

Aspects of tone change in three Krumen languages (southwest Côte d'Ivoire)¹

Peter Thalmann, Switzerland, SIL²

1.1 Objective

The aim of this article is to show some aspects of tone change in the *Krumen* language cluster (*Tepo*, *Plapo*, *Piè*). This phenomenon is triggered by a low tone. In Krumen languages, there are two low tones, one of them having association capacities. The coexistence of two low tones is indeed a puzzling fact, but it can easily be explained through the comparison with the neighbouring Grebo language, spoken across the border in southeastern Liberia.

Krumen is part of the *Western* Kru languages, yet, interestingly, there are vestiges of the low tone perfective marker, which characterizes *Eastern* Kru languages.

It is well known that in Grebo the complex tone system is governed by a number of tone change rules, whereas in Bete to the east the tones are mostly stable. In our study of three variants of Krumen, it is shown that going from west to east, the number of tone changes decreases.

1.2 Language facts

1.2.1 Linguistic classification

As mentioned above, **Krumen** is a cluster of languages found in the **Western branch** of the Kru language family. Its exact placement within the larger Niger Congo phylum is still debated till today (Marchese, 1983, 1989). Williamson and Blench (2000:11-42) have recently suggested that Kru is part of West Volta-Congo, alongside Gur-Adamawa. In Western Kru, there appear to be at least two main divisions: the Wè/Guere complex (Guere, Wobe, Glaro, Krahn) and a Kru cluster, the internal divisions of which are not yet well understood (Marchese, 1983). Kru languages are spoken both in Liberia and Cote d'Ivoire, with peoples next to the border being closely related. See MAP: KRU LANGUAGE FAMILY

1.2.2 Geographics

The Krumen area is located in south west Ivory Coast (Côte d'Ivoire). It forms a triangle reaching from San Pedro to the Liberian border to the west of Tabou, extending north to the Taï forest and south to San Pedro. See MAP: KRUMEN

The **Krumen language cluster** consists of a variety of languages or dialects.

In this article we refer to three variants :

a) **Tepo** [ted] (tèpò-wì *Tepo-langue*), spoken by an ethnic group named Tepo. The main villages are Grabo (glàgbò) (S/P) and Olodio (hlòdiò).

b) **Plapo** [ktj] (plāā-wì *Plapo-langue*), spoken by the Plapo people, who live around Tabou, a coastal town.

c) **Piè** [pye] (pié), spoken by the Piè ethnic group and by various neighbouring ethnic groupes, living between Grand-Béréby and San Pédro. On the maps, Piè is referred to as **Bereby Kru**.

¹ Article published 2018¹, 2020² revised,

Cf. Chapters on tone in: Thalmann, 1987:14s., 61ss.; revision is in progress

Our thanks go to the following people: Hémain Téba Roger (Tepo), Toto Nemlin Laurent (Plapo), Sablatou Kapet Samuel and Hié Gnahoué Adolphe (Piè), who provided the necessary information for this article. I am also thankful for the the helpful advice and input of Lynell Marchese Zogbo on several details of this study.

² c/o Poststrasse 16, CH-2504 Bienne

We will also briefly mention **Southern Grebo**³ [grj], spoken in the southeast of Liberia, across the border from the Plapo/Bapo region.

What is the relationship between Tepo and Plapo on the one hand and between Tepo/Plapo and Piè, on the other?

To the first question, we note that Tepo and Plapo might be considered dialects of the same language. But it takes some time for speakers to be able to understand each other. There are also some important differences in tone patterns, vocabulary, the verb system (especially the imperfect), as well as word order. As for Tepo/Plapo vis a vis Piè, there is no intercomprehension between the two groups. One might compare the distance as that between Italian and Portuguese. See Dialect Survey by Maire and Thalmann (1980).

2. The tonal system of Krumen

2.1 Tones on three levels – four melodies

Regarding tone, Tepo Krumen fits the general picture of the Kru languages. In the Atlas Linguistique Kru (1983:148), Marchese notes that all Kru languages studied have either four or three tone levels.

The Krumen languages are characterized by a three level tone system: High H, Mid M, Low L.

Each syllable of a given word is a potential carrier of a H (á), M (ā), L (à) tone or the sequence of LH (ǎ).

(1) Minimal tone pairs in Tepo, Plapo and Piè

H	M	L	LH
tá	tā	tà	tǎ
<i>salt</i>	<i>three</i>	<i>place</i>	<i>jump</i>

In the case of LH, the H is realized as a tone below the level of M, as a result of vertical assimilation.

We also find a floating low tone, marked as (Lb).

This tone system exists in the three Krumen variants Tepo, Plapo and Piè.

Tepo Krumen is different from the other speech variants in that the H tone has two realizations; cf. (33) ss.:

- a) a rising high, which we symbolize as H⁺, and
- b) a level high, which we mark as H⁻.

(2) The following phonetic rule describes the conditions of the two realizations:

/H/ [H⁻] / _____ H
[H⁺] / elsewhere

Note this example:

- (3) /5 pí nié/ [M H⁻ H⁺] (she, draw, water) *She drew water.*
/5 dé nié pí [M H⁻ H⁻ H⁺] (... PERFNEG⁴ ...) *She did not draw water.*

³ Referred to as Grebo in this article.

⁴ PERFNEG = negative perfective

2.2 Two low tones: La and Lb – the case of Tepo Krumen

Both of the two following examples contain a L tone:

- (4) /[t̄ b̄ u b̄ u ē]/ (buy, orange) *Buy an orange.*
 /[h̄ a b̄ u b̄ u ē]/ (remove, ...) *Pick an orange.*

But the tones of these verbs behave differently in the following examples:

- (5) /b̄ t̄ t̄ b̄ u b̄ u ē/ [b̄ t̄ (L) ...] *She should buy an orange.* (b̄ = that-she/he)
 /b̄ t̄ h̄ a b̄ u b̄ u ē/ [b̄ t̄ h̄ a` (ML) ...] *She should remove the orange.*
 (6) /b̄ t̄ t̄ b̄ u b̄ u ē/ [b̄ t̄ t̄ (L) ...] *I need to buy an orange.*
 /b̄ t̄ h̄ a b̄ u b̄ u ē/ [b̄ t̄ h̄ a (HL) b̄ u b̄ u ē] *I need to pick an orange.*

First observation: The low tone of the verb *h̄ a remove* attracts the tone to the left, i.e. it undergoes **tone spreading**. This is not the case for the low tone in the verb *t̄ t̄ buy*.

The two following examples reveal another difference in tonal behavior of these two lows:

- (7) /t̄ t̄ k̄ e b̄ u b̄ u ē/ [t̄ t̄ k̄ e (M) ...] (buy, today, orange) *Buy an orange today.*
 (8) /h̄ a k̄ e b̄ u b̄ u ē/ [h̄ a k̄ e (L) b̄ u b̄ u ē] *Pick an orange today.*
 (9) /b̄ t̄ h̄ i l̄ e/ [... h̄ i (L) l̄ e (H)] (that-he, pass, there) *He should pass there.*
 (10) /b̄ t̄ h̄ t̄ l̄ e m̄ u/ [b̄ t̄ h̄ t̄ (M) l̄ e (L) m̄ u] (that-he, leave, there, PP⁵) *He should leave there.*

Second observation: The low tone of *h̄ a remove* spreads to the following element of the verb phrase *k̄ e today* to the right (which belongs to the verb phrase). This is not the case for the low tone in *t̄ t̄ buy*.

These different tonal behaviors of *t̄ t̄ / h̄ i* and of *h̄ a / h̄ t̄* lead us to **conclude** that we need to distinguish **two low tones**:

- a) the tone of *t̄ t̄ buy*, *h̄ i pass*, which we symbolize by **La**, and
- b) the tone of *h̄ a remove*, *h̄ t̄ leave*, which we mark **Lb**.

(11) Here is a summary of the characteristics of **La** and **Lb**:

- the tone **La** remains stable (no tone association)
- the low tone **Lb** causes tone association

So far, we have seen that the **Lb** low tone

- a) *spreads to the right (within the verb phrase)*, cf. (8) and
- b) *attracts the tone on the left*, cf. (5)b et (6)b.

If the distinction between **La** and **Lb** is not relevant, we simply mark **L**.

So, we can state that the **tone inventory of Tepo Krumen** contains the following tones: **Four level tones H, M, La, Lb** and a **sequence of two tones LH**. On their basis, **noun and verb classes are established**. The verbal tone classes are based on the imperative⁶.

The four tones can be identified with the features [HIGH] [LOW] [EXTREME]:

(12)

		HIGH	LOW	EXTREME
high	H	+	-	-
mid	M	-	-	-
low a	La	-	+	+
low b	Lb	-	-	+

⁵ PP = postposition

⁶ There is also a M(Lb) verbal tone class in Tepo, which we are not going to discuss in this paper.

2.3 The two low tones La and Lb – parallels in Grebo (Liberia)

A look at the GREBO-ENGLISH dictionary by Gordon Innes (1969) reveals interesting parallels. Innes identifies a four level tone system: 1 high, 2 mid, 3 low, 4 very low. Among the low tones 3 and 4, he identifies a rising low 3-2 tone and a level low 3.

(13) Parallels between Grebo and Tepo:

	Grebo	Tepo
<i>buy</i>	tĩ ³⁻²	t̃ La
<i>pass</i>	hĩ ³⁻²	h̃ La
<i>remove</i>	ha ³	h̃ Lb

Note that the **Grebo 3-2** tone corresponds to the **Tepo La** tone, while the **Grebo 3** tone echoes the **Tepo Lb** tone. These parallels are found not only with verbs, but also with other word classes.

See section 7. **Appendix** for a more detailed **comparison between Krumen Tepo and Grebo**.

It is important to note that in Tepo and Plapo Kru the **personal pronouns** of the **2nd person singular and of the 1st person plural**, as well as the **relative pronouns** and **some emphatic pronouns** carry the tone **Lb**, which corresponds to the **Grebo tone 3**.

3. Tone changes in Krumen explained by universal tone change rules

3.1 An overview: Association & dissociation, tone genesis & lowering

In this section, we are first going to give a **brief overview** on the **inventory of the tone change rules** found in the Krumen cluster before giving examples of their application.

In what follows, we will examine tone change in the perfective aspect (section 4) and after low tone pronouns (section 5).

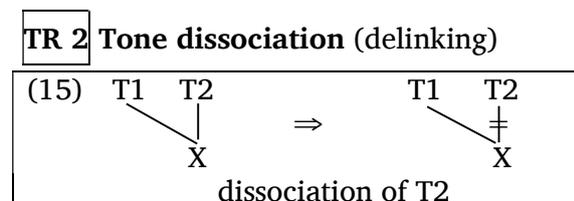
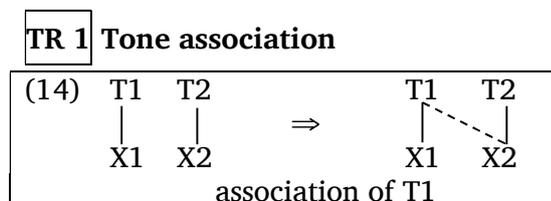
To explain tone changes within the Krumen cluster, we use the autosegmental approach.

