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Title A Phonological Analysis of Mro Khimi

Department Linguistics

Degree Master of Arts

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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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First and foremost, I wish to thank the Lord Jesus Christ for the opportunity to write this thesis and for His encouragement, strength, and wisdom in the entire process. This thesis is because of Him.

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To my friends who have supported me, cheered me on, and kept me in their prayers - this too is possible because of you. Thank you for being there.
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 ø/ that are not found in the vowel inventories of Proto-Chin or other Chin languages. These vowels correspond to the Proto-Chin diphthongs /ui oi ua/. 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 ø ø/ that are not found in the vowel inventories of Proto-Chin or other Chin languages. The central vowels /y ø ø/ correspond to the Proto-Chin diphthongs /ui oi ua/. 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

<table>
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<tr>
<th></th>
<th>Labial</th>
<th>Labio-</th>
<th>Alveolar</th>
<th>Palatal</th>
<th>Velar</th>
<th>Labial-</th>
<th>Uvular</th>
<th>Glottal</th>
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<td>Plosive</td>
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<td>Plosive</td>
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<td>Lateral Approx.</td>
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<tr>
<td>Approximant</td>
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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: /s̩ 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 [ɓ ɗ ɠ]. 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 [j] 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’ [ʔâfˈa:] and ‘bird’ [təvˈa:]. 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 /sʰ/. 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, /l/ and in loan words /j/, can occur in C₂ position in C₁C₂ 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/ [pá] ‘clan’

/?ä-pé/ [ʔäpé] ‘who’

/t-pä-dè/ [täprädè] ‘break off’

/pʰ/ voiceless aspirated bilabial plosive [pʰ]

/pʰá/ [pʰá] ‘mat for drying’

/?ä-pʰá/ [ʔäpʰá] ‘friend’

/t-pʰä-dè/ [täpʰädè] ‘pluck (feathers)’

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

/bá/ [bá] ‘five’

/?ä-bá/ [ʔäbá] ‘branch’

/bů-dè/ [brůdè]~[brůdè] ‘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-dè/ ‘be hot’ can be phonetically realized as /ɓ/ in the surface form [ɓídè].

---

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]
/t̞/ [t̞] ‘sweet’
/t̃/ [t̃] ‘beam of a house’
/ṭ/ [ṭ] ‘nose’
/tʰ/ voiceless aspirated alveolar plosive [tʰ]
/tʰ̂/ [tʰ̂] ‘whitewash’
/tʰ̃/ [tʰ̃] ‘fruit’
/tʰ̄/ [kʰ̄] ‘boast’ (v)
/d/ voiced alveolar plosive / voiced alveolar flap [d]—[ d]—[r]
/d̂/ [d̂] ‘camp’
/d̄-d̄/ [d̄-d̄] ‘get, obtain’
/d̃/ [d̃] ‘harvest (rice)’ (v)
/vá-dó/ [vádó] ‘together’

The allophones [d]—[ d] 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.

/mû-dê/ [mûrê] ‘blow’ (v)

/kʰypʰ-dê/ [kʰypʰrê] ‘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/ → [r] / V [ + back]
The /d/ in the underlying form for /mû̞-dè/ ‘blow’ is preceded by the back vowel /û/,
which causes the /d/ to undergo the process of flapping. The surface form is therefore
realized as [mûrè].

/k/ voiceless velar plosive [k]
/kê/ [kê] ‘waist’
/ʔâ-kê/ [ʔûkê] ‘body’
/t-kû̞-dè/ [tôkrû̞dê] ‘curse’ (v)

/kʰ/ voiceless aspirated velar plosive [kʰ]
/kʰâ/ [kʰû] ‘country(side)’
/ʔâ-kʰû̞/ [ʔûkʰû] ‘younger brother’
/kû-t-kʰâ-dè/ [kûtôkʰû̞dê] ‘capsize’

/g/ voiced velar plosive [g]~[ɡ]
/gû̞-lâ/ [gû̞là] ‘foreigner from India’
/ʔâ-g-dè/ [ʔûgû̞dê] ‘plaster’
/jâ-gû/ [jûgû] ‘soft sticky rice’
/k-lé nû gô hû̞/ [kû̞-lênûgû̞hû̞] ‘plaster’ (n)

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

/ʔ/ voiceless glottal stop [ʔ]
/ʔû̞-dè/ [ʔû̞dê] ‘plant’ (v)
/lû̞-û̞/ [lû̞û̞] ‘bag’
/kû-ʔê-dè/ [kûʔêdê] ‘oppose, debate’ (v)
/k-ʔû̞-dè/ [kûʔû̞dê] ‘tie together’
The glottal stop always occurs phonetically in word-final position following a Hi tone, as seen in ‘soft’ [pâdéʔ]. However, it is not contrastive with the absence of glottal stop in this environment.

/m/  bilabial nasal [m]
/mý/  [mý] ‘fish’
/ʔà-má/  [ʔámá] ‘3SG’
/ká-má/  [kámá] ‘Lord’

/n/  alveolar nasal [n]
/né-pý-dí/  [népýdí] ‘woman’
/ʔà-ná/  [ʔāná] ‘meat’
/ká-né-dé/  [kánédé] ‘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 /n/ ‘dwelling’ is velarized when preceded by /u/, as seen in the following example.

/kâ-jû nà/  [kâjû ɳà] ‘tree dwelling’

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

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

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

/ʔâ-fá kâ-tù nà/  [ʔâfʰá kátù nà] ‘toothbrush’

Given my data, I cannot account for the velarization of /n/ in [kâjû ɳà] ‘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 [fʰ]

/k-hà fû-dè/ [kɔ̀hà fûúrè] ‘pant’ (v)

/ʔà-fá/ [ʔàfá] ‘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 [fʰ] does not contrast with an unaspirated [f], I will represent the phoneme as /f/.

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

/vá/ [vá] ‘large basket’

/t-vá/ [tɔvá] ‘bird’

/kàvídé/ [kàwídé] ‘turn round’

/kʰɔví kô-ví/ [kʰɔví kôví] ‘crippled person’

In the example [kʰɔví kôví] ‘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 /kàvídé/ [kàwǐdi] ‘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, /kàvidé/ ‘turn round’ is realized as [kàwidé] by W1, [kàvídé] by W2, [kàvidé] by W3, and [ʔàvidí] by X. However, WE realized /kàvidé/ as [kàvídé] in five out of six repetitions and [kàwidé] in one out of six repetitions. This is summarized in (3).

(3) /kàvidé/ ‘turn round’

<table>
<thead>
<tr>
<th></th>
<th>W1 [kàwidé]</th>
<th>WE [kàvídé]~[kàwidé]</th>
</tr>
</thead>
<tbody>
<tr>
<td>W2</td>
<td>[kàvídé]</td>
<td>X [ʔàvidí]</td>
</tr>
<tr>
<td>W3</td>
<td>[kàvidé]</td>
<td></td>
</tr>
</tbody>
</table>

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

(4) /kúv/dé/ ‘crawl’

<table>
<thead>
<tr>
<th></th>
<th>W1 [kúwàdé]</th>
<th>WE [kúv/dé]~[kúwàdé]</th>
</tr>
</thead>
<tbody>
<tr>
<td>W2</td>
<td>[kúwà hà lûdé]</td>
<td>X [kúwàdí]</td>
</tr>
<tr>
<td>W3</td>
<td>[kúwàdé]</td>
<td></td>
</tr>
</tbody>
</table>

[w] is more frequently realized in /kúv/dé/ ‘crawl’ than in /kàvidé/ ‘turn round’, most likely because the /v/ in /kúv/dé/ is preceded by [u] in addition to being adjacent to the back vowel [a]. In the final example, ‘zebra’, I elicited the term [kówà bò bànnú sàpʰú] (literally, ‘striped horse’) from only one speaker, W1. Based upon the two previous examples, I posit the underlying form to be /k-vá bò bànnú s-pʰú/. 
/s/  

voiceless alveolar sibilant [s]

/sũ/ [sũ] ‘poison’

/ʔa-sô/ [ʔasô] ‘amulet’

/m-sô-dé/ [mɔsõdẽ] ‘transfer’

/sʰ/  

voiceless aspirated alveolar sibilant [sʰ]

/sʰō/ [sʰõ] ‘chisel’

/ʔa-sʰi/ [ʔasʰi] ‘evil thing’

/kà-sʰô-dé/ [kãsʰõdẽ] ‘move away’ (v)

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

/χ/  

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

/χá/ [xá] ‘yam’

/ʔa-χá/ [ʔaxá] ‘leaf’

/kà-χý-dé/ [kãχýdẽ] ‘run’ (v)


Likewise, the velar fricative almost always precedes the vowels [a õ õ ϰ y], that is vowels that are [-high, + back]. Examples include [sɔ xà χi lûdẽ] ‘limp’ (v), [ʔaxá] ‘leaf’, [bû kɔxõdẽ] ‘be hungry’, [tɔxõdẽ] ‘apply, besmear’, and [tɔxõdẽ] ‘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 [mɔχý]. Likewise, the rule does not apply to the /χ/ in /χú-dè/ ‘cut down’ because it precedes the high back vowel /u/, and the surface form is /χúdè/. However, the rule does apply to the /χ/ in /m-χà/ ‘cotton’ because it precedes the low back vowel /a/, and the surface form is therefore realized as [mɔ-χà].

