CHAPTER 4

CURRENT STATE OF RESEARCH ON KIM MUN PHONOLOGY

4.1 Previous Research

Three large works contributing to Kim Mun studies have been written by Mao (2004), Liu, et. al. (1998), and Shintani (1990). Another work contributing to Kim Mun studies is Savina (1926), a French lexicographer who collected data from the Kim Mun of Hái-ninh, Vietnam. His work has been translated into English by Dr. Kawagoe.[13] However, the transcription method used by Savina at Hái-ninh, Vietnam, was through the Vietnamese script and is very difficult to understand. Purnell (1970) used Savina's data in a 1970 dissertation. Shintani (1990) published a short paper comparing the Mun of Hainan Island to the Mun from Vietnam from the data that Savina (1926) collected:

> There is a dictionary on Mun in Vietnam by F. M. Savina (1926) as a good body of data...In comparison with my data from Mun in Hainan

[13] Dr. Kawagoe is a professor of economics in Hakodate Future University, Hokkaido prefecture in Japan. He speaks Japanese, English, and French and is concerned with human development in Asian countries, and is gifted in translation in several languages. Dr. Kawagoe's translation of Savina's (1926) dictionary is an ongoing work and as such all references to his work have come from personal communication.

> Island, basically there is no big difference between the phonological systems in the two varieties. The only differences are as follows: /p/ and /t/ in Vietnam correspond to the implosives /ˀb/ and /ˀd/ in Hainan variety, and /θ/ ('xl' in Savina's transcription, deriving from *s in proto-Miao-Yao) in Vietnam becomes /t/ in Hainan variety. (Shintani 1990: 8)

Shintani did not find any significant differences between the two varieties, even though the Mun on Hainan Island have been separated from the Mun on the mainland for a couple hundred years.

The following section provides background information on previous research on the Kim Mun. There are four sub-sections organized according to pertinent information regarding vowels, including quality and length; consonants, including syllable onsets and finals; tone, including the eight-tone system from Middle Chinese; and preglottalization.

4.2 Vowels

Vowels described in the literature include six to seven vowels, i.e. three or four unrounded front vowels and three rounded back vowels. Mao (2004) notes a couple allophonic central vowels in the Yunnan and Guangxi varieties in China. Vowel length is considered distinctive in some studies,

whereas other researchers observe that Kim Mun is perhaps losing this feature.

4.2.1 Vowel Quality

For the Yunnan variety, Mao (2004) identifies seven vowels, i.e. four unrounded front vowels /i, e, ɛ, a/ and three rounded back vowels /u, o, ɔ/. Liu, et. al. (1998) identifies a symmetrical system of six vowels, i.e. three unrounded front vowels /i, ɛ, a/ and three rounded back vowels /u, o, ɔ/. He (1999) identifies seven vowels, i.e. three unrounded front vowels /i, e, a/, two unrounded central vowels /ɨ, ə/, and two rounded back vowels /u, o/. Mao also mentions two vowels functioning as allophones, i.e. the open back unrounded [ʌ] as an allophone of the long /a:/ and the near open central unrounded [ɐ] as a variant of the short /a/.

For the Guangxi variety, Mao (2004) identifies a symmetrical system of six vowels. With the exception of missing the close-mid front unrounded vowel /e/ it is identical with the Yunnan variety. Vowels with similar quality, the near-open front unrounded [æ] and the [E][14], are considered variants of /ɛ/. The other two allophones are the open back unrounded [ɑ] as an allophone of /a/ and the open back rounded [ɒ] as a variant of /ɔ/.

[14] The [E] is a front unrounded vowel at exactly the mid-point between /e/ and /ɛ/.

For the Hainan variety, Shintani (1990) identifies an identical set of the six aforementioned vowels.

4.2.2 Vowel Length

According to He, vowel length is distinctive and widely distributed in the Yunnan variety of Kim Mun from China[15]. He identifies five long and five short vowels with the qualities /a, e, i, o, u/. (1999: 336), showing contrast in identical environments in over fifty examples.

Mao (2004) identifies the presence of long and short vowels in the Guangxi variety. Mao and Chou also note that "In some places (e.g., Hunan) the length distinction has been lost completely with single vocalic finals and finals without a coda all pronounced long now" (1972: 241). Shintani also identifies limited contrast of long and short vowels in the Hainan variety: "Short/long vowel opposition is phonemic only when it is followed by another consonant or vowel; in other words, it is not phonemic in an absolute position" (1990: viii). In other words, open syllables with monophthongs in the Hainan variety show no contrast in vowel length.

[15] He (1999) worked with Kim Mun from Yunnan, China, but his work is separate from Mao's (2004) work from Yunnan, China.

4.2.3 Summary of Vowels

It appears Kim Mun varieties normally have a symmetrical system of three front vowels and three back vowels. The front vowels /i, a/ and the back vowels /u, o, ɔ/ have been documented by each researcher that has previously studied Kim Mun. However, there is a lot more variation with the front vowels /e, ɛ/. Mao (2004) documents both vowels in the Yunnan variety, but only one of the vowels in the Guangxi variety. Liu, et. al. (1998) only identifies the /ɛ/ in Yunnan but He (1999) only identifies the /e/ in another location of Yunnan. Liu, et. al. (1998) is the only researcher to document central vowels as phonemes. Furthermore, there is uncertainty as to whether length distinction in Kim Mun is a common feature or a disappearing feature. Refer to Table 5 under Section 4.6 for an overview of all vowels documented in the previous research of Kim Mun.

4.3 Consonants

Generally, there are bilabial /p, p^h, b/, alveolar /t, t^h, d/, alveolo-palatal /ʨ, $ʨ^h$, ʥ/, and velar /k, k^h, g/ voiced, voiceless and voiceless aspirated stops as well as nasals /m, n, ȵ, ŋ/ reported in Kim Mun. Some researchers observe pre-glottalized plosives or implosives /ˀp, ˀb, ˀt, ˀd/. Kim Mun has a higher functional load on plosives and nasals than on other segments. Next to the glottal stop /ʔ/, voiced and voiceless labiodental fricatives /f, v/, and the

voiceless alveolar sibilant /s/, there are labiovelar /w/, lateral /l/, and palatal /j/ approximants found in Kim Mun. Clusters can be formed with labiovelar, lateral, and palatal approximants. Nasals and voiceless stops occur as finals.

4.3.1 Single Initials

In his study on Hainan Kim Mun, Shintani (1990) postulates three sets of voiced /b, d, g/, voiceless /p, t, k/, and voiceless aspirated /p^h, t^h, k^h/ stops as well as voiced nasals /m, n, ŋ/ with bilabial, alveolar and velar place of articulation. He also observes voiced bilabial and alveolar implosives /ˀb, ˀd/, the glottal stop /ʔ/, labiodental fricatives /v, f/, alveolar sibilant /s/, as well as the lateral approximant /l/. Shintani is the only one to document implosives in Kim Mun.