As in many other languages, in Tepo Krumen, we find **four tone rules (TR)** describing the following processes: **association, dissociation, tone genesis, tone lowering**.

a) Association (linking, tone spreading) and b) dissociation

The process of association involves tone spreading,

- 1) in general movement to the **right** (even though we will also see instances of right-to-left association), but also
- 2) attraction of the tone on the **left**:

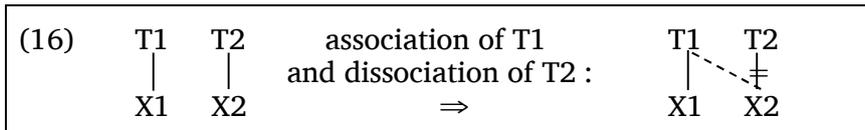


According to the conclusion in (11), the association process happens in the presence of a Lb ton.

Dissociation is the opposite of association: A tone undergoes delinking from the tone bearing unit. This leads to tone simplification: a contour tone becomes a level tone.

The two rules TR 1 and TR 2 together describe the process of **replacing one tone by another**:

TR 1 + 2 Replacement = association + dissociation

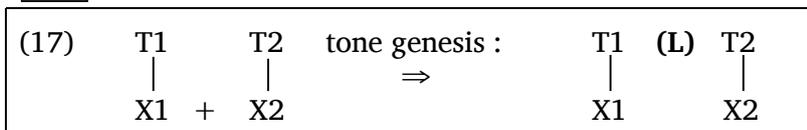


Tone genesis and tone lowering

c) Tone genesis (genesis of a Lb)

The processes of **tone genesis** and **tone lowering** are described by the tone rules TR 3 and TR 4. Tone **genesis** involves the creation and insertion of a tone within a specific grammatical and/or phonological environment.

TR 3 Genesis of a floating low tone⁷



The question arises whether this L is La or Lb. Below and in section 3.2.2, we are going to present the evidence that it is a **Lb tone**.

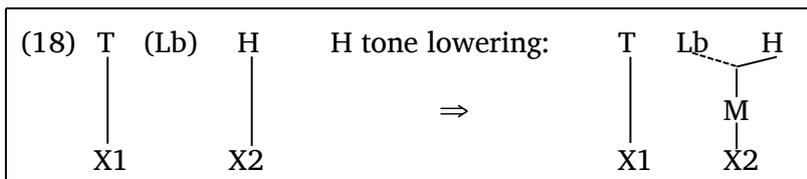
d) Tone lowering (caused by a low tone)

Once the **floating low tone** has been **inserted**, it may cause **lowering of a H tone to the M level**: Features of the high and the low are selected to form a M – see (37).

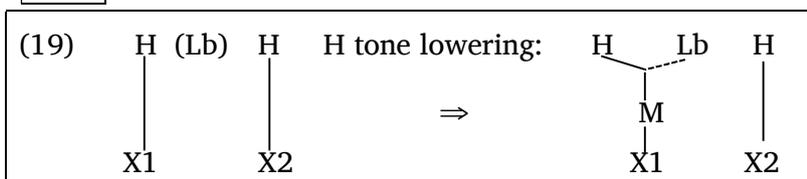
According to the context, the **floating low affects** either the **following H** (TR 4a) or the **preceding H** (TR 4b). This means that either **TR 3 plus TR 4a** will be combined, or **TR 3 plus TR 4b**:

TR 4a The floating low causes **tone lowering of the following H** (progressive change)

As we are going to see, in order for the floating low tone to be able to cause tone lowering, it has to associate, which, according to (11), means that it has to be a Lb tone.



TR 4b The floating Lb causes **tone lowering of the preceding H** (regressive change)



The examples of the following sections illustrate these four tone rules.

3.2 Association (TR 1) and dissociation (TR 2)

The processes of association and dissociation are described by TR 1 and TR 2 (see above):

⁷ floating tones are put into brackets

3.3 Tone genesis (TR 3) and tone lowering (TR 4)

3.3.1 Word formation - composition and tone change

We will see that tone change occurs in the following areas:

- a) in **composition** and
- b) in **derivation**
- c) in specific **phonological** contexts

Marchese (1983:162) notes that the lowering of tone in the second element of compounds seems to be a general characteristic in Kru languages, giving examples from both Western (Nyabwa, Wobe, Guere) and Eastern Kru (Bete, Godie Gbadi). In her analysis of the same type of constructions, Paradis (1984:147ss.) postulates the presence of a floating low tone between the two elements of the compound.

Interestingly, the same phenomenon of "tone lowering" in compounds can be observed in English, German and other languages. There is a difference in intonation with *a black bird* and *a blackbird*: we note a lowering of intonation in the second part of the compound.

Indeed, the same tone lowering affects these same structures **throughout the Krumen cluster**, as seen in the following examples of the associative (genitive) construction and a compound with the same morphemes (*cow* + *offspring* = *calf*):

(26) *cow* in **Tepo** = brī / in **Plapo** = blī / in **Piè** = brē

Tepo:	<u>associative construction</u>		<u>compound</u>
	brī ā jú (<i>cow</i> / CN ⁹ / <i>offspring</i>) <i>offspring of a cow</i>	>	brī-jū <i>calf</i>
	M M <u>H</u>		M <u>M</u>

As for the **Krumen cluster** (Tepo, Plapo, Piè), we postulate two processes: **tone genesis of a floating low tone, causing tone lowering of a H to M**.

This is illustrated as follows:

TR 3 Tone genesis of a floating low (Lb) - see (17)

(27)	M		H		tone genesis :	M	(Lb)	H
					TR 3			
	brī	+	yú	=>		brī		yú
	<i>cow</i>		<i>offspring</i>					

In the process of forming a **compound of two nouns**, a **floating low tone (Lb)** is generated between the two nouns.

Tone generated in the compound is formalized as follows: $\emptyset > (\text{Lb}) / [\text{T}______ \text{H}]_{\text{compound}}$

This process is followed by **tone lowering**:

TR 4a Progressive tone lowering - see (18)

(28)	M	(Lb)	H		H tone lowering :	M	(Lb)	H
					TR 4a			
	brī	+	yú	=>		brī	yú	M
								yú
								<i>calf</i>

In general terms, we have:

$(\text{Lb}) \text{ H} > \text{M} / [\text{T}______]_{\text{compound}}$

⁹ CN = connective or associative marker

3.3.2 Word formation - derivation and tone change

The following examples show that tone genesis causing tone lowering from H to M also takes place in the **derivational process of reduplication** of a **verb stem** in order to derive another **verb stem** (V → V) or a **noun stem** (V → N):

- (29) lá *tuer* > lá-lá > lí-lá = *preliminary form*, which is actually **lí (L) lá**
 > $\underline{V \rightarrow V}$: lí-lá > lí-lā *kill each other, kill here and there*
Tepo, Plapo, Piè¹⁰: H H H M
- $\underline{V \rightarrow N}$: lí-lá *killing, the act of killing*
Piè: H H (no tone lowering)
Tepo, Plapo: lí-lá > lī-lá *the act of killing*
H H > M H

In this process of reduplication, two levels have to be distinguished: segments and tone. Regarding the segments, lá > lá-lá > lí-lá (vowel raising in the prefixed derivative morpheme).

It is very interesting to see that in the **V → V derivation**, the floating low (Lb) causes the **lowering of the following tone** (partial progressive assimilation; as in the the compound bri-jū), whereas in the **V → N derivation**, the floating low causes the **lowering of the preceding tone** (partial regressive assimilation).

There is one **exception**: Piè has **no tone lowering in the V → N derivation**.

Here is the autosegmental representation of these examples:

TR 3 Tone genesis of (Lb)

- (30) $\begin{array}{ccc} \text{H} & & \text{H} \\ | & & | \\ \text{lá} & + & \text{lá} \\ >\text{lí} & + & \text{lá} \\ \text{DER}^{11} & & \text{kill} \end{array} \quad \begin{array}{c} \text{tone genesis:} \\ \text{TR 3} \\ \Rightarrow \end{array} \quad \begin{array}{ccc} \text{H} & (\text{Lb}) & \text{H} \\ | & & | \\ \text{lí} & & \text{lá} \end{array}$
- (generalization: V→V / V→N derivation)

This process can be formalized as follows:

$$\emptyset > (\text{Lb}) / [\text{H} ______ \text{H}]_{\text{verb reduplication}}$$

Then H tone lowering occurs, in two ways:

First: In the case of V→V derivation, it is the second H tone that is lowered (TR 4a), and the first syllable is interpreted as prefixed verbal distributive derivative. The result is the verb **lí-lā** *kill one another*:

TR 4a Progressive tone lowering

- (31) $\begin{array}{ccc} \text{H} & (\text{Lb}) & \text{H} \\ | & & | \\ \text{lí} & + & \text{lá} \\ \text{DER-DIST}^{12} & & \text{kill} \end{array} \quad \begin{array}{c} \text{H tone lowering:} \\ \text{TR 4a} \\ \Rightarrow \end{array} \quad \begin{array}{ccc} \text{H} & \text{Lb} & \text{H} \\ | & \text{---} & | \\ \text{lí} & & \text{M} \\ & & | \\ & & \text{lā} \end{array}$
- kill (distributive > reciprocity, repetition)*

Tone lowering according to TR 4a in duplicated H tone verbs applies to Krumen Tepo, Plapo and Piè.

In general terms, we have:

$$\text{Lb H} > \text{M} / [\text{H} ______]_{\text{V} \rightarrow \text{V} \text{ derivation}}$$

¹⁰ in Piè, the form is lí-rā

¹¹ derivative morpheme (meaning of *nominal and verbal generalization*)

¹² distributive derivative

4. The (Lb) low tone perfective marker in the Krumen languages

In terms of verbal aspect, Marchese (1979, 1983:30ss., 1986:29ss.) posits for proto-Kru the **distinction perfective-imperfective**. This is the basic aspectual distinction in Krumen Tepo, Plapo and Piè.

Marchese (1986:35) further states that "in **Western Kru** the perfective¹⁷ is expressed by a **bare verb stem**, while in **Eastern Kru**, the perfective is expressed by **low tone** on the verb stem....".

This statement is followed by double hypothesis: In **Proto-Kru**, the **perfective aspect** ...

- a) was marked by **low tone** but "was subsequently **lost in all Western languages**",
- b) was marked by a bare verb stem, and "those **Eastern** languages with **low tone perfective** would have **acquired** this marker through some innovative process".

