰǿ]

While all Chin languages have the five cardinal vowels /i e ɑ o u/, Kaang is the only other Chin language which has central vowels: /ɨ ʉ ə/. Although not phonemes, in most Chin languages, [ɛ] and [ɔ] are present as allophones of /e/ and /o/ in closed syllables. Also, while Mro Khimi makes a phonemic distinction between /a/ and /ɑ/, other Chin languages have allophonic variation between [a] and [ɑ] in which “the open front vowel /a/ is slightly different in its realization from [a] to [ɑ]” (Thang 2001).

In addition to correspondences between diphthongs and vowels, there appears to be a general vowel shift in Wakun between the older and younger speakers. The vowels of the younger speakers, W1, W2, and W3, are more open than those of the older speaker, WE, as shown in Table 5.

Table 5: Vowel shift

Corresponding Segments	WE	Phonemic Represen-tation	W2	Phonemic Represen-tation	Gloss
i ɪ	[ʔí xāděˋ]	/ʔí χā-dèˋ/	[ʔí xādèˋ]	/ʔí χā-dèˋ/	‘contradict’
ɪ e	[kə́tídèˋ]	/k-tí-dèˋ/	[kə́téⁿ̃ũ̀]	/k-té-nⁿ̃ũ̀/	‘threaten’
ɯ ɤ	[təkɾùˋ]	/t-kɹùˋ/	[təkɾɤ̀]	/t-kɹɤ̀/	‘cut off’
u ʊ	[ɾúⁿ̃ũ̀]	/ɹú-nⁿ̃ũ̀/	[ɾúdèˋ]	/ɹú-dèˋ/	‘spank’
o ɔ	[məkȭdéˊ]	/m-kȭ-déˊ/	[məkɔ̃̄déˊ]	/m-kɔ̃̄-déˊ/	‘answer’

For example, ‘contradict’ is pronounced as [ʔí xādèˋ] by WE, with the close front vowel /i/, whereas it is pronounced as [ʔí xādèˋ] by W1 and W3,[7] with the near-close front vowel /ɪ/. This shift does not happen in every word; however, anytime a vowel shifts, that vowel will follow the pattern shown in Table 5.

The younger speakers tend to retain the /o/ in Burmese loan words; for example, [sɔ̀̃] ‘sorcerer’, [ʔó] ‘brick’, and [jɔ́̃] ‘hare’. WE gave the Mro Khimi words [sʰémà nú] for ‘sorcerer’ and [ʔìtɔ́̃] for ‘brick’ – in general, WE gave fewer loan words - but realized ‘hare’ as [jṹ] with the high back vowel /ũ/. With the loan word ‘hare’, then, there is also a shift between /ũ/ and /õ/. In this case, [jɔ́̃] is closer to the Burmese pronunciation. Because of this retention of /o/ by the younger speakers, I have left the

[7] A synonym was recorded by W2.

/o/ in Figure 3. The phones [u] and [ʊ] are allophones of the same phoneme, while each speaker has /i ɪ e ɯ ɤ/ in his or her phonemic inventory.

As I noted, this vowel shift is only partial. While the vowels of the younger speakers lower in some words, as shown in Table 5, there are many examples where no shift occurs, such [ʔì] 'feces' and [ʔàlú] 'head' in Table 6.

Table 6: Vowel stability

Corresponding Segment	WE	Phonemic Represen-tation	W2	Phonemic Represen-tation	Gloss
i	[ʔàmí]	/ʔà-mí/	[ʔàmí]	/ʔà-mí/	'eye'
ɪ	[ʔì]	/ʔì/	[ʔì]	/ʔì/	'feces'
ɯ	[mànɯ̀dɛ̀]	/m-nɯ̀-dɛ̀/	[mànɯ̀nɯ̃̀]	/m-nɯ̀-nɯ̃̀/	'know'
u	[ʔàlú]	/ʔà-lú/	[ʔàlú]	/ʔà-lú/	'head'

More detailed analysis of the causes of this shift will require research which is beyond the scope of this study.

3.2.2 Gregerson's phonological description

In his preliminary phonological description, Gregerson (1997) identified 13 distinctive vowels, including three unrounded front vowels, three rounded front vowels, three unrounded non-front vowels, three rounded back vowels, and one rounded back vowel found in loan words, as well as two diphthongs. The correspondences between the two analyses are shown in Table 7. The first character is from my transcription, and the second is from Gregerson's transcription of the same words.

Table 7: Transcription of Mro Khimi vowels

i/i	y/y	ɯ/ ɨ	u/u
ɪ/e	ʏ/ø	ɤ/ ə	
e/ɛ^{i}	ø/œ	-/ə̯ɨ̯	o/o
ɛ/ɛ			ɔ/ɔ
	a/-	ɑ/a	ɒ/ɒ

G's front vowels /e ɛ^{i} ɛ ø œ/ are higher in my transcriptions, while G's back vowels /ɨ ə/ are farther back in my transcriptions. In the vowel shift that I observed between older and younger speakers, vowels among younger speakers are lower in height. My transcriptions are based upon many of the same words upon which G's analysis was based, in consultation with phonetician Sigrid Lew.

While G's open central unrounded vowel /a/ corresponds to my /ɑ/, the [a] also occurs in my data, but as an additional, relatively rare, vowel that that G did not find. My /a/ occurs in about 35 of 1310 words and contrasts with /ɑ/. However, G's description is based on about 200 words, none of which are words that I transcribe with an /a/, and I was also able to work with speakers for a more extended period of time, which would explain the lack of /a/ in G's analysis. In addition to the phonemes included in Table 7, both Gregerson and I transcribe a phonetic schwa in minor syllables. This phone will be discussed in 4.1.2.

The two diphthongs /ɛi̯ / and /ə̯ɨ̯ / in G's analysis are not included in the current analysis. G does not discuss the phoneme /ə̯ɨ̯ /. The words which G writes with /ə̯ɨ̯ / are the words where I find age-based variation: Younger speakers use /ɤ/ and WE uses /ɯ/. It could be that G transcribed these words as showing variation between /ə/ and /ɨ/, and decided to use the diphthong to regularize the transcription. In fact, it would be extremely unusual to have only the two diphthongs /ɛi̯ / and /ə̯ɨ̯ / in any language because /ai̯ / and /au̯/ are by far the most frequent diphthongs cross-linguistically.

3.2.3 Description of the oral vowels

The following list provides a description of each of the 15 vowels with examples in word-medial and word-final position. The variation for some vowels seems to be low-level phonetic variation that has no phonological implications, so I will not be formalizing rules for it.

/i/ close front unrounded vowel [i]

/ʔí-dɛ̀/ [ʔídɛ̀] ‘sleep’

/kʰí-dɛ̀/ [kʰídɛ̀] ‘borrow’

/ʔà-sʰì/ [ʔàsʰì] ‘evil thing’

/ɪ/ close front unrounded vowel with stiff voice [ḭ] ~ near-close front unrounded vowel with stiff voice, nearly creaky [ɪ̰]

/ʔí/ [ʔí] ‘excrement’

/kà-ʔī-dɛ́/ [kàʔīdɛ́] ‘argue’

/ʔà-kí/ [ʔàkí] ‘tumor’

/e/ centralized close-mid front unrounded vowel [ë] ~ close-mid front unrounded vowel [e]

/tʰè/ [tʰè] ‘arrow’

/kè/ [kè] ‘knife’

/t-pɹé-dɛ̀/ [tə́pɹédɛ̀] ‘split’ (v)

/ɛ/ open-mid front unrounded vowel [ɛ] ~ lowered close-mid front unrounded vowel [ɛ̝]

/ʔɛ̀-pý/ [ʔɛ̀pý] ‘frog’

/tʰɛ̀-bý/ [tʰɛ̀bý] ‘mole’

/ʔà-pɛ́/ [ʔàpɛ́] ‘who’

/a/ open central unrounded vowel [a̱]

/mà-tɤ́/ [màtɤ́] ‘duty’

/mà-dɛ́/ [màdɛ́] ‘lead’ (v)

/ʔà-kʰá/ [ʔàkʰá] ‘room’

/y/ close front rounded vowel [y]

/ʔỳ/ [ʔỳ] ‘dog’

/ʔý-dɛ̀/ [ʔýdɛ̀] ‘spoil, rot’ (v)

/tỳ/ [tỳ] ‘water’

/χỳ-nɛ́/ [χỳnɛ́] ‘rope’

/ʏ/ near-close front rounded vowel with advanced tongue root [ʏ̟] ~ near-close front rounded vowel [ʏ]

/kỳ-dɛ́/ [kỳdɛ́] ‘be full’

/hý-bì/ [hýbì] ‘very well’

/ʔá-s-lý/ [ʔásə̀lý] ‘hem’

/ø/ close-mid front rounded vowel [ø]

/jǿ-dɛ́/ [jǿdɛ́] ‘sell’

/ʔà-sʰǿ-sʰá/ [ʔàsʰǿsʰá] ‘tendon’

/kʰǿ/ [kʰǿ] ‘country’

/ɯ/ centralized close back unrounded vowel [ɯ̟]

/sʉ̀/ [sʉ̀] ‘poison’ (n)

/dʉ́-nʉ̋́/ [dʉ́nʉ̋́] ‘be curious’

/ʔà-pí-kʉ́/ [ʔàpíkʉ́] ‘crust’

/ɤ/ centralized close-mid back unrounded vowel [ɤ̟] ~ close-mid central unrounded vowel [ə]

/pɤ́/ [pɤ́] ‘hunting net’

/ʔɤ́-nɯ̋/ [ʔɤ́nɯ̋] ‘believe’

/ʔà-χɤ́χɤ́-dɛ̀/ [ʔàxɤ́xɤ́dɛ̀] ‘be different’

/ɑ/ lowered open-mid back unrounded vowel [ɑ̝] ~ open back unrounded vowel [ɑ]

/ʔá/ [ʔá] ‘chicken’

/χà/ [xà] ‘month’

/ká-sʰí-dɛ̀/ [kásʰídɛ̀] ‘wear’

/u/ close back rounded vowel [u]

/lú-kɤ̀/ [lúkɤ̀] ‘pillow’

/m-ʔú-dɛ̀/ [məʔúɾɛ̀] ‘bury’

/ʔá-bù/ [ʔábù] ‘grandfather’

/o/ near-close back rounded vowel [ʊ] ~ close-mid back rounded vowel [o]

/ʃò-nɯ̃̋/ [ʃònɯ̃̋] ‘fail’ Burmese loan word

/ʔó/ [ʔó] ‘brick’ Burmese loan word

The /o/ is found only in loan words; see the discussion following Table 5.

