Is There a Himalayan Tone Typology?

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1. Introduction

It has long been noted that Tibeto-Burman tone systems differ widely in structure from each other. This paper considers the tone systems of Western Tibeto-Burman languages, especially those of the Qiangic, Bodic, Tani, Bodo-Garo and Kuki-Chin-Naga branches, to see what commonalities, if any, emerge. While there does not appear to be an iron-clad typology, certain traits emerge from a cross-linguistic comparison of tone systems:

1) Prevalence of binary oppositions, with one member of the pair more marked than the other.
2) No more than one of each type of tonal distinction per word (culminativity).
3) Restricted location of tone distinctions (e.g., only stem-penultimate in Caodeng rGyalrong, word-initial elsewhere).
4) Right edge effect of (historically) checked syllables, which may be either synchronically predictable or distinctive (e.g., Tibetan dialects, Caodeng rGyalrong).
5) Morpho-tonemics:
   a. Affixes may be extrametrical (toneless: Caodeng rGyalrong, Lhasa Tibetan, Muka Qiang, Bodic, Bodo-Garo). However, this can lead to a reversal, where the suffixes can become the carrier of the tone (Tamangic).
   b. Tonal polarity under certain morphological conditions (Mianchi Qiang, Zhuokeji rGyalrong).

c. Morphologically determined tone deletions (Caodeng rGyalrong). Note that this does not include deletions due to culminativity restrictions.
d. Morphosyntactically assigned tones (Caodeng rGyalrong).

6) Tone-laryngeal interface:
a. Breathiness (Tamangic, Kham)
b. Voicing/aspiration of C_i (Tibetan dialects, Tamangic).

This paper has two aims. The first is to assemble typologically relevant features of tonal systems of languages in this area. The second aim is to thereby alert Himalayan linguists to a list of features that may be present in tone systems of interest, which it is hoped will lead to a greater number of detailed descriptions.

To date there have been various overviews of characteristics of Tibeto-Burman tone systems (e.g., Matisoff 1999; Weidert 1987; Yip 2002). Sources note that languages in this family range from having many tonal contrasts to none, and from displaying emerging tonal contrasts to disappearing ones. With such variety, it is not possible to establish one set of typological characteristics shared by all Tibeto-Burman languages.

The aim of this paper is to compare tonal properties of western TB languages, starting from the Qiangic languages of Sichuan and Yunnan, spreading westward across the Tibetan plateau, through Bhutan and Northern India, and into Nepal. In selecting sources of data, I have focused on those papers that include discussions of word-level phenomena.

It should be noted at the outset that most, but not all languages in the Sino-Tibetan family are tonal. Lexical pitch distinctions are not found in some varieties of rGyalrong ('Jiarong', Qiangic; Sichuan Province, China) (Nagano 1984, 2003), in most of Northern Qiang (H. Sun 1981; Liu 1998; cf. Evans 2006a; Huang and Zhou 2006), Newari (Genetti 2003; Hargreaves 2003), Garo (Burling and Joseph 2007), some Tani languages (J. Sun 2003), most of Kiranti (Ebert 2003), and various Tibetan dialects.

The extinct Tangut language had two tones (Nathan Hill, p.c., Gong 2003). In some cases, changes in Tangut tone indicate derivational changes: *ljii*[1] 'trousers', *ljii*[2] 'put on trousers'; *ŋewr*[1] 'to count', *ŋewr*[2] 'a number'. However, tonal changes do not always indicate changes in part of speech: *nər*[1], *nər*[2] 'yellow.' At this time, nothing is known of word-level prosody in Tangut.

The Sino-Tibetan language family is comprised of approximately 250 to 300 languages (Matisoff 2003), few of which have been described in sufficient detail to include in this study. In addition, this study does not examine languages with "omnisyllabic" tone systems (Matisoff 1999), in which each syllable has its own tone assignment which is relatively unaffected by neighboring syllables and word-level prosody. Such languages may be found in Lolo-Burmese, as well as among the 'dialects' of Chinese (Chen 2000). The languages in this study whose systems are closest to omnisyllabic are the Kuki-Chin-Naga languages Ao and Kuki-Thaadow.[1)]

The following discussion follows the order of the topics given in the Introduction. Phonological characteristics of tone are summarized by language in the appendix.

2. Documentation of Typological Features

2.1 Binarity of Tone

Throughout the Himalayan area, there is a prevalence of binary tone oppositions, in which one tone may be more marked (restricted) than the other. A surface distinction between two tones, say /H/ and /L/, may be phonologically structured in multiple ways. The opposition may be between two specified tones (phonological binarity), or between toned and toneless syllables (privativity, unarity). Some binary systems also contain toneless syllables (Mianchi Qiang, Evans 2008). See Hyman (2001b), Evans (n.d.) for further discussions of types of tonal privativity. Many sources do not present a sufficiently detailed phonological analysis to determine whether a surface binary opposition corresponds to phonological binarity or privativity, so this paper does not split these into two typological categories.