The **Krumen** cluster is classified as belonging to **Western Kru**, yet, as we are going to show, there are vestiges of a **low tone perfective marker**.

Consequently, the **findings in the Krumen** language cluster would support the assumption expressed under a) and **point to the fact that the low tone perfective marker was present in Proto-Kru** but was subsequently lost – **except** for the vestiges found in Krumen.

In Marchese (1986:34-35), we find evidence from languages in Eastern Kru that the perfective aspect is widely marked by a **low tone suffix**:

(46) Examples of low tone perfective markers in Eastern Kru:

	stem	perfective	
Godié	nú fétē	nú` fètè	<i>hear</i> <i>pierce</i>
Vata	nú	nú`	<i>understand</i>
Koyo	ńlá	ńlà	<i>drink</i>

Accordingly, the **Krumen tonal perfective marker** will be considered as a **tonal suffix**.

Let us briefly present the ways the three Krumen languages signal this perfective-imperfective distinction, using the examples containing the words **pī** *cook*, **gbā/kpā** *take*, **dē** *something*, **tè/mò** *as*, in the sentences "As s/he cooks/takes something. // As s/he cooked/took something."

(47) **Aspectual distinction imperfective : perfective**

	Tepo	Plapo	Piè
Imperfective markers *)	Auxiliary ɲē / - ṽ	a) Auxiliary jū b) derivative morpheme ɛ	derivative morpheme ɛ
Imperf. examples	tè ̄-̄ dē pī ¹⁸ tè ̄-̄ dē gbā	a) tè ̄ jū dē nī pī b) tè ̄ gbē dē	mò´ ̄ piē dē mò´ ̄ kpē dē
Perfective examples	tè ̄ pī dē tè ̄ gbā dē	tè ̄ pī dē tè ̄ gbā dē	mò´ ̄ pī dē mò´ ̄ kpā dē
Perfective marker	Low tone derivative (Lb), to be developed in this section.		

*) In Plapo, strategy a) is used with verbs containing a front vowel, b) is used with verbs containing central and back vowels.

¹⁷ called *factative*

¹⁸ Example with **ɲē**:- tè ̄-̄ gblā pī as she cooks rice > tè ̄ **ɲō** pī as she cooks it (ɲō < **ɲē** + ɔ)

In Piè, sentences that contain M or L tone verbs ending in -ε / -e / -ə are ambiguous as to the distinction between perfective and imperfective aspect; e.g. *mò' ē klē dē lé* (... , carry, thing, head) has the two meanings *as she carried sth. on her head / as she is carrying sth. on her head*; and *mò' ē brō* is either *as s/he sang* or *as s/he is singing* or *sings*.

In section 2.2, we discovered that the low tones of the verbs *tò* to buy and *hà* to pick behave differently according to their tonal environment. This is evidence for the existence of **two low tones**: a stable **low tone La**, and a **low tone Lb**, which causes tone change in that it attracts the preceding tone (Tepo) and spreads on the following element within the verb phrase or verbal constituent (Tepo and Plapo) - see (11).

The following **Tepo** examples are in the **imperative/injunctive mood**, where the **two different tonal behaviors** show up.

(48) Tonal behaviors of non-perfective L tone verbs (*kē* = today):

verb carrying La > <i>tò</i> to buy		verb carrying Lb > <i>hà</i> to pick
<i>tò būbuē</i>	<i>buy/pick an orange</i>	<i>hà būbuē</i>
<i>tò kē būbuē</i> L M no spreading	<i>buy/pick an orange today</i>	<i>hà kē būbuē</i> L L 1x spreading
<i>bō tò kē būbuē</i> L M no spreading <i>that-she, buy, today, orange</i>	<i>she should buy/pick an orange today</i>	<i>bō hā kē būbuē</i> M L 2x spreading

In the indicative perfective aspect, both verbs have the same tonal behavior.

(49) Tonal behavior of perfective L tone verbs:

<i>ō tō kē būbuē</i> M L <i>she, PERF-buy, ...</i>	<i>She bought/picked an orange today</i>	<i>ō hā kē būbuē</i> <i>she, PERF-pick, ...</i>
--	--	--

From the examples above we draw the following **conclusion**:

- 1) In the perfective conjugation, the inherent La tone of the verb *tò* buy is replaced by a Lb tone. This low tone is to be identified as the perfective aspect marker. It is a **floating** low: (Lb).

In Krumen Tepo, it a) spreads to the next verbal element on the right, and b) it attracts the tone to the left of the verb - see (11).

- 2) The (Lb) floating low surfaces in some cases, e.g. with low tone verbs - e.g. *ō Lb tō kē M L būbuē* (49), while it remains floating in most other cases - *ō (Lb) gbā kē M M būbuē* *She took an orange today* cf. (52).

4.1 The tonal behavior of perfective verbs in Tepo, Plapo and Piè

The question arises here as to the impact of the **perfective aspect marker (Lb)** in **Krumen Tepo, Plapo and Piè**: **Where does it surface and where does it remain floating?** To answer this question, we are going to present sentences with perfective verbs. In charts (50)ss. below, they are **grouped according to language and tone**.

The sentences are in the positive and negative perfective and in the potential (non-perfective), and the verbs are monosyllabic and belong to the four verbal classes (based on their tone in the imperative): **H pí** draw (water), **BH tĩ** descend, **M gbā / kpā** take, **B tò** sell.

In the following charts, we **highlight** the elements that **undergo tone change due to the presence of the (Lb) perfective marker**.

The word order in positive declarative/perfective sentences is S V O. In negative perfectives, a **negative auxiliary** occurs (Tepo *dé*, Plapo *jĩ*, Piè *já*), giving the word order S AUX O V.

The tones are marked according to their pronunciation. A frontshifted or backshifted object (O) signals focalization - e.g. (50)c : ē dī pí nié.

(50) **H tone verbs - the (Lb) perfective marker only surfaces in Piè**

Tepo	Plapo	Piè
a) Positive Perfective: <i>S/he drew (pī) water (nié). // It's water she drew.</i>		
̄ pí nié // nié ̄ pí M H H // H M H	ē pī nié // nié ē pí M M H // H M H	ē pī jé // jé ē pī M M H // H M M
b) Negative perfective: <i>S/he did not draw water.</i>		
̄ dé nié pí M H H H	ē jī niē pí // ē jí dē pí M M M H // M H M H	ē já jé pī M H H M
c) Potential (auxiliary dī): <i>S/he will draw water. // It's water s/he will draw.</i>		
̄ dī pí nié // nié ̄ dī pí M M H H // H M M H	ē dī pī nié // nié ē dī pí M M M H // H M M H	ē dī pí jé // jé ē dī pí M M H H // H M M H

In **Piè**, the perfective is marked by a **tone lowering from H to M**.

In **Plapo**, the M tone on **pī** in **ē pī nié** is not caused by the perfective marker since we have **pí** with H on the verb in the negative perfective and in the potential clause final. The tone lowering in Plapo is caused by TR 3 + 4; see (33) and (34).

(51) **LH tone verbs - as with H tone verbs, the (Lb) perfective only surfaces in Piè**

Tepo	Plapo	Piè
a) Positive perfective: <i>He descended (tī) from the village (dís). (mú / ́ = PP¹⁹)</i>		
̄ tī mú dís // dís mú ̄ tī M L H H // H H M LH	ē tī dís // dís ē tī M L H // H M LH	ē tī ś ́ // ś ́ ē tī M L H H // H H M L
b) Negative Perfective: <i>He did not descend from the village.</i>		
̄ dé dís mú tī M H H M LH	ē jī dís tī M M H LH	ē já ś ́ tī M H H H L
c) Potential: <i>He will descend from the village.</i>		
̄ dī mú tī dís // dís mú ̄ dī tī M L H L H // H H M M LH	ē dī tī dís // dís ē dī tī M L H // H M M LH	ē dī tī ś ́ // ś ́ ē dī tī M M LH H H // H H M LH

In **Piè**, the perfective is marked by a **tone change from LH to L**.

In **Plapo** and **Tepo**, the tone change from tī LH to L in **ē tī dís** is due to TR 2 - see (25), since we have **tī** in clause final position.

¹⁹ PP = postposition

(52) **M tone verbs - the Lb perfective marker surfaces in Tepo and Plapo clause final**

Tépo	Plapo	Piè
a) Positive perfective: <i>S/he took the water (today). // It's the water she took (today).</i>		
ɔ gbā nié // nié ɔ gbā M M H // H M M ní gbā nié // nié ní gbá H M H // H M H ɔ gbā kē nié // nié ɔ gbā kē M M M H // H M M M ní = je; kē = today	ē gbā nié // nié ē gbà M M H // H M L ní gbā nié // nié ní gbà H M H // H H L ē gbā kē nié // nié ē gbā kē M M M H // H M M M	ē kpā jé // jé ē kpā M M H // H M M
b) Negative perfective: <i>S/he did not take the water / anything / hot pepper.</i>		
ɔ dé nié gbá // ɔ dé dē gbā M H H H // M H M M dē = <i>thing</i> ɔ dé pià gbà (<i>hot pepper</i>) M H L L	ē jī nié gbà // ē jí dē gbà M M H L // M H M L ē jí pià gbà M H L L	ē já jé kpā // ē já dē kpā M H H M // M H M M
c) Potential: <i>S/he will take the water. // It's the water she will take.</i>		
ɔ dī gbā nié // nié ɔ dī gbā M M M H // H M M M	ē dī gbā nié // nié ē dī gbā M M M H // H M M M	ē dī kpā jé // jé ē dī kpā M M M H // H M M M

In **Tépo**, the tone change in **clause final** position is **M > T/T___**, i.e. it is assimilated to the preceding tone.

In **Plapo**, the change in **clause final** position is from **M > L**.