/ɔ/ open-mid back rounded vowel [ɔ]

/ʔɔ̀/ [ʔɔ̀] ‘pig’

/sɔ̀-kʰɤ́/ [sɔ̀kʰɤ́] ‘spoon’

/tʰɔ́-kʰá/ [tʰɔ́kʰá] ‘door’

/m-lɔ̃́/ [məlɔ̃́] ‘boat’

/ɒ/ open back rounded vowel [ɒ]

/kɒ̀/ [kɒ̀] ‘trap’

/nɒ̀-sɪ́/ [nɒ̀sɪ́] ‘daughter-in-law’

/k-lɒ̀/ [kə́lɒ̀] ‘cymbal’

3.2.4 Description of the nasal vowels

Nasal vowels contrast with oral vowels in Mro Khimi. There are only 13 nasal vowels; /ỹ ɤ̃/ do not occur. Since nasal vowels are rarer that oral vowels, and /y ɤ/ are rarer than other vowels, the lack of /ỹ ɤ̃/ is probably accidental. A list of nasal vowels and examples is provided below.

/ĩ/ nasal close front unrounded vowel [ĩ]

/ʔɪ̀̃ tű/ [ʔɪ̀̃ tű] ‘beam of a house’

/t-kɹɪ̄̃-dɛ́/ [tə̀kɹɪ̄̃dɛ́] ‘curse’ (v)

/t-kɪ́̃/ [tə̀kɪ́̃] ‘faithfulness’

/ɪ̃/ nasal near-close front unrounded vowel [ɪ̃]

/kɪ́̃/ [kɪ́̃] ‘small of the back’

/kɪ̀̃-dɛ́/ [kɪ̀̃dɛ́] ‘avoid’

/kɒ̀-χɪ́̃/ [kɒ̀xɪ́̃] ‘rich man’

/ẽ/ nasal close-mid front unrounded vowel [ẽ]

/ʔɛ́̃/ [ʔɛ́̃] ‘house’

/m-kɹɛ̄̃-dɛ́/ [mə̀kɹɛ̄̃dɛ́] ‘fasten’

/χ-dɛ́̃/ [xə̀dɛ́̃] ‘mat for sleeping’

/ɛ̃/ nasal open-mid front unrounded vowel [ɛ̃]

/ʔá-pɹɛ̀̃/ [ʔápɹɛ̀̃] ‘rag’

/t-kɹɛ̄̃-dɛ́/ [tə̀kɹɛ̄̃dɛ́] ‘watch’ (v)

/má-dɛ̋́/ [mádɛ̋́] ‘heifer’

/ã/ nasal open central unrounded vowel [ã]

/pà̃/ [pà̃] ‘bamboo raft’

/pʰɹá̋-dɛ̀/ [pʰɹá̋dɛ̀] ‘tear open’

/t-ká̋/ [tə̀ká̋] ‘money’

/ø̃/ nasal close-mid front rounded vowel [ø̃]

/χø̋́ kɹā-nʉ̀̃/ [xø̋́ kɹānʉ̀̃] ‘scratch’ (v)

/kɔ̀-nø̄̃-dɛ́/ [kɔ̀nø̄̃dɛ́] ‘sit’ (v)

/k-tø̀̃/ [kə́tø̀̃] ‘adult’

/ʉ̃/ nasal close back unrounded vowel [ʉ̃]

/dʉ̋́-dɛ́/ [dʉ̋́dɛ́] ‘ask’

/χʉ́-nʉ̀̃/ [χʉ́nʉ̀̃] ‘grow up’

/ʔà-mʉ̋́/ [ʔàmʉ̋́] ‘gall bladder’

/ɤ̃/ nasal close-mid back unrounded vowel [ɤ̃]

/ʔɤ̋́-dɛ́/ [ʔɤ̋́dɛ́] ‘believe’

/χɤ̋́-sà/ [xɤ̋́sà] ‘bowl’

/sʰɤ̀-pɤ̀̃/ [sʰɤ̀pɤ̀̃] ‘thread’

/ɑ̃/ nasal open back unrounded vowel [ɑ̃]

/ʔɑ̄̃/ [ʔɑ̄̃] ‘curry’

/kɑ́̋-má/ [kɑ́̋má] ‘first’

/ʔà-vɑ́̋/ [ʔàvɑ́̋] ‘price’

/ũ/ nasal close back rounded vowel [ũ]

/ʔű/ [ʔű] ‘among’

/ʔů̀-dɛ́/ [ʔů̀dɛ́] ‘blow (a balloon)’

/k-sũ ná/ [kə́sũ ná] ‘handle’ (n)

/õ/ nasal close-mid back rounded vowel [õ]

/jő/ [jő] ‘hare’ Burmese loan word

/ső-mà/ [ső-mà] ‘witch’ (female) Burmese loan word

See 3.2.1 for a discussion of [õ] in different dialects.

/ɔ̃/ nasal open-mid back rounded vowel [ɔ̃]

/ʔɔ̋-dɛ̀/ [ʔɔ̋dɛ̀] ‘have’

/tʰɔ̋-dɛ̀/ [tʰɔ̋dɛ̀] ‘cook’ (v)

/m-lɔ̋/ [məlɔ̋] ‘boat’

/ɒ̃/ nasal open back rounded vowel [ɒ̃]

/lɒ̋ t-kɑ́-dɛ̀/ [lɒ̋ tə̀kɑ́dɛ̀] ‘step’ (v)

/ná tʰɒ̄̃ sā-nů̀/ [ná tʰɒ̄̃ sānů̀] ‘hurt’

/ʔà-nɒ̋/ [ʔànɒ̋] ‘ghost’

CHAPTER 4

PHONOTACTICS

In this chapter I begin with an overview of Mro Khimi syllable types. I then discuss the characteristics of each syllable type, taking a closer look at the definition and description of minor syllable prefixes in Mro Khimi, as well as analyzing the schwa in minor syllables. Finally, I conclude with a description of Mro Khimi consonant-vowel sequences.

4.1 Syllable types

In Mro Khimi, there are three syllable types: major syllables, which can have any syllable structure permitted in Mro Khimi; minor syllable prefixes, which are restricted to a single consonant and an inserted schwa ([Cə]); and full prefixes, which are prefixes with a phonemic vowel that are limited to a [CV] structure.

While the majority of Chin languages allow consonant codas, both Mro Khimi and Mro Khimi's Southern Chin neighbor Mara do not (Thang 2001).

4.1.1 Major syllables

The maximal syllable template for the major syllable is $[C_1(C_2)V]_{MAX}$. Any vowel is permitted as the nucleus of the maximal syllable except the schwa, which is restricted to minor syllables. These characteristics are also found in Burmese major syllables (Green 1995). (C_2) is restricted to the approximant /ɹ/ and, in loan words, the approximant /j/.

There are no restrictions on either the C or V in [CV], except for the absence of the schwa.

[CV]	/pʰá/ [pʰá]	‘mat for drying things’
	*[pʰə]	

In Mro Khimi, each syllable must have an onset, which can include the glottal stop /ʔ/.

[ʔV]	/ʔɔ̀/ [ʔɔ̀]	‘pig’
	*/ɔ/	

The alveolar approximant /ɹ/ is permitted in consonant clusters following /p t k b/.

[CɹV]	/ká-pɹé-dɛ̀/ [kápɾédɛ̀]	‘divorce’ (v)
	/ʔà-ná#tɹɯ̃́/ [ʔànátɾɯ̃́]	‘nose’
	/t-pʰɹí-dɛ̀/ [tə́pʰɹídɛ̀]	‘pluck’
	/kɹé-dɛ̀/ [kɹédɛ̀]	‘grind’
	/bɹú-dɛ́/ [bɾúdɛ́]	‘bewitch’

Khumi, another Southern Chin language, similarly restricts (C_2) to /r/ and /l/, with /r/ occurring after /p/ or /k/, and Proto-Chin restricts (C_2) to /r/, with C_1 limited to voiceless velar stops, both aspirated and unaspirated (Thang 2001).

The palatal approximant /j/ is permitted in consonant clusters following /p pʰ/ in Burmese loan words.

[CjV]	/pʰjá/	[pʰjá] ‘cut’ (v)
	/ʔà-pʰjá/	[ʔàpʰjá] ‘destruction’
	/pʰjá-dɛ̀/	[pʰjádɛ̀] ‘destroy’ (v)TR
	/pjá-dɛ̀/	[pjádɛ̀] ‘destroy’ (v)INTR
	/kɤ̀ lí pjá-nɯ̃́/	[kɤ̀ lí pjánɯ̃́] ‘miscarriage’

4.1.2 Prefixes and suffixes

Suffixes have the surface form [CV], where [V] can be any of the phonemic vowels included in Figure 3. An example is the clause-final particle /dɛ/ in the word /k-né-dɛ́/ [kànɛ̄dɛ́] 'listen'.

Prefixes also have the surface form [CV], where [V] can be one of the phonemic vowels included in Figure 3 or [ə]. I will first discuss prefixes with phonemic vowels, then prefixes with [ə], otherwise known as minor syllables.

The most frequent prefixes are /ʔɑ/ and /kɑ/. /ʔɑ/ precedes nouns and /kɑ/ most frequently precedes verbs or nominalized verbs.

/ʔà-lú/ [ʔàlú] 'head' /ʔá-pì/ [ʔápì] 'grandmother'

/kà-lú-dɛ̀/ [kàlúdɛ̀] 'jump' /ká-pé-nɯ̃̀/ [kápénɯ̃̀] 'be born'

A minor syllable is an underlyingly voweless syllable, consisting of one consonant. It is always a prefix; however, it differs from the prefixes discussed above in that it does not have a distinct vowel, nor always a clear function in grammar. Minor syllables are quite common among Southeast Asian languages, including Mon-Khmer and Tibeto-Burman languages such as Burmese (Gafos 1999). In both Mro Khimi and Burmese, minor syllables consist of a single consonant at the underlying level.[8]

The minor syllable does have a surface vowel, which has a much shorter duration than vowels in other syllables. Gafos (1999) states that, "[I]t is generally accepted that the qualities of the surface vowels in minor syllables are not phonologically specified." Here I choose to transcribe the surface vowel using its nearest phonetic equivalent, the schwa [ə], as does Green (1995) in Burmese. This [ə] does not occur elsewhere, so by positing the underlying form as C, with a rule of insertion, I do not need to include [ə]

[8] In some of these languages, a minor syllable can have either one or two consonants.

in the set of phonemes. Also, the fact that schwa is not phonemic automatically accounts for the fact that it cannot be nasalized. It is inserted as an oral vowel, and there is no rule to nasalize it.

The consonants /m d p t t^h k k^h s s^h χ/ are attested as onsets for minor syllables, as shown in Table 8. Unaspirated voiceless obstruents /t k s/ and the bilabial nasal /m/ are the most frequently attested.