The presence of /H/, /L/, and toneless syllables in Mianchi Qiang may be demonstrated by numeral compounds with the generic classifier /qo (H)/, whose floating tone links to the leftmost toneless syllable. When paired with a /L/-toned numeral, a classifier in this group surfaces with /H/; if the numeral is toneless, (H) links to the numeral:

(1) Mianchi NUM-CL and linking of (H). (Evans 2008)

Low numerals:		Toneless numerals:	
/L-(H)/		/Ø-(H)/	
/a-qo/		/si-qo/	
[à-qó]		[sí-qò]	
one-CL		three-CL	
‘one (thing)‘		‘three (things)‘	
[nə̀-qó]	‘two (things)’	[tʂoú-qò]	‘six (things)’
[zə̀-qó]	‘four (things)’	[nə́-qò]	‘seven (things)’
[ʁuà-qó]	‘five (things)’	[gú-qò]	‘nine (things)’
[tʂ^{h}è-qó]	‘eight (things)’	[ɦà.diú-qò]	‘ten (things)’

In some cases, complex surface tone patterns reduce to binarity on closer inspection. This has been shown to be the case in Niuwozi Pumi (Ding 2006). In Ding’s analysis, the apparent complex of word tones (more on this later) actually consists of just /H/ and /L/ pitches, and /H/ can be specified to spread one syllable rightward (“High” tone) or not (“Falling”):

(2) Niuwozi Pumi mono- and disyllable pairs

	High	**Falling**	**Rising**	**Form**
(a)	ʃi^{H} ‘hundred’	ʃi^{F} ‘louse’	ʃi^{R} ‘new’	(citation)
	ʃi^{H} ge^{H}	ʃi^{F} ge^{L}	ʃi^{L} ge^{H}	(speech)

The presence of monosyllabic contours that then spread out on disyllables shows that both /H/ and /L/ are phonologically active. Similar patterns may be observed in Kuki-

Thaadow (Chin; Assam, Myanmar. Hyman 2007). In other cases, a surface contrast between two pitches can be shown to consist of one phonologically specified tone (privative), with the remaining pitches filled in by default rules. Muka (Southern) Qiang demonstrates "simple" privativity, in which /H/ contrasts with Ø (surface /L/): 'sickle'

(3) Muka Qiang tone patterns (Evans 2006b)

	Surface pattern:	σ	σσ	σσσ	σσσσ	tones
a.	all /H/	'ŋo [ŋó] 'bovine'	'ŋo mje [ŋó mjé] 'cow'	'ŋo lo kwe [ŋó ló kwé] 'old bovine'	'ra ko ɕi də [rá kó ɕí də́] 'sickle'	T#
b.	/H/ on 1st σ	zu̱* [zú̱] 'horse'	zu̱* mje [zú̱ mjè] 'mare'	zu̱* lo kwe [zú̱ lò kwè] 'old horse'	me* gu mi dʑi [mé gù mì dʑì] 'thunder'	*
c.	/H/ on 2nd σ		ksə zə* [ksə́ zə́] 'musk deer'	ksə zə* mje [ksə́ zə́ mjè] 'musk doe'	ksə zə* se n̥i [ksə́ zə́ sè ǹ̥i] 'musk deer liver'	*
d.	/H/ on 1st two σ		'lu ɹa* [lú ɹá] 'Small Heishui' (place)	'lu ɹa* pə [lú ɹá pə̀] 'Small Heishui-LOC'	'lu ɹa* zu̱we pə [lú ɹá zu̱wè pə̀] 'Small Heishui-field-LOC'	T#-*
e.	/H/ on last σ	i [í] 'chicken'	i dzu̱ [ì dzú̱] 'pheasant'	i lo kwe [ì lò kwé] 'old chicken'	ba lu ba se [bà lù bà sé] 'thing'	Ø

The Zhuokeji dialect of Situ rGyalrong has a more complex type of privativity, in which there are layers of tone assignment, and each layer has one tone to contribute (or not):[2)]

(4) Zhuokeji tone assigment in tri- and quadrisyllabic phrase-non-final words (Lin forthcoming; Evans n.d.)

	trisyllabic		quadrisyllabic	
lexicon:	tamərdam	samarpak	kasənapri	kɐnəsaksə
foot parsing: final σ of quadrisyllables is extrametrical	(tamə)(rdam)	(sama)(rpak)	(kasə)(na)pri	(kɐnə)(sa)ksə
metrical tone: /H/ on right syllable of first foot	(tamə)(rdam)	(sama)(rpak)	(kasə)(na)pri	(kɐnə)(sa)ksə
tone spread:	(tamə)(rdam)	(sama)(rpak)	(kasə)(na)pri	(kɐnə)(sa)ksə
default tone: assign /L/ to all syllables still toneless	(tamə)(rdam) ‘flail‘	(sama)(rpak) ‘shoulder pole‘	(kasə)(na)pri ‘to cause to dine‘	(kɐnə)(sa)ksə ‘to have lunch‘

Systems of two tones are rampant in this area, including Lhasa Tibetan, if one analyses the possibility of final contour as being conditioned by right-edge glottality (see J. Sun 1997, for discussion of competing analyses of Lhasa tone). However, the Tamangic (or TGTM) group is typified by four tones. Historically, these derived from two tones via a split. The table below (Mazaudon 2005; Noonan 2003) shows that breathy phonation (in gray) is specified for some tones.