(53) **La tone verbs - the Lb perfective marker surfaces only in Tepo and Plapo, in the positive clause**

Tépo	Plapo	Piè
a) Positive perfective: <i>S/he bought an orange (today). // It's an orange she bought today.</i>		
ɔ tɔ̀ bǔbuē // bǔbuē ɔ tɔ M ML M // M M M ɔ tɔ̀ kè bǔbuē // b. ɔ tɔ̀ kè M ML M // M M ML ɔ tɔ̀ tǔ bǔbuē // b. ɔ tɔ̀ tǔ M ML M // M M M LH tó = <i>hier</i> ; hiè = person name bǔbuē ní tɔ // bǔbuē hiè tɔ M H H // M L L bǔbuē ní tɔ tǔ // bǔbuē hiè tɔ tǔ M H H LH // M L L LH	ē tǔ bǔbuē // bǔbuē ē tǔ M L M // M M L ē tǔ kè bǔbuē // b. ē tǔ kè M L L M // M M L L ē tǔ tó ! bǔbuē // b. ē tǔ tó ! M L H M // M M L H bǔbuē ní tǔ // bǔbuē hiè tǔ M H L // M L L bǔbuē ní tǔ tó // bǔbuē hiè tǔ tó M H L H // M L L H	ē tǔ sàrè // sàrè ē tǔ M L L // L M L

b) Negative perfective: <i>S/he did not buy an orange.</i>		
̄ dē būbuē t̄ M H M L	ē jí būbuē t̄ M H M L	ē já sàrè t̄ M H L L
c) Potential: <i>S/he will buy an orange. // It's an orange she will buy.</i>		
̄ dī t̄ būbuē // būbuē ̄ dī t̄ M M L M // M M M L	ē dī t̄ būbuē // būbuē ē dī t̄ M M L M // M M M L	ē dī t̄ sàrè // sàrè ē dī t̄ M M L L // L M M L

In **Tepo**, in the positive perfective, the tone change is as follows: **L > T L / T_____** (T = preceding tone). **T L** is the tone pattern either on the verb if it is the only member of the VP > /̄ t̄ būbuē/ [̄ t̄ ML būbuē], or on the verb plus the next VP morpheme > /̄ t̄ kē būbuē/ [̄ t̄ kē M L būbuē], /̄ t̄ t̄ būbuē/ [̄ t̄ t̄ būbuē].

In **Plapo**, only the M tone verbal element, following the verb, carries a L: /̄ t̄ kē būbuē/ [̄ t̄ kē būbuē], but a H tone verbal element is not affected: /[̄ t̄ t̄ būbuē]/.

In **summarizing** the lists²⁰ above, we can make the following statement regarding the impact of the Lb perfective marker in the classes of **H, LH, M and La tone verbs in Tepo, Plapo and Piè**:

Tone changes only occur in *some* instances of the perfective. In most cases there is NO tone change.

#1 Piè - H and LH tone verbs, cf. 4.2

The perfective Lb tone affects only H and LH tone verbs, causing tone lowering: The perfective Lb tone and the H tone form a M tone (H + Lb > M) as in /̄ ē pí Lb H jé / [̄ ē pí jé].

In LH verbs, the M is left floating (LH + Lb > LM > L(M)) as in /̄ ē t̄ LH Lb d̄ t̄ / [̄ ē t̄ d̄ t̄]. This process occurs in any position, in positive and negative clauses.

#2 Plapo and Tepo - M tone verbs, cf. 4.3 and 4.3.1

- The (Lb) floating low tone of the perfective has an impact on M tone verbs in prepausal position (end of the clause) of positive and negative clauses.
- There is however a difference between Tepo and Plapo:
In **Plapo**, the verb carries a **L tone** as in ē jī nié gbà *She did not take the water*, whereas in **Tepo**, the tone of the verb carries the **preceding tone** as in ̄ dē nié gbá. The Tepo perfective Lb tone attracts the preceding tone, which is not the case in Plapo.

This gives evidence to the fact that the perfective Lb low tone replaces the inherent lexical mid tone in prepausal position both in Plapo and Tepo.

In fact, the Lb tone acts differently in each language.

#3 Plapo and Tepo - La tone verbs, cf. 4.4

- The floating Lb low tone of the perfective has an impact on La low tone verbs in any position of the positive clause: The perfective tone Lb replaces the lexical low tone. In Plapo and Tepo, it spreads to the next verbal element, if present, as in ē t̄ kē dē *She bought sth today*. (In Plapo it only spreads if a M tone verbal element is present, it does not spread to a H tone element.)
- In Tepo, in addition, it attracts the preceding tone, as in ē t̄ kē dē.

²⁰ There are two additional **marginal verb classes in Tepo**, where Lb is involved: **M(Lb)** - e.g. nī to be, nā walk, jā to bring - and **Lb** -hà to take away, h̄ to leave. Since they are not relevant in this discussion, we do not include them here.

(54) Summary: The **impact of the perfective low tone suffix (Lb)** in Tepo, Plapo and Piè:

Tepo	Plapo	Piè
		#1) high tone verbs H / LH H (Lb) > M (TR4) LH (Lb) > LM > L (TR4 + 2) contexts : positive and negative perfective in any position
		#2a) mid tone verbs M (Lb) > Lb (TR1 + 2 = replacement) contexts : - pos. and negative perfective - clause final (pre-pausal)
#2b) Lb > T Lb / T ____ (TR1) Lb attracts the tone to the left		
		#3a) low tone verbs La (Lb) > Lb (TR1 + 2 = replacement) context : - positive perfective - in any position
#3b = #2b		

(55) **Alternative presentation of the same facts:**

+ indicates that the perfective Lb marker surfaces in the indicated verb classes

Language →	Tepo (4.4)	Plapo (4.4)	Tepo (4.3)	Plapo (4.3)	Piè (4.2)
<i>Tonal verb class</i> →	L	L	M	M	H / LH
positive perfective	+	+	+	+	+
negative perfective			+	+	+
perf. pre-pausal			+	+	

Conclusion: The perfective is marked by a derivative morpheme in all the three Krumen languages. It consists of a floating low tone (Lb). Its characteristics vary from one language to another.

The differences between Plapo and Tepo are due to the fact that in Tepo, the Lb tone attracts the preceding tone, while in Plapo it does not.

Passing from Tepo (northwest) to Plapo (southwest) and to Piè (east), the tone changing power of (Lb) decreases.

In sections 4.2 to 4.4, we are going to look into more details regarding the impact of the (Lb) perfective marker in Piè, Plapo and Tepo.

4.2 The perfective in Piè H tone verbs

The charts (50) and (51) above show that in the perfective aspect, through a tone lowering process, H tone verbs become M tone verbs (H > M), and LH tone verbs become L tone verbs (LH > L). Let us look at the details of the tone change rules involved:

(56) H pí draw (water)

Positive perfective: ē pī né S/he drew water. // né ē pī It is water s/he drew.

Negative perfective: ē já né pī S/he did not draw water.

(57) LH $t\check{i}$ descend / s \acute{o} \acute{u} village at

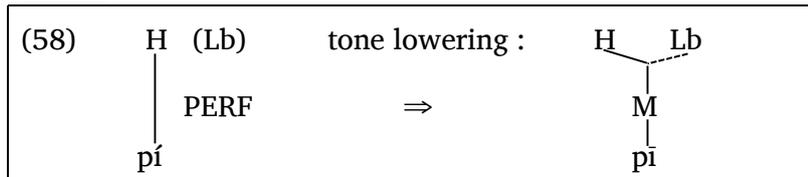
Positive perfective: $\bar{\epsilon}$ $t\check{i}$ s \acute{o} \acute{u} S/he descended from the village.

Negative perfective: $\bar{\epsilon}$ j \acute{a} s \acute{o} \acute{u} $t\check{i}$ He did not leave the village.

This tone lowering is caused by the (Lb) floating low tone perfective marker. It occurs in any position, in the positive and in the negative. That indicates that this morpheme **cannot be a grammatical marker on the clause level** but that it is a **verbal derivative tone suffix**.

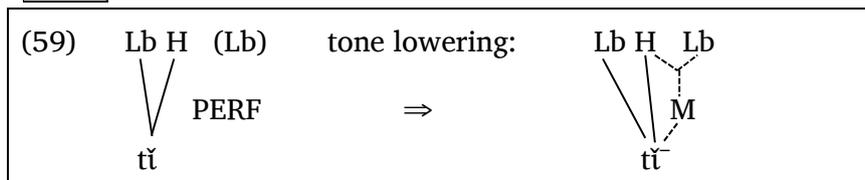
In the H > M change, the tone lowering rule TR 4a applies - see (28) - to both the H tone and the LH tone verbs:

TR 4b Tone lowering in H tone verbs

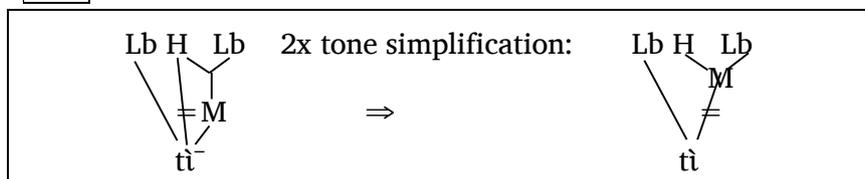


As to the LH verbs (in fact LbH - see appendix), the tone change can be explained as follows: In a first step, tone rule TR 4a is applied. This causes the lowering of H to M.

TR 4b Tone lowering in LH tone verbs and subsequent ...



TR 2 ... dissociation (tone simplification)



In this section, we have seen that in Krumen Piè, the (Lb) perfective marker has a tone lowering effect on the H and LH tone verbs.

4.3 The perfective in Plapo and Tepo M tone verbs

4.3.1 Comparison between Plapo and Tepo

As to Plapo and Tepo Krumen, chart (52) shows that it is the M tone verbs that are affected by the (Lb) perfective marker: They are realized with a low tone in prepausal position, in the positive and the negative.

Consider the following **Plapo and Tepo** examples. They seem to be incompatible. But in section 4.3.1, the tone changes in Tepo will be explained, and it will become clear why Tepo is different from Plapo.

(60) gbā nié (take / water) Take the water (# = pause)

Plapo	Positive perfective	Tepo
ē gbā nié #	<i>He took the water.</i>	ō gbā nié #
nié ní gbà # <u>L</u>	<i>It is the water that I took.</i>	nié ní gbá # <u>H</u>
nié ē gbà # <u>L</u>	<i>It is the water that he took.</i>	nié ō gbā # <u>M</u>
nié hiè gbà # <u>L</u>	<i>It is the water that Hie took.</i>	nié hiè gbà # <u>L</u>
nié ní gbā kē #	<i>It is the water I took today.</i>	nié ní gbā kē #
In the first and last example above, the verb is not in prepausal position. Consequently, the perfective Lb tone cannot associate.		
Plapo	Negative perfective	Tepo
ē jī nié gbà # <u>L</u>	<i>He did not take the water.</i>	ō dé nié gbá # <u>H</u>
ē jí pià gbà # <u>L</u>	<i>He did not take the hot pepper.</i>	ō dé pià gbà # <u>L</u>

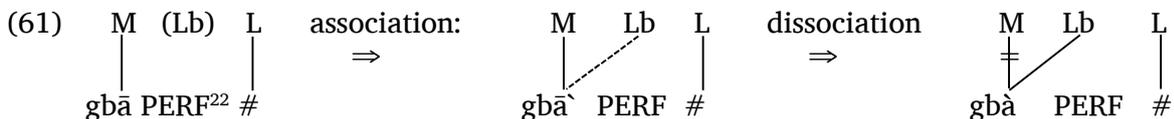
Below, there are the tone rules that govern tone change in these examples.

The first phase – TR 1 and TR 2 – is identical for Plapo and Tepo:

- association of the floating Lb tone of the perfective derivative to the verb in prepausal position, and
- dissociation of the lexical M tone (to avoid the sequence LM, which is not allowed).