Table 8: Minor syllable onsets

m	/m-lɔ̋/	[məlɔ̋]	'boat'
d	/d-hɑ̃̀/	[dəhɑ̃̀]	'fate'
p	/p-ʔí/	[pəʔí]	'mother-in-law'
t	/t-pǿ-dɛ̀/	[tə́pǿdɛ̀]	'make'
t^h	/ʔá-sà t^h-pɔ̀/	[ʔásà t^hə́pɔ̀]	'stomach, internal'
k	/k-nɛ́-dɛ́/	[kənɛ́dɛ́]	'listen'
k^h	/k^h-lí/	[k^həlí]	'flute'
s	/s-kɹá-dɛ́/	[səkɹádɛ́]	'descend'
s^h	/s^h-nú/	[s^hənú]	'girl'
χ	/χ-dɛ̋́/	[χədɛ̋́]	'mat for sleeping'

Of the two examples I do have of the /t-/ prefix followed by /ɹ/, the first example, /t-ɹá/ [təɹá] 'law' was the second Mro term given to me for 'law' and the second example was /t-ɹí-dɛ̀/ [təɹídɛ̀] 'write, draw'. Since the sequence [tɹV] is a well-formed syllable, these examples indicate that insertion is triggered by morpheme boundaries. The optional Flapping rule did not apply in either example; since Flapping is less likely between vowels, the non-flapped form is more natural. There are also examples in my data of consonant clusters in which both the Flapping rule and the rule of [ə] insertion

have not applied to a tautomorphemic consonant cluster, such as /s-kɹā-dɛ́/ [sàkɹādɛ́] ‘descend’. In my data I have no examples of sequences such as a /p- k- b-/ prefix followed by /ɹ/ or /pɹV tɹV kɹV bɹV/ surfacing as [pəɹV təɹV kəɹV bəɹV]. I hypothesize that the rule of [ə] insertion always applies across morpheme boundaries to break up consonant sequences. Since [ə] insertion refers to morpheme boundaries, it must be lexical. However, since it inserts a segment not present in any underlying forms, it must be post-lexical. I posit, then, that [ə] insertion is a two-part rule. First, there is a lexical rule of Vowel place holding, in which a vowel slot (V slot) is inserted between a consonant prefix and the root, as formulated in (8).

(8) $\emptyset \rightarrow V / C\_\_\_ + C$

Second, there is a postlexical rule of [ə] feature insertion, in which the features of [ə] are inserted into an empty vowel slot. For example, I give the derivation for /s-kɹā-dɛ́/ [sàkɹādɛ́] ‘descend’ in (9).

(9)	/s-kɹā-dɛ́/	UF
	sV̀-kɹādɛ́	Vowel place holding
	sà-kɹādɛ́	[ə] feature insertion
	[sàkɹādɛ́]	SF

4.2 Summary of word syllable structure

The word is composed maximally of a CV- prefix followed by a Cə- prefix, a root consisting of a major syllable, and finally a CV suffix (for example, a plural marker, clause-final particle, or other grammatical marker). The maximal word template, then, is $[CV.Cə.CCV.CV]_{MAX}$

Here are examples of templates:

CV	kʰǿ	kʰǿ	‘country, nature’
CCV	pʰɹa̰	pʰɾa̰	‘straight’
Cə.CV	k-sʰí	kə̀sʰí	‘medicine’
CV.CV	ʔà-lú	ʔàlú	‘head’
Cə.CCV	s-kɹá	sə̀kɹá	‘sickle’
CV.CCV	ʔá-pɹɛ̰̀	ʔápɹɛ̰̀	‘rag’
CCV.CV	kɹé-dɛ̀	kɹédɛ̀	‘grind’
Cə.CV.CV	m-ké-jí	mə̀kéjí	‘parrots’
CV.Cə.CV	ʔá-m-ná	ʔámə́ná	‘side of body’
CV.CV.CV	kà-lú-dɛ̀	kàlúdɛ̀	‘jump’
Cə.CCV.CV	t-pʰɹí-dɛ̀	tə́pʰɹídɛ̀	‘pluck’
CV.CCV.CV	ká-pɹé-dɛ̀	kápɾédɛ̀	‘divorce’ (v)
CV.Cə.CV.CV	ká-t-kʰɔ́-dɛ̀	kátə́kʰɔ́dɛ̀	‘capsize’
CV.Cə.CCV.CV	DATA GAP		

The word is minimally composed of a major syllable, such as /kʰǿ/ [kʰǿ] ‘country, nature’. This follows Green’s (1995) observation regarding prosodic minimality: Among the majority of languages which distinguish major and minor syllables, the word is minimally composed of a major syllable, which the minor syllable may precede but not follow.

CHAPTER 5

TONE

In Chapter 5, I begin with an overview of tone in Southern Chin languages, moving on to a description and analysis of Mro Khimi nouns, and then a description and analysis of Mro Khimi verbs. Southern Chin languages can have contrastive Hi (H), Mid (M), Lo (L), falling, and rising tones. Mro Khimi's neighbor Mara has three contrastive level tones, H, M, and L, but no falling and rising tones, whereas its neighbor Khumi has four contrastive tones, H, M, L, and rising. Khumi does not have falling tone (Thang 2001). Mro Khimi has two contrastive tones, H and L. Like Mara, there are no rising tones, and falling tones only occur phrase-finally. Mro Khimi has four tone melodies on the roots, L H LH and HL, toneless affixes, tone on suffixes spreading from roots, and polar tone on prefixes.

5.1 Tone in nouns

Simple nouns have stems with the syllable profile CV, while complex nouns have stems with the the syllable profile CəCV or CVCV, where the CV noun root is preceded by a prefix. Nasalized vowels and oral vowels are the only Tone Bearing Units (TBUs) in Mro Khimi. Section 5.1.1 provides an overview of tone melodies, and section 5.1.2 is an analysis of their tone patterns. Finally, section 5.1.3 addresses contour tones.

5.1.1 An overview of tone melodies in nouns

Examination of simple and complex nouns in the singular and plural establishes the following phonetic tone patterns: L H LL HH LH HL LLL HHH LHH LHL HLL and HLH. Given three rules, Melody Association, Spreading and Polar Tone Assignment, most of those 12 tone patterns can be accounted for by the following four melodies, L H LH HL, shown in Table 9.

Table 9: Summary of noun tone melodies

Tone Melody	Tone Pattern	Example	Gloss
H	H	ʔa̋	'curry'
	HH	lɔ́jí	'mountain fields'
	LHH	kàníjí	'blankets'
	HHH	ʔápɛ́jí	'fathers'
L	L	tỳ	'water'
	LL	pɤ̀jì	'nets'
	HLL	ʔásʰìjì	'evil things'
	LLL	kànɔ̀jì	'unripe fruits'
LH	L	ʔɔ̀	'pig'
	LH	xɑ̀jí	'months'
	HLH	məthɒjɪ	'flies'
HL	H	khǿ	'country'
	HL	xɑ́jì	'yams'
	LHL	ʔɑ̀bɑ̋́jì	'branches'

Since Mro Khimi does not permit contour tones, the final tones in words with more tones than syllables, such as the final L in /khøHL/ 'country', are left floating, resulting in [khǿ].

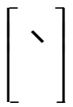
5.1.2 An analysis of tone patterns in nouns

In this section I examine tone patterns on non-compound nouns, beginning with singular and plural forms of simple nouns, then expanding the analysis to cover prefixed nouns.

I will first begin with an analysis of simple nouns. On singular forms of simple nouns, there are two surface tone patterns, a H-fall, as seen in [lô] ‘mountain field’ and [xâ] ‘yam’ in (10a), and a L, as seen in [pɤ̀] ‘net’ and [xà] ‘month’ in (10b). Brackets are used to enclose the noun roots.

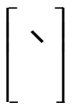
(10)

a.



lɒ

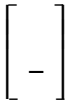
‘mountain field’



xɑ

‘yam’

b.



pɤ

‘net’

xɑ

‘month’

Because [xâ] ‘yam’ in (10a) and [xà] ‘month’ in (10b) contrast only in tone, I posit that H-fall and L are contrastive tone patterns. The length of the H-fall is variable and does not have a consistent pattern. Monosyllabic L nouns sometimes have a fall, but this, too, is variable, and the fall is shorter than the H-fall. Therefore, I propose that the H-fall is underlyingly level H, resulting in an underlying H vs. L contrast. The rule accounting for the fall is further discussed in 5.1.3.

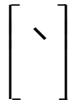
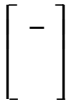
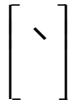
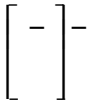
Plurals are formed by the addition of the plural marker /jɪ/. Monosyllabic nouns that have a L surface tone in isolation are realized as either LH, as in (11a), [xàjí] ‘months’, or LL, as in (11b), [pɤ̀jì] ‘nets’.

(11)

	Singular	Plural /jɪ/
a.		
	xɑ	xɑjɪ
	‘month’	‘months’
b.		
	pɤ	pɤjɪ
	‘net’	‘nets’

Similarly, monosyllabic nouns that have a H-fall surface tone in isolation have either a HL-fall pattern for the plural form, as in (12a), [xɑ́jì] ‘yams’, or a HH pattern, as in (12b), [lɒ́jí] ‘mountain fields’.

(12)

	Singular	Plural /jɪ/
a.		
	xɑ	xɑjɪ
	‘yam’	‘yams’
b.		
	lɒ	lɒjɪ
	‘mountain field’	‘mountain fields’

Since the tone pattern of [jɪ] is variable, I posit that the plural marker is underlyingly toneless and that the root carries the underlying tone melody for the root and the

suffix. I also posit that tone melody is associated left to right and, if there are fewer tones than tone bearing units, the final tone spreads to the right.

Two rules, then, are needed: first, a rule of Melody Association in which the tone melody associates to the root and any following TBUs on a one-to-one basis of one tone to one TBU, and second, a rule of Spreading in which the assigned tone of a syllable spreads to an adjacent syllable with no tone.

For example, [xâ] ‘yam’ has a H-fall tone pattern, but in the plural form it has a HL-fall pattern. Assuming that falls are created by a post-lexical rule, I posit that /χɑ/ has an underlying HL melody, that is, its underlying form is /χɑ^{HL}/. (Tone melodies in underlying forms (UF) are indicated by superscript letters.) I give the derivations for /χɑ^{HL}/ and its plural form/χɑ^{HL}-jɪ/ in (13).

(13)

a.	/χɑ^{HL}/	UF
	xá	Melody Association
	[xá]	SF
b.	/χɑ^{HL}-jɪ/	UF
	xá-jì	Melody Association
	[xájì]	SF

In the singular form, the H tone associates to the root, leaving a floating L tone, as shown in (13a). In the plural, /χɑ^{HL}-jɪ/, the H tone associates to the root and the L tone associates to the suffix, as shown in (13b), resulting in [xájì].