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

/ʔɛ-χá ʔɔ-nú/ [ʔɛχá ʔɔnú] ‘be selfish’
/χɔ̃ kí-a-nú/ [xɔ̃ kíánú] ‘scratch’
/tí-χù/ [tíxù] ‘thief’

The rule seems to be both over- and under-applied. It does not apply in [ʔɛχá ʔɔnú] ‘be selfish’ even though it should. The only occurrences of the uvular fricative before nonhigh back vowels are before /a/. The rule overapplies in [xɔ̃ kíánú] ‘scratch’ and [tíxù] ‘thief’. The form [xɔ̃ kíánú] ‘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 /a/, as well as 7 instances of a velar fricative preceding /ā/. I have only 2 instances of a uvular fricative preceding /a/ and no instances of the uvular fricative preceding /ā/.
precedes a nonback vowel. The form [tīxù] ‘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]

/hó-dè/ [hódè] ‘say’

/l-hó/ [làhó] ‘lion’

/kú-hû-dè/ [káhûdè] ‘shiver’ (v)

/l/ alveolar lateral [l]

/ló/ [ló] ‘mountain field’

/ʔà-lú/ [ʔàlú] ‘head’

/kà-lú-dè/ [kàlúdè] ‘jump’ (v)

/ʃ/ alveolar approximant / alveolar flap [ʃ] ~ [r]

/ʃè-dè/ [ʃèdè] ‘talk about’

/ʔá-ʃò/ [ʔáʃò] ‘mad person’

/ʃh-ʃà/ [ʃhʃà] ‘nasal mucous’

/t-pʃ-dè/ [tʃprídè] ‘break off’

Gregerson (1997) had described the /ʃ/ phoneme as a phonetic voiced alveolar flap [r] and a voiced retroflex fricative [z] in free variation; however, I did not perceive a voiced retroflex fricative. The voiced alveolar flap [r] is an allophone of the voiced alveolar approximant /ʃ/, although it is less frequent than the allophone [ʃ]. The most
usual position for the allophone [r] is the second member in a consonant cluster, as shown in Table 2.

<table>
<thead>
<tr>
<th></th>
<th>$ $</th>
<th>$ C $</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>[r]</td>
<td>4</td>
<td>14</td>
<td>18</td>
</tr>
<tr>
<td>[l]</td>
<td>37</td>
<td>19</td>
<td>56</td>
</tr>
</tbody>
</table>

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

Consonant clusters in Mro Khimi are composed of the phoneme /l/ 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 /tʰ/ (Thang 2001).

Unlike the Flapping rule, in which the phoneme /d/ is realized as the flap [r] following a back vowel, I have no examples in which /l/ is realized as [r] after a back vowel. In my data, the realization of the phoneme /l/ as the flap [r] 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-ká-dé/ ‘descend’ and /k-kíó/ ‘change of state’ (v), a rarer term recorded by WE, as [sɔkχ̃d̃e] and [kɔkχ̃b̃], respectively, with [χ̃] as an allophone of /l/ 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]~[j]

/jí-dè/  [jíðè] ‘slice’ (v)

/ʔá-jè/  [ʔájè] ‘elder sister’

/kò-jó-dè/  [kòjódè] ‘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 [j], as accounted for by the optional postlexical Spirantization rule in (6).

(6)  /j/ → [j] / _ _ V
     [ + high ]

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

(7)  /jí-dè/  UF
     jídè  Spirantization
     [jídè]  SF

Gregerson (1997) had described this phoneme as a phonetic palatal approximant [j] and a voiced alveo-palatal fricative [z] 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 [j], not a voiced alveo-palatal fricative [z]. Also, while [j] and [j] are in free variation before high vowels, [j] 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’, [métʃʊ] ‘(electric) light’, and [dʒʊ] ‘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 /u ʊ 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.
Although there are no diphthongs in the Wakun dialect, the diphthongs /ai/ and /au/ are present in Xautau. According to Lindau, et al. (1985), 30% of all languages have diphthongs. Moreover, 75% of languages with diphthongs have /ai/, and 65% of languages with diphthongs have /au/. 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

<table>
<thead>
<tr>
<th>Wakun</th>
<th>Xautau</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ʔójɔ̀]</td>
<td>[ʔójɔ́u]</td>
<td>abdomen</td>
</tr>
<tr>
<td>[ʔásɔ́]</td>
<td>[ʔásɔ̀u]</td>
<td>breast</td>
</tr>
<tr>
<td>[kɪ́]</td>
<td>[ʔákɔ̀]</td>
<td>waist</td>
</tr>
<tr>
<td>[màkʰdɛ̀]</td>
<td>[màkʰdi]</td>
<td>gnaw</td>
</tr>
<tr>
<td>[mòlɛ̀dɛ̀]</td>
<td>[mòlɛ́di]</td>
<td>lick</td>
</tr>
</tbody>
</table>
In the Xautau dialect, /a/ corresponds to the near close front unrounded vowel /i/ or the close-mid front unrounded vowel /e/ in Wakun, and /au/ in Xautau corresponds to the open-mid back unrounded vowel /o/ in Wakun, as illustrated in Table 3.

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

The diphthongs /au/ and /ai/ do occur in the Wakun dialect in Burmese loan words such as [métʃaw] ‘(electric) light’ and [dài] ‘shield’.

According to Thang (2001), the front round vowels /y ø/ of Mro Khimi are not found in the vowel inventories of Proto-Chin or other Chin languages. However, /y ø/ correspond to the Proto-Chin diphthongs /ui oi ua/ 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>
<thead>
<tr>
<th>Proto-Chin</th>
<th>Gloss</th>
<th>Tedim</th>
<th>Khumi</th>
<th>Kaang</th>
<th>Mro Khimi</th>
</tr>
</thead>
<tbody>
<tr>
<td>ui</td>
<td>water</td>
<td>[túː]</td>
<td>[tú ]</td>
<td>[tú ]</td>
<td>[tỳ ]</td>
</tr>
<tr>
<td>oi</td>
<td>good</td>
<td>[hòː]</td>
<td>[a.hòː]</td>
<td>N/A</td>
<td>[hỳ ]</td>
</tr>
<tr>
<td>ua</td>
<td>rain</td>
<td>[gùː]</td>
<td>[kʰúː]</td>
<td>[kʰòː]</td>
<td>[kʰó ]</td>
</tr>
</tbody>
</table>

While all Chin languages have the five cardinal vowels /i e o u/, Kaang is the only other Chin language which has central vowels: /i u a/. 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 /o/, other Chin languages have allophonic variation between [a] and [o] in which “the open front vowel /a/ is slightly different in its realization from [a] to [o]” (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