Guangxi Kim Mun (Mao 2004) shows voiceless aspirated stops /p^h, t^h, $ʈ^h$, k^h/, voiced stops /b, d, ɖ, g/, and three segments marked in the data with a glottal stop preceding the plosive, /ˀp, ˀp^h, ˀt/. Of all the approximants, only the palatal approximant /j/ appears in syllable-initial position. The Guangxi variety also documents the alveolo-palatal stops /ʈ, $ʈ^h$, ɖ/ and alveolo-palatal nasal /ɳ/, meaning the plosives and nasals have four places of articulation. The alveolo-palatal place of articulation often corresponds to the palatalized

alveolar place of articulation in Shintani's (1990) and Liu, et. al.'s (1998) analyses, i.e. /ʈ, ɖ, ɳ/ with /tj, dj, nj/. The alveolar sibilant /s/ is replaced by the alveolo-palatal fricative /ɕ/ in the Guangxi variety. The Guangxi variety does not document a lateral alveolo-palatal segment, however the consonant cluster /lj/ may correspond to such a segment.

Yunnan Kim Mun (Mao 2004) also shows the labiovelar /w/ and palatal /j/ approximants in syllable-initial position. It does not have the plosive segments with a preceding glottal stop /ˀp, ˀt/, as found in the Guangxi variety, and it also does not have the voiceless aspirated stops, however it does have the affricates /tθ, dð/ and the alveolo-palatal stops /ʈ, ɖ/ and nasal /ɳ/.

The Yunnan variety from Liu, et. al. (1998) documents the voiced counterpart of the /θ/, the /ð/, whereas in the Guangxi variety, Mao (2004) documents the voiceless fricative /θ/ but not the voiced fricative [ð]. Liu, et. al. (1998) also documents the affricates /ts, dz, tɬ, dɮ/. The Yunnan variety from He (1999) is very similar to that of Liu, et. al.'s study. He does not document the affricates /dz, tɬ, dɮ/, but he does document the affricates /ts, tɕ, dʑ/. Liu, et. al. (1998) and He (1999) both documented several affricates that are not recorded in the other varieties.

4.3.2 Consonant Clusters

Syllable onsets have been treated as one unit in the investigated literature. Mao (2004), Liu, et. al. (1998), and Shintani (1990) present all of their data with syllable onsets including both the C_1 and C_2 slots. Chengqian (1991) mention consonant clusters when they address sound changes in Mienic languages in terms of cluster persistence or loss.

Hainan Kim Mun shows clusters formed with plosives and the approximants /l, j, w/ (Shintani 1990). Shintani groups the voiceless bilabial stop with the lateral approximant as a syllable onset /pl/ because in his data the bilabial stop /p/ never occurs by itself.

In his study of Yunnan Kim Mun, He (1999) identifies the consonant clusters /pl, bl, kl, gl/. Yunnan Kim Mun shows clusters formed with the approximants /l, j, w/ and Mao (2004) identifies the consonant clusters /pl, pj, bl, tl, tj, dl, dj, tθj, dðj, kw, kj, gw, gj, mj, nj, ŋw, sj, lj, hj/. Guangxi Kim Mun shows clusters formed with the approximants /l, j, w/ and Mao (2004) identifies the consonant clusters /ˀpl, p^hj, p^hl, bl, bj, kw, kl, kj, k^hw, k^hl, k^hj, gw, gl, gj, mj, nj, ŋw, ŋj, lj/. Liu, et. al.'s study of Yunnan Kim Mun (1998) shows only /pl, bl/ as consonant clusters. Liu, et. al. does not document clusters with the palatal or labial approximants, but this is due to his transcription method; Liu, et. al. transcribes the palatal approximant [j] and

the labial approximant [w] as the vowels [i] and [u] in all positions except syllable initial.

Chengqian identifies clusters formed with the lateral /l/ when he writes that "the ancient Yao cluster consonants have persisted in certain dialects whereas in others they have already disappeared. For example, Byau Min has preserved *pl, pl', bl,* and *kl, kl', gl;* Kim Mun *pl, bl,* and *kl, gl;* however, these cluster consonants have already disappeared in Mien and Yau Min..." (1991: 49).

4.3.2.1 Labialization and Palatalization

There is some evidence that clusters with labiovelar or palatal approximants in related varieties merged to single initials with labialization and palatalization as secondary articulation. Downer (1961) argues that there is some support for labialization and palatalization in Yao languages that could lend to grouping clusters such as /pj/ or /pw/ as one unit.

Kim Mun seems to be unaffected by this sound change. Edmondson (2007), in his studies in Vietnam, recognizes clusters with the approximants /j/ and /w/. In his comparison of Kim Mun with Iu Mien, he observes that "Mun preserves the complex initials *kl-/kj-*, whereas in Mien these have become

palatalized to the affricates *ts-/tɕ* (cf. 'road' in Yu Mien *tsau*^{3} but in Kim Mun of Lao Cai *kjau*^{3})".

4.3.2.2 Alveolo-Palatal Segments

The alveolo-palatal place of articulation is prevalent in Asia. Mandarin Chinese, Burmese, Thai, and Korean, all four major Asian languages, have alveolo-palatal consonants, which some label as affricates. For this place of articulation, IPA includes symbols for the fricatives /ɕ, ʑ/ under "other symbols". Irish also has alveolo-palatal oral and nasal stops and a lateral that are distinctive from their dental and palatal counterparts (International Phonetic Association 1999: 112). There are other Western languages showing this place of articulation (Catalan, cf. Recasens 1984, Polish, cf. Jassem 2003). Because IPA does not have a replete set of symbols for alveolo-palatal consonants, the alveolo-palatal sounds in Irish are captured with diacritics /t̠ʲ, d̠ʲ, n̠ʲ, l̠ʲ/. Mao (2004) and Liu, et. al. (1998) utilize the symbols /ȡ, ȶ, ȵ/ representing alveolo-palatal oral and nasal stops in the Yunnan and Guangxi Kim Mun varieties. Since alveolo-palatal sounds are quite common in Asia and the transcription with diacritics is not very user and reader-friendly, the author is using the symbols of the Chinese researchers in this study.

The alveolo-palatal fricatives in Polish and Russian developed from palatalized alveolar sibilants (cf. Padgett and Zygis 2003). The framework of this study does not allow investigating whether alveolo-palatal consonants in Kim Mun are a result of this kind of sound change, and whether they are phonetically distinct from the reported palatalized segments in previous studies on Kim Mun. These questions need to be answered in future studies.

4.3.3 Finals

In Hainan Kim Mun (Shintani 1990), Yunnan Kim Mun (Mao 2004, He 1999, and Liu, et. al. 1998), and Guangxi Kim Mun (Mao 2004) syllables end with voiceless plosives /p, t, k/ or nasals /m, n, ŋ/ with labial, alveolar, or velar places of articulation.