On the other hand, [lô] ‘mountain field’ has a surface H-fall pattern in the singular, while the plural form, [lɔ́jí], has a HH surface pattern. I posit that /lɒ/ has an

underlying H tone melody, that is, its UF is /lɒ^{H}/.[9] In (14) I give the derivations for both the singular and plural forms.

(14)

a.	/lɒ^{H}/	UF
	lɒ́	Melody Association
	[lɒ́]	SF
b.	/lɒ^{H}-jɪ/	UF
	lɒ́-jɪ	Melody Association
	lɒ́-jí	Spreading
	[lɒ́jí]	SF

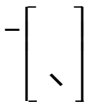
The underlying H melody associates to the root [lɒ́] in both singular and plural and then spreads onto the suffix in the plural form, as shown in (14b), resulting in [lɒ́jí].

Di-syllabic complex noun stems occur when a prefix is attached to the root. The tone on prefixes varies depending on the root to which they are attached. For example, the prefix /ʔɑ-/ in (15a, b) has a H tone preceding the low-tone root /mɑ^{L}/ in (15a), but a L tone preceding the high-tone root /my^{H}/ in (15b). Likewise, the prefix /m-/ in (15c, d) has a H tone preceding the low-tone root /sø^{L}/ in (15c) and a L tone preceding the high-tone root /xø^{H}/ in (15d).

[9] An underlying HH melody would violate the Obligatory Contour Principle (OCP), which does not permit adjacent identical elements.

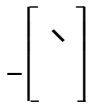
(15)

Prefix /ʔɑ-/

a. 

ʔɑmɑ

‘younger sister’

b. 

ʔɑmy

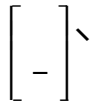
‘fur’

Prefix /m-/

c. 

məsø

‘stick for roasting’

d. 

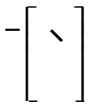
məxø

‘necklace’

Therefore, I posit that Mro Khimi prefixes are underlyingly toneless.

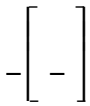
In addition to the two tone patterns already shown, prefixed nouns have an additional two tone patterns in the singular. All four surface patterns are shown in (16).

(16)

a. 

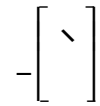
ʔɑpɛ

‘father’

b. 

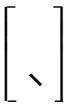
kənɒ

‘unripe fruit’

c. 

kəni

‘blanket’

d. 

təpø

‘handi-work’

The first, in (16a), [ʔápɛ̂] ‘father’, is a HH-fall pattern, while the second, in (16b), [kànɒ̀] ‘unripe fruit’, is a LL pattern. The third, in (16c), [kànî] ‘blanket’, is a LH-fall pattern, and the last, in (16d), [tápø̀] ‘handiwork’, is a HL-fall pattern.

In determining how tone is assigned to prefixes, it is significant that in my corpus of 372 nouns with prefixes, 343 — 92 percent — of the prefixes have a tone that is opposite to that of the root, either a L prefix preceding a H root or a H prefix preceding

a L root, as seen in the examples in (15). I propose, then, that polar tone is assigned to these prefixes.

There are also, however, the 8 percent of prefixed nouns where the prefix has the same tone as the root, for example [kànɔ̀jì] ‘unripe fruits’, [kʰàlɔ̃̀] ‘bell’, [ʔáməńá] ‘side of the body’, and [ʔápɛ́ʔɛ́] ‘father’. For these, I propose that polar tone is blocked and the Spreading rule spreads the tone from root to prefix.

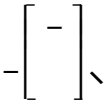
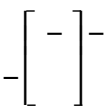
A new rule, then, is needed. In 4.1.2, I stated that the rule of [ə] insertion does not apply to tautomorphemic clusters, that [ə] insertion applies across morpheme boundaries always, and post-lexically to break up consonant sequences which are not acceptable in Mro. However, since [ə] insertion refers to morpheme boundaries, [ə] insertion must also be lexical. I proposed, then, that [ə] insertion is a two-part rule. First, there is a lexical rule of Vowel Place Holding, in which a vowel slot (V slot) is inserted between a consonant prefix and the root, and second, there is a postlexical rule of [ə] Feature Insertion, in which the features of [ə] are inserted into an empty vowel slot. Polar Tone Assignment likewise behaves lexically in that it has exceptions and refers to morpheme boundaries. Therefore, I propose a lexical rule of Polar Tone Assignment (PTA) in which polar tone is assigned to the vowel or the as-yet featureless vowel slot of the prefix. For example, I give the derivation for /m-χø^{H}/ [mə̀χǿ] ‘necklace’ in (17).

(17)

/m-χø^{H}/	UF
m-χǿ	Melody Association
m-Vχǿ	Vowel Place Holding
m-V̀χǿ	Polar Tone Assignment
mə̀-χǿ	[ə] Feature Insertion
[mə̀χǿ]	SF

Four tone patterns, LH LL HL and HH, were seen on the root and suffix in plural forms of simple nouns in (11) and (12). We would expect to see the same patterns in nouns with prefixes. This is exactly what we see for complex nouns with the tone pattern LH. Prefixed nouns with a surface LH pattern are realized as either LHL or LHH in the plural form. As shown in (18), [kàní] ‘sun’ and [kàní] ‘blanket’ are both realized as LH in the singular form. However, [kàní] ‘sun’ is realized as LHL [kàníjì] in the plural while [kàní] ‘blanket’ is realized as LHH [kàníjí] ‘blankets’ in the plural.

(18)

	Singular	Plural /jɪ/
a.		
	kəni	kənijɪ
	‘sun’	‘suns’
b.		
	kəni	kənijɪ
	‘blanket’	‘blankets’

Since /jɪ/ is underlyingly toneless, I posit that the root melody of /k-ni/ ‘sun’ is underlyingly HL. I give the derivation for the singular/k-ni^{HL}/ ‘sun’ in (19).

(19)	/k-ni^{HL}/	UF
	k-ní	Melody Association
	kV-ní	Vowel Place Holding
	kV̀-ní	Polar Tone Assignment
	kə-ní	[ə] Feature Insertion
	[kàní]	SF

Tone associates to the root in [k-ní]. Next, a V slot is inserted between the prefix and the root in [kV-ní]. Polar tone is assigned to the prefix in [kV̀-ní]. Finally, [ə] features are inserted postlexically into the V slot, leaving [kàní] with a floating L tone at the end.

In the plural /k-ni^{HL}-jɪ/ 'suns', tone melody associates left to right and the final L tone associates to the suffix. I give the derivation for /k-ni^{HL}-jɪ/ in (20).

(20)	/k-ni^{HL}-jɪ/	UF
	k-ní-jì	Melody Association
	kV-ní-jì	Vowel Place Holding
	kV̀-ní-jì	Polar Tone Assignment
	kə-ní-jì	[ə] Feature Insertion
	[kəníjì]	SF

Following V slot insertion, polar tone is assigned to the prefix. Finally, [ə] features are inserted postlexically into the V slot, resulting in [kəníjì] as shown in (20).

The plural of [kàní] 'blanket', [kàníjí] 'blankets' has a surface LHH melody, with the polar tone L assigned to the prefix. The OCP prevents H in the underlying form and /jɪ/ is underlyingly toneless, so I posit that the root melody of /k-ni/ 'blanket' is H. I give the derivation for the singular /k-ni^{H}/ in (21).

(21)	/k-ni^{H}/	UF
	k-ní	Melody Association
	kV-ní	Vowel Place Holding
	kV̀-ní	Polar Tone Assignment
	kə-ní	[ə] Feature Insertion
	[kàní]	SF

The tone melody of /k-ni^{H}/ associates to the root. A V slot is then inserted between the prefix and the root, followed by Polar Tone Assignment. Finally, [ə] features are postlexically inserted into the V slot, resulting in the surface form [kàní].

In the plural /k-ni^{H}-jɪ/ 'blankets', the H tone associates to the root, and then spreads onto the last tone bearing unit in [k-ní-jí], as shown in the derivation in (22).

(22)

/k-ni^{H}-jɪ/	UF
k-ní-jɪ	Melody Association
k-ní-jí	Spreading
kV-ní-jí	Vowel Place Holding
kV̀-ní-jí	Polar Tone Assignment
kà-ní-jí	[ə] Feature Insertion
[kàníjí]	SF

A V slot is inserted between the prefix and the root and polar tone is assigned to the prefix. Lastly, [ə] features are inserted postlexically into the V slot, resulting in the surface form [kàníjí].

In my data, all but one prefixed noun with the surface pattern HL in the singular form are realized as HLH in the plural form. The one HLL form is [ʔás^{h}ìjì] 'evil things'. However, I only recorded 34 complex nouns (excluding compound nouns) in the plural form, so the rarity of HLL might be accidental. HLH is frequently attested in examples such as [tə́pə̀jí] 'handiwork (pl)' which have a HL pattern in the singular form [tə́pə̀] 'handiwork', as shown in (23).

(23)

Singular	Plural /jɪ/
–[–]	–[–]–
təpø	təpøjɪ
‘handiwork’	‘handiwork (pl)’

Since /jɪ/ receives its tone from the root, it must have an underlying root melody LH. I give the derivation for the singular /t-pø^{LH}/ ‘handiwork’ in (24).

(24)	/t-pø^{LH}/	UF
	t-pə̀	Melody Association
	tV-pə̀	Vowel Place Holding
	tV́-pə̀	Polar Tone Assignment
	tə́-pə̀	[ə] Feature Insertion
	[tə́pə̀]	SF

Tone associates to the root, leaving a floating H tone. Next, a V slot is inserted between the prefix and the root. Polar tone is then assigned to the prefix. Finally, [ə] features are inserted into the V slot postlexically, as shown in [tə́pə̀] in (24).

In the plural form /t-pø^{LH}-jɪ/ ‘handiwork (pl)’, however, the final H tone associates to the plural marker /jɪ/. I give the derivation in (25).

(25)	/t-pø^{LH}-jɪ/	UF
	t-pə̀-jí	Melody Association
	tV-pə̀-jí	Vowel Place Holding
	tV́-pə̀-jí	Polar Tone Assignment
	tə́-pə̀-jí	[ə] Feature Insertion
	[tə́pə̀jí]	SF

The tone melody associates to the root and plural marker. A V slot is inserted between the prefix and the root. Polar tone is then assigned to the prefix. Lastly, [ə] features are inserted postlexically into the V slot, as shown in (25), resulting in [tə́pə̀jí].

HHH and LLL patterns are exceptions to Polar Tone Assignment. In the discussion of these exceptions before (17), I proposed that polar tone is blocked and the Spreading rule spreads the tone from root to all toneless TBUs. I posit, then, that HHH is underlyingly H and LLL is underlyingly L. I give the derivation for a HHH surface pattern, [ʔápɛ́ʔɛ́] 'father', in (26) and the derivation for a LLL surface pattern, [kə̀nɔ̀jì] 'unripe fruits' in (27).

