

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

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1.1 Objective

The aim of this article is to show some aspects of the functioning of tone change in three Krumen languages or dialects. This phenomenon is triggered by a low tone which occurs in various grammatical and tonological contexts. It is well known that in Grebo, spoken across the border in the south east Liberia, 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* (Tepo, Plapo and Piè), it is shown that going from west to east, the number of tone change decreases.

1.2 Language facts

1.2.1 Linguistic classification

Krumen is a cluster of languages found in the Western branch of the Kru language family, whose 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 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 (glàgbù) (S/P) and Olodio (hlòdù).
- 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 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.

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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. (32) 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 the following 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) /[t̄̀ b̄̀ u b̄̀ u ē]/ (buy, orange) *Buy an orange.*
 /[h̄̀ a b̄̀ u b̄̀ u ē]/ (remove, ...) *Pick an orange.*

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

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

First observation: The low tone of the verb **h̄̀ a remove** attracts the preceding tone, i.e. it undergoes tone spreading. This is not the case for the low tone in the verb **t̄̀ t̄̀ buy**.

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

- (7) /t̄̀ k̄̀ e b̄̀ u b̄̀ u ē/ [t̄̀ k̄̀ e (M) ...] (buy, today, orange) *Buy an orange today.*
 (8) /h̄̀ a k̄̀ e b̄̀ u b̄̀ u ē/ [h̄̀ a k̄̀ e (L) b̄̀ u b̄̀ u ē] *Pick an orange today.*
 (9) /b̄̀ h̄̀ i l̄̀ e/ [... h̄̀ i (L) l̄̀ e (H)] (that-he, pass, there) *He should pass there.*
 (10) /b̄̀ h̄̀ ǐ l̄̀ e m̄̀ u/ [b̄̀ h̄̀ ǐ (M) l̄̀ e (L) m̄̀ u] (that-he, leave, there, PP⁵) *He should leave there.*

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

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

- the tone of **t̄̀ t̄̀ buy, h̄̀ i pass** that we symbolize by **La**, and
- the tone of **h̄̀ a remove, h̄̀ ǐ leave** that we mark **Lb**.

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

- The tone **La** remains stable,
- the tone **Lb** undergoes tone association.

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

- attracts the preceding tone and*
- spreads to the right (within the verb phrase)*

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	tò La
<i>pass</i>	hĩ ³⁻²	hì La
<i>remove</i>	ha ³	hà 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

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 (sections 4 and 5), we will examine tone change in the perfective aspect and after low tone pronouns.

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

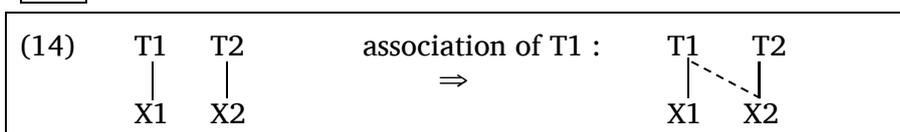
As in many other languages, in Tepo Krumen, we find **four tone rules** (TR) describing the following processes:

Association and dissociation

a) Association (linking, assignment, tone spreading)

The process of association involves tone spreading, in general movement to the right (even though we will also see instances of right-to-left association):

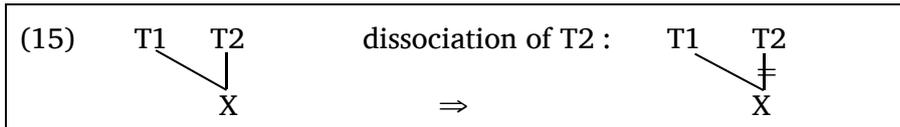
TR 1 Tone association



b) Dissociation (delinking)

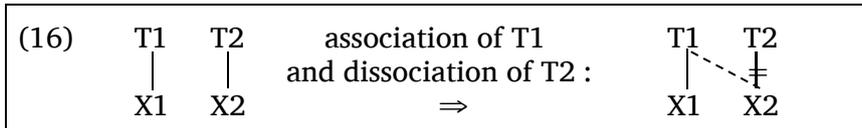
Dissociation is the opposite of association: A tone undergoes delinking from the tone bearing unit. This leads to tone simplification: a contour tone becomes a level tone.

TR 2 Tone dissociation



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

TR 1 + 2 Replacement = association + dissociation

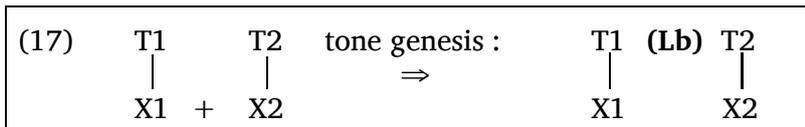


Tone genesis and tone lowering

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 tone (Lb)



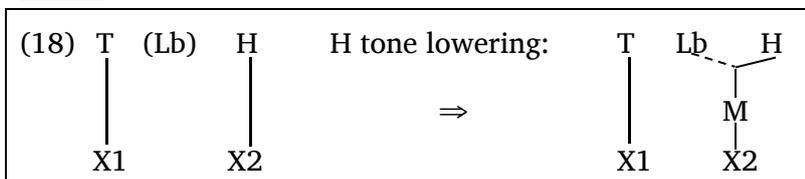
The question arises whether this L is La or Lb. In section 3.2.2, we are going to present the evidence that it is a **Lb tone**.

d) Tone lowering (caused by a Lb tone)

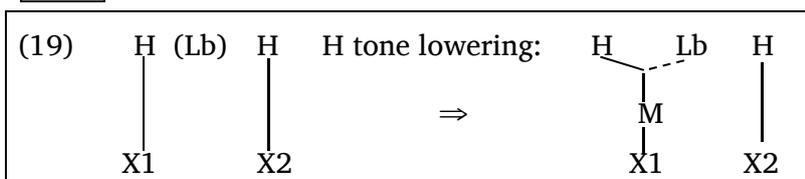
Once the **floating Lb tone** has been **inserted**, it may cause **lowering of a H tone to the M level**: Features of the H and the Lb are selected to form a M.