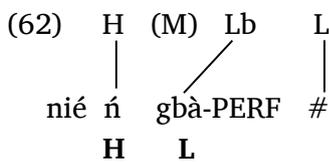
It is a known fact that the clause sentence final pause is linked to a low tone. It is obviously this **pausal L tone**²¹ that somehow **triggers the association of the floating (Lb) of the perfective** to the verb.

TR 1 + 2 Tone replacement by association and dissociation, cf. Fehler! Verweisquelle konnte nicht gefunden werden. + Fehler! Verweisquelle konnte nicht gefunden werden.



The result is the following:

in Plapo: final; in Tepo: prefinal, see the final Tepo form in 4.3.2



Conclusion: In **Plapo** and **Tepo**, the **Lb** perfective marker **replaces the lexical M** tone in **prepausal position**. In **Plapo**, this is the **final** stage.

In **Tepo**, the tone changes go a **step further**, as we will see in the next section.

4.3.2 The perfective in Tepo - additional changes in M tone verbs

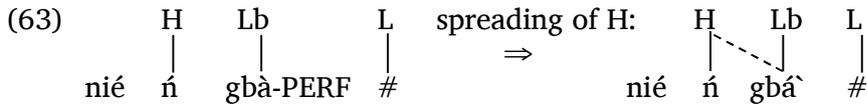
As was pointed out before, this **second phase** concerns a phenomenon which is **peculiar to Tepo Krumen**: As demonstrated in (60), the verb carrying the **perfective Lb** attracts the **preceding tone**.

²¹ unspecified regarding the distinction between La and Lb

²² perfective derivational morpheme

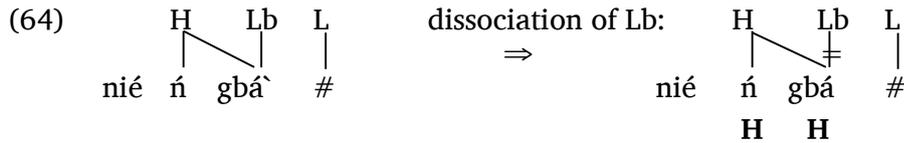
According to TR 1, the low tone Lb attracts the tone to the left:

TR 1 Association - cf. Fehler! Verweisquelle konnte nicht gefunden werden.



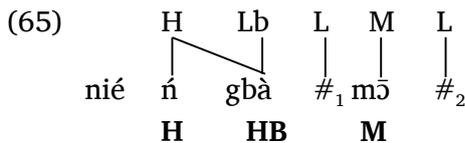
Then TR 2 is applied, which causes tone simplification of the falling tone TL in prepausal position (a low tone L being associated to the pause):

TR 2 Dissociation - cf. Fehler! Verweisquelle konnte nicht gefunden werden.



There is a striking contrast between Plapo (62) and Tepo (64) regarding the tone on the verb in this particular sentence: In Plapo, the verb carries the Lb of the perfective marker, whereas in Tepo, the verb carries a H tone, owing to the characteristic of the Lb in Tepo to attract the preceding tone.

The following example supports the analyses made so far. Going on from (63), we add the emphatic marker **m̄**, which results in ...



We postulate a core of the clause that is marked by a pre-margin #₁. In the slot between the pre-margin #₁ and the main margin #₂, very few morphemes can be placed, like **m̄**, which emphasizes the whole clause or sentence, or **l̄l̄l̄**, which marks repetition.

4.4 The perfective in Plapo and Tepo L tone verbs

Let us reconsider examples of the **perfective with La low tone verbs** as seen in chart (53):

(66) t̄ b̄b̄uē (buy / orange) Buy an orange. // k̄ today, t̄ yesterday

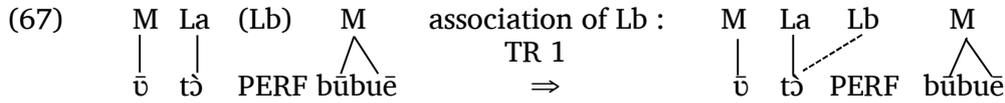
Plapo	Positive perfective	Tepo
ū t̄ b̄b̄uē	They bought an orange.	ū t̄ b̄b̄uē
ū t̄ k̄ b̄b̄uē	They bought an orange today.	ū t̄ k̄ b̄b̄uē
ū t̄ t̄ (sic!) b̄b̄uē	They bought an orange yesterday.	ū t̄ t̄ b̄b̄uē
ū t̄ pià	They bought hot pepper.	ū t̄ pià
ń t̄ pià	I bought hot pepper.	ń t̄ pià
b̄b̄uē ū t̄ #	They bought an orange today.	b̄b̄uē ū t̄ #
b̄b̄uē ū t̄ k̄ #	It's an orange they bought today.	b̄b̄uē ū t̄ k̄ #
	Negative perfective	
ū jí b̄b̄uē t̄	They did not buy an orange.	ū dé b̄b̄uē t̄

We observe that in **Plapo and Tepo, the perfective Lb tone associates in a positive sentence and that it spreads to the next verb phrase element on the right.**

In **Tepo**, it **also attracts the previous tone** (we will look at this process in section 4.4.1). That is why the impact of the Lb perfective marker is more obvious in Tepo than it is in Plapo.

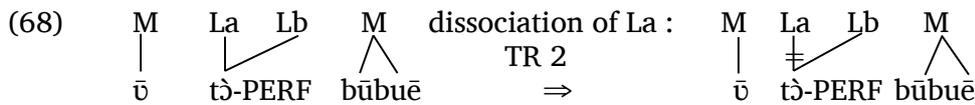
Let us now look at the autosegmental representation of the sentence *They bought an orange* in **Plapo** and **Tepo**.

The **first stage** involves the replacement of the La lexical verb tone by the Lb perfective tone. This process becomes only obvious as we consider later stages.



The Lb low tone of the perfective derivative associates to the La tone verb.

This association causes the dissociation of the lexical La tone of the verb:

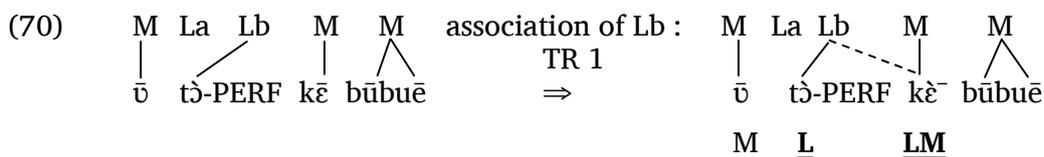


In this example $\bar{u} t\check{\text{ɔ}} b\bar{u}b\bar{u}\bar{e}$ (67), the verb is the only element of the verb phrase (VP). If the verb phrase is expanded, there are additional tone change rules that become effective.

(69) The **structure of the verb phrase**²³ is as follows²⁴:

verb + PR ²⁵	+ tense marker	+ locative pronoun	+ verbal focalization marker
	kē <i>today</i> tú <i>yesterday</i> lā <i>long ago</i> ŋà <i>tomorrow</i> etc.	lé/lí ²⁶ <i>there (3rd pers. deixis)</i> nō/né <i>here (2nd pers. deixis)</i> mō <i>here (1st pers. deixis)</i>	nī (Tepo allomorphs : lě, nǎ, mǎ)

If in the examples (67) ss. above, we add the tense marker **kē today**, we get the following:



The **Lb low tone spreads to the tense marker on the right**, which is part of the verb phrase.

Subsequently, there is a simplification of the contour tone LM:

²³ of the positive perfective

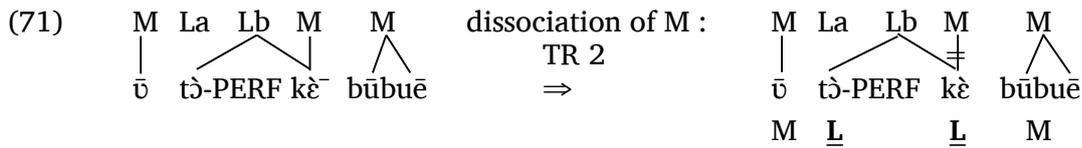
²⁴ In Tepo, Plapo and Piè, the object pronoun (PR) is the only element of the VP that has the form of a suffix. For examples of "verb + PR", see 4.4.2. The other elements - tense marker, locative pronoun, focalization marker - are phonologically independent clitics.

²⁵ In Tepo, the object pronoun is suffixed to the verb to form one syllable. In Plapo, its form is /-ṽ/, and it is suffixed to the end of the VP (excluding the focalization marker); example *S/he bought it (today / there)*: /ē t̃-ɔ̃ nī/ [ē t̃-ɔ̃ nī], *S/he bought it*; [ē t̃ k̃-è-è nī], *S/he bought it today*; [ē t̃ lí-ì nī] *S/he bought it there*.

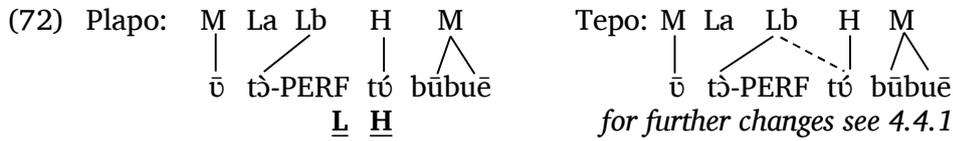
The tone change from ṽ to v̂ is due to TR 2 - dissociation for tone simplification.