(26)	/ʔɑ-pɛ^{H}-ʔɛ /	UF
	ʔɑ-pɛ́-ʔɛ	Melody Association
	ʔɑ́-pɛ́-ʔɛ́	Spreading
	[ʔápɛ́ʔɛ́]	SF

First, the H melody associates to the root. Polar tone is blocked, so the H tone then spreads onto all toneless TBUs.

(27)	/k-nɒ^{L}-jɪ/	UF
	k-nɔ̀-jɪ	Melody Association
	kV-nɔ̀-jɪ	Vowel Place Holding
	kV̀-nɔ̀-jì	Spreading
	kə̀-nɔ̀-jì	[ə] Feature Insertion
	[kə̀nɔ̀jì]	SF

The L melody associates to the root and a vowel slot is inserted between the prefix and the root. Polar tone is blocked, so the L tone on the root spreads to all toneless TBUs. Finally, [ə] features are inserted postlexically into the V slot, resulting in [kə̀nɔ̀jì].

I will now analyze nouns with double prefixes. Among tri-syllabic nouns with double prefixes, I've found three patterns, LLL LLH and HLH. The final tone is the tone of the root. LLL is rare, but does occur in /ʔà-m-nà/ [ʔàmənà] 'side of body' and in the first word of some compound nouns with double prefixes. When two prefixes precede a root, it is more common for both prefixes to have the same tone than for the tone of the first prefix to be a polar tone of the second. In my corpus of 35 prefix pairs (29 nouns and six verbs), 21 pairs have the same tone, while in 14 pairs the tone of the first prefix is a polar tone of the second.

For example, the word [ʔàtəlá] 'fiancée' has a LLH pattern. In (28) I give the derivation for [ʔàtəlá].

(28)	/ʔa-t-lá/	UF
	ʔa-t-lá	Melody Association
	ʔa-tV-lá	Vowel Place Holding
	ʔa-tV̀-lá	Polar Tone Assignment
	ʔà-tV̀-lá	Spreading
	ʔà-tə-lá	[ə] Feature Insertion
	[ʔàtəlá]	SF

The L polar tone spreads from the minor prefix one TBU to the left onto the prefix /ʔa/. Lastly, [ə] features are inserted postlexically into the V slot, resulting in [ʔàtəlá].

The two prefixes do not always take the same tone, however. When a root is preceded by two prefixes which have different tones, such as [ʔátəbú] 'womb', which has the surface pattern HLH, I posit that the first prefix [ʔa] is assigned the polar tone of the prefix adjacent the root, [tə]. I give the derivation for [ʔátəbú] in (29).

(29)	/ʔɑ-t-bu^{H}/	UF
	ʔɑ-t-bú	Melody Association
	ʔɑ-tV-bú	Vowel Place Holding
	ʔɑ-tV̀-bú	Polar Tone Assignment
	ʔá-tV̀-bú	Polar Tone Assignment
	ʔá-tə̀-bú	[ə] Feature Insertion
	[ʔátə̀bú]	SF

The H tone associates to the root. Next, a V slot is inserted between the prefix and the root. Polar tone applies cyclically; a L polar tone is assigned to the minor prefix immediately preceding the root, and then a H polar tone is assigned to the full prefix /ʔɑ/. Finally, [ə] features are inserted into the V slot, as shown in (29), resulting in [ʔátə̀bú].

The problem with this analysis is that both [ʔàtə̀lá] ‘fiancée’ and [ʔátə̀bú] ‘womb’ seem to have the identical double prefixes /ʔɑ-tə-/. Both have a L polar tone assigned to the minor prefix /t-/, yet in [ʔàtə̀lá] the polar tone does not trigger PTA, while in [ʔátə̀bú] the polar tone triggers PTA. I would like to have more data to analyze this problem; at this point I will leave it as residue.

In summary, there is evidence that the plural marker /jɪ/ does not have an underlying tone. As I show in the discussion of (11), (12), (18), and (23), both monosyllabic and prefixed nouns with identical tone patterns in the singular are distinguished by the tone on /jɪ/ in plural forms. I posit, then, that the suffix receives its tone from the root melody. If the melody contains only one tone, it is assigned to the root and copied to the suffix. If the melody contains two tones, the second associates to the suffix. In singular forms, the second tone in two-tone melodies becomes a floating

tone with no surface realization. I also hypothesize that TBUs then cannot be multiply associated with tones, leaving floating tones.

5.1.3 Non-contrastive falling pitch

Mro Khimi does not have contrastive contour tones. While falling pitch is common, there is no evidence for underlying contour tones. All of these falls occur only on the final syllable of the word or phrase. Each word or phrase was also recorded in isolation and was therefore phrase final; this is why they could end in a fall, and gives evidence for a postlexical rule that creates surface falling tones (Kiparsky 1982). I posit, then, that Mro Khimi allows a phonetic phrase-final fall.

5.2 Compound nouns

In this section I show that tone melodies do not cross word-internal boundaries in compound nouns. Instead, each stem in a compound noun has its own tone melody. This is contrasted with an alternative analysis in which the tone of the entire compound is determined by the tone of the first stem. The analysis of compound nouns is complicated by the fact that the meaning of the components is not always clear. Sometimes that is because I do not know the meaning, and sometimes that is because the meaning of the individual components has dropped out of knowledge.

The behavior of tone in compound nouns does not markedly differ from the behavior of tone in simple and complex nouns. Example (30) shows three related forms: the compound (30a), the plural form of the first lexeme (30b), and the plural form of the compound (30c).

(30)

a.	tə̀mákə̰̀	‘scar’
b.	tə̀májì	‘wounds’
c.	tə̀mákə̰̀jì	‘scars’

In the compound noun [tə̀mákə̰̀] ‘scar’, the surface tone pattern is LH#L. The first stem of the compound is [tə̀má] ‘wound’, which has a LH surface pattern. /kə̰̀/, the second stem, has a L surface tone; however, I do not know the meaning of /kə̃/ in isolation.

The underlying form of [tə̀má] ‘wound’ can be determined by looking at the plural, [tə̀májì] ‘wounds’ in (30b), which has a surface LHL pattern. Since /jɪ/ is underlyingly toneless, [tə̀má] must be underlyingly HL, with the L tone being associated to [jɪ] in the plural and a L polar tone assigned to the prefix. I give the derivation for [tə̀mákə̰̀jì] in (31).

(31)	/t-mɑ^{HL}#kə̃^{L}-jɪ/	UF
	t-má#kə̰̀-jɪ	Melody Association within word boundaries
	t-má#kə̰̀-jì	Spreading
	tV-má#kə̰̀-jì	Vowel Place Holding
	tV̀-má#kə̰̀-jì	Polar Tone Assignment
	tə̀-má#kə̰̀-jì	[ə] Feature Insertion
	[tə̀mákə̰̀jì]	SF

If each stem has its own tone, [kə̃] must be underlyingly /kə̃^{L}/ and this L tone spreads onto [jɪ], as seen in (31). The L of /t-mɑ^{HL}/ does not cross the internal word boundaries and is simply left floating in [tə̀mákə̰̀jì].

An alternative analysis is that the second stem of a compound is toneless and that the tone pattern of the first root spreads across the internal word boundary. I give the alternative derivation for [tə̀mákə̰̀jì] in (32).

(32)	/t-mɑ^{HL}#kã̀-jɪ/	UF
	t-má#kã̀-jɪ	Melody Association across word boundaries
	t-má#kã̀-jì	Spreading
	tV-má#kã̀-jì	Vowel Place Holding
	tV̀-má#kã̀-jì	Polar Tone Assignment
	tə̀-má#kã̀-jì	[ə] Feature Insertion
	[tə̀mákã̀jì]	SF

As shown in (32), the L of /t-mɑ^{HL}/ could cross the internal word boundary, linking to [kã̀] and spreading to [jɪ]. Whichever analysis is correct, the plural of the compound follows naturally; either the L of the first root or the L of the second root spreads to the plural suffix.

The next example, (33), shows three related forms: (33a) the compound, (33b) a related compound, and (33c) the plural of the original compound.

(33)

a.	kã́mà	‘master’
b.	kã́má	‘first’
c.	kã́màjí	‘masters’

The compound noun [kã́mà] ‘master, Lord’, shown in (33a), has two roots, /kã/ and /mɑ/. I do not know the meaning or the plural form for either of the individual roots; however, the root /kã/ is the same as the first root in the compound noun [kã́má] ‘first’, shown in (33b).

The compound [kã́mà] has a H#L surface tone pattern and [kã́má] has a H#H surface tone pattern. If my hypothesis is correct that each root in a compound comes with its own melody, then the melody of /kã/ does not spread across root boundaries, as illustrated in [kã́màjí] in (34).

(34) /kã^{H}#mɑ^{LH}-jɪ/ UF

kɑ́#mà-jí Melody Association

[kɑ́màjí] SF

The UF of /kã/ cannot be proven here; for now I posit that it is H. The root /mɑ/, however, must be underlyingly LH, as shown in the UF /kã^{H}#mɑ^{LH}-jɪ/, so that its H tone can associate to the plural marker /jɪ/ resulting in [kɑ́màjí] in (34). Given this hypothesis, /mɑ^{LH}/ (gloss unknown) in (33a), and /ma^{H}/ 'go first, lead' in (33b) have different tone melodies, and this is the source of the tone difference between the compounds.

The alternative analysis, in which the second stem receives its tone from the first stem, cannot account for the compounds in (33a, b), since (1) in order to account for the plural form [kɑ́màjí] in (33c), I would need an underlying pattern HLH which exists nowhere else in my data, and (2) the H surface tone of the first root /kã/ is the same in each compound but the surface tone of the second root is L for [kɑ́mà] and H for [kɑ́má].

In the previous examples, the second stem of the compounds has been composed of a root with no prefix. In the following example, both stems have a prefix.

(35)

a.	kàníkàtʰɔ̃̀	'linens'
b.	kànì	'blanket'
c.	kànìjí	'blankets'
d.	kàníkàtʰɔ̃̀jì	'linens, plural'

In (35), (35a) is the compound, (35b) is the first stem, (35c) is the plural of the first stem, and (35d) is the plural of the compound. In [kàníkàtʰɔ̃̀] 'linens', shown in (35a),

both stems are composed of a root and the prefix /k-/. The first stem is [kàní] ‘blanket’, in (35b), and the second stem is [kət^{h}ɔ̀̃], the meaning of which I do not know.

An analysis of the compound [kàníkət^{h}ɔ̀̃jì] further supports the claim that the tone of the first stem does not affect the the second stem. I will first give the derivation for [kàníjí] in (36) to support the analysis of the underlying form of [kàní] and then give the derivation for [kàníkət^{h}ɔ̀̃jì] in (37).