<table>
<thead>
<tr>
<th>Corresponding Segments</th>
<th>WE Phonemic Representation</th>
<th>W2 Phonemic Representation</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>i i</td>
<td>[ʔí xā́dẽ] /ʔí ɣ̄-dẽ/</td>
<td>[ʔí xā́dẽ] /ʔí ɣ̄-dẽ/</td>
<td>‘contradict’</td>
</tr>
<tr>
<td>i e</td>
<td>[kṓt̄dẽ] /k-t̄-dẽ/</td>
<td>[kṓt̄nũ] /k-t̄-nũ/</td>
<td>‘threaten’</td>
</tr>
<tr>
<td>ū ū</td>
<td>[t̄okrũ] /t̄-kũ/</td>
<td>[t̄okr̄ũ] /t̄-k̄ũ/</td>
<td>‘cut off’</td>
</tr>
<tr>
<td>ū ū</td>
<td>[rṹnũ] /r̄-nũ/</td>
<td>[r̄dẽ] /r̄-dẽ/</td>
<td>‘spank’</td>
</tr>
<tr>
<td>o o</td>
<td>[m̄ok̄dẽ] /m̄-k̄-dẽ/</td>
<td>[m̄ok̄dẽ] /m̄-k̄-dẽ/</td>
<td>‘answer’</td>
</tr>
</tbody>
</table>

For example, ‘contradict’ is pronounced as [ʔí xā́dẽ] by WE, with the close front vowel /i/, whereas it is pronounced as [ʔí xā́dẽ] by W1 and W3,7 with the near-close front vowel /i/. 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, [sṍ] ‘sorcerer’, [ʔō] ‘brick’, and [jô] ‘hare’. WE gave the Mro Khimi words [s̄ṍmá nû] for ‘sorcerer’ and [ʔīt̄å] for ‘brick’ – in general, WE gave fewer loan words - but realized ‘hare’ as [jû̊] with the high back vowel /ũ̊/. With the loan word ‘hare’, then, there is also a shift between /ũ̊/ and /ô̊/. In this case, [jô] 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 [ø] are allophones of the same phoneme, while each speaker has /i i e u y/ 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 [ʔi] ‘feces’ and [ʔəlú] ‘head’ in Table 6.

Table 6: Vowel stability

<table>
<thead>
<tr>
<th>Corresponding Segment</th>
<th>WE Phonemic Representation</th>
<th>W2 Phonemic Representation</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>i</td>
<td>[ʔəmí]</td>
<td>/ʔə-mí/</td>
<td>‘eye’</td>
</tr>
<tr>
<td>ɪ</td>
<td>[ʔi]</td>
<td>/ʔi/</td>
<td>‘feces’</td>
</tr>
<tr>
<td>uu</td>
<td>[mòı̞nudè]</td>
<td>/m-nú-dè/</td>
<td>‘know’</td>
</tr>
<tr>
<td>u</td>
<td>[ʔəlú]</td>
<td>/ʔə-lú/</td>
<td>‘head’</td>
</tr>
</tbody>
</table>

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

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>i/i</td>
<td>y/y</td>
<td>u/ i</td>
<td>u/u</td>
</tr>
<tr>
<td>i/e</td>
<td>y/ø</td>
<td>y/ ø</td>
<td></td>
</tr>
<tr>
<td>e/εᵢ</td>
<td>ø/œ</td>
<td>-/œᵢ</td>
<td>o/o</td>
</tr>
<tr>
<td>ε/ε</td>
<td>a/-</td>
<td>a/a</td>
<td>ø/ø</td>
</tr>
</tbody>
</table>

G’s front vowels /e e₁ e ø œ œ/ are higher in my transcriptions, while G’s back vowels /i ø/ 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 /a/, 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 /a/. 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 /ei/ and /əi/ in G’s analysis are not included in the current analysis. G does not discuss the phoneme /əi/. The words which G writes with /əi/ are the words where I find age-based variation: Younger speakers use /y/ and WE uses /u/. It could be that G transcribed these words as showing variation between /ə/ and /i/, and decided to use the diphthong to regularize the transcription. In fact, it would be extremely unusual to have only the two diphthongs /ei/ and /əi/ in any language because /ai/ and /au/ 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]
   /ʔʰ-dɛ/ [ʔʰdɛ] ‘sleep’
   /kʰ-dɛ/ [kʰdɛ] ‘borrow’
   /ʔà-sʰi/ [ʔàsʰi] ‘evil thing’

/i/ close front unrounded vowel with stiff voice [ɨ] ~ near-close front unrounded vowel with stiff voice, nearly creaky [i]
   /ʔi/ [ʔi] ‘excrement’
   /kà-ʔi-dɛ/ [kàʔidyɛ] ‘argue’
   /ʔà-kí/ [ʔàki] ‘tumor’

/e/ centralized close-mid front unrounded vowel [e] ~ close-mid front unrounded vowel [ɛ]
   /tʰè/ [tʰè] ‘arrow’
   /kè/ [kè] ‘knife’
   /t-pà-dè/ [t̚pàdè] ‘split’ (v)

/e/ open-mid front unrounded vowel [ɛ] ~ lowered close-mid front unrounded vowel [ɛ]
   /ʔè-pý/ [ʔèpý] ‘frog’
   /tʰè-bý/ [tʰèbý] ‘mole’
   /ʔà-pè/ [ʔàpè] ‘who’
/a/ open central unrounded vowel [a]

/mà-t/ [màt] ‘duty’

/mà-d/ [màd] ‘lead’ (v)

/ʔà-k/ [ʔàk] ‘room’

/y/ close front rounded vowel [y]

/ʔy/ [ʔy] ‘dog’

/ʔy-d/ [ʔyδ] ‘spoil, rot’ (v)

/tỳ/ [tỳ] ‘water’

/χỳ-n/ [χỳn] ‘rope’

/v/ near-close front rounded vowel with advanced tongue root [ɣ] ~ near-close front rounded vowel [v]

/kỳ-d/ [kỳd] ‘be full’

/hỳ-bì/ [hỳbi] ‘very well’

/ʔá-s-l/ [ʔásl] ‘hem’

/ø/ close-mid front rounded vowel [ø]

/jò-d/ [jòd] ‘sell’

/ʔà-s-ʰ-s-h/ [ʔàshosh] ‘tendon’

/kʰ/ [kʰ] ‘country’

/u/ centralized close back unrounded vowel [ɯ]

/sù/ [sù] ‘poison’ (n)

/dú-nú/ [dúmú] ‘be curious’

/ʔà-pl-kú/ [ʔàplku] ‘crust’
/γ/ centralized close-mid back unrounded vowel [γ] ~ close-mid central unrounded vowel [ə]

/pγ/ [pγ] ‘hunting net’

/γ-ŋu/ [γŋu] ‘believe’

/ʔə-χγγ-ɗə/ [ʔəxγγdə] ‘be different’

/α/ lowered open-mid back unrounded vowel [ʌ] ~ open back unrounded vowel [a]

/ʔá/ [ʔá] ‘chicken’

/χá/ [xá] ‘month’

/ká-sʰ-ɗə/ [kásʰɗə] ‘wear’

/u/ close back rounded vowel [u]

/lú-kʰ/ [lúkʰ] ‘pillow’

/m-ʔu-ɗə/ [mʔuɗə] ‘bury’

/ʔá-ɓu/ [ʔáɓu] ‘grandfather’

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

/jò-ȵu/ [jòȵu] ‘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]

/ʔɔ/ [ʔɔ] ‘pig’

/sɔ-kʰɔ/ [sɔkʰɔ] ‘spoon’

/tʰɔ-kʰɔ/ [tʰɔkʰɔ] ‘door’

/m-łó/ [mɔlɔ] ‘boat’
3.2.4 Description of the nasal vowels

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

/ĩ/ nasal close front unrounded vowel [ĩ]
/ĩ tû/ [ʔĩ tû] ‘beam of a house’
/t-kũ-dé/ [t̚akũd̚é] ‘curse’ (v)
/t-ki/ [t̚aki] ‘faithfulness’

/ɨ/ nasal near-close front unrounded vowel [ɨ]
/ˈkî/ [kî] ‘small of the back’
/kê-dé/ [kêd̚é] ‘avoid’
/kê-x̚î/ [kêx̚î] ‘rich man’