4.3.4 Summary of Consonants

In all, there are approximately 21 consonants, with the consonants /p, t, k, m, n, ŋ/ serving as finals. Syllable-initial clusters can mainly be formed with /p, b, k, g/ but also with /m, n, ŋ, s, h/ in the C_1 position and /l, j, w/ in the C_2 position. Refer to Table 5 under Section 4.6 for an overview of all consonants documented in the previous research of Kim Mun.

4.4 Tones

Tones in Kim Mun from Vietnam were recorded by Savina (1926). Purnell (1970) transcribes Savina's tones by using simple tone numbers 1 to 6. Savina himself describes the six tones of Vietnam Kim Mun as plain or equal, rising, descending, acute interrogative, grave interrogative, and grave (1926: 25). Chang (1966: 304) labels Savina's tone transcriptions as high falling-rising, level, rising, falling, low, and low falling-rising tone. A comparison of Chang's examples with the tone numbers that Purnell used in his transcription of Savina's data still does not clarify the tone contour patterns of Savina's data.

In a later study on Hainan Kim Mun, Shintani (1990) documents seven tones /13, 11, 33, 354, 31, 44, 53/ that are dependent on vowel length and syllable structure. He also documents one allotone [45], as a variant of the /44/ in the environment that the syllable is closed and the nucleus is either long or is a vowel cluster.

Kim Mun varieties from Yunnan and Guangxi provinces of China have a significant higher number of tones than reported by Shintani (1990) or Savina (1926). Researchers report up to thirteen tones for the Kim Mun varieties in these two provinces. Mao (2004) reports twelve tones in the Yunnan variety, i.e. /35, 31, 33, 545, 43, 32, 44, 21, 22, 24, 54, 42/ and ten

tones in the Guangxi variety, i.e. /35, 13, 33, 55, 42, 31, 335, 331, 32, 12/. Liu, et. al. (1998) reports thirteen tones in the variety he studied in Yunnan, i.e. /24, 52, 11, 35, 42, 43, 44, 453, 32, 55, 44, 23, 21/[16], and He (1999) also reports thirteen tones in the variety he studied in Yunnan, i.e. /24, 53, 11, 35, 443, 43, 44, 453, 32, 55, 44, 24, 21/.

Mao (2004), He (1999), Liu, et. al. (1998), and Shintani (1990) all employ the use of the Middle Chinese eight-tone system in their analysis of Kim Mun tones. While in-depth tonal analysis using the eight-tone system is for future Kim Mun studies, a short introduction to this system is provided in the following section in order to help facilitate an understanding of the tonal analysis of the above researchers.

4.4.1 The Eight-Tone System of Middle Chinese

This schema of classifying tones, beginning from Ancient Chinese, had four classes: Ping, Shang, Qu, and Ru. These names were derived from the nature of rhymes from Chinese characters in the Shijing, which is a collection of poems dating back to 1100 to 500 B.C. (Huang and Li 1996). Later in Middle Chinese, each of these tone categories split into two registers: an

[16]Liu, et. al. (1998) documents the /44/ tone twice because in his analysis a /44/ tone on a live syllable is distinct from a /44/ on a dead syllable.

upper register, "yin", and a lower register, "yang". The yin register is derived from voiceless initials and was marked with a higher tonal onset and the yang register is derived from voiced initials and was marked with a lower tonal onset (Thurgood and LaPolla 2003). This register split created eight tone categories, hence the name "eight" tone system employed by some (Reves, et. al. 1995). This system is illustrated in Table 1.

The four tones from ancient Chinese have also been labeled by some as A (level), B (rising), C (leaving), and D (entering) and then further divided using 1 to refer to tones associated with upper register and 2 to refer to tones associated with lower register (Huang and Li 1996).

Table 1. The Eight-Tone System of Middle Chinese

	Ping (Even) (平)		Shang (Rising) (上)		Qu (Leaving) (去)		Ru (Entering) (入)	
Yin (陰)	1		3		5		7	
Yang (陽)	2		4		6		8	

Each section represents a distinct set of syllable onsets. These syllable onsets developed as consonants merged together. New tones were a result of the loss of consonantal distinctions (Fox 2002). Furthermore, the coda of a syllable also plays a role in the eight-tone system. Sections 1 through 6 are live syllables, while sections 7 and 8 are both dead syllables.

Mao (2004), He (1999), and Liu, et. al. (1998) also make divisions between checked and unchecked syllables. Tones with checked syllables are

represented by odd numbers and tones with unchecked syllables are represented by even numbers. Furthermore, the above researchers also assign multiple tones to the checked tones based on syllable onset. For example, Mao (2004) assigns two tones to the checked syllables represented in section 1 (Ping Yin) for both the Yunnan and Guangxi varieties, /35, 31/ and /35, 13/ respectively. He labels one as tone one (1), and one as tone one prime (1'). This is why the above researchers document more than eight tone contours despite there are only eight categories in the eight-tone system.

4.4.1.1 Drawbacks of the Eight-Tone System

There are two main drawbacks of the eight-tone system: 1) The eight-tone system does not take into account the changing nature of syllable onsets. 2) The eight-tone system often creates tones that are too similar phonetically to contrast, which in turn creates a tone system with more tones than necessary.

The eight-tone system primarily divides tones based on syllable onset; however these syllable onsets have changed over time. Shintani (1990) still attempts to group the data from Hainan into the eight-tone system based on syllable onsets. The results are that his data are not always consistent with

his analysis. For example, Shintani's "tripartition of the tonal system", as he refers to it, is based on the eight-tone system and only documents the /13/ tone occurring on syllables with a voiceless unaspirated onset. Because of the change of Kim Mun onsets over time, this analysis does not hold true in the data showing voiced onsets with the same tone (i.e. 'light' /gwaŋ13/).

Mao (2004), He (1999), and Liu, et. al. (1998) in their use of the eight-tone system, split the Kim Mun tones into many different categories with tones that often vary slightly in phonetic form, but do not appear contrastive. He (1999) mentions there are thirteen contours, nine contours with open syllables and four contours with closed syllables. He further marks sections 1, 3, 5, and 7 as checked tones and divides them into aspirated initials and unaspirated initials. His tonal division seems to describe various environments for tonal sandhi or tonal alternation, however none of the above three researchers, including He, distinguish between the phonologically conditioned environments that lead to tone sandhi or different variations of tones. In looking at the tones documented by Mao (2004), He (1999), and Liu, et. al. (1998) in their analysis of Yunnan and Guangxi varieties of Kim Mun (cf. Section 4.4) it is clear from the close phonetic nature of the tones that further research and analysis of these tonal

systems is necessary to get a proper understanding of the tonemes that exist in these two respective areas.