(5) Tamangic tones

	Tamang			Thakali			Gurung	Manang	
tone	Ris.	Sahu	Taglung	Tukche	Marpha	Syang	Ghachok	Ngawal	Nar-Phu
1.	54	44	55/44	54	43	43	33	33	53
2.	44	54	43	44/33	45	45	54	45	44
3.	33/22	11	33/22	11	33/22	11	11	54	12
4.	211	32	51	121	51	33/22	12	31	21/31

Several of these languages (although not all) could be analyzed as having a binary pitch contrast coupled with a phonation contrast. Similarly, Kham (Kiranti; Nepal) has a four-way opposition that has been described as opposition between two tones, combined with clear/ breathy phonation (D. Watters 2003).

The Tani/Mirish branch appears to include both binary tone systems and those with

more. Apatani (Weidert 1987) has /L/ and /H/, which like Niuwozi Pumi can be specified to spread rightward one syllable. Gallong (Adi-Galo) has three tones, which following Weidert's (1987) description, consist of /H/, /HM/, /HL/. Eastern Tani languages (e.g., Bokar) lack lexical tone (J. Sun 2003).

Of the languages and groups examined for this paper, only TGTM, Gallong, and the languages of Nagaland are not typified by binarity.

2.2 Culminativity and Restricted Locations

Many prosodic systems in this area do not permit more than one tone specification per multisyllabic prosodic unit. It will be assumed that this unit is the prosodic word. This restriction on tonality has gone by many names in the literature: restricted tone, (pitch) accent, word tone. The optimality theory label OCP! (Myers 1997) has also been applied to this phenomenon. Following Hyman (2001a, n.d.), it will simply be called 'tone' in this paper.

In Mianchi Qiang, the culminativity restriction applies to /H/ tones, where only the first /H/ in a prosodic word may surface (Evans 2008):

(6) Culminative restriction on /H/ in Mianchi Qiang

/L + L.H/	->	L-L.H	/mɛ̂ + ʨì.peí/	->	[mɛ̂-ʨì.peí]	'human body'
/LH + L.H/	->	LH-L.L	/bʐɛ̌ + ʨì.peí/	->	[bʐɛ̌-ʨì.peì]	'snake body'

In most other languages in this area, tone is only specified in one place, usually identified in reference to the left or right edge of the word. In Zhuokeji, the only existing lexical tone (/HL/) can only link to the last syllable in the prosodic word (4). In the Caodeng dialect of rGyalrong, the marked tone falls on the stem-penultimate syllable. The counting requirement is so strict that the tone falls on the prefix of a monosyllabic verb stem:

(7) Caodeng rGyalrong penultimate tone location (J. Sun 2008)

kɐ́d-^{n}dʒev	'to roll'	kɐ-qɐ́se	'to look for'
kɐ-sə́-^{n}dʒev	'to cause to roll'	kɐ-qɐsə́se	'to look for each other'

In Bodic, Mirish, and Niuwozi Pumi, only the tone specified for the first syllable/morpheme is pronounced, although its contour may spread:

(8) Niuwozi Pumi first syllable tone spread (Ding 2006)[3]

Monosyllable	Disyllable	Trisyllable	Quadrisyllable
bɨ^{HL} 'honey'	bɨ^{H} ge^{L} 'as for honey'	bɨ^{H} bˈõ^{L} bˈõ ^{L} 'roasted flour with honey'	bɨ^{H} bˈõ^{L} bˈõ^{L} ge^{L} 'as for roasted flour with honey'
bɨ^{H} 'sun'	bɨ^{H} ge^{H} 'as for sun'	bɨ^{H} ɬi^{H} ɹu^{L} 'sunflower stem'	bɨ^{H} ɬi^{H} pɜ^{L} tsɨ^{L} 'sunflower'
tʃʔɨ^{LH} 'dog'	tʃʔɨ^{L} mɛ̃^{H} 'dog hair'	tʃʔɨ^{L} ñ̥i^{H} dʒjɛ̃^{L} 'dog-nose group'	tʃʔɨ^{L} ñ̥i^{H} ʤjɛ̃^{L}ɹə^{L} 'dog-nose groups'
	tõ^{L} pu^{H} 'donkey'	tõ^{L} pu^{H} kʾʉ^{H} 'donkey head'	tõ^{L} pu ^{H} mɜ^{H} ɬe^{L} 'donkey tail'
	dʒjõ^{L} dʒɨ^{LH} 'buffalo'	dʒjõ ^{L} dʒɨ^{L} kʾʉ^{H} 'buffalo head'	dʒjõ ^{L} dʒɨ^{L} mɜ^{H} ɬe^{L} 'buffalo tail'
	ɹə^{L} tʃʔɨ^{LH} 'liquor'	ɹə^{L} tʃʔɨ^{L} ʃõ^{H} 'clean liquor'	ɹə^{L} tʃʔɨ^{L} ʃõ^{H} ge^{H} 'as for clean liquor'
		də^{L} ɹ̥ə^{L} ñ̥i^{r} 'concentrate'	də^{L} ɹ̥ə^{L} ñ̥i^{L} si^{H} 'concentrated'

In Lavrung, the location of the pronounced tone is determined by a set of complex interactions among input tones:

(9) Lavrung tone realization rules (J. Sun 2008)

(i) Accent the leftmost high (falling) tone.
(ii) If there are no high tones, then
  a) accent the rightmost low tone if the accentual domain contains no toneless syllables.
  b) otherwise accent the leftmost low tone.