/e/ nasal close-mid front unrounded vowel [e]
/ʔê/ [ʔê] ‘house’
/m-kê-dê/ [m̚akêd̚ê] ‘fasten’
/x̚-dê/ [x̚dê] ‘mat for sleeping’
\(/\ddot{\text{e}}/\)  nasal open-mid front unrounded vowel [\(\ddot{\text{e}}\)]
\(/\dddot{\text{a}}\ddot{\text{p}}\ddot{\text{e}}/\)  [\(\dddot{\text{a}}\ddot{\text{p}}\ddot{\text{e}}\)] ‘rag’
\(/t\text{-k} \ddot{\text{u}}\ddot{\text{e}}\ddot{\text{d}}/\)  [\(t\text{-k} \ddot{\text{u}}\ddot{\text{e}}\ddot{\text{d}}\)] ‘watch’ (v)
\(/\text{m} \ddot{\text{u}}\ddot{\text{d}}\ddot{\text{e}}/\)  [\(\text{m} \ddot{\text{u}}\ddot{\text{d}}\ddot{\text{e}}\)] ‘heifer’
\(/\ddot{\text{a}}/\)  nasal open central unrounded vowel [\(\ddot{\text{a}}\)]
\(/\text{p} \ddot{\text{a}}/\)  [\(\text{p} \ddot{\text{a}}\)] ‘bamboo raft’
\(/\text{p}^h\ddot{\text{j}} \ddot{\text{a}}\ddot{\text{d}}/\)  [\(\text{p}^h\ddot{\text{j}} \ddot{\text{a}}\ddot{\text{d}}\)] ‘tear open’
\(/t\ddot{\text{k}}\ddot{\text{a}}/\)  [\(t\ddot{\text{k}}\ddot{\text{a}}\)] ‘money’
\(/\ddot{\text{o}}/\)  nasal close-mid front rounded vowel [\(\ddot{\text{o}}\)]
\(/\chi \ddot{\text{o}}\text{ k} \ddot{\text{n}}\ddot{\text{u}}/\)  [\(\chi \ddot{\text{o}}\text{ k} \ddot{\text{n}}\ddot{\text{u}}\)] ‘scratch’ (v)
\(/\text{k} \ddot{\text{o}}\text{n} \ddot{\text{o}}\ddot{\text{d}}/\)  [\(\text{k} \ddot{\text{o}}\text{n} \ddot{\text{o}}\ddot{\text{d}}\)] ‘sit’ (v)
\(/\text{k} \ddot{\text{t}}\ddot{\text{o}}/\)  [\(\text{k} \ddot{\text{t}}\ddot{\text{o}}\)] ‘adult’
\(/\ddot{\text{u}}/\)  nasal close back unrounded vowel [\(\ddot{\text{u}}\)]
\(/\text{d} \ddot{\text{u}}\text{d} \ddot{\text{e}}/\)  [\(\text{d} \ddot{\text{u}}\text{d} \ddot{\text{e}}\)] ‘ask’
\(/\chi \ddot{\text{u}}\text{n} \ddot{\text{u}}/\)  [\(\chi \ddot{\text{u}}\text{n} \ddot{\text{u}}\)] ‘grow up’
\(/\text{t} \dddot{\text{a}}\text{m} \ddot{\text{u}}/\)  [\(\text{t} \dddot{\text{a}}\text{m} \ddot{\text{u}}\)] ‘gall bladder’
\(/\ddot{\text{r}}/\)  nasal close-mid back unrounded vowel [\(\ddot{\text{r}}\)]
\(/\text{t} \dddot{\text{r}}\ddot{\text{d}}\ddot{\text{e}}/\)  [\(\text{t} \dddot{\text{r}}\ddot{\text{d}}\ddot{\text{e}}\)] ‘believe’
\(/\chi \ddot{\text{r}}\text{s} \ddot{\text{a}}/\)  [\(\chi \ddot{\text{r}}\text{s} \ddot{\text{a}}\)] ‘bowl’
\(/\text{s}^h\ddot{\text{y}}\text{p} \ddot{\text{y}}/\)  [\(\text{s}^h\ddot{\text{y}}\text{p} \ddot{\text{y}}\)] ‘thread’
\(/\ddot{\text{a}}/\)  nasal open back unrounded vowel [\(\ddot{\text{a}}\)]
\(/\dddot{\text{a}}/\)  [\(\dddot{\text{a}}\)] ‘curry’
\(/\text{k} \dddot{\text{a}}\text{m} \ddot{\text{a}}/\)  [\(\text{k} \dddot{\text{a}}\text{m} \ddot{\text{a}}\)] ‘first’
\(/\text{t} \dddot{\text{a}}\text{v} \ddot{\text{a}}/\)  [\(\text{t} \dddot{\text{a}}\text{v} \ddot{\text{a}}\)] ‘price’
/ũ/ nasal close back rounded vowel [ũ]

/ʔũ/ [ʔũ] ‘among’

/ʔũ-dè/ [ʔũdè] ‘blow (a balloon)’

/k-sũ ná/ [kósũ ná] ‘handle’ (n)

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

/jő/ [jõ] ‘hare’ Burmese loan word

/só-mà/ [só-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]

/ʔɔ̃-dè/ [ʔɔ̃dè] ‘have’

/tʰɔ̃-dè/ [tʰɔ̃dè] ‘cook’ (v)

/m-lɔ/ [mɔlɔ] ‘boat’

/õ̃/ nasal open back rounded vowel [õ̃]

/lõ t-ká-dè/ [lõ tɔkádè] ‘step’ (v)

/ná tʰõ sā-nû/ [ná tʰõ sänû] ‘hurt’

/ʔà-nõ/ [ʔaŋõ] ‘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 ([Ca]); 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 \([C_1(C_2)V]_{\text{max}}\). 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 /j/ 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.

\[
[CV] \quad /p^h\acute{a}/ /p^h\acute{a}/ \quad \text{‘mat for drying things’}
\]

\*'\[
[p^h\emptyset]
\]

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

\[
[?V] \quad /\dot{\acute{a}}\acute{a}/ /\dot{\acute{a}}/ \quad \text{‘pig’}
\]

\*'\[
/\acute{a}/
\]

The alveolar approximant /\acute{j}/ is permitted in consonant clusters following /p t k b/.

\[
[C\acute{j}V] \quad /k\acute{a}-p\acute{a}-d\acute{e}/ /k\acute{a}pr\acute{e}d\acute{e}/ \quad \text{‘divorce’ (v)}
\]

\[
/\dot{\acute{a}}-n\acute{a}\#t\acute{u}/ /\dot{\acute{a}}n\acute{a}\k\acute{u}/ \quad \text{‘nose’}
\]

\[
/t-p^h\acute{\acute{i}}-d\acute{e}/ /t\acute{a}p^h\acute{\acute{i}}d\acute{e}/ \quad \text{‘pluck’}
\]

\[
/k\acute{e}-d\acute{e}/ /k\acute{e}d\acute{e}/ \quad \text{‘grind’}
\]

\[
/b\acute{u}-d\acute{e}/ /br\acute{u}d\acute{e}/ \quad \text{‘bewitch’}
\]

Khumi, another Southern Chin language, similarly restricts (C₂) to /r/ and /l/, with /r/ occurring after /p/ or /k/, and Proto-Chin restricts (C₂) to /r/, with C₁ limited to voiceless velar stops, both aspirated and unaspirated (Thang 2001).

The palatal approximant /\acute{j}/ is permitted in consonant clusters following /p\acute{b}/ in Burmese loan words.

\[
[C\acute{j}V] \quad /p\acute{b}\acute{\acute{a}}/ \quad /p\acute{b}\acute{\acute{a}}/ \quad \text{[p\acute{b}\acute{\acute{a}}] ‘cut’ (v)}
\]

\[
/\dot{\acute{a}}-p\acute{b}\acute{\acute{a}}/ \quad [\dot{\acute{a}}p\acute{b}\acute{\acute{a}}] \quad \text{‘destruction’}
\]

\[
/p\acute{b}\acute{\acute{a}}-d\acute{e}/ \quad [p\acute{b}\acute{\acute{a}}d\acute{e}] \quad \text{‘destroy’ (v)TR}
\]

\[
/p\acute{\acute{j}}-d\acute{e}/ \quad [p\acute{\acute{j}}d\acute{e}] \quad \text{‘destroy’ (v)INTR}
\]

\[
/k\acute{\acute{r}} \acute{\acute{l}} p\acute{\acute{j}}-n\acute{\acute{u}}/ \quad [k\acute{\acute{r}} \acute{l} p\acute{\acute{j}}n\acute{\acute{u}}] \quad \text{‘miscarriage’}
\]
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 /d/ in the word /k-né-dé/ [kənẽdẽ] ‘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 /ʔa/ and /ka/. /ʔa/ precedes nouns and /ka/ most frequently precedes verbs or nominalized verbs.