4.4.1.2 Insight Gleamed from the Eight-Tone System

One valuable insight gained from the use of the eight-tone system is a depiction of the relationship of tones among cognates in related Kim Mun varieties. When comparing the tone systems of various Kim Mun varieties grouped into the eight-tone system, it is clear across one section of the eight-tone system how the tones are represented among cognates in other varieties.

A second insight of the eight-tone system helps shed light on why the Yunnan and Guangxi varieties (Mao 2004, He 1999, and Liu, et. al. 1998) document so many more tones than that of the Lao, Vietnam, and Hainan varieties. For physiological reasons, a tone on a closed syllable may be realized slightly different than a tone on an open syllable, or as alluded to by Yip (2002) a tone may be realized slightly different depending on voicing quality. It has been the practice of Asian linguists, Chinese linguists in particular, to make tonal distinctions based on syllable type and voicing quality. Most Western linguists group one as the allotone of the other because the tonal difference is dependent on the environment and therefore predictable. This is seen in a related language, Mien, where Chinese linguists classify Mien with 8 tones,

making a distinction on live and dead syllables (cf. Table 2). On the other hand, Western linguists normally classify Mien with 6 tones with two allotones on dead syllables, according to Table 3:

Table 2. Chinese Classification of Mien Tones

Mien Contour	/33/	/31/	/52/	/231/	/24/	/13/	/55/	/12/
8-Tone Category	1	2	3	4	5	6	7	8

Table 3. Western Classification of Mien Tones

Mien Contour	/33/	/31/	/52/	/231/	/24/	/13/
Allotone Contour			/55/			/12/

A further benefit of the eight-tone system could reveal possible historical relations between voicing quality and tones. According to Fox (2002), voice quality often has an impact on the development of a tonal system of a tonal language. There is a possible relation between the tonal system of Kim Mun and the laryngeal setting used in the production of preglottalized plosives as reported in Section 4.5, but investigation of tonal and voice quality is for future Kim Mun studies.

4.4.2 Synopsis of Kim Mun Tones

Extended discussion of this system and other results it may produce, beyond what is already mentioned above, are beyond the scope of this thesis and are for future Kim Mun studies. However a cursory look at this system will provide a superficial look at the tones among cognates in various Chinese

varieties of Kim Mun, as demonstrated in Table 4. Refer to Section 4.4.1 for further explanation of how previous researchers of Chinese Kim Mun employ the below table.

Table 4. Comparison of Kim Mun varieties in China based on the Chinese Eight-Tone System

			Yunnan (Mao 2004)	Yunnan (He 1999)	Yunnan (Liu, et. al. 1998)	Guangxi (Mao 2004)	Hainan (Shintani 1990)
Tone Category			Tone Contour	Tone Contour	Tone Contour	Tone Contour	Tone Contour
Ping (平)	yin (陰)	1	/35/	/24/	/24/	/35/	/13/
		1'	/31/	/53/	/52/	/13/	/11/
	yang (陽)	2	/33/	/11/	/11/	/33/	/33/
Shang (上)	yin (陰)	3	/545/	/35/	/35/	/55/	/354/
		3'	/43/	/443/	/42/	/42/	/354/
	yang (陽)	4	/32/	/43/	/43/	/31/	/31/
Qu (去)	yin (陰)	5	/44/	/44/	/44/	/335/	/44/
		5'	/21/	/453/	/453/	/331/	/31/
	yang (陽)	6	/22/	/32/	/32/	/32/	/53/
Ru (入)	yin (陰)	7a	/24/	/24/	/23/	/35/	/13/
		7b	/54/	/55/	/55/	N/A	/44/
		7a'	/31/	N/A	N/A	/12/	/31/
		7b'	/32/	/44/	/44/	N/A	/11/
	yang (陽)	8a	/42/	N/A	N/A	/32/	[45]
		8b	/21/	/21/	/21/	/32/	/44/

As an example, according to Table 4, when the /35/ tone occurs in the Yunnan variety, among cognates it appears as the /24/ tone (Yunnan), the /35/ tone (Guangxi), and the /13/ (Hainan) as in 'water' /wɔm^{35}/ (Yunnan) compared with /wɔm^{24}/ (Yunnan), /wɔm^{35}/ (Guangxi), and /vam^{13}/

(Hainan). These tone contours between varieties do not always match up so nicely between cognates, especially on dead syllables, but nevertheless there are general patterns of occurrence between cognates that can be observed between the various varieties. The results that may proceed from applying Lao and Vietnam Kim Mun to the above template is for future Kim Mun tonal studies.

4.5 Preglottalization

This section will give a literature review on the use and meaning of the term preglottalization. This is necessary because this phenomenon is frequently mentioned in literature about Southeast Asian languages, such as Thai (Vaissière 1997; Ladefoged and Maddieson 1996), Tamil (Laver 1994), Mpi (Ladefoged 2005), and Mien (Purnell 1965), to list a few. Kim Mun is one of the languages where this phenomenon is documented, e.g. Mao (2004) in the Guangxi variety of Kim Mun, Shintani (1990) in the Hainan Island variety of Kim Mun, Edmondson in the raw data received from him on the Lao Cai, Vietnam variety of Kim Mun, and finally Purnell (1965) in Mien.

At the outset of this study, it was uncertain whether this phenomenon was a mere matter of pronunciation, an allophonic variant, or a distinctive feature of the Kim Mun in Laos and Vietnam.

The term preglottalization has been widely used, with a whole range of different meanings that are not always explicitly stated. Purnell (1965) documents preglottalization in Mien without further definition. Shintani (1990) and Mao (2004) both report preglottalized segments in Kim Mun, with Shintani documenting voiced preglottalized segments [ˀb, ˀd] in the Hainan variety while Mao records voiceless preglottalized segments [ˀp, ˀt] in the Guangxi variety. Mao vaguely explains preglottalization in a footnote as "Labial, alveolar stops along with glottal stop" (2004: 100) whereas Shintani (1991) applies the term to voiced implosives. Others apply the term to voiceless implosives or more vaguely, non-explosive stops (Clements and Osu 2002). Some researchers have used the term in reference to a sequence of first glottal and then oral closure or constriction (Edmondson 2004; Dimmendaal 1986). Haudricourt (1950) uses the term for any combination of oral and glottal closure, regardless of how the two closures are phased. Goyvaerts (1988) applies preglottalization to stops with minimal implosion, like a weaker variant of implosives. Ladefoged and Maddieson (1996) point out that the term preglottalization has been used for implosives as well as for laryngealized (creaky-voiced) stops. Vaissière (1997) also uses the term glottalized consonants or preglottalization to refer to creaky-voiced stops.