According to the context, the **floating Lb 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 Lb causes **tone lowering of the following H** (progressive change)



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



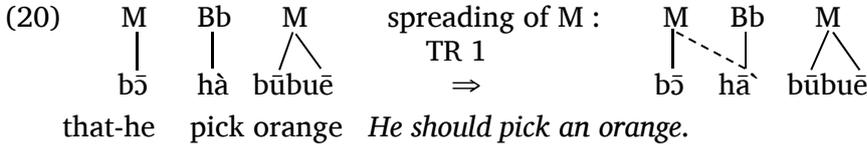
The examples of the following sections illustrate these four tone rules.

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

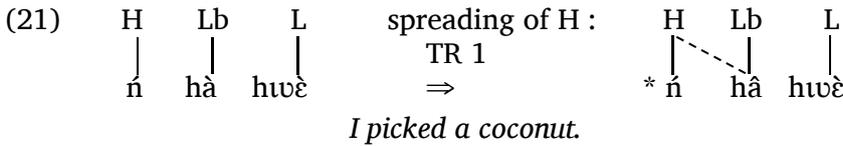
As mentioned above, the processes of association and dissociation are described by TR 1 and TR 2:

TR 1 Association - see (14)

In the **Tepo** example (5) above, we saw that the low tone (which is a Lb) of the verb attracts the tone of the preceding syllable:



In the following Tepo example, the preceding syllable carries a H tone:



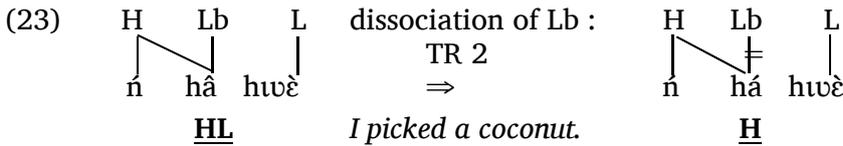
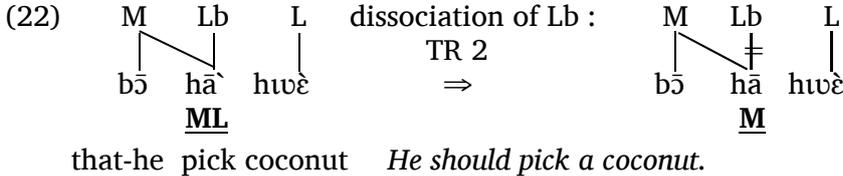
Here is the tone change formulated in general terms:

Lb > -L Lb / -L _____

TR 2 Dissociation - see (15)

This process **meets the need of tone simplification**, i.e. the second part of a contour tone is delinked, while the first part - a level tone - remains. It is illustrated by the following **Tepo** examples, where a **falling tone** (ML and HL) **becomes a level tone**:

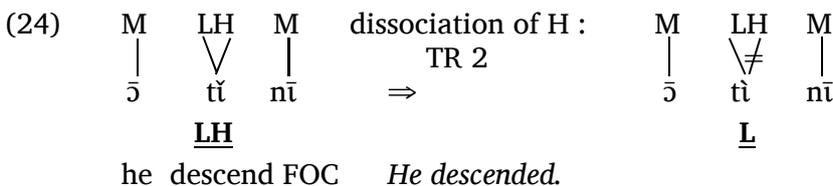
ML > M and **HL > H**. In the Tepo-Plapo-Piè cluster, **falling tones only occur in Tepo**⁷.



These changes are formalized as follows:

-L Lb > -L / _____ L

This process also occurs symmetrically: A rising tone LH is simplified by dissociation and becomes a level tone: **LH > L**. This rule only applies to Tepo and Plapo, not to Piè.



This tone change is formulated as follows:

LH > L / _____ -L

⁷ because the Tepo Lb tone attracts the preceding tone, which is not the case in Plapo and Piè

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

3.2.1 Word formation and tone change

We will see that tone change occurs in the the two areas of **word formation**:

a) in composition and

b) in derivation.

c) It also occurs independently from the grammatical context.

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 examles of the associative (genitive) construction and a compound with the same morphemes (*cow* + *offspring* = *calf*):

(25) *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 ⁸ / <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)

(26)	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:

∅ > (Lb) / [T_____ H]_{compound}

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

TR 4a Progressive tone lowering - see (18)

(27)	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:

(Lb) H > M / [T_____]_{compound}

⁸ CN = connective or associative marker

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):

- (28) lá tuer > lá-lá > lí-lá = preliminary form, which is actually lí (L) lá
 > V → V: lí-lá > lí-lā kill each other, kill here and there
 Tepo, Plapo, Piè⁹ H H H M
- V → N: lí-lá killing, the act of killing
 Piè H H (no tone lowering)
 Tepo, Plapo lí-lá > lí-lā 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** (**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** (**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

- (29) H H tone genesis: H (Lb) H
 | | TR 3 | |
 lá + lá ⇒ lí lá
 > lí + lá
 DER¹⁰ kill (generalization: V→V / V→N derivation)

This process can be formalized as follows:

∅ > (Lb) / [H_____H] 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

- (30) H (Lb) H H tone lowering: H Lb H
 | | TR 4a | |
 lí + lá ⇒ lí lá
 DER-DIST¹¹ kill 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:

Lb H > M / [H_____] V→V derivation

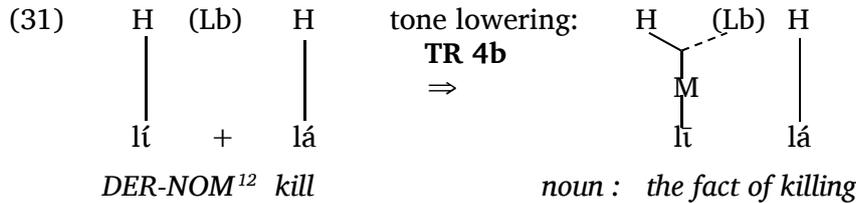
⁹ in Piè, the form is lí-rā

¹⁰ derivative morpheme (meaning of nominal and verbal generalization)

¹¹ distributive derivative

Second: In the case of V→N derivation, it is the first H tone that is lowered, and the first syllable is interpreted as prefixed nominalizing derivative (nominalizer):

TR 4b Regressive tone lowering



Tone lowering according to TR 4b in duplicated H tone nouns applies to Krumen Tepo and Plapo, but not to Piè.

This process is formalized as follows:

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

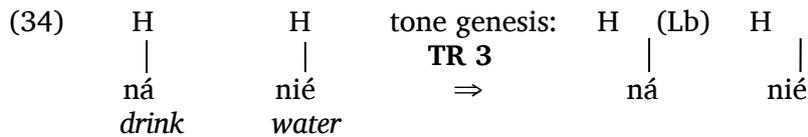
In Plapo Krumen, this same tone genesis followed by tone lowering, occurring in the V → N derivation (H H > M H), is found in any context, whenever a H tone is followed by another H in a series of H tones:

(32) /ná nié/ > [nā nié] *Drink water*. BUT: /[ná nō]/ *Drink palm wine*.

(33) /ē jí nié pí/ [ē jī niē pí] (she, PERFNEG¹³, water, draw) *She did not draw water*. Cf. (3).

According to the autosegmental representation, we first have ...

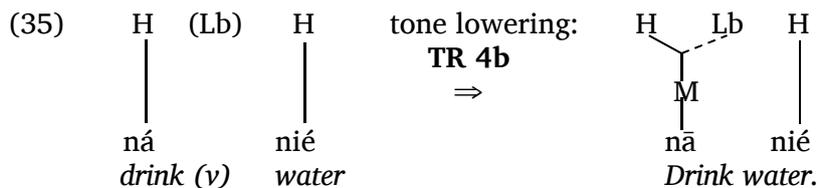
TR 3 Tone genesis



$$\emptyset > (Lb) / H \text{_____} H$$

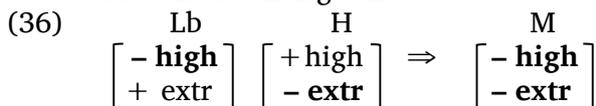
... and then ...

TR 4b Regressive tone lowering



$$H \text{ Lb} > M / [\text{_____} H]$$

We have seen that the floating Lb tone produces a tonal lowering in the presence of H. Through a process of fusion, Lb plus H result in M. The explanation for this is the fact that the feature [- high] of the first tone and the feature [- extreme] of the second tone are selected for the resulting tone:



These are the few fundamental rules RT 1 - 4, which explain the various tonal processes. They are more numerous in Tepo Krumen than in Krumen Plapo and Piè.

¹² nominalizer (derivative morpheme)

¹³ PERFNEG = negative perfect auxiliary

Before moving on to **sections 4 to 6**, we will have to deal with the question of the nature of the generated low tone: Is it La or Lb?

3.2.2 The nature of the generated low tone (TR 3)

This section is somewhat of a digression. Its purpose is to identify the nature of the low tone, resulting from low tone genesis through reduplication.

In TR 3, we have tentatively called the generated low a Lb tone. Evidence for this can be found in Tepo and Plapo. Let us look at the following examples, which contain verb particles marking *negative imperfective*. Their form in Tepo is **níní** in dependent clauses and **ní ... lě** in independent clauses:

(37) Tepo: / [b́ **níní** mū] / (if-he, IMPFNEG¹⁴, go) *If he does not leave, ...*
 / ̄ **ní** mū **lě** / [̄ ní mú lě] *He is not leaving OR He does not leave.*

(38) Plapo: / ̄ **ní** mū-ǒ lī / [̄ ní mù-ò lī] (he, IMPFNEG1, go, IMPFNEG2, FOCv¹⁵)
(same meaning)

We can easily see that **níní** is a reduplication of **ní** (which occurs in the negative intentional conjugation). Both discontinuous morphemes, the Tepo **ní...lě** and the Plapo **ní...ǒ** (*v* stands for a partially assimilated vowel)¹⁶, are derived from the reduplication of **ní**.

In both cases, the second syllable contains a L tone. The examples above of H tone reduplication lead us to conclude that the low in **ní...lě** / **ní...ǒ** was generated through the reduplication process.

For Tepo, we postulate the following steps: **ní** > **ní L ní** > **ní L lé**. The second syllable has undergone a double process: denasalisation (n > l) and a change in vowel harmony (i > e).

If we consider the example [̄ ní mú lě], we can see that the verb *mu* carries a H tone and that there is a tone change from H *lé* to LH *lě*, i.e. the L tone attracts the preceding H tone and spreads to the right, causing the change from H *lé* to the LH *lě*.

This leads to the conclusion that the L is a Lb tone, and that the example (37)b can be rewritten as follows:

(39) 1 ̄ ní Lb mū lé
 > 2 ̄ ní **mù** lé (the M of the verb is replaced by Lb)
 > 3 ̄ ní mù **lě** (Lb spreads on *lé*, which becomes *lě* LbH)
 > 4 ̄ ní **mú** lě (Lb on *mu* attracts the H of *ní*)

Stage 3 ̄ **ní mù lě** corresponds to the Plapo example (38) ̄ **ní mù-ò lī** (in Plapo the pronoun is ̄, and the clause ends with the obligatory verbal focus marker **lī**¹⁷).