/ʔà-lú/ [ʔ˘lú] ‘head’ /ʔá-pí/ [ʔ˘pí] ‘grandmother’
/kà-lô-dê/ [k˘l˘d˘] ‘jump’ /ká-pé-nû/ [k˘p˘nû] ‘be born’

A minor syllable is an underlyingly voiceless 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 h k s/ 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

<table>
<thead>
<tr>
<th>Consonant</th>
<th>Example</th>
<th>Sound</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>m</td>
<td>/m-lʃ/</td>
<td>/mɔlʃ/</td>
<td>‘boat’</td>
</tr>
<tr>
<td>d</td>
<td>/d-hʌ/</td>
<td>/dɔhʌ/</td>
<td>‘fate’</td>
</tr>
<tr>
<td>p</td>
<td>/p-i/</td>
<td>/pɔi/</td>
<td>‘mother-in-law’</td>
</tr>
<tr>
<td>t</td>
<td>/t-pɔ-dɛ/</td>
<td>/tɔpdo/</td>
<td>‘make’</td>
</tr>
<tr>
<td>tʰ</td>
<td>/tʰ-sʊ tʰ-pɔ/</td>
<td>/tʰasɔ tʰɔpɔ/</td>
<td>‘stomach, internal’</td>
</tr>
<tr>
<td>k</td>
<td>/k-nɛ-dɛ/</td>
<td>/kɔnɛdɛ/</td>
<td>‘listen’</td>
</tr>
<tr>
<td>kʰ</td>
<td>/kʰ-ɭ/</td>
<td>/kʰɭ/</td>
<td>‘flute’</td>
</tr>
<tr>
<td>s</td>
<td>/s-kɛ-dɛ/</td>
<td>/sɔkɛdɛ/</td>
<td>‘descend’</td>
</tr>
<tr>
<td>sʰ</td>
<td>/sʰ-ɲu/</td>
<td>/sʰɔɲu/</td>
<td>‘girl’</td>
</tr>
<tr>
<td>ŋ</td>
<td>/ŋ-ɭ/</td>
<td>/ŋɭ/</td>
<td>‘mat for sleeping’</td>
</tr>
</tbody>
</table>

Of the two examples I do have of the /t-/ prefix followed by /s/, the first example, /t-ʈau/ [ʈau] ‘law’ was the second Mro term given to me for ‘law’ and the second example was /t-ʈɨ-dɛ/ [ʈɨɖɛ] ‘write, draw’. Since the sequence [ʈɨV] 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-kā-dē/ [sòkādē] ‘descend’. In my data I have no examples of sequences such as a /p- k- b-/ prefix followed by /ʌ/ or /pV tV kV bV/ surfacing as [pəV təV kəV bəV]. 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-kā-dē/ [sòkādē] ‘descend’ in (9).

(9) /s-kā-dē/ UF

\[ s\tilde{V}\text{-kādē} \quad \text{Vowel place holding} \]

\[ s\text{-kādē} \quad [ə] \text{ feature insertion} \]

\[ [sòkādē] \quad SF \]

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 \([CV.Cə.CCV.CV]_{\text{MAX}}\)
Here are examples of templates:

<table>
<thead>
<tr>
<th>Pattern</th>
<th>CV</th>
<th>CCV</th>
<th>C C V</th>
<th>CV C V</th>
<th>C a C V</th>
<th>C a C V C V</th>
<th>C V a C V C V</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>kʰ ô</td>
<td>kʰ ô</td>
<td>‘country, nature’</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CCV</td>
<td>pʰ ŭã</td>
<td>pʰ ŭã</td>
<td>‘straight’</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C a C V</td>
<td>k sʰ í</td>
<td>k sʰ í</td>
<td>‘medicine’</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C V C V</td>
<td>ŭ ô lú</td>
<td>ŭ ô lú</td>
<td>‘head’</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C a C C V</td>
<td>s k ŭá</td>
<td>s k ŭá</td>
<td>‘sickle’</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C V C C V</td>
<td>ŭ ô p à ŭé</td>
<td>ŭ ô p à ŭé</td>
<td>‘rag’</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C C V C V</td>
<td>k ié d ê</td>
<td>k ié d ê</td>
<td>‘grind’</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C a C V C V</td>
<td>m k ê jí</td>
<td>m k ê jí</td>
<td>‘parrots’</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C V C a C V</td>
<td>ŭ ô m ná</td>
<td>ŭ ô m ná</td>
<td>‘side of body’</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C V C V C V</td>
<td>k ŭ l ŭ d ê</td>
<td>k ŭ l ŭ d ê</td>
<td>‘jump’</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C a C C V C V</td>
<td>t ŭ p h á d ê</td>
<td>t ŭ p h á d ê</td>
<td>‘pluck’</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C V C C V C V</td>
<td>k â p à ŭ d ê</td>
<td>k â p à ŭ d ê</td>
<td>‘divorce’ (v)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C V C a C V C V</td>
<td>k á t kʰ ô d ê</td>
<td>k á t kʰ ô d ê</td>
<td>‘capsize’</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The word is minimally composed of a major syllable, such as /kʰ ô/ [kʰô] ‘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 syllable profile C̃CV 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 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

<table>
<thead>
<tr>
<th>Tone Melody</th>
<th>Tone Pattern</th>
<th>Example</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>H</td>
<td>?á</td>
<td>‘curry’</td>
</tr>
<tr>
<td></td>
<td>HH</td>
<td>lójí</td>
<td>‘mountain fields’</td>
</tr>
<tr>
<td></td>
<td>LHH</td>
<td>kònújí</td>
<td>‘blankets’</td>
</tr>
<tr>
<td></td>
<td>HHH</td>
<td>?ápéjí</td>
<td>‘fathers’</td>
</tr>
<tr>
<td>L</td>
<td>L</td>
<td>tỳ</td>
<td>‘water’</td>
</tr>
<tr>
<td></td>
<td>LL</td>
<td>pỳjì</td>
<td>‘nets’</td>
</tr>
<tr>
<td></td>
<td>HLL</td>
<td>?ásùjì</td>
<td>‘evil things’</td>
</tr>
<tr>
<td></td>
<td>LLL</td>
<td>kònújì</td>
<td>‘unripe fruits’</td>
</tr>
<tr>
<td>LH</td>
<td>L</td>
<td>?ò</td>
<td>‘pig’</td>
</tr>
<tr>
<td></td>
<td>LH</td>
<td>xùjì</td>
<td>‘months’</td>
</tr>
<tr>
<td></td>
<td>HLH</td>
<td>matùjì</td>
<td>‘flies’</td>
</tr>
<tr>
<td>HL</td>
<td>H</td>
<td>kʰò</td>
<td>‘country’</td>
</tr>
<tr>
<td></td>
<td>HL</td>
<td>xájì</td>
<td>‘yams’</td>
</tr>
<tr>
<td></td>
<td>LHL</td>
<td>?ùbájì</td>
<td>‘branches’</td>
</tr>
</tbody>
</table>

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

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 [xà] ‘yam’ in (10a), and a L, as seen in [pỳ] ‘net’ and [xà] ‘month’ in (10b). Brackets are used to enclose the noun roots.

(10)

a. 

\[
\begin{array}{c}
| \ \ \ | \\
\hline
\text{lô} & \text{xà} \\
\text{‘mountain field’} & \text{‘yam’}
\end{array}
\]

b. 

\[
\begin{array}{c}
| \ \ \ |
\hline
\text{pỳ} & \text{xà} \\
\text{‘net’} & \text{‘month’}
\end{array}
\]

Because [xà] ‘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 /jì/. Monosyllabic nouns that have a L surface tone in isolation are realized as either LH, as in (11a), [xàjì] ‘months’, or LL, as in (11b), [pỳjì] ‘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), [xájí] ‘yams’, or a HH pattern, as in (12b), [lójí] ‘mountain fields’.

(12)
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^H/. (Tone melodies in underlying forms (UF) are indicated by superscript letters.) I give the derivations for /χɑ^H/ and its plural form /χɑ^H-ji/ in (13).