The lack of experimental studies on what researchers label as preglottalization and the often missing distinction of this category cause Clements and Osu to make use of the term glottalization as "some degree of glottal constriction beyond that involved in ordinary modal voicing." (2002: 312). This would include voiceless implosives, laryngealized as well as preglottalized stops, and "other types." Together with the aforementioned applications of this term, there are four different possible meanings of the term preglottalization:

(1) Implosives

(2) Stiff Voice

(3) Laryngealization

(4) Glottalization

Implosives differ from the other phenomena referred to as preglottalization in their manner of articulation; stiff voice and laryngealization are phonation types and glottalization is a consonantal modification through a complete glottal closure at the onset or offset of a consonantal segment. It is obvious that this wide range of uses applied to the term preglottalization causes confusion if the term is not defined by the researcher using it. Therefore, the purpose of this section is to present the varying descriptions of

preglottalized segments as listed above. It is hoped that a suitable and satisfying definition will be arrived at that can be used to describe the different phonetic phenomena that may possibly occur in the Kim Mun varieties under investigation in this study.

4.5.1 Implosives

The following two sections will describe voiced and voiceless implosives. Implosives are non-pulmonic consonants, i.e. the airflow is not generated by the lungs but by a fast downward movement of the larynx with either lightly or tightly closed vocal folds while an oral closure is formed. This movement enlarges the oral cavity and decreases the air pressure. The air pressure under the glottis increases, causing the lightly closed vocal folds to vibrate as pulmonic air passes through the glottis into the oral cavity. As for voiceless implosives, the glottis is entirely closed. On release of the oral closure, inward airflow fills the relative vacuum (Laver 1980).

4.5.1.1 Voiced Implosives

Shintani refers to "preglottalized or implosive stops" as a feature of all the languages on Hainan Island, including the local Chinese dialect, Hainanese, and the five non-Chinese languages (1991: 1). Shintani claims the voiced implosives of Hainan Kim Mun are originally derived from voiceless

segments. He relates these segments to the Thai initials, transcribing them with the same symbols [ˀb, ˀd] as he used to transcribe the Kim Mun segments. Since Shintani does not differentiate between preglottalized stops and implosives, he obviously considers Thai voiced initials to be implosives. Ladefoged and Maddieson (1996) on the other hand report voiced Thai stops to have stiff voice (cf. Section 4.5.2.1). Furthermore, implosives involve larynx lowering, whereas Edmondson in his study on Sui, a Tai language in China, notices even larynx heightening on the so-called preglottalized segments, which he attributes to the production of certain tones (2004).

Li (1943) already postulated that the voiced plosives in Tai languages were preglottalized. According to Edmondson (2004), Li is perhaps one of the first researchers to put forward the notion of preglottalized segments in Tai and Kam-Sui languages, possibly because of his exposure to Northwest Native American languages containing this feature. Edmondson (2004) later conducted a study using instrumental analysis to prove that Li's preglottalized stops are not implosives but preglottalized in its literal sense, namely as a sequence of a glottal stop and a modal voice plosive (cf. Section 4.5.3).

The reason why researchers might have mistaken voiced stops in Kim Mun or Thai for implosives is that voiced stops can exhibit a slight lowing of the

larynx. Sometimes this larynx lowering is sufficient to rarefy the air in the oral cavity and create some inward airflow on the release of the oral closure (Ladefoged and Maddieson 1996). Vaissière (1997) notes that a lowering of the larynx may assist voicing by causing the vocal folds to slacken. However, the lowering of the larynx for voiced plosives is a physiological artifact and is to be distinguished from true implosives with a faster and stronger downward movement of the larynx (Catford 1980).

4.5.1.2 Voiceless Implosives

Clements and Osu use the term "preglottalized stops" as a synonym for voiceless implosives or "nonexplosive stops" (2002: 300). Because of the many varying interpretations of the term preglottalization, they settle on the term voiceless implosive for their study on Ikwere, a Niger-Congo language. As pointed out in the previous section, voiceless implosives require a closed glottis, which might be the reason why the term preglottalization has been used for this manner of articulation. There is no evidence in the literature for voiceless implosives in Kim Mun.

4.5.2 Phonation Types

As mentioned earlier, the term preglottalization is also used in reference to the phonation types stiff and creaky voice. Phonation in general describes

the various laryngeal and glottal modifications as pulmonic egressive air passes through the larynx (Ball and Rahilly 1999), with the exception of initiation (implosives, ejectives, clicks) or articulation (glottal stop or fricative) of speech sounds (Crystal 2003). Laver (1980) describes phonation types as a degree of muscular tension of either progressive relaxation or progressive tensing with modal voice, first labeled as such by Hollien (1971), as neutral in relation to muscular tension. The vibration of the vocal folds is "periodic, efficient, and without audible friction" for modal voice (Laver 1980: 94). Ladefoged and Maddieson (1996) refer to modal voice as the most relaxed state of the glottis. Languages only contrast phonation types with more than one degree in the continuum of laryngeal settings (Ladefoged and Maddieson 1996; Vaissière 1997), i.e. modal voice would not contrast with stiff voice but only laryngealization, and stiff voice in turn would be more likely to contrast with slack voice. The possible laryngeal settings form a continuum that may be visible on spectrograms and wave graphs (Laver 1980; Ladefoged and Gordon 2001) but are acoustically similar enough that they do not contrast within a language.

Ladefoged and Maddieson (1996) and Gordon and Ladefoged (2001) pinpoint the controlling mechanism of phonation to a state of the glottis that can be organized on a continuum. This is illustrated in Figure 2.

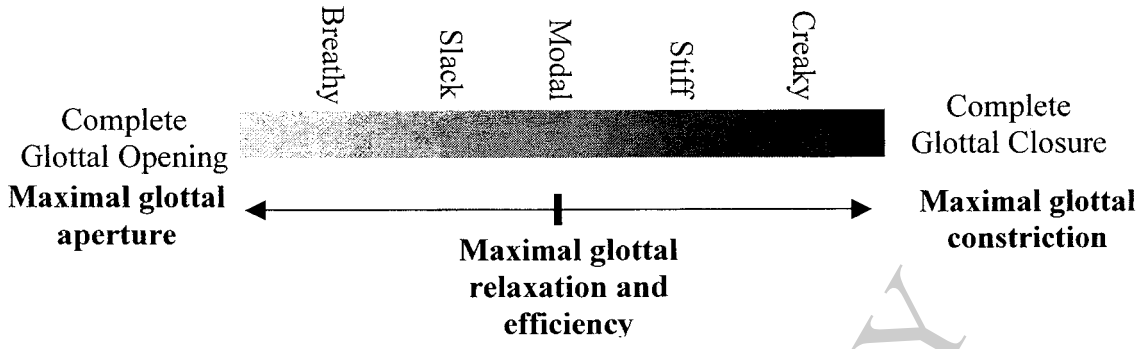

Figure 2. Modes of Phonation

In one direction on the continuum of laryngeal settings the glottis becomes more constricted, with stiffer vocal folds, and the mode of vibration becoming more aperiodic, up to the point of full glottal closure. Edmondson even establishes a continuum for glottal closure, "beginning with moderate glottal stop" to the "production of an epiglottal stop" (2004: 7). In the other direction on the continuum the glottal aperture increases, the vocal folds get loser and eventually produce audible friction, becoming more inefficient (Ladefoged 2005; 1996; 1971; Laver 1980), up to the point where the glottis is too spread to vibrate at all.