²⁶ Tepo: lé, nō; Plapo: lí, né

Aspects of tone change in three Krumen languages



There is a special feature in Plapo: If the verb phrase element following the verb has a H tone, the Lb does not spread, while it does in Tepo:



(73) Examples with various elements of the verb phrase (*hì pass*, *nī FOC*²⁷), see (69)):

Plapo	Positive perfective	Tepo
$\bar{u} \text{ h}\grave{i} \text{ n}\grave{i}$ M L L	<i>They passed by.</i>	$\bar{u} \text{ h}\bar{i} \text{ n}\grave{i}$ M M L
$\bar{u} \text{ h}\grave{i} \text{ k}\grave{e} \text{ n}\bar{i}$ M L L M	<i>They passed by today.</i>	$\bar{u} \text{ h}\bar{i} \text{ k}\grave{e} \text{ n}\bar{i}$ M M L M
Plapo	Positive perfective	Tepo
$\bar{u} \text{ h}\grave{i} \text{ t}\acute{u} \text{ n}\bar{i}$ M L <u>H</u> M	<i>They passed by yesterday.</i>	$\bar{u} \text{ h}\bar{i} \text{ t}\grave{o} \text{ n}\bar{i}$ M M L M
$\bar{u} \text{ h}\grave{i} \text{ l}\acute{e} \text{ n}\bar{i}$ M L <u>H</u> M	<i>They passed through there.</i>	$\bar{u} \text{ h}\bar{i} \text{ l}\grave{e} \text{ l}\grave{e}$ M M LH LH
$\bar{u} \text{ h}\grave{i} \text{ t}\acute{u} \text{ l}\acute{e} \text{ n}\bar{i}$ M L H H M	<i>They passed through there yesterday.</i>	$\bar{u} \text{ h}\bar{i} \text{ t}\grave{o} \text{ l}\acute{e} \text{ l}\grave{e}$ M M L H LH
$\bar{u} \text{ h}\grave{i} \text{ m}\grave{o} \text{ n}\bar{i}$ M L L M	<i>They passed through here.</i>	$\bar{u} \text{ h}\bar{i} \text{ m}\grave{o} \text{ m}\check{s}$ M M L LH

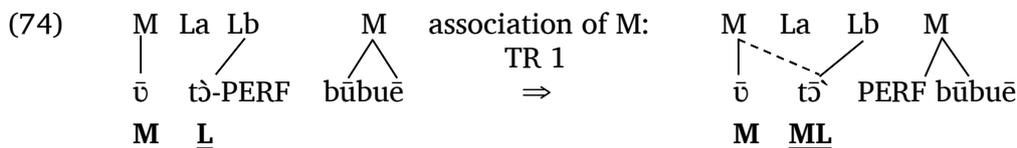
As we have seen above, the tone changes that occur follow tone rules TR 1 (spreading) and TR 2 (dissociation – tone simplification):

So far, we have seen that the lexical **La tone** is **replaced by the Lb tone** of the perfective marker and that this **Lb tone spreads to the next verb phrase element to the right**.

This is the **final stage** for **Plapo**. In 4.4.1, we will see that there is a further stage in Tepo.

4.4.1 The perfective in Tepo - additional changes in L tone verbs

We continue from the result of the example (68) and observe the following **additional tone change** that occurs in **Tepo**:

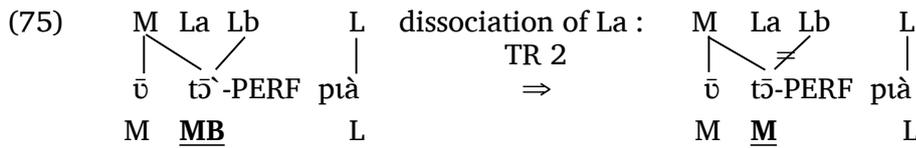


The Lb tone attracts the tone of the element to the left.

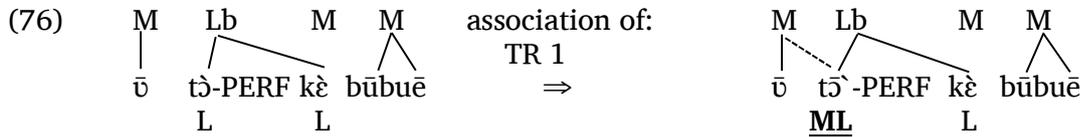
So, in Plapo, we have $\bar{u} \text{ t}\grave{o} \underline{L} \text{ b}\bar{u}b\bar{u}\bar{e}$, while in Tepo, we find $\bar{u} \text{ t}\check{s} \underline{ML} \text{ b}\bar{u}b\bar{u}\bar{e}$.

If a L follows (on the object), there is tone simplification through dissociation of Lb:

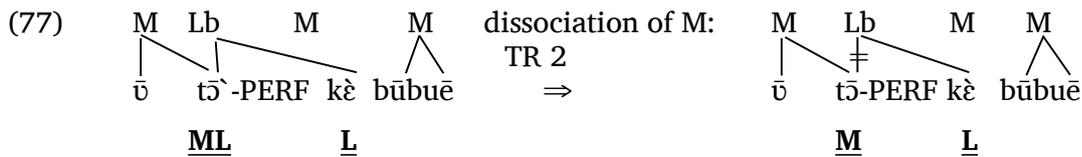
²⁷ verbal focalization marker



We take up the example (71) with the expanded verb phrase and, as in (74), observe that the Lb tone on the verb attracts the preceding tone:



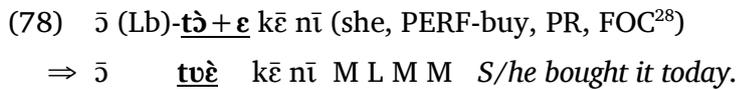
This is followed by dissociation for tone simplification:



We state again: The difference between Plapo and Tepo tone patterns results from the fact that the Lb tone behaves differently in the two languages: In Tepo it attracts the preceding tone, which is not the case in Plapo.

4.4.2 The influence of the Tepo object pronoun on tone change

In Tepo, the object pronoun has the form of \bar{u} , $\bar{\epsilon}$, \bar{v} or \bar{v} and is suffixed to the verb stem, which may undergo vowel raising. If, in the sentence / \bar{v} t \bar{o} k \bar{e} b $\bar{u}b\bar{u}\bar{e}$ / [\bar{v} t \bar{o} k \bar{e} b $\bar{u}b\bar{u}\bar{e}$] *S/he bought an orange today*, the noun is replaced by a pronoun (PR), we get the following:



We would expect * \bar{v} tv $\bar{\epsilon}$ k \bar{e} n \bar{i} M M L M.

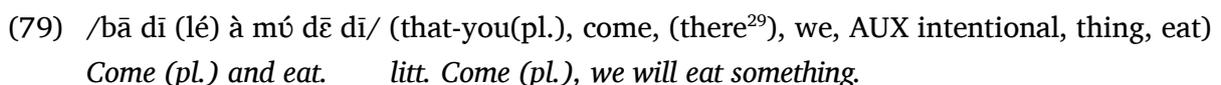
The tonal realization M L M M shows that the perfective (Lb) tone is left floating. That means that **the suffixed pronoun blocks the association of (Lb)**: the application of TR 1 is not possible.

5. The low tone subject pronouns in the Krumen languages

5.1 Tone change caused by the subject Lb pronoun (none perfective)

As in other Kru languages, in the languages of the Krumen cluster, we find pronouns with a **low tone**: the pronouns of the 2nd person singular, the 1st person plural, part of the emphatic pronouns, the relative pronouns, and it plays a part in the focalization of the subject. The question is to know whether this it is a Lb low or a La low tone.

The following sentence containing two propositions perfectly illustrates the behavior of the pronominal low tone in Krumen:



Here is how this sentence is pronounced in Plapo, Tepo and Piè:

²⁸ The verbal focus marker appears because the nominal object, which is focalized by its end position, has disappeared so that the focus now lies on the verb.

²⁹ The locative pronoun $\bar{l}\bar{e}$ only appears in Tepo.

Plapo

(80) /bā dī à mú dē dī/ [bā dī à mù dē dī]

In the autosegmental representation, it is tone rule TR 1 that applies first:

(81) $\begin{array}{cccccc} \text{M} & \text{M} & \text{Lb} & \text{H} & \text{M} & \text{M} \\ | & | & | & | & | & | \\ \text{bā} & \text{dī} & \text{à} & \text{mú} & \text{dē} & \text{dī} \end{array}$ association of La : \Rightarrow $\begin{array}{cccccc} \text{M} & \text{M} & \text{Lb} & \text{H} & \text{M} & \text{M} \\ | & | & | & | & | & | \\ \text{bā} & \text{dī} & \text{à} & \text{mù} & \text{dē} & \text{dī} \end{array}$

Then there is simplification of the contour tone through dissociation according to TR 2:

(82) $\begin{array}{cccccc} \text{M} & \text{M} & \text{Lb} & \text{H} & \text{M} & \text{M} \\ | & | & | & | & | & | \\ \text{bā} & \text{dī} & \text{à} & \text{mù} & \text{dē} & \text{dī} \end{array}$ dissociation of H : \Rightarrow $\begin{array}{cccccc} \text{M} & \text{M} & \text{Lb} & \text{H} & \text{M} & \text{M} \\ | & | & | & | & | & | \\ \text{bā} & \text{dī} & \text{à} & \text{mù} & \text{dē} & \text{dī} \\ & & \text{L} & \underline{\text{L}} & & \end{array}$

The low tone of the pronoun *à we* spreads to the following element of the verb phrase, which corresponds to characteristic a) mentioned in (11), but it does not attract the preceding tone. This behavior is typical of a Lb tone in Plapo.

Tépo

(83) $\begin{array}{cccccc} \text{M} & \text{M} & \text{H} & \text{Lb} & \text{H} & \text{M} & \text{M} \\ | & | & | & | & | & | & | \\ \text{bā} & \text{dī} & \text{lé} & \text{à} & \text{mú} & \text{dē} & \text{dī} \end{array}$ associations of Lb : \Rightarrow $\begin{array}{cccccc} \text{M} & \text{M} & \text{H} & \text{Lb} & \text{H} & \text{M} & \text{M} \\ | & | & | & | & | & | & | \\ \text{bā} & \text{dī} & \text{lé} & \text{â} & \text{mù} & \text{dē} & \text{dī} \end{array}$

(84) $\begin{array}{cccccc} \text{M} & \text{M} & \text{H} & \text{Lb} & \text{H} & \text{M} & \text{M} \\ | & | & | & | & | & | & | \\ \text{bā} & \text{dī} & \text{lé} & \text{â} & \text{mù} & \text{dē} & \text{dī} \end{array}$ dissociations : \Rightarrow $\begin{array}{cccccc} \text{M} & \text{M} & \text{H} & \text{Lb} & \text{H} & \text{M} & \text{M} \\ | & | & | & | & | & | & | \\ \text{bā} & \text{dī} & \text{lé} & \text{á} & \text{mù} & \text{dē} & \text{dī} \\ & & \text{H} & \underline{\text{H}} & \underline{\text{L}} & \text{M} & \text{M} \end{array}$

In Tépo, the number of tone changes increases because of the **two characteristics of tone Lb: a) spreading to the next element within the verb phrase (VP) and b) attraction of the preceding tone.**

Consider the difference to Plapo (81) and (82) above: In Tépo, we have two associations according to TR 1 and two dissociations according to TR 2 instead of one in Plapo.

Piè

(85) /[bā dī à mú dē dī]/

No tone change in Piè. The low tone of the pronoun *à we* does not spread onto the following element in the VP, nor does it attract the preceding tone. This raises the question whether in Piè, the pronominal low tone is a La or a Lb low. We will find the answer in the next section.

5.2 Interaction between the subject Lb pronoun and the perfective

In Krumen, when a **Lb low tone pronoun comes in contact with a Lb perfective tone** on the verb, changes may occur. These changes depend, however, on the tone class of the verb. Below we will examine how each of the Krumen languages studied here behaves in this environment.

We are going to present clauses grouped according the verbal tone classes H, LH, M, La.³⁰

In each box, the verbs appear in different contexts and show what tone changes occur. In the first clause, the verb is in prepausal position; the other clauses contain different verb phrase elements: *nī* = verbal focalization marker, *kē* = *today*, *tó* = *yesterday*.