(13)

a.  /χɑ^H/  UF
    xá  Melody Association
    [xá]  SF

b.  /χɑ^H-ji/  UF
    xá-ji  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^H-ji/, 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, [lôjì], has a HH surface pattern. I posit that /lɔ/ has an
underlying H tone melody, that is, its UF is /lʊ̃/. In (14) I give the derivations for both the singular and plural forms.

(14)

a.  /lʊ̃/    UF
   ló     Melody Association
   [ló]    SF

b.  /lʊ̃-jí/    UF
   ló-jí   Melody Association
   ló-jí   Spreading
   [lójí]   SF

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

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 /ʔa-/ in (15a, b) has a H tone preceding the low-tone root /mɑ́/ in (15a), but a L tone preceding the high-tone root /m’y̌/ in (15b). Likewise, the prefix /m-/ in (15c, d) has a H tone preceding the low-tone root /sø̆/ in (15c) and a L tone preceding the high-tone root /xø̆/ in (15d).

9 An underlying HH melody would violate the Obligatory Contour Principle (OCP), which does not permit adjacent identical elements.
Therefore, I posit that Mro Khimi prefixes are underlingly 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).

The first, in (16a), [ʔäpē] ‘father’, is a HH-fall pattern, while the second, in (16b), [kənə] ‘unripe fruit’, is a LL pattern. The third, in (16c), [kənì] ‘blanket’, is a LH-fall pattern, and the last, in (16d), [təpø] ‘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 [kɔnɔŋɔi] ‘unripe fruits’, [kɔŋɔłɔ] ‘bell’, [ʔamɔnà] ‘side of the body’, and [ʔąpɛʔɛ] ‘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-χøʰ/ [məχø] ‘necklace’ in (17).

(17) /m-χøʰ/ \[məχø\]
    m-χø \[məχø\] Melody Association
    m-Vχø \[məχø\] Vowel Place Holding
    m-VVχø \[məχø\] Polar Tone Assignment
    mə-χø \[məχø\] [ə] Feature Insertion
    [məχø] 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), [kɔní] ‘sun’ and [kɔní] ‘blanket’ are both realized as LH in the singular form. However, [kɔní] ‘sun’ is realized as LHL [kɔnįnį] in the plural while [kɔní] ‘blanket’ is realized as LHH [kɔnįjŋ] ‘blankets’ in the plural.

(18)

<table>
<thead>
<tr>
<th></th>
<th>Singular</th>
<th>Plural /jį/</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td><img src="" alt="Root Melody" /></td>
<td><img src="" alt="Plural Melody" /></td>
</tr>
<tr>
<td></td>
<td>kɔnį</td>
<td>kɔnįjį</td>
</tr>
<tr>
<td></td>
<td>‘sun’</td>
<td>‘suns’</td>
</tr>
</tbody>
</table>

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

(19) /k-ni̯/ UF

k-nį Melody Association
kV-nį Vowel Place Holding
kṾ-nį Polar Tone Assignment
kɔ-nį [ə] Feature Insertion
[kɔnį] 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-níᵲᵲ-j/ ‘suns’, tone melody associates left to right and the final L tone associates to the suffix. I give the derivation for /k-níᵲᵲ-j/ in (20).

(20)   /k-níᵲᵲ-j/  UF
      k-ní-jï  Melody Association
      kV-ní-jï  Vowel Place Holding
      kV̀-ní-jï  Polar Tone Assignment
      kàní-jï  [ə] Feature Insertion
      [kàní]  SF

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

The plural of [kàní] ‘blanket’, [kàníj] ‘blankets’ has a surface LHH melody, with the polar tone L assigned to the prefix. The OCP prevents H in the underlying form and /j/ is underlyingly toneless, so I posit that the root melody of /k-ní/ ‘blanket’ is H. I give the derivation for the singular /k-níᵲᵲ/ in (21).

(21)   /k-níᵲᵲ/  UF
      k-ní  Melody Association
      kV-ní  Vowel Place Holding
      kV̀-ní  Polar Tone Assignment
      kàní  [ə] Feature Insertion
      [kàní]  SF
The tone melody of /k-níⁿ/ 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 [kòní].

In the plural /k-níⁿ-ji/ ‘blankets’, the H tone associates to the root, and then spreads onto the last tone bearing unit in [k-ní-ji], as shown in the derivation in (22).

(22)   /k-níⁿ-ji/ UF
       k-ní-ji     Melody Association
       k-ní-ji     Spreading
       kV-ní-ji    Vowel Place Holding
       kV-ñí-ji    Polar Tone Assignment
       kò-ní-ji    [ə] Feature Insertion
       [kòníjí]    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 [kòníjí].

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 [ʔásʰíjí] ‘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 [tápøjí] ‘handiwork (pl)’ which have a HL pattern in the singular form [tápø] ‘handiwork’, as shown in (23).
Since /j/ receives its tone from the root, it must have an underlying root melody LH. I give the derivation for the singular /t-pø\textsuperscript{H}/ ‘handiwork’ in (24).

(24) /t-pø\textsuperscript{H}/ UF
t-pø Melody Association
tV-pø Vowel Place Holding
tV̍-pø Polar Tone Assignment
tó-pø [ə] Feature Insertion
[tápø] 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 [tápø] in (24).

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

(25) /t-pø\textsuperscript{H}-ji/ UF
t-pø-ji Melody Association
tV-pø-ji Vowel Place Holding
tV̍-pø-ji Polar Tone Assignment
tó-pø-ji [ə] Feature Insertion
[tápø-ji] 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 [tápòjí].

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, [ʔápéʔé] ‘father’, in (26) and the derivation for a LLL surface pattern, [kànbjì] ‘unripe fruits’ in (27).

(26)  /ʔá-péʔé/  UF

ʔá-péʔé  Melody Association
ʔá-péʔé  Spreading
[ʔápéʔé]  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-nòjì/  UF

k-nòjì  Melody Association
kV-nòjì  Vowel Place Holding
kV-nòjì  Spreading
kà-nòjì  [ə] Feature Insertion
[kànbjì]  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 [kànbjì].
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 /à̞m-à̀nà/ ‘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 [à̞tòlá] ‘fiancée’ has a LLH pattern. In (28) I give the derivation for [à̞tòlá].

\[(28) \quad \text{/à̞t-lá/} \quad \text{UF} \]
\[
\text{à̞t-lá} \quad \text{Melody Association} \\
\text{à̞tV-lá} \quad \text{Vowel Place Holding} \\
\text{à̞tV-lá} \quad \text{Polar Tone Assignment} \\
\text{à-tV-lá} \quad \text{Spreading} \\
\text{tà-tôlá} \quad [ə] \text{ Feature Insertion} \\
[à̞tòlá] \quad \text{SF} \\
\]
The L polar tone spreads from the minor prefix one TBU to the left onto the prefix /à̞/. Lastly, [ə] features are inserted postlexically into the V slot, resulting in [à̞tòlá].

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 [à̞tòbú] ‘womb’, which has the surface pattern HLH, I posit that the first prefix [à̞] is assigned the polar tone of the prefix adjacent the root, [tə]. I give the derivation for [à̞tòbú] in (29).
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 /ʔa/. Finally, [ə] features are inserted into the V slot, as shown in (29), resulting in [ʔátəbů].

The problem with this analysis is that both [ʔátəló] ‘fiancéé’ and [ʔátəbů] ‘womb’ seem to have the identical double prefixes /ʔa-ta-/ . Both have a L polar tone assigned to the minor prefix /t-/ , yet in [ʔátəló] the polar tone does not trigger PTA, while in [ʔátəbů] 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 /ji/ 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 /ji/ 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).
In the compound noun [tômákà] ‘scar’, the surface tone pattern is LH#L. The first stem of the compound is [ tômá] ‘wound’, which has a LH surface pattern. /kâ/, the second stem, has a L surface tone; however, I do not know the meaning of /kâ/ in isolation.

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

(31)  /t-mâ#kâ-ji/  UF  
   t-má#kâ-ji  Melody Association within word boundaries  
   t-má#kâ-ji  Spreading  
   tV-má#kâ-ji  Vowel Place Holding  
   tÔ-má#kâ-ji  Polar Tone Assignment  
   tô-má#kâ-ji  [ə] Feature Insertion  
   [ tômákâjì]  SF

If each stem has its own tone, [kâ] must be underlyingly /kâ]/ and this L tone spreads onto [ jì], as seen in (31). The L of /t-mâ#l/ does not cross the internal word boundaries and is simply left floating in [ tômákâjì].