(36)	/k-ni^{H}-jɪ/	UF
	k-ní-jɪ	Melody Association
	k-ní-jí	Spreading
	kV-ní-jí	Vowel Place Holding
	kV̀-ní-jí	Polar Tone Assignment
	kə-ní-jí	[ə] Feature Insertion
	[kàníjí]	SF

The UF of [kàní] is /k-ni^{H}/, since in the plural [kàníjí] ‘blankets’ in (35c), the H spreads onto [jɪ], shown in (36), and a L polar tone is assigned to the prefix, resulting in [kàníjí].

In my proposed analysis, both roots would have tone. The UF for [kàníkət^{h}ɔ̀̃jì] ‘linens’ would be /k-ni^{H}#k-t^{h}ɔ̃^{L}-jɪ/, as shown in the derivation given in (37).

(37)	/k-ni^{H}#k-t^{h}ɔ̃^{L}-jɪ/	UF
	k-ní#k-t^{h}ɔ̀̃j-ɪ	Melody Association
	k-ní#k-t^{h}ɔ̀̃-jì	Spreading
	kV-ní#kV-t^{h}ɔ̀̃-jì	Vowel Place Holding
	kV̀-ní#kV-t^{h}ɔ̀̃-jì	Polar Tone Assignment
	kV̀-ní#kV̀-t^{h}ɔ̀̃-jì	Spreading
	kà-ní#kà-t^{h}ɔ̀̃-jì	[ə] Feature Insertion
	[kàníkàt^{h}ɔ̀̃jì]	SF

The L melody of the second root spreads onto the plural marker /jɪ/, as shown in (37), as well as onto the prefix of the second stem in [kàníkàt^{h}ɔ̀̃jì]. I posit that Spreading applies cylically, since polar tone is evidently blocked in this stem.

However, if the H tone from /k-ni^{H}/ spreads onto the stem [kə-t^{h}ɔ̃], the incorrect surface pattern HH surfaces, as shown in *[kàníkát^{h}ɔ́] (38).

(38)	/k-ni^{H}#k-t^{h}ɔ̃/	UF
	k-ní#k-t^{h}ɔ̃	Melody Association
	kV-ní#kV-t^{h}ɔ̃	Vowel Place Holding
	kV-ní#kV́-t^{h}ɔ́	Spreading
	kV̀-ní#kV́-t^{h}ɔ́	Polar Tone Assignment
	kà-ní#ká-t^{h}ɔ́	[ə] Feature Insertion
	*[kàníkát^{h}ɔ́]	SF

Tone patterns associated with the root, then, do not cross root or internal word boundaries, contrary to the alternative analysis of [tàmákɑ̀̃jì] illustrated in the derivation in (32). The tone of the plural marker is determined by the final tone of the second root, which either associates or spreads onto the plural marker.

5.3 Morphologically simple and complex verbs

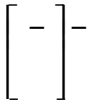
Verb roots have the syllable profile CV; if they are preceded by a prefix, the verb stem will have the syllable profile CəCV or CVCV. Verb stems never occur in isolation; they are followed by an obligatory clause-final particle (CFP). In its citation form, this particle is /dɛ/. Morphologically simple verbs are comprised of a single stem and a CFP, while morphologically complex verbs must have prefixes. However, these prefixes are not necessarily obligatory; some roots can occur with and without prefixes (Hartmann 2001). Section 5.3.1 provides an overview of tone melodies and the syllable profiles for verbs, and section 5.3.2 presents an analysis of their tone patterns.

5.3.1 Verb tone melodies

Mro Khimi verbs have several contrastive tone patterns, as seen in examples (39) and (40). The examples in (39) have simple stems, while the examples in (40) have complex stems including prefixes. I am ignoring the falls since, as in the case of nouns, they are surface phenomena.

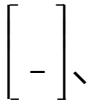
(39)

a. HH



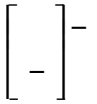
bidɛ ‘warm’

b. LL



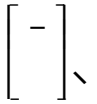
bidɛ ‘blame’

c. LH



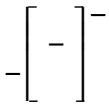
madɛ ‘go first’

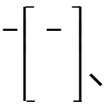
d. HL

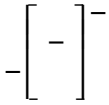


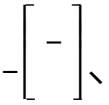
mɑdɛ ‘remember’

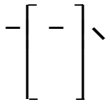
(40)

a. LMH

məsødɛ ‘transfer’

b. HHL

məsødɛ ‘urge’

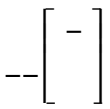
c. LMH

məsʰɪdɛ ‘put on a stick’

d. LHL

məsʰɪdɛ ‘wash’

e. HHH

məhɤ̃dɛ ‘yawn’

f. LLL

DATA GAP

g. LLH

ʔɑtəlɑ ‘fiancée’

These tone patterns will be further discussed and their underlying tone melodies analyzed in 5.3.2, first with CV stems and then with CəCV / CVCV stems.

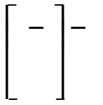
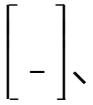
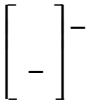
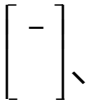
In the following discussion, I propose that the CFP /dɛ/ is underlyingly toneless and that its tone is determined from the tone melody associated with the root. Two processes are needed to account for the behavior of tone in simple and complex verbs in addition to those posited in 5.1.2 for nouns. As shown in example (50), verbs with a H tone preceding a multiply-associated L will spread one TBU to the right, delinking the L on that TBU. In the discussion of the surface pattern LMH before example (48), I posit that a H following a L is phonetically lowered in verbs when it precedes a H.

We have four observed melodies in nouns, so I look for evidence of the same four melodies for verbs. The melody H is frequently attested; the melody L is also attested, but much less frequently. I find clear evidence for HL and also for LH, a pattern found in nouns, though LH is less common than HL. Finally, I have two surface patterns, HHL and LMH, that can be tied to L and H, respectively.

5.3.2 Tone patterns of verbs

Morphologically simple verbs are composed of a monosyllabic stem and the CFP.

(41)

a.	b.	c.	d.
			
bidɛ	bidɛ	madɛ	mɑdɛ
‘warm’	‘blame’	‘go first’	‘remember’

Four contrastive surface tone patterns emerge, HH, as in [bídɛ́] ‘warm’ in (41a), LL, as in [bìdɛ̀] ‘blame’ in (41b), LH, as in [màdɛ́] ‘go first’ in (41c), and HL, as in [mɑ́dɛ̀] ‘remember’ in (41d). This is identical to the situation seen for simple nouns. The surface tone pattern LL is rare in simple di-syllabic verbs.

The tone on /dɛ/ can be H or L following a H, as in [bídɛ́] ‘warm’ in (41a) and [mɑ́dɛ̀] ‘remember’ in (41d), and H or L following a L, as in [màdɛ́] ‘go first’ in (41c) and [bìdɛ̀] ‘blame’ in (41b). Therefore, I posit that /-dɛ/, like the plural marker /-jɪ/ for nouns, is underlyingly toneless and that its tone is determined from the tone melody associated with the root.

Because of the OCP, I posit that LL has an underlying L melody, which spreads to the suffix as shown for /bi^{L}-dɛ/ [bìdɛ̀] ‘blame’ in (42).

(42) /biᴸ-dɛ/ UF

bì-dɛ Melody Association

bì-dɛ̀ Spreading

[bìdɛ̀] SF

Because of the OCP, I also posit that the pattern HH is underlyingly H.

The tone for the suffix comes from the root, but, unlike for nouns, there is never a floating tone in the verbs, even when the tone melody is HL or LH, since verbs are obligatorily suffixed. For example, the HL pattern in [mádɛ̀] 'remember' in (41c) results from a HL root melody as seen in /mɑᴴᴸ-dɛ/. However, the L cannot be left floating because it will always associate with /dɛ/. Simple verbs with suffixes, then, like simple nouns with suffixes, have four underlying melodies: H L HL and LH.

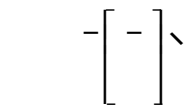
Morphologically complex verbs have a di-syllabic stem that is composed of a prefix followed by a root, forming a tri-syllabic word including the obligatory CFP/dɛ/. There is no difference in the inventory of surface tone patterns between CəCV and CVCV, so instances of both types will be included in the following discussion.

In the discussion of tone in noun prefixes, I proposed that polar tone is assigned to these prefixes. In instances where prefixes were assigned the same tone as the root, I posited that polar tone is blocked and that Spreading applies cyclically. The question is, does Polar Tone Assignment also apply to verbs? Six surface tone patterns are found among verbs: HHH, LLL, HHL, LLH, LHL, and LMH. Out of 298 prefixed verbs, 112 have one of the four patterns in which prefixes have the same tone as the verb; however, 95 of the 112 have the pattern HHL, further discussed following example (49). The remainder includes 9 HHH patterns and 6 LLH patterns with the respective roots H and LH. Out of 298 prefixed verbs, there are, then, only 17 in which polar tone is blocked, evidence that Polar Tone Assignment also applies to verbs.

In tri-syllabic verbs, there is a HHH surface tone pattern, as in [məhɤ̋dɛ́] ‘yawn’ in (43a) and [kɑ́nédɛ́] ‘lean against’ in (43b).

(43)

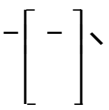
a. CəCV



məhɤ̃dɛ

‘yawn’

b. CVCV



kɑnedɛ

‘lean against’

The OCP prevents adjacent identical elements, so I posit that HHH has an underlying root melody H. I give the derivation for [məhɤ̋dɛ́] in (44).

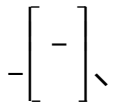
(44)	/m-hɤ̃^{H}-dɛ/	UF
	m-hɤ̋-dɛ	Melody Association
	m-hɤ̋-dɛ́	Spreading
	mV-hɤ̋-dɛ́	Vowel Place Holding
	mV́-hɤ̋-dɛ́	Spreading
	mə́-hɤ̋-dɛ́	[ə] Feature Insertion
	[məhɤ̋dɛ́]	SF

The H in /m-hɤ̃^{H}-dɛ/ ‘yawn’ associates to the root, and spreads to the suffix. After a V slot is inserted between the prefix and the root, polar tone is blocked, and the H tone of the root spreads left onto the prefix. Finally, [ə] features are inserted postlexically into the V slot, resulting in [məhɤ̋dɛ́], as shown in (44).

The verbs in (45), [mɔ̀s^{h}ídɛ̀] ‘wash’ and [kɔ̀lúdɛ̀] ‘jump’, have a surface LHL pattern.

(45)

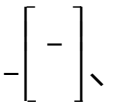
a. CəCV



məsʰɪdɛ

‘wash’

b. CVCV



kɑludɛ

‘jump’

The roots in (45) have a HL melody. I give the derivation for [màsʰídɛ̀] in (46).