This section gives evidence to the fact that the low tone generated through the reduplication of the particle **ní** is a Lb tone.¹⁸

We conclude that when **a low tone is generated through reduplication, it is a Lb low.**

¹⁴ IMPFNEG = imperfect negative verb particle

¹⁵ FOCv = verbal focalisation particle

¹⁶ The tone change from *ǒ* to *ò* is due to TR 2, cf. example (24)

¹⁷ **lī** appears in the negative imperfective and is an allomorph of **nī**

¹⁸ In Tepo, it has both characteristics defined in (11): It attracts the previous tone and spreads to the next element. In Plapo, Lb spreads to the next element, but it does not attract the previous tone.

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

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

Let us briefly present the ways the three languages signal this 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."

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

	Tepo	Plapo double strategy ¹⁹ :	Piè
Imperfective markers	Auxiliary jē -/- v̄	a) Auxiliary jū b) derivative morpheme ε	derivative morpheme ε
Imperf. examples	tè ̄-̄ dē pī ²⁰ 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	Floating low tone (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.

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' ̄ 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' ̄ 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.

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

verb carrying **La** > **tò** to buy

tò b̄ubuē
tò kē b̄ubuē **L M** no spreading
b̄ò **tò kē** b̄ubuē **L M** no spreading
that-she, buy, today, orange

buy/pick an orange
buy/pick an orange today
she should buy/pick an orange today

verb carrying **Lb** > **hà** to pick

hà b̄ubuē
hà kē b̄ubuē **L L** 1x spreading
b̄ò **hā** kē b̄ubuē **M L** 2x spreading

¹⁹ a) for verbs containing front vowels, b) for verbs containing back vowels

²⁰ Example with **jē**:- tè ̄-̄ gblā pī as she cooks rice > tè ̄ **jō** pī as she cooks it (jō < jē + ɔ)

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

(42) Tonal behavior of perfective L tone verbs:

̄ t̄ k̄ è b̄ ubuē M L <i>she, PERF-buy, ...</i>	<i>She bought/ picked an orange today</i>	̄ h̄ ā k̄ è b̄ ubuē <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 t̄ buy is replaced by a Lb tone, which is the perfective aspect marker. It is a floating low: (Lb).

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

- 2) The (Lb) floating low either surfaces in some cases - e.g. ̄ Lb t̄ k̄ è **M L** b̄ ubuē (42), or it remains floating - ̄ (Lb) **gb̄ ā k̄ è M M** b̄ ubuē *She took an orange today* cf. (45).

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 (43)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 t̄** descend, **M gb̄ ā / kp̄ ā** take, **B t̄** 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 **jí**, 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. (43)c: ̄ d̄ í pí nié.

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

Tepo	Plapo	Piè
a) Positive Perfective: <i>S/he drew (pí) water (nié). // It's water she drew.</i>		
̄ pí nié // nié ̄ pí M H H // H M H	̄ p̄ í nié // nié ̄ p̄ í M M H // H M H	̄ p̄ í né // né ̄ p̄ í M M H // H M M
b) Negative perfective: <i>S/he did not draw water.</i>		
̄ dé nié pí M H H H	̄ j̄ í nié pí // ̄ j̄ í d̄ é pí M M M H // M H M H	̄ já né p̄ í M H H M
c) Potential (auxiliary d̄ í): <i>S/he will draw water. // It's water s/he will draw.</i>		
̄ d̄ í pí nié // nié ̄ d̄ í pí M M H H // H M M H	̄ d̄ í p̄ í nié // nié ̄ d̄ í pí M M M H // H M M H	̄ d̄ í pí né // né ̄ d̄ í 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 (32) and (33).

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

Tepo	Plapo	Piè
a) Positive perfective: <i>He descended (tì) from the village (dɪ́ɔ).</i> (mó / ʔ = PP ²¹)		
ɔ̀ tì mó dɪ́ɔ // dɪ́ɔ mó ɔ̀ tǐ M L H H // H H M LH	ē tì dɪ́ɔ // dɪ́ɔ ē tǐ M L H // H M LH	ē <u>tì</u> só ʔ // só ʔ ē <u>tì</u> M <u>L</u> H H // H H M <u>L</u>
b) Negative Perfective: <i>He did not descend from the village.</i>		
ɔ̀ dé dɪ́ɔ mó tǐ M H H M LH	ē j̄ dɪ́ɔ tǐ M M H LH	ē já só ʔ <u>tì</u> M H H H <u>L</u>
c) Potential: <i>He will descend from the village.</i>		
ɔ̀ dī mó tì dɪ́ɔ // dɪ́ɔ mó ɔ̀ dī tǐ M L H L H // H H M M LH	ē dī tì dɪ́ɔ // dɪ́ɔ ē dī tǐ M L H // H M M LH	ē dī tǐ só ʔ // só ʔ ē dī tǐ M M L H H H // H H M LH

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

In **Plapo**, the tone change from LH to L in **ē tì dɪ́ɔ** is due to TR 2 - see (24), since we have **tǐ** in clause final position.