Ladefoged and Maddieson demonstrate the five phonation types by documenting the approximate air flow rate for a male speaker without significant supraglottal constriction: Voiceless 1000 ml/s, breathy 500 ml/s; slack 250 ml/s; modal 120 ml/s; stiff voice 100 ml/s; creaky voice even less

than 100 ml/s (1996: 50). Ladefoged and Maddieson point out that the airflow for stiff voice is only slightly lower than for modal voice whereas the airflow of creaky voice differs considerably from the one for modal voice (1996: 48). As already seen in Figure 1, stiff and creaky voice share the feature [+constricted]. Laver describes an "exaggerated laryngeal tension" for creaky voice, as "a combination of extreme adductive tension and extreme medial compression, brought about by over-contraction of the muscle systems" (1980: 130). The reason for this is that creaky voice is produced with a partially closed glottis while only one end of the vocal cords is vibrating very slowly. For stiff voice, on the other hand, no partial glottal closure has been reported, though Kang argues that if the feature [+stiff vocal cords] is apart of the fortis/stiff voiceless plosives in Korean then this may "result in a natural contraction of the vocalis muscles to form a glottal constriction" (2004: 171). Ladefoged (2006) and Vaissière (1997) refer to creaky voice as laryngealized and stiff voice as slightly laryngealized since stiff phonation has less glottal constriction than creaky voice.

The two phonation types that share the feature [+constricted] are stiff voice and creaky voice. Both of them can appear with the label preglottalization and therefore will be discussed in the following section. The application of

the term preglottalization to the phonation type stiff voice will be discussed first, with its voiced and voiceless variant.

4.5.2.1 Stiff Voice

Ladefoged and Maddieson (1996) note that stiff voice segments have a degree of glottal constriction along with a degree of laryngealization due to a possible contraction of the vocalis muscles, which make up the glottal part of each vocal fold. The vocalis muscles contract and stiffen for the laryngeal features [+constricted] and [+stiff]. Kang argues that obstruents produced with stiff phonation are produced with a narrow glottis accompanied with stiff vocal folds, which in turn reduces "the range of glottal widths to the extent that there might be a slight degree of glottal constriction" (2004: 178). Laver documents the muscular tension of the laryngeal system as "progressively boosted beyond the limits for normal voicing", which results in first the "glottal aperture to be reduced in length" and second for the "upper larynx to begin to be constricted" (1994: 419). Stiff voice also has the feature [-spread] meaning the glottis does not spread at the time of the release as in aspirated stops (Vaissière 1997).

4.5.2.1.1 Voiced Stiff Segments

Vaissière (1997) and Ladefoged and Maddieson (1996) identify stiff voice for Thai voiced plosives. In his study on a Tai language found in China (cf. Section 4.5.3), Edmondson's stroboscopic recordings of the glottis area of his Sui language informant producing preglottalized stops reveal a "closed UNPHONATED state of the glottis" (2004: 7). It appears Edmondson may be referring to neutral voice because he further mentions that there are no recorded instances of preglottalized consonants with creaky voice. Furthermore, Edmondson describes the production of a moderate glottal stop as having a laryngeal setting with a "slight constriction of the whole laryngeal vestibule" (2004: 7). Edmondson's observation of a preconsonantal "moderate" glottal stop and a slight laryngeal constriction seems to suggest that there is a combination of preglottalization and stiff voice present in Sui voiced stops.

The presence of the initial glottal closure before a voiced plosive could be a result of voice onset. Ball and Rahilly (1999) describe the voicing cycle as beginning with a "closed (or nearly closed) glottis, with contact between the edges of the two vocal folds" to "form a barrier to the pulmonic egressive airflow" which results "in a build-up of air pressure in the sub-glottal area". The additional constriction of the laryngeal vestibule mentioned by

Edmondson would add a degree of glottal constriction, with the stiff vocal cords increasing the degree of glottal closure necessary for voicing up to what Edmondson labels as a "moderate" glottal stop. Therefore, Edmondson's observation of a preconsonantal moderate glottal stop does not preclude the possibility of voiced stiff stops as a feature for the languages in this study; rather his observation of a slight laryngeal constriction somewhat supports the possibility of voiced stiff segments.

4.5.2.1.2 Voiceless Stiff Segments

In the Guangxi variety of Kim Mun, Mao (2004) marks the preglottalized stops only on voiceless initial plosives in the labial and alveolar places of articulation. It is necessary to look at the voiceless counterpart of stiff phonation in order for this analysis to reconcile with Mao's observations.

Korean has contrast between two voiceless unaspirated plosives in its consonantal repertoire. According to Ladefoged and Maddieson (1996), researchers sometimes refer to this phenomenon as "unaspirated lenis" and "unaspirated fortis". Purnell (1965) mentions that Mien exhibits fortis on Mien initials. The so-called fortis and lenis plosives in Korean have many observable differences, the most notable of which is "attributed to the laryngeal activity associated with the stiff voice position of the vocal folds"

for fortis plosives, accompanied by a very sharp voice onset of the following vowel (Ladefoged and Maddieson 1996: 56). The sharp voice onset of the following vowel can be explained through the feature [-spread], meaning that the vocals cords are too stiff to vibrate but close enough to immediately vibrate upon release of the oral closure. Vaissière (1997) similarly notes that stiffening of the vocal folds can lead to higher vibration of the vocal folds on the onset of the following vowel.

The vocal folds are not vibrating in the production of a voiceless segment. Therefore, the key factor in the production of voiceless stiff segments seems to be the increased laryngeal muscular tension (cf. Section 4.5.2), regardless of whether the vocal cords are adducted closely enough to vibrate or whether they are stiff enough not to vibrate. Stiff voice therefore is more than a phonation type, it is a laryngeal modification. A necessary additional binary feature to distinguish between voiceless stiff and voiced stiff would then be the feature [+/- voice] next to the features [+constricted] [-spread] [+stiff] marking stiff segments.

4.5.2.2 Laryngealization

As mentioned in the beginning of this chapter, the term glottalization does appear in reference to laryngealization or creaky voice. Laryngealization is

a particular type of vocal fold vibration and therefore only occurs on voiced segments. Gordon defines creaky voice as "characterized by irregularly spaced glottal pulses and reduced acoustic intensity relative to modal voice" (2001: 2). It is this state of the glottis producing rapid intermittent glottal closures that may be the reason why creaky voice or laryngealization are being referred to as glottalization. Creaky voice and glottalization are hard to distinguish, but they do have some common characteristics, primarily laryngeal constriction (Laver 1980).