The meaning of the sentences is *As we (climbed) ... // We (climbed) ...* (the tone of *tè / mǝ́* as, since will not be noted).

³⁰ For economical reasons, we are not going to include the marginal tone classes (Lb)M (like *nā walk*) and Lb (like *hà remove*).

(86) Sentences containing the Lb tone pronoun *à we* and being followed by a perfective verb marked by the (Lb) perfective morpheme:

tones	Tépo	Plapo	Piè ³¹
H <i>jà/ já climb</i>	tè à jǎ L <u>LH</u> à jà nī L <u>L</u> M à jà kē nī L <u>L</u> M M	tè à jǎ L <u>LH</u> à jà nī L <u>L</u> M à jà kē nī L <u>L</u> M M	mò' à jà L <u>L</u> à jà nī L <u>L</u> M <i>like the M verbs below</i>
LH <i>tǐ descend</i>	tè à tǐ L LH à tì nī L L M à tì kē nī L L M M	tè à tǐ L LH à tì nī L L M à tì kē nī L L M M	mò' à tì L <u>L</u> à tì nī L <u>L</u> M <i>like the L verbs below</i>
M <i>mū leave, go</i>	tè à mù L <u>L</u> à mù nī L <u>L</u> <u>L</u> à mù kē nī L <u>L</u> <u>L</u> M à mù tó nī L <u>L</u> <u>L</u> M	tè à mù L <u>L</u> à mù nī L <u>L</u> <u>L</u> à mù kē nī L <u>L</u> <u>L</u> M à mù tó nī L <u>L</u> H M	mò' à mù <u>L</u> <u>L</u> à mù nī L <u>L</u> M !!
tones	Tépo	Plapo	Piè ³²
L <i>hì pass</i>	tè à hì L L à hì nī L L <u>L</u> à hì kē nī L L <u>L</u> M à hì tó nī L L <u>L</u> M	tè à hì L L à hì nī L L <u>L</u> à hì kē nī L L <u>L</u> M à hì tó nī L L H! M	mò' à hì L L à hì nī L L M

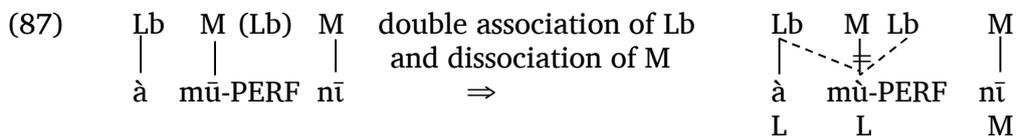
We are going to see what processes occur in the different Krumen languages, which explain the realizations of the sentences in the chart above, which are the parallels and which are the differences. Let us start with the sentence *We went (away) = We left (verb mū go)*.

Piè

We already saw in (50) s. and (58) ss. that the perfective derivative causes a tone lowering of the H and LH tone verbs, i.e. H becomes M and LH becomes L. So, in the perfective, only two verb classes are left: M and L tone verbs.

What is surprising is the fact that in Piè, we find the M tone verb *mū* with L *mù* after the L tone pronoun: *à mù nī L L M*. This does not seem to be compatible with the conclusions drawn previously, namely that in Piè, the Lb tone does not spread to the right and that it does not attract the tone to the left.

The only explanation for a low on *mū go* and *jà climb* seems to be the impact of the double presence of the pronominal low and the floating perfective low, a constellation which triggers a double association. And since only a Lb low has spreading capacity, we conclude that the pronominal low in Piè is a Lb low as in Plapo and Tepo.



Lb spreading to the right in Piè is only found in this context: The **double presence of the Lb low tone subject pronoun and of the perfective Lb low tone suffix on the verb**.

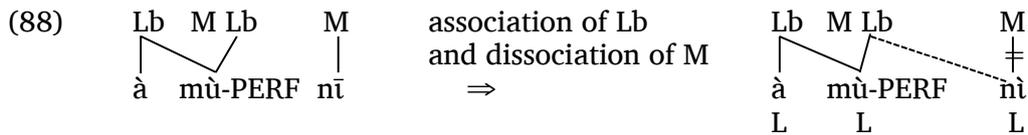
Plapo, Tepo

In Plapo and Tepo, the same processes as in (87) take place.

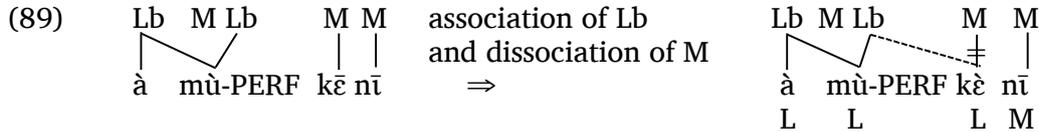
In a next step the perfective Lb on the verb spreads to the following VP element on the right:

³¹ In Piè, kē and tó correspond to adverbial phrases.

³² In Piè, kē and tó correspond to adverbial phrases.



The following is an example with *two* postverbal VP elements - the tense marker *kē today* and the verbal focalization marker *nī*:



As we have already seen, if the tense marker carries a H tone as in *tó yesterday*, the perfective Lb does not attach in Plapo. Thus, for /à mù tú nī/ *we left yesterday*, we have:

Tepo: [à mù t̃ nī] L L L M, Plapo: [à mù tú nī] L L H M - see the chart above.

At this point, we can give an overview on the behavior of the Lb low tone in a given language and a given context.

(90) The behavior of the **pronominal** and the **perfective Lb low tone** in Krumen:

Tone change caused by the Lb tone	Tepo	Plapo	Piè
H tone lowering in word formation 3.2.1	+	+ ³³	+
H tone lowering in perfective 4.2			+
right association of pronoun Lb and perfective (Lb) 4.3, 4.4, 5	+	+	(+) ³⁴
left association of pronoun Lb and perfective (Lb) 4.4.1, 5	+		

On the one hand, we observe, it is the Tepo Lb with the two characteristics of right **and left** association - see (11) - that triggers the largest number of tone rules. At the opposite side, the smallest number of tone rules is found in Piè. So we can state the following: **In the language chain Tepo – Plapo – Piè, the complexity of tone change decreases from northwest (Tepo) to southwest (Plapo) to east (Piè).**

6. Conclusions

This study of tone in three languages of the Krumen cluster (Tepo, Plapo and Piè) shows that the autosegmental model is a practical, convincing way to account for tone change with a minimum of four simple rules.

It also shows that in order to solve especially difficult problems of analysis, a perspective that looks at several related languages is key to finding possible solutions.

It is interesting to note that the existence of a low tone with association capacity triggers a variety of tone change rules, which are differently applied according to the language, explaining a great deal of variety in realization.

Comparisons between these three different languages reveal that languages show varying degrees of tonal complexity, and most notably, there is a decreasing complexity of tone change starting in Tepo in the west, passing through Plapo and going on to Piè in the east.

The complexity of changes in Tepo is due to the characteristic of a Lb low tone that causes association from the left.

³³ including H tone lowering in any context with a series of H tones; see 3.2.1

³⁴ only in conjunction with Lb pronoun and perfective (Lb) on M tone verbs

7. Appendix: Tone systems in Grebo and in Tepo Krumen

Here is a comparison between the Tepo Krumen and the Grebo tone systems. It is an expansion of section 2.3.

Innes (1966:12) states that *Grebo has a system of four tone levels Gliding tones are marked with a combination of two ... numerals joined by a hyphen*. In the Krumen languages on the other hand, there are only three levels. Does this mean that in a historical perspective, the Grebo four tone system was reduced to a three tone system in Krumen?

A brief comparison between the following two word lists of nouns and verbs reveals amazing parallels between Grebo and Tepo Krumen.

(91) NOUN, PRONOUN and VERB TONAL correspondances GREBO - TEPO

	nouns and pronouns		tone ³⁵		verbs		
	Grebo	Tepo	Grebo	Tepo		Grebo	Tepo
<i>salt</i> <i>spirit</i>	ta ku	tá kú	2-1	H	<i>to climb</i> <i>to fish</i>	ja pa	já pá
<i>heap</i> <i>time</i>	du ti	dū tī	2	M	<i>to go</i> <i>to come</i>	mu di	mū dī
<i>shame</i> <i>neck</i>	tuĩ plv	tuì plò	3-2	La	<i>to pass</i> <i>to finish</i>	hĩ wε	hì wè
<i>affair</i> <i>ten</i> <i>you, sg.</i> <i>we</i>	tu pu <u>mɔ</u> <u>a</u>	tì pù <u>mò</u> <u>à</u>	3	Lb	<i>to remove</i>	ha	hà
<i>canoe</i> <i>rice</i> <i>Object PR</i>	tv bla <u>nε</u>	tǔ gblǎ <u>ně</u>	4	LH =LbH	<i>to descend</i> <i>to swell</i>	tu pū	tǐ pǔ

Innes (1966:12 and 1969) also gives the example of a tone 1: *kí king, chief*. As can be seen in the table below, this word corresponds to the two syllable Tepo and Plapo word *kū* (short variant: *kĩ* /H M/) or /H (M)/.

(92) GREBO TONE [1] correspondances in TEPO

	nouns		tone		grammatical marker		
	Grebo	Tepo	Grebo	Tepo		Grebo	Tepo
<i>king, chief</i> <i>store</i> <i>saw n.f.</i>	kĩ to sɔ	kĩ̃ tóō sóō	1	H M	permansive morpheme	tí	tíē (plapo)
<i>piece</i> <i>plank</i>	pisi plãĩ	písĩ plãĩ̃	1 3	H M			

As can easily be seen, English loan words evoke a specific tone pattern, which disqualifies them as evidence for the existence of a tone 1 in Grebo.