The following data exemplify the Lavrung tone association rules:

(10) Lavrung tone realizations

Input		**Output**	**Type**
spô 'meadow' + *sʌsə̂* 'wild berry'	→	*spôsʌsə* 'strawberry'	i
və̌ɣ 'butter' + *dʐî* 'eat'	→	*vəɣ dʐî*	i
snə̌ɯ 'broad bean' + *c^{h}ʌ̌^{ɤ}v* 'pod'	→	*snəɯc^{h}ʌ̌^{ɤ}v* 'broad-bean pod'	ii.a
və̌ɣ 'butter' + *u-dʐǐ* 'eat [pfv] '	→	*və̌ɣ u-dʐi*	ii.b

Because these tone rules (like the much simpler /H/ rule in Mianchi Qiang) rely on the input tones to determine the output, rather than restricting tone to a certain location in the word, these languages are not considered to have restrictions on where tone may surface.

In Boro (Bodo-Garo; Burling and Joseph 2007), tones are culminative. Like the above cases, tone is specified once per word; however, the location need not be specified, as the tone category and morphological structure determine the pitch pattern for the entire word (see Burling and Joseph 2007, for conventions on the location of tone markings):

(11) Boro tone examples

High (rising)		Low level		Falling	
bái	'break'	bài	'buy'		
gɯ-bá	'thin'	gɯ-bà	'embrace'	gɯ-bâ	'vomit'
gɯ-bá-gɯn	'will be thin'	gɯ-bà-gɯn	'will embrace'	gɯ-bâ-gɯn	'will vomit'

Boro syllables ending in /-p/ or /-t/ are more restricted in their tonal possibilities; e.g., the main consultant did not draw tonal distinctions on syllables ending in /-p/.

In the closely related Bodo-Garo language Tiwa (Joseph and Burling 2001), one tone per word is specified, and the specification can fall on any syllable. Words longer than three syllables are not common:

(12) Tiwa tonal possibilities

Mono-	Disyllables		Trisyllables		
	1st σ	2nd σ	1st σ	2nd σ	3rd σ
H	H-H	M-H	H-H-H	M-H-H	M-M-H
ná	khú-jur	kojá	khú-jur-o	yaŋ-gúl-o	chor-ri-á
'you'	'lip'	'red'	'on the lip'	'at the back'	'lime'
F	H-L	M-F	H-M-L	M-H-L	M-M-F
nâ	khân-jur	paŋ-sî	khân-jur-o	paŋ-sî-na	che-la-râu
'come out'	'ear'	'flute'	'on the ear'	'for the back'	'y. sis. Hu'

2.3 Right Edge Effects

As has been well documented, tonal Tibetan dialects have a possible right edge pitch contour, conditioned by final glottal stop (at least historically). For those dialects which have lost the glottal conditioning, this contour is distinctive. The wide range of tonal analyses of Lhasa may be due to different degrees of preservation of this glottal feature among speakers. A predictable pitch contour effect is also found in Caodeng rGyalrong.

Similarly, Garo syllables with final glottal stop correspond to /H/ toned syllables in other Bodo-Garo languages, often with redundant glottal stop. In Boro, that glottal stop often 'travels' with the /H/ tone to the final syllable of the word.

In Kuki-Thaadow, contour tones only appear in word-final position.

2.4 Morpho-Tonemics

There are numerous interactions between tones and morphology that are possible. Many of the sources do not mention these; those writings that focus on phonology often do not consider morphological complexities, and sources related to morphosyntax often do not discuss morphophonemics. However, there are a few patterns that have been noted, which are discussed presently.

2.4.1 Extrametrical affixes

Affixes can be extrametrical in some of these languages. Extrametricality does not have the same implications in each case. Lhasa clitics, such as

> "the perfective marker –pə- are extrametrical in that the host syllables they are attached to are characterized by domain-final contours, as if the enclitics do not count as part of the tonal domain (Qu 1981; Mazaudon 1977; Durand 1990)." (J. Sun 1997)

In Muka Qiang, lexically toneless words receive a postlexical /H/ on the last syllable; for plurals, this tone falls on the last syllable before the plural marker, which shows that the plural marker is extrametrical:

(13) Tonal pattern of lexically toneless words in Muka Qiang

a.	/i/	[í]	'chicken'
b.	/i-mje/	[ì mjé]	'hen'
c.	/i-lo.kue/	[ì lò kué]	'old chicken'
d.	/i-lo.kue= ŋa/	[ì lò kué ŋà]	'old chickens'

In Caodeng rGyalrong, tone surfaces on the stem penult, regardless of the presence or absence of suffixes. In Tamangic, "grammatical suffixes are reported to be devoid of distinctive tones." (Mazaudon 2005) As a result, they end up carrying some of the tonal melody, as in the following examples from Risiangku Tamang (ibid.):