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 [ tômákâjì] in (32).
As shown in (32), the L of /t-mă̄i/ could cross the internal word boundary, linking to [kā] and spreading to [jī]. 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. kāmā ‘master’
b. kāmá ‘first’
c. kāmājī ‘masters’

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

The compound [kāmā] has a H#L surface tone pattern and [kāmá] 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 /kā/ does not spread across root boundaries, as illustrated in [kāmājī] in (34).
The UF of /kā/ cannot be proven here; for now I posit that it is H. The root /ma/, however, must be underlyingly LH, as shown in the UF /kā#ma-

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 [kāmājí] 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 /kā/ is the same in each compound but the surface tone of the second root is L for [kāmā] and H for [kāmá].

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. kōnjkòt#hɔ  ‘linens’

b. kōnì  ‘blanket’

c. kōnjí  ‘blankets’

d. kōnjikt#hɔjí  ‘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 [kōnjikt#hɔ] ‘linens’, shown in (35a),
both stems are composed of a root and the prefix /k-/.

The first stem is [kənǐ] ‘blanket’, in (35b), and the second stem is [kòt̃̂], the meaning of which I do not know.

An analysis of the compound [kònìkòt̃̂jì] further supports the claim that the tone of the first stem does not affect the second stem. I will first give the derivation for [kònìjì] in (36) to support the analysis of the underlying form of [kònì] and then give the derivation for [kònìkòt̃̂jì] in (37).

(36)  /k-ni\textsuperscript{hi}-jì/  UF

k-nì-jì    Melody Association
k-nì-jí    Spreading
kV-nf-jì    Vowel Place Holding
kṼ-nì-jí    Polar Tone Assignment
kò-nì-jí    [ə] Feature Insertion
[kònìjì]    SF

The UF of [kònì] is /k-ni\textsuperscript{hi}/, since in the plural [kònìjì] ‘blankets’ in (35c), the H spreads onto [jì], shown in (36), and a L polar tone is assigned to the prefix, resulting in [kònìjì].

In my proposed analysis, both roots would have tone. The UF for [kònìkòt̃̂jì] ‘linens’ would be /k-ni\textsuperscript{hi}#k-t̃̂-jì/, as shown in the derivation given in (37).
The L melody of the second root spreads onto the plural marker /ji/, as shown in (37), as well as onto the prefix of the second stem in [kànìkàtʰjì]. I posit that Spreading applies cyclically, since polar tone is evidently blocked in this stem.

However, if the H tone from /k-ni\^H/ spreads onto the stem [k\-tʰjì], the incorrect surface pattern HH surfaces, as shown in *[^kànìkàtʰjì] (38).

Tone patterns associated with the root, then, do not cross root or internal word boundaries, contrary to the alternative analysis of [təmùkàjì] 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 /de/. 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)

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<tbody>
<tr>
<td>a.</td>
<td>HH</td>
<td>b.</td>
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<tr>
<td>bide</td>
<td>‘warm’</td>
<td>bide</td>
<td>‘blame’</td>
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<tbody>
<tr>
<td>c.</td>
<td>LH</td>
<td>d.</td>
<td>HL</td>
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<tr>
<td>made</td>
<td>‘go first’</td>
<td>made</td>
<td>‘remember’</td>
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</table>
These tone patterns will be further discussed and their underlying tone melodies analyzed in 5.3.2, first with CV stems and then with C<>CV / CVCV stems.

In the following discussion, I propose that the CFP /d/ 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)

\[
\begin{align*}
\text{a. } & \quad \begin{array}{c}
\text{bide} \\
\text{'warm'}
\end{array} \\
\text{b. } & \quad \begin{array}{c}
\text{bide} \\
\text{'blame'}
\end{array} \\
\text{c. } & \quad \begin{array}{c}
\text{made} \\
\text{'go first'}
\end{array} \\
\text{d. } & \quad \begin{array}{c}
\text{made} \\
\text{'remember'}
\end{array}
\end{align*}
\]

Four contrastive surface tone patterns emerge, HH, as in [bídé] ‘warm’ in (41a), LL, as in [bídé] ‘blame’ in (41b), LH, as in [mádé] ‘go first’ in (41c), and HL, as in [mádé] ‘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 [bídé] ‘warm’ in (41a) and [mádé] ‘remember’ in (41d), and H or L following a L, as in [mádé] ‘go first’ in (41c) and [bídé] ‘blame’ in (41b). Therefore, I posit that /-dɛ/, like the plural marker /-jì/ 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 /bì^i^-dɛ/ [bídé] ‘blame’ in (42).
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 [mó́lé] ‘remember’ in (41c) results from a HL root melody as seen in /mó́lé/. 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 CaCV 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 [māhýḍé] ‘yawn’ in (43a) and [kánédé] ‘lean against’ in (43b).

(43)

\[
\begin{array}{cc}
\text{a.} & \text{b.} \\
\text{CaCV} & \text{CVCV} \\
mōhýḍé & kānédé \\
\end{array}
\]

‘yawn’ ‘lean against’

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

(44)

\[
\begin{array}{c}
/m-hý/-dē/
\text{UF} \\
m-hý-dē \text{ Melody Association} \\
m-hý-dé \text{ Spreading} \\
mV-hý-dē \text{ Vowel Place Holding} \\
mV-hý-dé \text{ Spreading} \\
má-hý-dé \text{ [ə] Feature Insertion} \\
[māhýḍé] \text{ SF}
\end{array}
\]

The H in /m-hý/-dē/ ‘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 [māhýḍé], as shown in (44).

The verbs in (45), [māsʰídé] ‘wash’ and [kálúdé] ‘jump’, have a surface LHL pattern.
The roots in (45) have a HL melody. I give the derivation for [məsʰʰidə] 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 [m̀sǿd́] ‘transfer’ and [kàtʰǿd́] ‘boast’. The LMH pattern is the only surface tone pattern with a Mid tone.

(47)

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<td>-</td>
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<tr>
<td>m̀sǿd́</td>
<td>kàtʰǿd́</td>
<td></td>
</tr>
<tr>
<td>‘transfer’</td>
<td>‘boast’</td>
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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, [m̀sǿd́] is underlingly /m-sø̯-ḏ/10. 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 [m̀sǿd́] 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.
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. [ɛ] features are then inserted postlexically into the V slot. Lastly, the first H in the sequence LHH is phonetically lowered, resulting in [mɔsɔdɛ], 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 [mɔsɔdɛ] ‘urge’ and [kɔsʰïdɛ] ‘wear’.

(48) /m-søʰ-dɛ/ UF
m-sø-dɛ Melody Association
m-sø-dɛ Spreading
mV-sø-dɛ Vowel Place Holding
mV-sø-dɛ Polar Tone Assignment
mɔ-sø-dɛ [ɛ] Feature Insertion
mɔ-sø-dɛ Lowering
[mɔsɔdɛ] SF

(49)

a. \[\begin{array}{c}
- \\
- \\
\end{array}\] mɔsɔdɛ ‘urge’
b. \[\begin{array}{c}
- \\
- \\
\end{array}\] kɔsʰïdɛ ‘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 [mósóðè] ‘urge’ has the surface pattern HHL. I posit that the underlying melody is L and give the derivation for /m-só̱-de/ in (50).

(50)  /m-só̱-de/  UF
      m-só̱-de  Melody Association
      m-só̱-dè  Spreading
      mV-só̱-dè  Vowel Place Holding
      mV̱-só̱-dè  Polar Tone Assignment
      mV̱-só̱-dè  H Spreading
      má-só̱-dè  [ə] Feature Insertion
      [mósó̱dè]  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 *[mósó̱dè]. 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 [másódê].

In this section, I have shown that one of four tone melodies associates to each verb root. Both the CFP and any prefixes are underlingly 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. kêtʰātʰýdɛ̀ ‘announce’

b. kêtʰ ţằ ‘news’

c. tʰýdɛ̀ ‘tell’

The surface tone pattern of [kêtʰátʰýdɛ̀] is LH#HH. [kêtʰ ţằ] ‘news’ has a surface LH tone pattern; [tʰýdɛ̀] ‘tell’ has a HH surface pattern. I posit that the root melody of [kêtʰ ţằ] ‘news’ is H, with a L polar tone assigned to the prefix. Since /de/ is underlingly

\[11\] Whether the UF of the surface pattern LH in [kêtʰ ţằ] is H or HL cannot be proven here since I do not have the plural in its non-compound form.
I posit that /t\textsuperscript{h}y/ ‘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 [kət\textsuperscript{h}ât\textsuperscript{h}ýd\textsuperscript{e}] in (52).