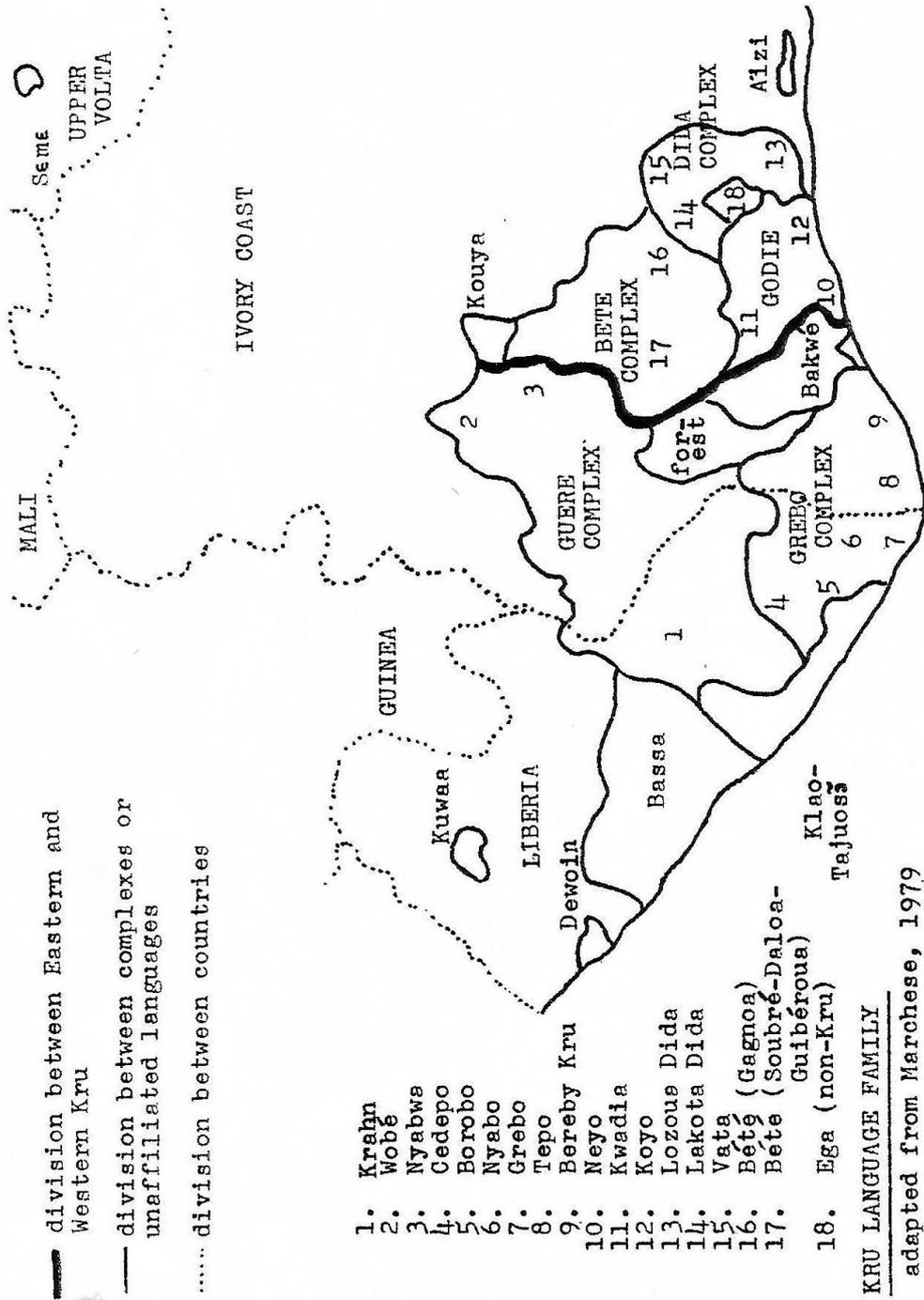
³⁵ The tone indications refers to the pronunciation in isolation

8. Bibliography

- INNES G. 1966. *An Introduction to Grebo*, The Hague, Mouton.
- . 1969 (1967). *A Grebo-English Dictionary*, Cambridge University Press, West African Language Monographs 6.
- MAIRE J. et THALMANN P. 1980. *Enquête dialectale kroumen*, Publications conjointes I.L.A. - S.I.L. no. 5, Université d'Abidjan.
- MARCHESE L. 1983 (3e éd. augmentée, 1979 1ère éd.). *Atlas linguistique des langues kru: essai de typologie*, ILA, Université d'Abidjan, vol. LXXIII.
- . 1986. *Tense / Aspect and the Development of Auxiliaries in Kru Languages*, S.I.L. & University of Texas at Arlington; and 1979. Los Angeles, University of California. Ph.D. dissertation.
- . 1989. 'Kru' in *The Niger-Congo Languages*, Bendor Samuel (ed.), Lanham: University Press of America, Inc. - SIL, pp. 119-139.
- PARADIS C. 1984. *Le comportement tonal des constructions associatives en wobé*, Journal of African Languages and Linguistics no. 6, p. 147-171, Leiden.
- THALMANN P. 1978. *Tonèmes et règles tonales en krou tépo*, Annales de l'Université d'Abidjan, Série H, linguistique, vol. 11.
- . 1980. *Phonologie du kroumen*, Publications conjointes I.L.A. - S.I.L. no. 5, Université d'Abidjan.
- . 1987. *Éléments de grammaire kroumen tépo (parler kru de la Côte d'Ivoire)*, Thèse, Université de Paris 7.
- WILLIAMSON K. & BLENCH R. 2000. *Niger Congo* in Heine & Nurse, *African Languages: An Introduction*, Cambridge University Press, p. 11-42.

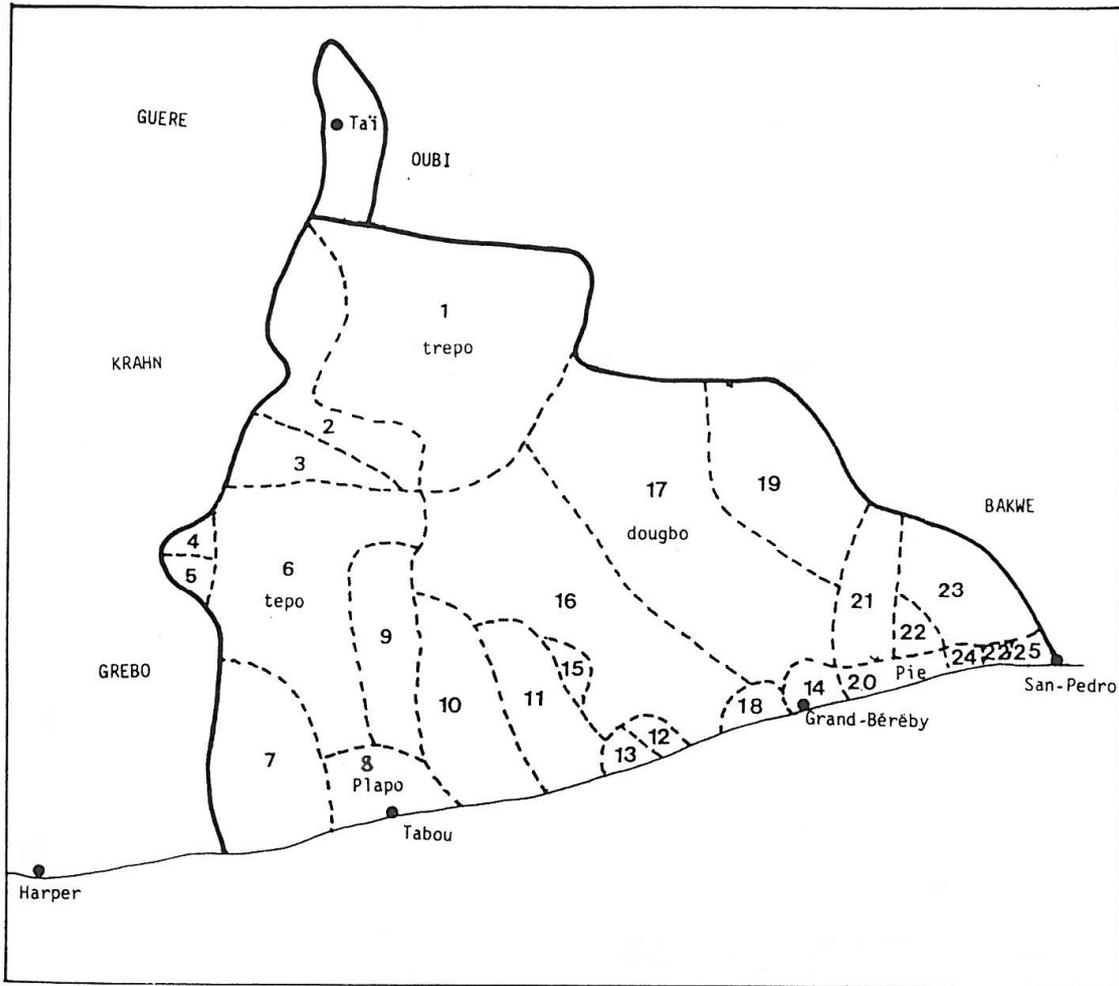
9. Maps

KRU LANGUAGE FAMILY



KRUMEN CLUSTER

L'ensemble kroumen
 (partie ivoirienne de l'ensemble grébo)
 (d'après Maire et Thalmann (1980)
 et Marchese (1983))



Groupes ethniques:

- | | | |
|----------|-------------|------------|
| 1 Trèpo | 9 Dapo | 17 Dougbo |
| 2 Glawlo | 10 Hompo | 18 Yréwé |
| 3 Yrépo | 11 Touoyouo | 19 Yapo |
| 4 Kapo | 12 Wlouwé | 20 Pié |
| 5 Wlopo | 13 Hawlo | 21 Pli |
| 6 Tépo | 14 Gbowé | 22 Mahon |
| 7 Bapo | 15 Hna | 23 Kouisi |
| 8 Plapo | 16 Wlépo | 24 Gblapo |
| | | 25 Hènekwé |

10. Table of Contents

Aspects of tone change in three Krumen languages (southwest Côte d'Ivoire)	1
1.1 Objective.....	1
1.2 Language facts.....	1
1.2.1 Linguistic classification	1
1.2.2 Geographics.....	1
2. The tonal system of Krumen	2
2.1 Tones on three levels – four melodies	2
2.2 Two low tones: La and Lb – the case of Tepo Krumen.....	3
2.3 The two low tones La and Lb – parallels in Grebo (Liberia)	4
3. Tone changes in Krumen explained by universal tone change rules	4
3.1 An overview: Association & dissociation, tone genesis & lowering.....	4
3.2 Association (TR 1) and dissociation (TR 2).....	5
3.3 Tone genesis (TR 3) and tone lowering (TR 4).....	7
3.3.1 Word formation - composition and tone change.....	7
3.3.2 Word formation - derivation and tone change	8
4. The (Lb) low tone perfective marker in the Krumen languages.....	11
4.1 The tonal behavior of perfective verbs in Tepo, Plapo and Piè	12
4.2 The perfective in Piè H tone verbs	16
4.3 The perfective in Plapo and Tepo M tone verbs	17
4.3.1 Comparison between Plapo and Tepo	17
4.3.2 The perfective in Tepo - additional changes in M tone verbs.....	18
4.4 The perfective in Plapo and Tepo L tone verbs.....	19
4.4.1 The perfective in Tepo - additional changes in L tone verbs.....	21
4.4.2 The influence of the Tepo object pronoun on tone change	22
5. The low tone subject pronouns in the Krumen languages.....	22
5.1 Tone change caused by the subject Lb pronoun (none perfective).....	22
5.2 Interaction between the subject Lb pronoun and the perfective	23
6. Conclusions.....	25
7. Appendix: Tone systems in Grebo and in Tepo Krumen	26
8. Bibliography.....	28
9. Maps.....	29
10. Table of Contents	31