Ladefoged and Maddieson (1996) offer a list of examples of languages, including the Kam-Tai languages Sui and Lungchow, which are reported as having laryngealized stops. They qualify their list by stating that they have not heard all these languages and point out that published descriptions suggest preglottalization as well as implosives for the same languages. Therefore it is not certain that all of these languages exhibit what Ladefoged and Maddieson would call creaky voice. They do mention that Thai voiced stops "are often pronounced with stiff, or even creaky, voice at least during the onset of the closure (1996: 55).

Edmondson (2004) who notices initial glottal stops on Sui voiced plosives, remarks that pre-consonantal glottal stops exclude laryngealization. Gordon (2001) mentions that the laryngealization of consonants often spreads to the

following vowels which is not reported for Kim Mun or found in any of the Tai languages their voiced stops are being compared to. Edmondson's and Gordon's observation allow the exclusion of laryngealization as a possible feature for Kim Mun voiced stops.

4.5.3 Glottalization

Laver (1980) mentions that glottalization has been used as a cover term for a wide variety of phenomena. Ladefoged lists such phenomena as "ejectives, implosives, laryngealized sounds, and pulmonic articulations accompanied by glottal stops" (1971: 28). This section will focus on pulmonic articulations accompanied by glottal stops. There are two forms of glottalization: preglottalized segments, which start with glottal closure, and postglottalized segments, which are followed by a glottal stop.

According to Edmondson (2004), Li (1943) documented "strongly preglottalized" stops in Tai languages. Edmondson also claims this feature for the Tai language Sui found in the Guizho and Guangxi provinces of China. Some literature on this language reports a slight implosive onset for the preglottalized stops, a physiological artifact accompanying voiced stops (cf. Section 4.5.1.1), but Edmondson cannot find any larynx lowering and airflow evidence for implosives. Sui stops are literally pre-glottalized as they

are "formed from a sequence of moderate glottal stop released into a voiced nasal, a voiced fricative, a voiced stop or voiced approximant including vowels, similar to their description by Li Fang Kuei (1943)" (2004: 16). Therefore, the consonantal modification of preglottalization should be considered as a possible feature for the languages in this study.

In Lao and Vietnam Kim Mun, there are glottal closures following syllable-final vowels, approximants and nasals. These syllable-final glottal stops always accompany certain tones (cf. Sections 5.1.3 and 6.1.3) and therefore are interpreted as a suprasegmental feature.

4.5.4 Possible Laryngeal Settings in Kim Mun

As discussed in Section 4.5, preglottalized plosives have been interpreted various ways in the literature, such as implosives (Clements and Osu 2002; Shintani 1991), as a sequence of glottal stop followed by a pulmonic consonant (Edmondson 2004; Dimmendaal 1986), or laryngealization (Vaissière 1997; Ladefoged and Maddieson 1996). The previous discussion of the features different researchers assign to what may be called preglottalization leads to the following possible laryngeal settings for Lao and Vietnam Kim Mun:

(1) Implosives

As pointed out in Section 4.5.1.1, Shintani mentions voiced implosives in his study on Kim Mun (1991), comparing them to Thai initials. The results of Edmondson's (2004) airflow studies on Sui, a related language, preclude preglottalization as implosive. Other researchers like Ladefoged and Maddieson (1996) identify stiff voice for Thai initials. These studies suggest that voiced implosives are unlikely to occur in Lao and Vietnam Kim Mun, and indeed this analysis does not find implosives in either Lao or Vietnam Kim Mun.

(2) Stiff Voice

Vaissière (1997) and Ladefoged and Maddieson (1996) identify stiff voice for Thai voiced plosives that Shintani compared his Kim Mun stops to. Accordingly, stiff voice is a possible feature for the voiced stops of Lao and Vietnam Kim Mun. Since Mao (2004) marks the preglottalized stops only on voiceless initial plosives in Guangxi Kim Mun, stiff voice might be a feature of voiceless Kim Mun stops too.

(3) Laryngealization (Creaky Voice)

Stiff consonants are characterized as slightly laryngealized and difficult to distinguish from laryngealized segments (Ladefoged and Maddieson 1996).

Gordon notes that the creaky voice of consonants is often carried into the following vowel onset (2001). This is not reported for the Tai languages being referred to as containing laryngealized stops. Together with Edmondson (2004) noticing initial glottal stops on Sui voiced plosives—which excludes laryngealization—there is not sufficient reason to consider creaky voice as a possible feature for Kim Mun voiced stops.

(4) Preglottalization

Li (1943) reconstructs preglottalized stops in Proto-Tai. In his instrumental analysis, Edmondson (2004) later also reports this feature for the Kam-Tai language Sui and also documents it in the raw data provided for this analysis from Lao Cai, Vietnam. Therefore, preglottalization must be included as a possible feature for Kim Mun.

With implosives and laryngealization being ruled out as possible features in Kim Mun, stiff phonation and preglottalization are two possible features that may explain the production of initial plosives in Lao and Vietnam Kim Mun. Refer to Roman numeral IV under Section 4.6 for the final forecast used in this analysis. Neither Shintani (1991) with implosives nor Mao (2004) with preglottalized segments offer evidence of contrast with modal stops.

Accordingly, the laryngeal setting accompanied with preglottalized segments is not expected to be contrastive, but most likely an areal feature.

4.6 Summary and Forecast

Table 5 provides a linear comparison of the Chinese varieties of Kim Mun studied under Mao (2004), He (1999), Liu, et. al. (1998), and Shintani (1990). It can be observed that He's (1999) and Liu, et. al.'s (1998) analysis of Kim Mun in Yunnan are quite similar, while Mao's (2004) analysis of Kim Mun in Yunnan differs slightly, i.e. fewer initials and more consonant clusters. Liu, et. al.'s (1998) analysis contains the fewest consonant clusters because he transcribed the ambiguous vowels /i, u/ without further analysis as to whether they have phonological status as the approximants /j, w/. The vowel systems reported by Mao (2004) and Liu, et. al. (1998) are quite similar, whereas the vowel system reported by He (1999) differs the most from any other researcher.

Mao's (2004) analysis of Yunnan and Guangxi Kim Mun do not differ significantly from Shintani's (1990) analysis of Hainan, though the initials reported by Mao (2004) in the Guangxi variety are the most diverse of any other variety. The initials of Hainan are the most similar to that of the Guangxi variety, especially when taking into account that what Shintani

(1990) labels as a palatalized segment /tj, t^hj, dj, nj/ may correspond to the alveolo-palatal place of articulation recorded by Mao (2004) in the Yunnan and Guangxi varieties. The area with the most consistency between these various studies in China is that of the finals, which report no variation.