(14) Risiangku tonal melody on verbs and suffixes

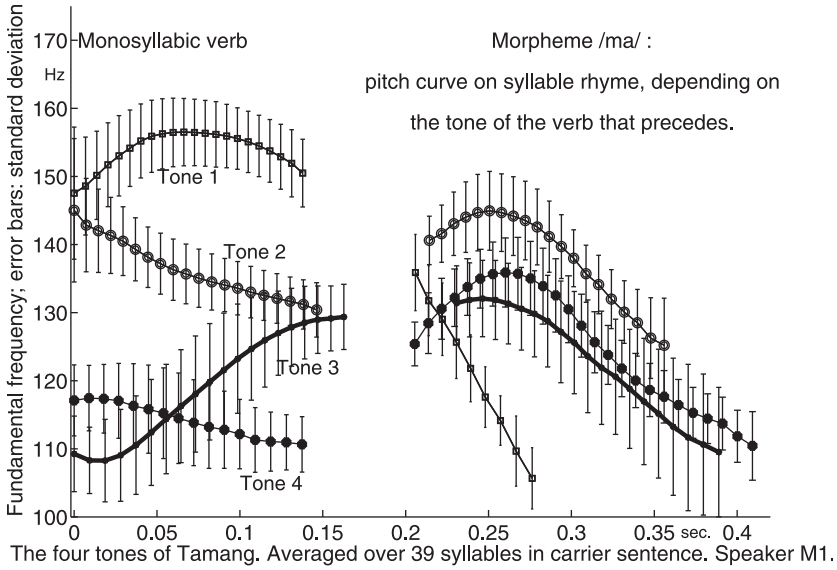

Figure 1 Affixes are also toneless in other languages of this area, such as Meithei (Chelliah, 2003)

2.4.2 Tonal polarity

By definition, polarity can only occur in a binary tonal system. In Mianchi Qiang and in Zhuokeji rGyalrong there are morphological processes that reverse a tone value. Because Zhuokeji has a privative tonal system, this is equivalent to alternating the presence/absence of tone.

In Zhuokeji, "almost all verbs resort to tone to achieve stem alternation. This morphological process involves tone polarity. That is, if a verb is on /HL/ in its Stem1 form, then it switches to /Ø/ to achieve Stem2 form, and vice versa." (Lin, forthcoming)

In Mianchi, negation of an existential verb causes the tone on that verb to switch between high and low:

(15) Mianchi tonal polarity

Root	NEG + root	Gloss
ŋá	mì-ŋà	'have (wealth), there is (a matter)'
ʑì	mì-ʑí	'there is (person)'
wɛ̀	mì-wɛ́	'there is (something fixed in place, as a tree)'
lɛ̀	mì-lɛ́	'there is (something contained)'
tɨ̀	mì-tɨ́	'there is (something on a surface)'

Kuki-Thaadow pronominal possessive proclitics have /L/ tone before /HL, H/, but /HL/ before /L/ (the rising tone on /zóoŋ/ 'monkey' comes from spreading of the proclitic's /L/

tone; /HL/ simplifies to /H/ in non-final position):

(16) Kuki-Thaadow tonal polarity

	'my'	'your'	'his/her'	'our (dual incl.)'	
/L/:	kà ûy	nà ûy	à ûy	ì ûy	'dog' /ûy/
/L/:	kà zŏoŋ	nà zŏoŋ	à zŏoŋ	ì zŏoŋ	'monkey' /zóoŋ/
/HL/:	ká kèel	ná kèel	á kèel	í kèel	'goat' /kèel/

2.4.3 Tone deletions

In Zhuokeji rGyalrong, "the observational verb forms are all realized with the phrase-final melody of /Ø/," as seen in the following examples.

(17) Zhuokeji rGyalrong tone deletion (Lin, p.c.)

	Present Imperfective		**Observational**	
a. 's/he is standing'	ŋa-rjap [H-L]	(/Ø/)	na-rjap [H-L]	(/Ø/)
b. 's/he is releasing (it)'	ŋɐ-lêt [L-HL]	(/HL/)	nɐ-lɐt [H-L]	(/Ø/)
c. 's/he is detouring'	ŋa-nə-pjol [L-H-L]	(/Ø/)	na-nə-pjol [L-H-L]	(/Ø/)
d. 's/he is resting'	ŋa-nə-nâ [L-H-HL]	(/HL/)	na-nə-na [L-H-L]	(/Ø/)
e. 's/he is putting (it) on top of (sth.)'	ŋa-sa-tak-tak [L-H-H-L]	(/Ø/)	na-sa-tak-tak [L-H-H-L]	(/Ø/)
f. 's/he is reading (it)'	ŋɐ-nə-mcɐ-rêw [L-H-H-HL]	(/HL/)	nɐ-nə-mcɐ-rɐw [L-H-H-L]	(/Ø/)

In Caodeng rGyalrong,

> "Unprefixed verb forms are distinguished from prefixed ones by removal of inherent accent. This quite idiocyncratic accent loss can be demonstrated by the following prefixed (18a) and unprefixed (18b) forms of the accented verb *kɐ-rɐ́ski* 'to pull'" (J. Sun 2008):

(18) Caodeng tone loss

a.	kə-rɐ́ski	'one who pulls'
	tə-rɐ́skɛ	'you$_{sg}$ will pull' or '(You$_{sg}$) pull upward!'
	jə-rɐ́skɛ	's/he will pull'
	ʃə-rɐ́ski-jə kə	'Let's go pull!'
b.	rɐskɛ	's/he will pull'
	rɐskɛ-aŋ	'I will pull'
	rɐski-tsə	'we$_{dl}$ will pull'
	rɐski-jə kə	'Let's pull!'