(46)	/m-sʰɪ^{HL}-dɛ/	UF
	m-sʰí-dɛ̀	Melody Association
	mV-sʰí-dɛ̀	Vowel Place Holding
	mV̀-sʰí-dɛ̀	Polar Tone Assignment
	mà-sʰí-dɛ̀	[ə] Feature Insertion
	[màsʰídɛ̀]	SF

The melody in /m-sʰɪ^{HL}-dɛ/ ‘wash’ associates left to right onto the verb root and the CFP. After a V slot is inserted between the prefix and the root, a L polar tone is assigned to the prefix. Finally, [ə] features are inserted postlexically into the V slot, resulting in [màsʰídɛ̀] as shown in (46).

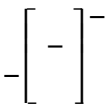
The H of a LHL pattern is phonetically lower than the H of a HHH or HHL pattern, and I posit that H is phonetically lowered between the L prefix and the L CFP. Unlike the LMH pattern discussed after (47), the lowered H of a LHL pattern does not contrast with another H in the pattern, and so seems to be a low-level phonetic phenomenon.

While we have a LHL pattern, there is no evidence for a HLH pattern in verbs. The HLH pattern in Mro Khimi nouns is also slightly less common than LHL or LHH patterns. The underlying melody for a HLH pattern would be LH, with the initial H

being accounted for by Polar Tone Assignment. If there is a constraint on HLH for verbs, it is a constraint on the output, not on the input.

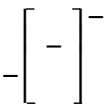
The next observed surface tone pattern to be discussed is LMH, as in [màsə̄dɛ́] 'transfer' and [kàtʰə̄dɛ́] 'boast'. The LMH pattern is the only surface tone pattern with a Mid tone.

(47)

a. 

məsədɛ

'transfer'

b. 

kɑtʰədɛ

'boast'

LHH is an unattested surface tone pattern for verbs. We can account for the unusual surface pattern LMH and the apparent lack of a LHH pattern in complex tri-syllabic verbs by positing that the underlying root melody resulting in LMH is H, for example, [màsə̄dɛ́] is underlyingly /m-sø^{H}-dɛ/. One additional postlexical rule is then needed to derive the correct surface form: the rule of Lowering in which the first H in the sequence LHH is phonetically lowered.[10] I give the derivation for [màsə̄dɛ́] in (48).

[10] I am aware that there is a problem with this rule, since it can only apply to verbs, and postlexical rules should not be able to refer to morphological information. But it cannot be lexical, since it introduces a novel phonetic segment.

(48)

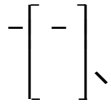
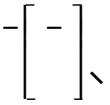
/m-sø^{H}-dɛ/	UF
m-sǿ-dɛ	Melody Association
m-sǿ-dɛ́	Spreading
mV-sǿ-dɛ́	Vowel Place Holding
mV̀-sǿ-dɛ́	Polar Tone Assignment
mə̀-sǿ-dɛ́	[ə] Feature Insertion
mə̀-sø̄-dɛ́	Lowering
[məsø̄dɛ́]	SF

The H associates to the root and then spreads to the suffix. A V slot is inserted between the prefix and the root and a L polar tone is assigned to the prefix. [ə] features are then inserted postlexically into the V slot. Lastly, the first H in the sequence LHH is phonetically lowered, resulting in [məsø̄dɛ́], shown in (48).

Among surface tone patterns of verbs already discussed, LMH is the only pattern in which the height of a lowered H is in an environment in which it contrasts with the height of another H.

The final observed surface tone pattern to be discussed is HHL, as shown in (49) with the verbs [mə́sǿdɛ̀] ‘urge’ and [kɑ́s^{h}ídɛ̀] ‘wear’.

(49)

a.	b.
	
məsødɛ	kɑs^{h}ɪdɛ
‘urge’	‘wear’

The high frequency of the HHL pattern, which accounts for almost one-third of prefixed verbs, does not seem to follow the claim that polar tone is normally assigned to prefixes. However, the HLL pattern is not found in tri-syllabic verbs, contrary to expectation.

Of the four root melodies L H LH and HL, HHL must have the underlying melody L or LH, since I have already shown that the underlying melody of LHL is HL and that the underlying melody of LMH is H. An underlying L or LH melody would also explain why this surface pattern is common, even though it seems to violate Polar Tone Assignment. If the underlying melody is LH, both tones will need to be changed to get the correct output HHL. If the underlying melody is L, only the first tone will need to be changed to get the correct output HHL. For example [mə́sə́dɛ̀] 'urge' has the surface pattern HHL. I posit that the underlying melody is L and give the derivation for /m-sø^{L}-dɛ/ in (50).

(50)	/m-sø^{L}-dɛ/	UF
	m-sə̀-dɛ	Melody Association
	m-sə̀-dɛ̀	Spreading
	mV-sə̀-dɛ̀	Vowel Place Holding
	mV́-sə̀-dɛ̀	Polar Tone Assignment
	mV́-sə́-dɛ̀	H Spreading
	mə́-sə́-dɛ̀	[ə] Feature Insertion
	[mə́sə́dɛ̀]	SF

Tone associates to the root, and the L spreads to the suffix. Next, a V slot is inserted between the prefix and the root, and H polar tone is assigned to the prefix. At this point, if the [ə] features are inserted postlexically into the V slot, the surface form would be *[mə́sə̀dɛ̀]. To derive the correct surface form, I propose a new rule of H Spreading, in which the H tone in a HLL sequence spreads one TBU to the right. The attachment of the H tone automatically causes the L to simultaneously delink because multiply-associated TBUs are not permitted in Mro Khimi. This results in the correct

surface tone pattern of HHL. [ə] features are then inserted postlexically into the V slot, resulting in the correct surface form [mə́sə́dɛ̀].

In this section, I have shown that one of four tone melodies associates to each verb root. Both the CFP and any prefixes are underlyingly toneless. The CFP receives tone from the tone melody, while the tone of the prefix is generally a polar tone.

5.4 Compound and nominalized verbs

Morphologically complex verbs include compound and nominalized verbs. I will analyze compound verbs in 5.4.1, followed by nominalized verbs in 5.4.2.

5.4.1 Compound verbs

Compound verbs are verbs with two or more root morphemes. In this section I show that tone assignment in compound verbs, like that in compound nouns, cannot cross internal word boundaries.

In example (51), the compound verb (51a) consists of a noun plus verb. The complex noun in isolation is given in (51b), while the verb with CFP is given in (51c).

(51)

a.	kə̀tʰə́tʰýdɛ́	'announce'
b.	kə̀tʰə́	'news'
c.	tʰýdɛ́	'tell'

The surface tone pattern of [kə̀tʰə́tʰýdɛ́] is LH#HH. [kə̀tʰə́] 'news' has a surface LH tone pattern; [tʰýdɛ́] 'tell' has a HH surface pattern. I posit that the root melody of [kə̀tʰə́] 'news' is H,[11] with a L polar tone assigned to the prefix. Since /dɛ/ is underlyingly

[11] Whether the UF of the surface pattern LH in [kə̀tʰə́] is H or HL cannot be proven here since I do not have the plural in its non-compound form.

toneless, I posit that /tʰy/ ‘tell’ is underlyingly H and this tone spreads to the suffix in (51c).

I next propose that tone melodies for compound verbs, like those for compound nouns in 5.2, do not cross internal word boundaries. I give the derivation for [kàtʰáátʰýdɛ́] in (52).

(52)	/k-tʰãᴴ#tʰyᴴ-dɛ/	UF
	k-tʰá́#tʰý-dɛ	Melody Association
	k-tʰá́#tʰý-dɛ́	Spreading
	kV-tʰá́#tʰý-dɛ́	Vowel Place Holding
	kV̀-tʰá́#tʰý-dɛ́	Polar Tone Assignment
	kə̀-tʰá́#tʰý-dɛ́	[ə] Feature Insertion
	[kàtʰáátʰýdɛ́]	SF

The tone melodies associate to their own roots, and the H tone on /tʰyᴴ/ then spreads to the verbal suffix. Following V slot insertion, polar tone is assigned to the noun prefix. Lastly, [ə] features are inserted postlexically into the V slot, resulting in [kàtʰáátʰýdɛ́] as shown in (52).

The alternative analysis of the LH#HH tone pattern in [kàtʰáátʰýdɛ́] is that [kàtʰá́] has an underlying H root melody, that the second root of the compound, [tʰydɛ], has no tone, and that the second root receives tone from the first root. I give the derivation for [kàtʰáátʰýdɛ́] under this alternative analysis in (53).

(53)

/k-tʰãᴴ#tʰy-dɛ/	UF
k-tʰā́#tʰy-dɛ	Melody Association
k-tʰā́#tʰý-dɛ́	Spreading
kV-tʰā́#tʰý-dɛ́	Vowel Place Holding
kV̀-tʰā́#tʰý-dɛ́	Polar Tone Assignment
kə̀-tʰā́#tʰý-dɛ́	[ə] Feature Insertion
[kə̀tʰā́tʰýdɛ́]	SF

After the H associates to the noun root, the H spreads right across the verb. Next, a V slot is inserted between the noun prefix and the root. Polar tone is then assigned to the prefix. Finally, [ə] features are inserted postlexically into the V slot, resulting in [kə̀tʰā́tʰýdɛ́], as shown in (53). Without further evidence, either analysis is an option.

In example (54), (54a) is the compound consisting of noun plus verb, (54b) is the noun in isolation, (54c) is the plural of the noun, and (54d) is the verb with CFP in isolation.

(54)

a.	kə̀nákə̀sʰȳdɛ́	‘pierce ears’
b.	kə̀ná	‘ear’
c.	kə̀nájí	‘ears’
d.	kə̀sʰȳdɛ́	GLOSS UNKNOWN

[kə̀nákə̀sʰȳdɛ́] has a LH#LMH surface pattern. The H on the noun is phonetically a little lower than the last H; I will discuss this later. The first stem, [kə̀ná] ‘ear’ has a LH surface pattern, while its plural [kə̀nájí] has LHH surface pattern. I therefore posit that the root melody of [kə̀ná] is underlyingly H. I give the derivation for [kə̀nájí] in (55).

(55)	/k-nɑ^{H}-jɪ/	UF
	k-ná-jɪ	Melody Association
	k-ná-jí	Spreading
	kV-ná-jí	Vowel Place Holding
	kV̀-ná-jí	Polar Tone Assignment
	kə̀-ná-jí	[ə] Feature Insertion
	[kə̀nájí]	SF

The H tone associates to the root and then spreads to the suffix. Following V slot insertion, a L polar tone is assigned to the prefix. [ə] features are then inserted into the V slot, resulting in [kə̀nájí] as shown in (55).

If tone cannot spread across internal word boundaries, each root in the compound must have its own tone melody, giving an UF of /k-nɑ^{H}#kɑ-s^{h}y^{H}-dɛ/. The derivation of the SF [kə̀nákə̀s^{h}ȳdɛ́] is shown in (56).