(45) **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>		
ɔ̀ gbā nié // nié ɔ̀ gbā M M H // H M <u>M</u>	ē gbā nié // nié ē gbà M M H // H M <u>L</u>	ē kpā jé // jé ē kpā M M H // H M M
ń gbā nié // nié ń gbá H M H // H M <u>H</u>	ń gbā nié // nié ń gbà H M H // H H <u>L</u>	
ɔ̀ gbā kē nié // nié ɔ̀ gbā kē M M M H // H M M M	ē gbā kē nié // nié ē gbā kē M M M H // H M M M	
ń = je; kē = today		
b) Negative perfective: <i>S/he did not take the water / anything / hot pepper.</i>		
ɔ̀ dé nié gbá // ɔ̀ dé dē gbā M H H <u>H</u> // M H M <u>M</u> dē = thing	ē j̄ nié gbà // ē jí dē gbà M M H <u>L</u> // M H M <u>L</u>	ē já jé kpā // ē já dē kpā M H H M // M H M M
ɔ̀ dé pià gbà (<i>hot pepper</i>) M H L <u>L</u>	ē jí pià gbà M H L <u>L</u>	

²¹ PP = postposition

c) Potential: <i>S/he will take the water. // It's the water she will take.</i>		
ɔ̄ dī gbā nié // nié ɔ̄ 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 **Tepo**, 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**.

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

Tepo	Plapo	Piè
a) Positive perfective: <i>S/he bought an orange (today). // It's an orange she bought today.</i>		
ɔ̄ <u>tɔ̄</u> b̄ubuē // b̄ubuē ɔ̄ <u>tɔ̄</u> M <u>ML</u> M // M M <u>M</u> ɔ̄ <u>tɔ̄ kɛ̄</u> b̄ubuē // b. ɔ̄ <u>tɔ̄ kɛ̄</u> M <u>M L</u> M // M M <u>M L</u> ɔ̄ <u>tɔ̄ t̄</u> b̄ubuē // b. ɔ̄ <u>tɔ̄ t̄</u> M <u>M L</u> M // M M <u>M L</u> tó = <i>hier</i> ; hiè = person name b̄ubuē ní <u>tɔ̄</u> // b̄ubuē hiè <u>t̄</u> M H <u>H</u> // M L <u>L</u> b̄ubuē ní <u>tɔ̄ t̄</u> // b̄ubuē hiè <u>t̄ t̄</u> M H <u>H LH</u> // M L <u>L LH</u>	ē t̄ b̄ubuē // b̄ubuē ē t̄ M L M // M M L ē t̄ <u>kɛ̄</u> b̄ubuē // b. ē t̄ <u>kɛ̄</u> M L <u>L</u> M // M M L <u>L</u> ē t̄ tó ! b̄ubuē // b. ē t̄ tó ! M L <u>L</u> M // M M L <u>L</u> b̄ubuē ní t̄ // b̄ubuē hiè t̄ M H L // M L L b̄ubuē ní t̄ tó // b̄ubuē hiè t̄ tó M H L H // M L L H	ē t̄ sàrè // sàrè ē t̄ M L L // L M L
b) Negative perfective: <i>S/he did not buy an orange.</i>		
ɔ̄ dé b̄ubuē t̄ M H M L	ē jí b̄ubuē 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>		
ɔ̄ dī t̄ b̄ubuē // b̄ubuē ɔ̄ dī t̄ M M L M // M M M L	ē dī t̄ b̄ubuē // b̄ubuē 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 > /ɔ̄ t̄ b̄ubuē/ [ɔ̄ tɔ̄ ML b̄ubuē], or on the verb plus the next VP morpheme > /ɔ̄ t̄ kɛ̄ b̄ubuē/ [ɔ̄ tɔ̄ kɛ̄ M L b̄ubuē], /ɔ̄ t̄ tó b̄ubuē/ [ɔ̄ tɔ̄ t̄ b̄ubuē].

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

In **summarizing** the lists²² 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 (Lb + H > M) as in /ē (Lb) pí H né / [ē pī M né].

In LH verbs, the M is left floating (Lb + LH > LM > L(M)) as in /ē (Lb) tǐ LH dtó / [ē tì (M) dtó]. 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 ē dé 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 both 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 tǒ **kè** 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 **tǒ** **kè** dē.

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

Tepo	Plapo	Piè
		#1) <i>high tone verbs H / LH</i> (Lb) H > M / (Lb) LH > LM > L contexts : positive and negative perfective in any position
#2b) <i>mid tone verbs</i> (Lb) M > Lb contexts : - pos. and negative perfective - clause final (pre-pausal)	#2a) <i>mid tone verbs</i> (Lb) M > Lb contexts : - pos. and negative perfective - clause final (pre-pausal)	

²² 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, hǎ to leave. Since they are not relevant in this discussion, we do not include them here.

Tepo	Plapo	Piè
#3b) low tone verbs (Lb) La > Lb context : - positive perfective - in any position	#3a) low tone verbs (Lb) La > Lb context : - positive perfective - in any position	

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

+ indicates that the perfective Lb marker surfaces in the indicated contexts

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			+	+	+
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 (in the west) to Plapo and to Piè (in the 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 (43) and (44) 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:

(49) 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.

(50) LH tǐ descend / só ǔ village at

Positive perfective: ē **tì** só ǔ S/he descended from the village.

Negative perfective: ē já só ǔ **tì** 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**.

In the H > M change, the tone lowering rule TR 4a applies - see (27) - to both the H tone and the LH tone verbs:

(55) gbā nié (take / water) Take the water.

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>

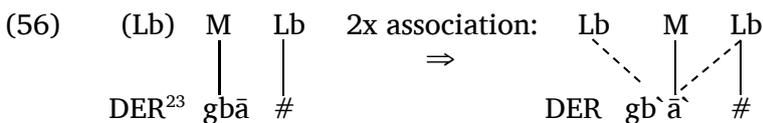
Below, there are the tone rules that govern tone change in these examples.

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).