Table 5. Summary of Chinese Varieties of Kim Mun

	Hainan KM (Shintani 1990)	Yunnan KM (Mao 2004)	Yunnan KM (He 1999)	Yunnan KM (Liu, et. al. 1998)	Guangxi KM (Mao 2004)
Single Initials	p^h, b, ʔb, t^h, d, ʔd, k, k^h, g, m, n, ŋ, f, v, s, h, ʔ, l	p, b, t, d, ʈ, ɖ, k, tθ, dð, g, m, n, ɳ, ŋ, f, v, s, h, l, j, w	p, b, t, d, k, g, ts, tɕ, dʑ, m, n, ɳ, ŋ, f, v, θ, ð, ɕ, x, w, j, l	p, b, t, d, k, g, ts, dz, tɬ, dɮ, m, n, ɳ, ŋ, f, v, θ, ð, ɕ, h, w, j, l	ʔp, p^h, ʔp^h, b, ʔt, t^h, d, ʈ, ʈ^h, ɖ, k, k^h, g, m, n, ɳ, ŋ, f, v, θ, ɕ, h, l, j
Clusters	pl, p^hl, bl, pj, p^hj, bj, tj, t^hj, dj, kj, k^hj, gj, kw, k^hw, gw, kl, k^hl, gl, mj, nj, ŋj, ŋw, lj	pl, pj, bl, tl, tj, dl, dj, tθj, dðj, kw, kj, gw, gj, mj, nj, ŋw, sj, lj, hj	pl, bl, kl, gl	pl, bl	ʔpl, p^hj, p^hl, bl, bj, kw, kl, kj, k^hw, k^hl, k^hj, gw, gl, gj, mj, nj, ŋw, ŋj, lj
Finals	p, t, k, m, n, ŋ	p, t, k, m, n, ŋ	p, t, k, m, n, ŋ	p, t, k, m, n, ŋ	p, t, k, m, n, ŋ
Vowels	i, e, a, u, o, ɔ	i, e, ɛ, a, u, o, ɔ	i, e, a, ɨ, ə, u, o	i, ɛ, a, u, o, ɔ	i, ɛ, a, u, o, ɔ
Tones	13, 11, 33, 354, 31, 44, 53	35, 31, 33, 545, 43, 32, 44, 21, 22, 24, 54, 42	24, 53, 11, 35, 443, 43, 44, 453, 32, 55, 44, 24, 21	24, 52, 11, 35, 42, 43, 44, 453, 32, 55, 44, 23, 21	35, 13, 33, 55, 42, 31, 335, 331, 32, 12

Shintani (1990) did not find significant differences between Hainan Kim Mun and Vietnam Kim Mun, despite Hainan Kim Mun being separated from the mainland for an extended period of time. According to Shintani, Hainan

Kim differs in that the voiceless plosives /p/ and /t/ in Vietnam correspond to what Shintani labels as voiced implosives /ˀb/ and /ˀd/ in the Hainan variety, and the /θ/ in Vietnam becomes /t/ in the Hainan variety. These two differences are minor, so it is rather likely that the Kim Mun variety found in neighboring Laos will not differ significantly from the Vietnam Kim Mun. Based on the research on Kim Mun reviewed in the previous sections, the following expectations apply in the analysis of the Lao and Vietnam varieties of Kim Mun.

I. Consonants

A. Clusters

For all three Chinese varieties consonant clusters are documented, which is also claimed to be a Kim Mun feature by Edmondson (2007) and Chengqian (1991). Consequently, consonant clusters will most likely be found in the Lao and Vietnam varieties as well. He (1999), Liu, et. al. (1998), and Shintani (1990) show that the C_1 position is restricted largely to plosives and a few nasals, and while Mao (2004) shows a similar restriction, he does record a few fricatives occurring in the C_1 position. Each of the varieties demonstrated a more consistent

restriction on the C_2 position, i.e. only the approximants /j, w, l/. Similar restrictions are expected to be true for Laos and Vietnam.

B. Initials

Both the Yunnan and Guangxi varieties (Mao 2004) have four places of articulation for plosives and nasals. The Guangxi variety also records one alveolo-palatal fricative. He (1999) and Liu, et. al. (1998) record the alveolo-palatal place of articulation with affricates and fricatives, though not with plosives. Shintani (1990) is the only researcher not to record the alveolo-palatal place of articulation, but this may be a result of his transcription method. Each of the varieties demonstrated a high functional load on plosives and nasals. It is therefore expected that the Lao and Vietnam varieties will have a similar consonantal system and will contain four places of articulation as reported by Mao (2004), He (1999), and Liu, et. al. (1998).

C. Finals

All three varieties have either voiceless plosives or nasals as finals, so it is expected that the finals of the Lao and Vietnam varieties will be the same.

II. Vowels

A. Symmetry

The Kim Mun varieties of Hainan Island (Shintani 1990), Guangxi (Mao 2004), and Yunnan (Liu, et. al. 1998) all have a simple symmetrical vowel system of three front vowels with three back vowels. The Yunnan variety reported by Mao (2004) differs slightly with one extra front vowel. The Yunnan variety reported by He (1999) differs the most. Therefore, it is likely that the Lao and Vietnam varieties of Kim Mun will exhibit a similar vowel system. Mao (2004) did find some central vowels that were allophones that may lend to the central vowels reported by He (1999), so it is possible that some central vowels may show up in either the Lao or Vietnam varieties.

B. Length

All three Chinese Kim Mun varieties (Hainan, Yunnan, and Guangxi) show distinctive vowel length. While Mao (2004) argues that the long-short vowel distinction tends to disappear in Kim Mun, He (1999) calls it common and widely distributed. It is therefore uncertain whether there will be many examples of quantitative vowel contrast discovered in either the Lao or Vietnam variety.

III. Tones

The Hainan variety documented seven tones with one allotone by Shintani (1990), and the Yunnan and Guangxi varieties documented twelve and ten tones respectively by Mao (2004) and thirteen tones in the Yunnan variety as reported by He (1999) and Liu, et. al. (1998). Much of the tonal variety goes back to different syllable structures, namely open and closed syllables with varying onsets, which could be analyzed as tonal sandhi or tonal alteration. Therefore, it is uncertain how many tones may exist in the Lao and Vietnam varieties, but it is certain that both varieties will have a high functional load on tone as in the other varieties.

IV. Preglottalization

The moderate glottal stop preceding voiced plosives as documented by Edmondson (2004) can be interpreted as a physiological artifact with voiced stiff plosives (Ball and Rahilly 1999). This is in line with what Purnell (1965) labels preglottalization and with Edmondson's research on Sui (2004). This laryngeal setting would also account for the segments Mao (2004) documents in the Guangxi variety of Kim Mun. It further corresponds to the fortis segments documented in Mien by Purnell (1965)

who lists preglottalization on voiced segments and fortis on voiceless segments.

Based on the previous research on preglottalized segments, this study identifies stiff voice for both voiced and voiceless stops as present in both Lao and Vietnam Kim Mun. Following Ladefoged and Maddieson (1996), stiff voice will be transcribed with a subscript v for voiced stops [b̪] and an asterisk for voiceless stops [p*].