2.4.4 Tone insertions

Caodeng rGyalrong and Mianchi Qiang have morphosyntactic processes that insert tones. In Caodeng, "The intensive forms of stative verbs are formed via partial reduplication" with the addition of tone, if the verb is toneless:

(19) Caodeng tone insertion

Citation form	**Intensive**	
kə-xtɛʔ	kə-xtə́xtɛ	'to be big'
kə-wɐrneʔ	kə-wɐrnə́rne	'to be red'
kə-qɐrquʔ	kə-qɐrqə́rqu	'to be freezing'
kə-mə́rtsev	kə-mɐrtsə́rtsev	'to be spicy'

In Mianchi Qiang, if the verb root has a directional prefix, but is non-suffixed, then it surfaces with a /LH/ tone, as in the third person perfective forms:

(20) Mianchi Morphological /LH/ tone

zí̱	'dry'	tə-zǐ̱	's/he dried (it).'
bzà̱	'big'	dà-bzǎ̱	'It got bigger.'

Similarly, causativized perfective verbs in which the causative suffix is the last syllable of its clause appear with a /HL/ tone on the causative suffix:

(21) Mianchi Morphological /HL/ tone

Causative is the last syllable of its clause:

ɦà-ŋà bùzà̱ ʂè-q^{h}àlà-z̲ə̂.
3-pl wall DIR-knock.down-CAUS
'They knocked down the wall.'

Causative is not the last syllable of its clause:

ŋà bùzà̱ ʂè-q^{h}àlà-z̲ə́-ɕà.
1sg wall DIR-knock.down-CAUS-PERF:1sg
'I knocked down the wall.'

Mongsen Ao (Kuki-Chin-Naga; Nagaland, India) has three phonologically and perceptually level tones, H(igh), M(id), L(ow). Lexically, /H/ is marked: most non-derived lexical items occur with /M/ and/or /L/ tones. However, the /L/ toned nominalizing suffix /-pàʔ/ causes the last syllable of the verb stem to be pronounced with /H/: /ləmsa/ 'distribute' (past), /ləmsá-pàʔ/ 'distribution.' (Coupe 2007)

2.5 The Tone-Laryngeal Interface

Tamangic languages, Tibetan dialects, and Kham show interactions between pitch patterns and laryngeal characteristics, especially breathiness of the vowel and voicing/aspiration of

the initial consonant.

In the Tamangic group, as shown by the shading in (5), all languages except Manang have one to two tone categories that are characterized by breathy voice. In both Tamangic and some Tibetan dialects, certain tones only occur with a given aspiration state. In Tamangic,

> "for all eight dialects, the obstruent initials, on which a contrast of aspiration exists under tone-1 and tone-2, do not contrast for aspiration under tone-3 and tone-4. In words of tones 3 and 4, only one laryngeal mode is found on word-initial consonants. In the five dialects with a main High/Low division, the resulting archiphoneme is unaspirated." (Mazaudon 2005)

In Lhomi Tibetan, high and low register are characterized by the following bundles of features:

(22) Lhomi Tibetan register features (S. Watters 2002)

High register "tense"
modal voice on the vowel
glottal stop on vowel-initial syllables
strong aspiration
plain stops and affricates are voiceless

Low register "lax"
absence of above
often breathy voice on the vowel
voiceless stops and affricates vary between slight and no aspiration
vowels are longer than their high register counterparts; vowel quality contrasts are maintained rather than vowel length contrasts

3. Discussion

Of the hundreds of Sino-Tibetan languages, only a small percentage have been described at all; of these, even fewer have had their tone systems subjected to adequate phonetic, phonological, and morphological scrutiny to be able to say anything definite about their typological characteristics. In spite of this lacuna, certain patterns emerge from the languages that have been discussed above.

In order to answer the question raised by the title of this paper, the notion of 'typology' must be clarified. In some uses, 'typology' refers to features that are found to frequently occur among the group of languages under consideration, such as the large number of languages for which primary stress assignment is either (stem-) initial or penultimate (Downing 2004; Hyman 1977). The Greenbergian sense of typology is much more restrictive, and is intended to have at least probabilistic predictive power, such as his Universal 2: "In languages with prepositions, the genitive almost always follows the governing noun, while in languages with postpositions it almost always precedes." (Greenberg 1963)

If we allow for tone typology categories that "leak," (Hyman 2007) then there are some observations to be drawn from our sample of about 20 languages. Before stating these observations, we recall that a number of ST languages were excluded from this comparison, namely those with "omnisyllabic" tone (Matisoff 1999), in which there are minimal word-level effects on tonal phonology (e.g., Mandarin Chinese, Lahu).

The most commonly found features among these tonal systems are binary oppositions (e.g., High vs. Falling), culminativity (found everywhere except Kuki-Chin-Naga and Dayang Pumi (Matisoff 1997)), and restrictions to certain locations.

Binary tone systems increase in number if certain assumptions are made; e.g., if tone and phonation type are separated, then numerous TGTM languages have binary tone systems, coupled with a modal/breathy voice distinction.