(56)	/k-nɑ^{H}#kɑ-s^{h}y^{H}-dɛ/	UF
	k-ná#kɑ-s^{h}ý-dɛ	Melody Association
	k-ná#kɑ-s^{h}ý-dɛ́	Spreading
	kV-ná#kɑ-s^{h}ý-dɛ́	Vowel Place Holding
	kV̀-ná#kɑ-s^{h}ý-dɛ́	Polar Tone Assignment
	kə̀-ná#kə̀-s^{h}ý-dɛ́	[ə] Feature Insertion
	kə̀-ná#kə̀-s^{h}ȳ-dɛ́	Lowering
	[kə̀nákə̀s^{h}ȳdɛ́]	SF

H tone melodies associate to each root and the H associated with the verb root spreads to the suffix. The H associated with the noun root is blocked from spreading to the verb prefix by the word boundary. A V slot is then inserted between the verb prefix and root, and L polar tones are assigned to each prefix. Next, [ə] features are inserted

postlexically into the V slot. Finally, the first H in the sequence LHH in the verb root is phonetically lowered to M, resulting in [kànákàsʰȳdɛ́].

In the alternative analysis, the verb receives its tone from the noun, as shown in (57).

(57)

/k-nɑᴴ#kɑ-sʰy-dɛ/	UF
k-ná#kɑ-sʰy-dɛ	Melody Association
k-ná#ká-sʰý-dɛ́	Spreading
kV-ná#ká-sʰý-dɛ́	Vowel Place Holding
kV̀-ná#ká-sʰý-dɛ́	Polar Tone Assignment
kə̀-ná#ká-sʰý-dɛ́	[ə] Feature Insertion
*[kə̀nákásʰýdɛ́]	SF

The H tone melody associates to the root and spreads across the prefix, root, and CFP of the verb. Following V slot insertion, polar tone is assigned to the noun prefix. Finally, [ə] features are inserted postlexically into the V slot, resulting in the incorrect surface form *[kə̀nákásʰýdɛ́]. This analysis shows, then, that tone melodies in compound verbs do not cross internal word boundaries, in the same way that tone melodies in compound nouns do not cross internal word boundaries.

In the next example, (58a) is the compound consisting of a noun plus a verb, (58b) is the noun in isolation, and (58c) is the plural of the noun.

(58)

a.	kə̀nīkə̀hū̄dɛ́	‘cover the body’
b.	kə̀ní	‘blanket’
c.	kə̀níjí	‘blankets’

The verb [kə̀hū̄dɛ́] is related to [mə̀hū̄dɛ́] ‘uncover, open’.

The compound [kànīkɑ̀hū̄dɛ́] has a LM#LMH surface tone pattern. In isolation, however, [kàní] has the surface tone pattern LH. The plural of [kàní] is [kànìjí], which has the surface tone pattern LHH. Since /jɪ/ is underlyingly toneless, I posit that /kə-ni/ is underlyingly H. I give the derivation for [kànìjí] in (59).

(59)	/k-ni^{H}-jɪ/	UF
	k-ní-jɪ	Melody Association
	k-ní-jí	Spreading
	kV-ní-jí	Vowel Place Holding
	kV̀-ní-jí	Polar Tone Assignment
	kə-ní-jí	[ə] Feature Insertion
	[kànìjí]	SF

After association of the melody to the root, the H tone spreads to the plural suffix. A V slot is inserted between the prefix and the root, and a L polar tone is assigned to the prefix. Lastly, [ə] features are inserted postlexically into the V slot, resulting in [kànìjí], shown in (59).

In [kànīkɑ̀hū̄dɛ́], however, the H tone of [kàní] is phonetically M. I would expect the surface form of the compound to be [kàníkɑ̀hū̄dɛ́] with a LH#LMH surface tone pattern. However, I noted in the discussion following (46), [màs^{h}ídɛ̀] 'wash', that the H of a LHL pattern is phonetically lower than the H of a HHH or HHL pattern and posited that the H is phonetically lowered between the L prefix and the L CFP. In most of my data, the lowered H of a LHL pattern does not contrast with another H in the pattern. In the compound environment, the H of [kàní] is between two L prefixes, and the lowering of the first two H's is more easily perceived because of the contrast with the final H. While sometimes the difference in height is quite small, at other times it is much greater, and so it is probably determined by a postlexical phonological rule. A

new postlexical rule of Lowering is needed, then, in which a H tone is phonetically lowered between two L tones regardless of word boundaries. The derivation for [kànīkàhū̄dɛ́] is given in (60).

(60)	/k-ni^{H}#kɑ-hũ^{H}-dɛ/	UF
	k-ní#kɑ-hṹ-dɛ	Melody Association
	k-ní#kɑ-hṹ-dɛ́	Spreading
	kV-ní#kɑ-hṹ-dɛ́	Vowel Place Holding
	kV̀-ní#kɑ-hṹ-dɛ́	Polar Tone Assignment
	kà-ní#kà-hṹ-dɛ́	[ə] Feature Insertion
	kà-ní#kà-hū̄-dɛ́	Lowering between L and H
	kà-nī#kà-hū̄-dɛ́	Lowering between L and L
	[kànīkàhū̄dɛ́]	SF

In this derivation, H tone melodies associate to each root, and the H of the verb root spreads to the CFP. The word boundary prevents the H of the first root in [k-ní] from spreading. A V slot is inserted between the noun prefix and root, and L polar tones are assigned to the prefixes. [ə] features are then inserted postlexically into the V slot. The first H in the noun is phonetically lowered between the L prefix and the following H. Finally, the H is lowered between the L prefix of the stem and the L prefix of the following stem, resulting in [kànīkàhū̄dɛ́] in (60).

5.4.2 Nominalized verbs

Nominalized verbs are composed of the verb stem and the nominalizer /-nũ̱/. In this section I will show that the nominalized form has the same surface tone pattern as the verb form, and that /-nũ̱/, like the CFP /-dɛ/, is underlyingly toneless.

For example, [χìdɛ́] ‘fear’ is a di-syllabic verb with a LH surface tone pattern, as shown in (61a). In nominalized forms, the root takes the suffix /nɯ̃/, forming [χìnɯ́̃], shown in (61b), which has the same LH surface tone pattern as the verb form.

(61)

	Verb	Nominalized Verb
a.	$\begin{bmatrix} \\ - \end{bmatrix}^{-}$	
b.		$\begin{bmatrix} \\ - \end{bmatrix}^{-}$
	χidɛ	χinɯ̃
	‘fear’ verb	‘fear’ noun

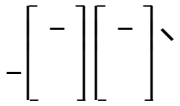
In tri-syllabic verbs, the nominalized form also has the same surface tone pattern as the verb form. For example, [kà?ītɛ́] ‘argue’ in (62a) has a surface LMH pattern, and the nominalized form [kà?ītɛ́nɯ́̃] ‘argument’, shown in (62b), has the same surface LMH pattern.

(62)

	Verb	Nominalized Verb
a.	$_{-}\begin{bmatrix} - \\ \\ \end{bmatrix}^{-}$	
b.		$_{-}\begin{bmatrix} - \\ \\ \end{bmatrix}^{-}$
	kɑ?ɪdɛ	kɑ?ɪnɯ̃
	‘argue’	‘argument’

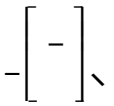
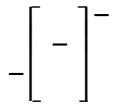
Compound verbs also do not change their surface tone pattern when nominalized. In example (63a), [kàtʰɑ́ tʰýdɛ́] ‘announce’ has the surface tone pattern LH#HH, which is the same pattern as the nominalized form [kàtʰɑ́ tʰýnɯ́̃] in (63b).

(63)

	Verb	Nominalized Verb
a.		b. 
	kətʰɑ̃tʰydɛ	kətʰɑ̃tʰynɯ̃
	‘announce’	‘announcement’

The nominalizer /nɯ̃/, like the CFP /dɛ/, receives its tone from the tone melody of the root. In (64a), [mànùnɯ̀̃] ‘know’, the L tone of the root /nɯᴸ/ spreads to the suffix /-nɯ/. In (64b), [mànúnɯ̀̃] ‘show’, the final L tone of the HL melody of the root /nɯᴴᴸ/ associates to the suffix, and in (64c), [mànūnɯ́̃] ‘laugh’, the final H tone of the root /nɯᴴ/ spreads to the suffix, after which the H of the root lowers to M.

(64)

a.		b.		c.	
	mənɯnɯ̃		mənɯnɯ̃		mənɯnɯ̃
	‘know’		‘show’		‘laugh’

I propose, then, that /nɯ̃/, like /dɛ/, is underlyingly toneless and that it receives its tone from the tone melody of the root.

CHAPTER 6

CONCLUSIONS AND FURTHER RESEARCH

6.1 Conclusions

While earlier work by Gregerson (1997) identified the number and approximate place of articulation of most phonemes in the Mro Khimi language, /a/ was not attested in his research and the non-existent diphthong /ə̟̆i/, apparently an orthographic compromise, was posited by him as a phoneme. Vowel shift from /i ɪ ɯ u o/ to /ɪ e ɤ ʊ ɔ/ between older and younger speakers occurs in several instances.

Mro Khimi has two contrastive tones, H and L, which form four tone melodies: H L LH HL. Affixes are underlyingly toneless. Tone melodies associate to the root and are assigned left to right, one-to-one to TBUs. If there are more TBUs than tones, an assigned tone spreads onto a following toneless TBU. If there are more tones than TBUs, the final tone will be left floating. Suffixes receive tone either by association or spreading. Prefixes are assigned polar tone. If polar tone is blocked, the tone of the root spreads left onto the prefix. Contour tones are not permitted on a single tone bearing unit. A H tone is phonetically lowered between a L and another H, giving the surface pattern LMH. Tone melodies do not cross root boundaries in compound nouns and verbs.

6.2 Archiving and further research

The study of tone in noun and verb phrases is beyond the scope of this thesis, as is the study of voice quality in relation to tone. L tones are often accompanied by a breathiness and, in conjunction with a H tone, a phonetic word-final glottal stop often appears.

Diphthongs appear in the phonemic inventory of many other Mro Khimi dialects. Further research is needed to see whether these diphthongs can bear contour tones.

In some Chin languages with syllable codas, such as Kaang, “the close mid front vowel /e/ is changed to open mid front vowel [ɛ] in a closed syllable with either falling or low tone /e/→[ɛ]/C_C. The close mid back vowel /o/ is also changed to open mid back vowel [ɔ] at the position of closed syllable type with either falling or low tone, /o/→[ɔ]/C_C” (Thang 2001). In Mro Khimi, /ɛ/ is less frequent than /e/ and /o/ undergoes vowel shift. It would be good to study whether the tone patterns of syllables with these vowels correlate with the tone patterns found in the closed syllables above.

Finally, I plan to archive the data I have collected on this language, including my recordings, in PARADISEC or SIL’s REAP archive.

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