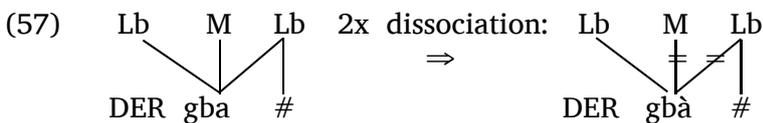
It is a known fact that the clause sentence final pause is linked to a low tone. It is obviously this **pausal Lb tone** that **triggers the association of the floating (Lb) of the perfective** to the verb. Since the Lb tone has the capacity of being associated, we interpret the pausal low as a Lb tone.

TR 1 Association, cf. (14)



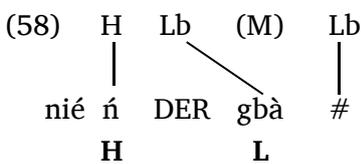
The BMB contour tone then needs simplification:

TR 2 Dissociation, cf. (15)



The result is the following:

in Plapo: final; in Tepo: prefinal, see the final Tepo form in 4.3.1



²³ perfective derivational morpheme

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

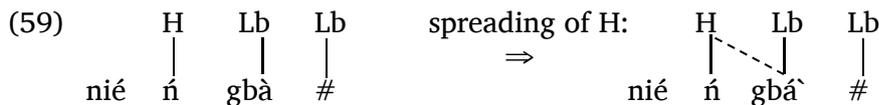
In **Tepo**, the tone changes go a **step further**, as we will see in the next section.

4.3.1 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 (55), the verb carrying the **perfective Lb** attracts the **preceding tone**.

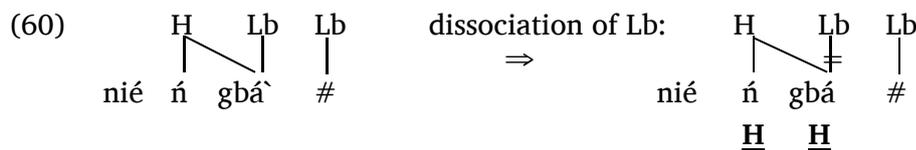
According to TR 1, the low tone Lb attracts the preceding tone:

TR 1 Association - cf. (14)



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

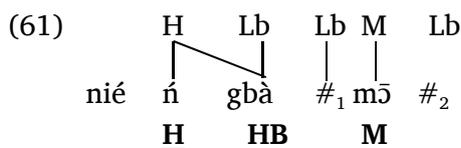
TR 2 Dissociation - cf. (15)



The application of TR 2 allows tone simplification, as a falling tone TL is not allowed before another Ltone.

There is a striking contrast between Plapo (58) and Tepo (60) 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 (59), we add the emphatic marker **m̄**, which results in ...



In Tepo, 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 (46):

(62) t̄̀ b̄̀buē (buy / orange) Buy an orange. // k̄̀ today, t̄̀ yesterday

Plapo	Positive perfective	Tepo
ū t̄̀ b̄̀buē	<i>They bought an orange.</i>	ū <u>t̄̀</u> b̄̀buē
ū t̄̀ <u>k̄̀</u> b̄̀buē	<i>They bought an orange today.</i>	ū <u>t̄̀ k̄̀</u> b̄̀buē
ū t̄̀ t̄̀ (sic!) b̄̀buē	<i>They bought an orange yesterday.</i>	ū <u>t̄̀ t̄̀</u> b̄̀buē
ū t̄̀ pià	<i>They bought hot pepper.</i>	ū <u>t̄̀</u> pià
ń t̄̀ pià	<i>I bought hot pepper.</i>	ń <u>t̄̀</u> pià
b̄̀buē ū t̄̀ #	<i>They bought an orange today.</i>	b̄̀buē ū <u>t̄̀</u> #
b̄̀buē ū t̄̀ <u>k̄̀</u> #	<i>It's an orange they bought today.</i>	b̄̀buē ū <u>t̄̀ k̄̀</u> #
	Negative perfective	
ū jí b̄̀buē t̄̀	<i>They did not buy an orange.</i>	ū dé b̄̀buē t̄̀

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.

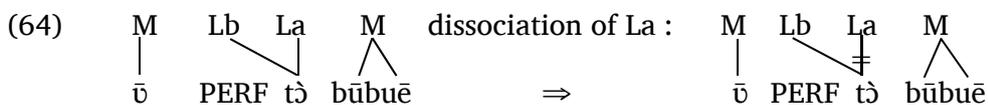
Let us now look at the autosegmental representation of the sentence *They bought an orange* in **Plapo and Tepo**.

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:

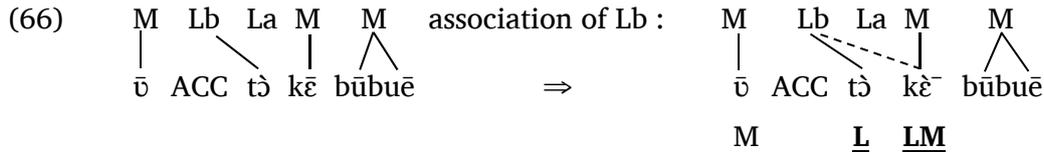


In this example ū t̄̀ b̄̀buē (63), the verb is the only element of the verb phrase (VP). If the verb phrase is expanded, there are additional tone change rules that become effective.