For languages with restrictions on where tone may be specified, the most common locations are left and right edges of the phonological word or morphological stem. Contour tones may be restricted to word-final (Muya, Ikeda 2002, Kuki-Thaadow, Hyman 2007) or clause-final positions (contour tones on Mianchi Qiang verbs). Final-only contour tones are found in languages across the world, due to the typical lengthening of final syllables that provides enough time to articulate a contour (Zhang 2002).

Certain typological relationships are tautologous – tonal polarity is only found in languages with binary tone systems, and morphological tone deletions are only possible in languages that permit syllables to remain tonally non-specified.

There are some intriguing sub-typologies within the set of languages examined: morphological manipulation of tones is common in Qiangic and Kuki-Chin-Naga, breathy phonation is found in Bodic and Kham (due to the course of tonogenesis via registrogenesis).

There are no clear geographic tendencies in the structure of tone systems for this group of languages. For example, within the Qiangic branch, rGyalrongic, which is comprised of mostly binary tonal dialects, abuts Northern Qiang, which has only a few tonal forms in a few varieties, which borders Southern Qiang, where most dialects have binary tone systems in their native lexica. In the same area where rGyalronic languages are spoken, Amdo Tibetan (no lexical tone) is in widespread use.

In spite of the lack of geographic trends among the languages examined here, we may observe that "omnisyllabic" languages, such as Lahu, tend to fall more within the Sinosphere, with influence from Chinese, Thai or other languages with larger tonal inventories and denser tonal specification than is found among these more westerly ST languages (cf. Matisoff 1999).

In recent publications, two languages of this area, the Mianchi dialect of Qiang (Evans 2008), and Kuki-Thaadow (Hyman 2007) have been noted as having prototypical African tendencies in their tonal systems:

(23) African vs. East Asian vs. Mianchi tone properties

African languages (typical)	Chinese dialects (typical)	Mianchi more like…
Privative /T, Ø/ or binary contrast (/H, L/ or /H, L, Ø/)	Rich tonal inventory	African (/H, L, Ø/)
Limits on adjacency of marked tone (OCP) or co-occurrence at word level (culminativity)	Limited OCP	African
Sparse distribution of tone specifications	Every lexical syllable has a tone	African
Toneless syllables receive default tone (usually L)	Pitch of toneless syllables determined by context	African
Tones can float	Tones are pre-linked to syllables. No floating tones.	African
One-to-many tone associations (spreading)	Mostly one-to-one tone associations	Chinese
Downstep caused by L	No downstep	Chinese
Level tones primary	Level and contour tones are both primary	African
Contour tones are sequences of level tones	Contour tones form units at a deeper level of structure	African
Restricted occurrence of contour tones	Contour tones occur freely	African
Morphological tones	No morphemes that lack segmental content	African
Tonal polarity of some affixes	No tone polarity	African
Tendency toward fixed tone patterns	No higher order restrictions	African

Employing Pike's (1948) characterizations, Hyman (2007) shows the ways that Kuki-Thaadow is more similar to 'Register tone systems' (prototypical Bantu), than it is to 'Contour tone systems' (Mandarin Chinese, Thai, etc.):

(24) Kuki-Thaadow tonal characteristics (Hyman 2007)

A. "Contour tone systems"	**B. "Register tone systems"**	**Kuki-T.**
Fewer level tones than contours	More level tones than contours	B
Contour tones = units	Contour tones = sequences (clusters)	B
Contour tones have free distribution within the utterance	Contour tones (clusters) are often limited to the last syllable	B
Dissimilation of contour + contour	Dissimilation of contour tones = rare	B
Metathesis of features within a contour	Metathesis of contour tones = rare	B
No downstep	Downstep	B
Floating tones = rare	Floating tones = frequent	B
Tone spreading = rare	Tone spreading = frequent	B
Function of tone = lexical	Function = lexical *and/or* grammatical	B
Words are monosyllabic	Words come in various sizes	A
Tones are restricted by syllable type	Tones may occur on any syllable type	A

4. Conclusions

In recent years, there have appeared an increasing number of tonological studies of Himalayan languages. Precise observations made in these works, coupled with unambiguous examples, have made possible the typological characterizations drawn in this preliminary study. The preceding discussion presents an attempt to find typological generalizations of tone systems in "western" Tibeto-Burman, with regard to phonetic, phonological, and morphological characteristics.

Outside of Qiangic, tone often has its phonetic "fellow travelers" – phonation type in Tibetan, Kham, and TGTM (as well as in Burmese); a traveling final glottal stop in Bodo-Garo; syllable length in Boro and Lhomi Tibetan.

In most of these languages, tones are not completely separated from other aspects of phonology, especially prosodic word-level limitations on numbers and locations of tonemes.

As has been observed in the above table (Hyman 2007), it is not surprising that in languages in which words have variable lengths (whether measured by morphemes or syllables), there are interactions between morphology and tone, whether morpho-syntactic (as in the cases of tonal assignment, deletion, and polarity) or at the level of word-formation (e.g., tonal realization in Lavrung).