(52) /k-t\textsuperscript{h}â#t\textsuperscript{h}ý-d\textsuperscript{e}/
    k-t\textsuperscript{h}â#t\textsuperscript{h}ý-d\textsuperscript{e} Melody Association
    k-t\textsuperscript{h}â#t\textsuperscript{h}ý-d\textsuperscript{e} Spreading
    kV-t\textsuperscript{h}â#t\textsuperscript{h}ý-d\textsuperscript{e} Vowel Place Holding
    kV-t\textsuperscript{h}â#t\textsuperscript{h}ý-d\textsuperscript{e} Polar Tone Assignment
    k\textordmasculine-t\textsuperscript{h}â#t\textsuperscript{h}ý-d\textsuperscript{e} [ə] Feature Insertion
    [kət\textsuperscript{h}ât\textsuperscript{h}ýd\textsuperscript{e}] SF

The tone melodies associate to their own roots, and the H tone on /t\textsuperscript{h}ý/ 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 [kət\textsuperscript{h}ât\textsuperscript{h}ýd\textsuperscript{e}] as shown in (52).

The alternative analysis of the LH#HH tone pattern in [kət\textsuperscript{h}ât\textsuperscript{h}ýd\textsuperscript{e}] is that [kət\textsuperscript{h}â] has an underlying H root melody, that the second root of the compound, [t\textsuperscript{h}ýd\textsuperscript{e}], has no tone, and that the second root receives tone from the first root. I give the derivation for [kət\textsuperscript{h}ât\textsuperscript{h}ýd\textsuperscript{e}] under this alternative analysis in (53).
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 [katetimeˈájidé], 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. kònákwáshýdé ‘pierce ears’
b. kòná ‘ear’
c. kònájí ‘ears’
d. kósáhýdé GLOSS UNKNOWN

[kònákwáshýdé] 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, [kòná] ‘ear’ has a LH surface pattern, while its plural [kònájí] has LHH surface pattern. I therefore posit that the root melody of [kòná] is underlyingly H. I give the derivation for [kònájí] in (55).
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 [kənájí] 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-ná#s-hŷ-de/. The derivation of the SF [kənákəs-hydé] is shown in (56).

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 \([\text{k}\text{ànk}\text{k}\text{s}\text{̀yd}\text{̀}]\).

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

\[
(57) \quad /k-n\text{̀}#k\text{-s}\text{̀}y-d\text{̀}/ \quad \text{UF}
\]

\[
\begin{align*}
\text{k-n}\text{̀}#k\text{-s}\text{̀}y-d\text{̀} & \quad \text{Melody Association} \\
\text{k-n}\text{̀}#k\text{-s}\text{̀}y-d\text{̀} & \quad \text{Spreading} \\
\text{kV-n}\text{̀}#k\text{-s}\text{̀}y-d\text{̀} & \quad \text{Vowel Place Holding} \\
\text{kV-n}\text{̀}#k\text{-s}\text{̀}y-d\text{̀} & \quad \text{Polar Tone Assignment} \\
\text{k}\text{̀n}\text{̀}#k\text{-s}\text{̀}y-d\text{̀} & \quad [\text{a}] \text{ Feature Insertion} \\
*\text{k}\text{̀n}\text{̀k}\text{̀s}\text{̀}y-d\text{̀} & \quad \text{SF}
\end{align*}
\]

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, \([\text{a}]\) features are inserted postlexically into the V slot, resulting in the incorrect surface form \(*\text{k}\text{̀n}\text{̀k}\text{̀s}\text{̀}y-d\text{̀}\). 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.

\[
(58) \quad \begin{align*}
a. \quad & \text{k}\text{̀n}\text{̀k}\text{̀h}\text{̀d}\text{̀} \quad \text{‘cover the body’} \\
b. \quad & \text{k}\text{̀n}\text{̀} \quad \text{‘blanket’} \\
c. \quad & \text{k}\text{̀n}\text{̀j}\text{̀} \quad \text{‘blankets’}
\end{align*}
\]

The verb \([\text{k}\text{̀h}\text{̀d}\text{̀}]\) is related to \([\text{m}\text{̀h}\text{̀d}\text{̀}]\) ‘uncover, open’. **
The compound [kònikâhūdē] has a LM#LMH surface tone pattern. In isolation, however, [kònî] has the surface tone pattern LH. The plural of [kònî] is [kònîjî], which has the surface tone pattern LHH. Since /j/ is underlingly toneless, I posit that /kə-ni/ is underlingly H. I give the derivation for [kònîjî] in (59).

(59)  /k-niH-j/  UF

  k-ní-jî  Melody Association
  k-ní-jî  Spreading
  kV-ní-jî  Vowel Place Holding
  kV'ní-jî  Polar Tone Assignment
  kò-ní-jî  [ə] Feature Insertion
  [kònîjî]  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 [kònîjî], shown in (59).

In [kònikâhūdē], however, the H tone of [kònî] is phonetically M. I would expect the surface form of the compound to be [kònikâhūdê] with a LH#LMH surface tone pattern. However, I noted in the discussion following (46), [məšhîdê] ‘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 [kònî] 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 [kònikâhůdè] is given in (60).

(60)  /k-ní#kã-hû#-de/  UF
  k-ní#kã-hû-de  Melody Association
  k-ní#kã-hû-de  Spreading
  kV-ní#kã-hû-de  Vowel Place Holding
  kV-ní#kã-hû-de  Polar Tone Assignment
  kà-ní#kã-hû-de  [ə] Feature Insertion
  kà-ní#kã-hû-de  Lowering between L and H
  kà-ní#kã-hû-de  Lowering between L and L
  [kònikâhůdè]  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 [kònikâhůdè] in (60).

5.4.2 Nominalized verbs

Nominalized verbs are composed of the verb stem and the nominalizer /-nû/. In this section I will show that the nominalized form has the same surface tone pattern as the verb form, and that /-nû/, like the CFP /-de/, is underlyingly toneless.
For example, [χidé] ‘fear’ is a di-syllabic verb with a LH surface tone pattern, as shown in (61a). In nominalized forms, the root takes the suffix /nū/, forming [χinū], shown in (61b), which has the same LH surface tone pattern as the verb form.

(61)

<table>
<thead>
<tr>
<th>Verb</th>
<th>Nominalized Verb</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>b.</td>
</tr>
<tr>
<td>[χidé]</td>
<td>[χinū]</td>
</tr>
<tr>
<td>‘fear’ verb</td>
<td>‘fear’ noun</td>
</tr>
</tbody>
</table>

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

(62)

<table>
<thead>
<tr>
<th>Verb</th>
<th>Nominalized Verb</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>b.</td>
</tr>
<tr>
<td>[kāʔidé]</td>
<td>[kāʔinū]</td>
</tr>
<tr>
<td>‘argue’</td>
<td>‘argument’</td>
</tr>
</tbody>
</table>

Compound verbs also do not change their surface tone pattern when nominalized. In example (63a), [kāt̚á t̚ydé] ‘announce’ has the surface tone pattern LH#HH, which is the same pattern as the nominalized form [kāt̚á t̚ynū] in (63b).
The nominalizer /nʊ/, like the CFP /dɛ/, receives its tone from the tone melody of the root. In (64a), [mənʊnʊ] ‘know’, the L tone of the root /nu/ spreads to the suffix /-nu/. In (64b), [mənʊnʊ] ‘show’, the final L tone of the HL melody of the root /nu/ associates to the suffix, and in (64c), [mənʊnʊ] ‘laugh’, the final H tone of the root /nu/ spreads to the suffix, after which the H of the root lowers to M.

I propose, then, that /nʊ/, like /dɛ/, is underlingly 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 /əi/, apparently an orthographic compromise, was posited by him as a phoneme. Vowel shift from /i wi u o/ to /i e y u o/ 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.
REFERENCES