This study has not delved into the histories of the various subgroups; in some cases, the origins of the tonal systems are clear, as in Tibetan dialects. For groups such as TGTM and Lolo-Burmese, tonal splits can be detected, but the origin of tones at the proto-subgroup level are obscure. In other subgroups, such as Qiangic, there does not appear to be any tonal cor-

respondence between languages.

So, to restate the question: Is there a Himalayan tone typology? Two answers may be provided:

No: These languages do not provide evidence for strict implicational typologies in the Greenbergian sense, aside from tautological trivialities.

Yes: There are typological tendencies that are spread across these related languages (typology in the Downing 2004).

As more studies are done, especially on the little-known and prosodically under-described languages of Northeast India, the typology(-ies) of tone in this area will become increasingly clear.

Postscript. A brief digression on the notion of Tone-Bearing Unit

Consider the following three comments about Tone-Bearing Units (TBU):

- "The tone bearing unit is the element in the segmental tier to which tone associates." (Gussenhoven 2004: 29)
- "It seems that tone always associates to prosodic entities, but languages can differ as to whether the syllable or the mora is the TBU." (Yip 2006; similar observation in Hyman 2001a)
- "In TGTM languages the tone bearing unit in the lexicon is the morpheme; in the sentence, it is the word, formed of a tonal lexical item plus its atonal grammatical affixes. The tonal melody which characterizes the tone of the lexical item fully determines the pitch of the suffix or string of suffixes. In many cases, the melody simply extends, or rather deploys itself over the number of syllables available." (Mazaudon 2005)

Almost forty years ago, Ilse Lehiste (1970, cited in Hyman 2005) observed: "A certain degree of vagueness seems to characterize most discussions of prosodic features." In the above quotes, the first two authors use TBU as a phonological unit (either segmental or prosodic) that can accept a tone; Yip's quote appears to be more specific, as Gussenhoven does not here state what 'elements' can appear in the CV tier. For both of these authors, the TBU may be seen as the phonological domain under the tone, although they disagree as to how directly tone relates to segments.

By way of contrast, Mazaudon appears to define TBU as the domain over the tone. Her first observation is that morphological units have tone in their lexical entries (this may be taken as definitional of a tone language). Second, she notes that when Tamangic morphemes are combined into a word, suffixes are toneless; their pitch specification is determined by the tonal category of their lexical morpheme. Similar effects determine which lexical tone specification gets pronounced when compounds are formed. In Mazaudon's usage, TBU is the morphological unit in which only a single tone specification is found in the pronounced form. For Gussenhoven and Yip, TBU is the phonological unit which receives a tonal pitch command.

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Notes

1) The validity of Naga as a linguistic genealogical subgrouping is not universally accepted (Burling 2003).
2) It should be noted that fieldwork with other speakers of this same dialect have not found evidence for tonal distinctions (Nagano 2003). Subsequent versions of Lin (forthcoming) arrive at the surface form via a different derivation. However, the relevant observations – lexical tone can only be specified on the final syllable, and the remaining tone assignments are not distinctive – are unchanged.
3) /HL/ and /LH/ have been substituted for Ding's /F/, /R/.

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Appendix: Properties of Selected Himalayan tone systems

	Qiangic								Bodic			Tani/Mirish		Bodo-Garo		Kuki-Chin-Naga		Kiranti
	Qiang Mianchi	Qiang Muka	Jiarong Caodeng	Jiarong Lavrung	Jiarong Zhuokeji	Pumi Dayang	Pumi Niuwozi	Muya	Tibetan Lhasa	TGTM	Manange	Apatani	Gallong	Tiwa	Bodo / Boro	Kuki-Thaadow	Ao	Kham
1. 'Binary' tone values	+	+	+	+	+	+	+	+	+	-/+	-	+	-	+	+	+/-	-	+
2. Culminative	+	+	+	+	+	-	+	+	+	+	+	+	+	+	+	-	-	+
3. Restricted location	-	+	+	-	+	-	+	+	+	+	+	+	+	-	?; cf. (11)	-	-	+
4. Checked tones on right edge	-	-	+ (allophonic)		-	-	-	-	+		-	-	-	H has /-ʔ/	/-ʔ/ can shift to right edge of word	-	-	-
5a. Suffix extra-metrical	-	+	+		-		+		+	-	-	-	-	+	+		-	+
5b. Polarity	+				+											+	-	
5c. Morphological deletions	-	-	+		+				-									
5d. Tone assigned by morph	+		+													+	+	
6a. Breathy	-	-	-		-	-	-		some dialects	+ (Manang -)	-	-	-	-	-	-	-	+
6b. Voice, aspiration effects	-	-	-		-	-	-		+ (dial.)	+	+; < 100%	-	-	-	-	-	-	-
References	Evans 2008	Evans n.d.	J. Sun 2008	J. Sun 2008	Y. Lin 2008	Matisoff 1997	Ding 1998, 2006	Ikeda 2002	J. Sun 1997	Mazaudon 2004	Hildebrandt 2004, 2005	Weidert 1987	Weidert 1987	Joseph, Burling 2001	Burling, Joseph 2007	Hyman 2007	Coupe 2007	D. Watters 2003

Notes:

1. Numbers are page numbers in the given reference.
2. Minus (-) means that the source either explicitly states that the property is lacking, or the source is extensive enough to reasonably draw that conclusion.
3. Blanks represent unknown values.