(65) The **structure of the verb phrase**²⁴ is as follows²⁵:

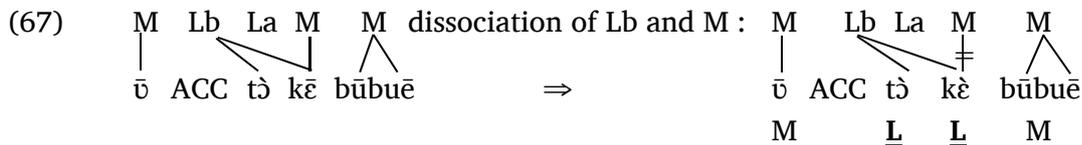
verb + PR ²⁶	+ tense marker	+ locative pronoun	+ verbal focalization marker
	kē <i>today</i> tú <i>yesterday</i> lā <i>long ago</i> ŋà <i>tomorrow</i> etc.	lé/lí ²⁷ <i>there (3rd pers. deixis)</i> nō/nē <i>here (2nd pers. deixis)</i> mō <i>here (1st pers. deixis)</i>	nī (Tepo allomorphs : lě, nǎ, mǎ)

If in the examples (63) ss. above, we add the tense marker **kē today**, we get the following:

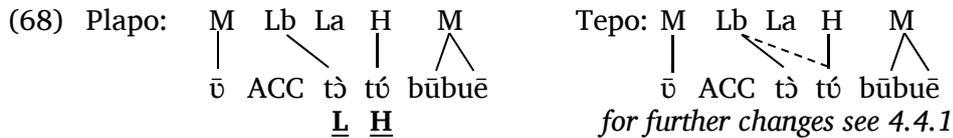


The **Lb low tone spreads to the tense marker on the right**, which is part of the verb phrase.

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



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:



(69) Examples with various elements of the verb phrase (**hì pass**, **nī FOC**²⁸), see (65)):

Plapo	Positive perfective	Tepo
\bar{u} hì nī M L L	<i>They passed by.</i>	\bar{u} hī nī M M L
\bar{u} hì kè nī M L L M	<i>They passed by today.</i>	\bar{u} hī kè nī M M L M

²⁴ of the positive perfective

²⁵ 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.

²⁶ In Tepo, the object pronoun is suffixed to the verb to form one syllable. In Plapo, its form is /-ǎ/, and it is suffixed to the end of the VP (excluding the focalization marker); example *S/he bought it (today / there)*: /ē tò-ǎ nī/ [ē tò-ǎ nī], *S/he bought it*; [ē tò kè-è nī], *S/he bought it today*; [ē tò lí-ì nī] *S/he bought it there*.

The tone change from ǎ to ă is due to TR 2 - dissociation for tone simplification.

²⁷ Tepo: lé, nō; Plapo: lí, nē

²⁸ verbal focalization marker

Plapo	Positive perfective	Tepo
ū hì tó nī M L <u>H</u> M	<i>They passed by yesterday.</i>	ū hī t̀ò nī M M L M
ū hì lé nī M L <u>H</u> M	<i>They passed through there.</i>	ū hī lě lě M M LH LH
ū hì tó lé nī M L H H M	<i>They passed through there yesterday.</i>	ū hī t̀ò lé lě M M L H LH
ū hì m̀ nī M L L M	<i>They passed through here.</i>	ū hī m̀ m̃ M M L LH

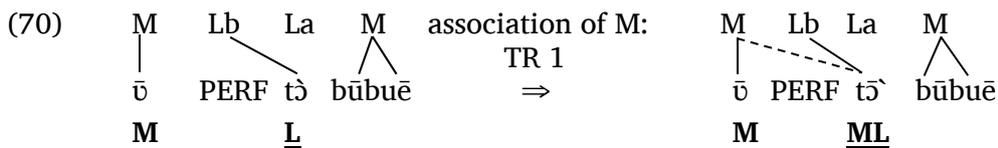
As we have seen above, the tone changes that occur follow tone rules TR 1 (spreading) and TR 2 (dissociation – tone simplification):

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

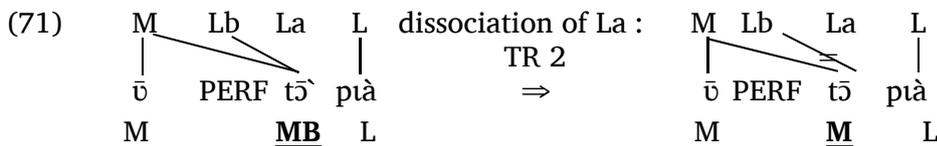
We continue from the result of the example (64) and observe the following **additional tone change** that occurs in **Tepo**:



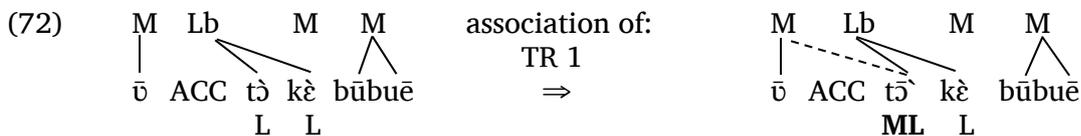
The Lb tone attracts the tone of the element to the left.

So, in Plapo, we have ū t̃ L būbuē, while in Tepo, we find ū t̃̀ ML būbuē.

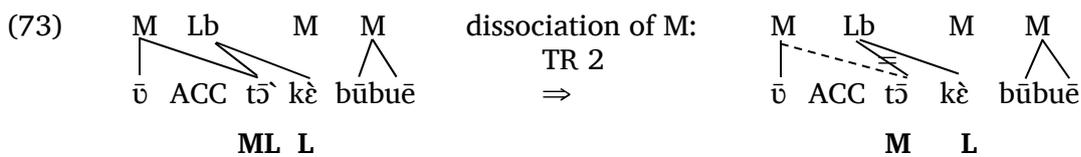
If a L follows (on the object), there is tone simplification through dissociation of Lb:



We take up the example (67) with the expanded verb phrase and, as in (70), 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 *ɪ*, *ɛ*, *ʊ* or *ɔ* and is suffixed to the verb stem, which may undergo vowel raising. If, in the sentence /*ɔ̄ t̄ò k̄ɛ̄ b̄ubūɛ̄*/ [*ɔ̄ t̄ò k̄ɛ̄ b̄ubūɛ̄*] *S/he bought an orange today*, the noun is replaced by a pronoun (PR), we get the following:

(74) *ɔ̄* (Lb)-t̄ɔ̄+*ɛ̄* *k̄ɛ̄ n̄i* (she, PERF-buy, PR, FOC²⁹)

⇒ *ɔ̄* **tv̄ɛ̄** *k̄ɛ̄ n̄i* M L M M *S/he bought it today.*

We would expect * *ɔ̄ tv̄ɛ̄ k̄ɛ̄ n̄i* 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

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:

(75) /*b̄ā d̄i* (lé) à *m̄ú d̄ɛ̄ d̄i*/ (that-you(pl.), come, (there³⁰), we, AUX intentional, thing, eat)
Come (pl.) and eat. litt. Come (pl.), we will eat something.

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

Plapo

(76) /*b̄ā d̄i* à *m̄ú d̄ɛ̄ d̄i*/ [*b̄ā d̄i* à *m̄ù d̄ɛ̄ d̄i*]

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

(77)

M	M	Lb	H	M	M	association of La :	M	M	Lb	H	M	M
						⇒						
<i>b̄ā</i>	<i>d̄i</i>	<i>à</i>	<i>m̄ú</i>	<i>d̄ɛ̄</i>	<i>d̄i</i>		<i>b̄ā</i>	<i>d̄i</i>	<i>à</i>	<i>m̄ǔ</i>	<i>d̄ɛ̄</i>	<i>d̄i</i>

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

(78)

M	M	Lb	H	M	M	dissociation of M :	M	M	Lb	H	M	M
						⇒						
<i>b̄ā</i>	<i>d̄i</i>	<i>à</i>	<i>m̄ǔ</i>	<i>d̄ɛ̄</i>	<i>d̄i</i>		<i>b̄ā</i>	<i>d̄i</i>	<i>à</i>	<i>m̄ù</i>	<i>d̄ɛ̄</i>	<i>d̄i</i>
							L		L			

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

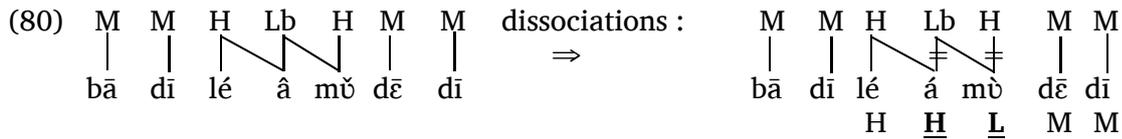
Tépo

(79)

M	M	H	Lb	H	M	M	associations of Lb :	M	M	H	Lb	H	M	M
							⇒							
<i>b̄ā</i>	<i>d̄i</i>	<i>lé</i>	<i>à</i>	<i>m̄ú</i>	<i>d̄ɛ̄</i>	<i>d̄i</i>		<i>b̄ā</i>	<i>d̄i</i>	<i>lé</i>	<i>â</i>	<i>m̄ǔ</i>	<i>d̄ɛ̄</i>	<i>d̄i</i>

²⁹ 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.

³⁰ The locative pronoun *lé* only appears in Tepo.



In Tepo, the number of tone changes increases because of the **two characteristics of tone Lb: attraction of the preceding tone and spreading to the next element within the VP**. Consider the difference to Plapo (77) and (78) above: In Tepo, we have two associations according to TR 1 and two dissociations according to TR 2 instead of one in Plapo.

Piè

(81) / [bā dī à mú dē dī] /

No tone change in Piè. The low tone of the pronoun *à we* does not attract the preceding tone, nor does it spread onto the following element in the verb phrase. 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.

5.1 Interaction between the pronominal Lb and the perfective (Lb)

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 studies here behaves in this environment.

We are going to present propositions grouped according the verbal tone classes H, LH, M, La.³¹

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

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

(82) 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 ³²
H já/ já <i>climb</i>	tè à já L <u>LH</u> à já nĩ L <u>L</u> M à já kē nĩ L <u>L</u> M M	tè à já L <u>LH</u> à já nĩ L <u>L</u> M à já kē nĩ L <u>L</u> M M	mò' à já L <u>L</u> à já nĩ L <u>L</u> M <i>like M verbs</i>
LH tĩ <i>descend</i>	tè à tĩ L LH à tĩ nĩ L L M à tĩ kē nĩ L L M M	tè à tĩ L LH à tĩ nĩ L L M à tĩ kē nĩ L L M M	mò' à tĩ L <u>L</u> à tĩ nĩ L <u>L</u> M <i>like L verbs</i>
M mũ <i>leave, go</i>	tè à mù L <u>L</u> à mù nĩ L <u>L</u> <u>L</u> à mù kē nĩ L <u>L</u> <u>L</u> M à mù tò nĩ L <u>L</u> <u>L</u> M	tè à mù L <u>L</u> à mù nĩ L <u>L</u> <u>L</u> à mù kē nĩ L <u>L</u> <u>L</u> M à mù tú nĩ L <u>L</u> H M	mò' à mù <u>L</u> <u>L</u> à mù nĩ L <u>L</u> M !!

³¹ For economical reasons, we are not going to include the marginal tone classes (Lb)M (like *nā walk*) and Lb (like *hà remove*).

³² In Piè, *kē* and *tú* correspond to adverbial phrases.

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

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

Tone change caused by the Lb tone	Tepo	Plapo	Piè
H tone lowering in word formation 3.2.1	+	+ ³⁴	+
H tone lowering in perfective 4.2			+
right association of pronoun Lb and perfective (Lb) 4.3, 4.4, 5	+	+	(+) ³⁵
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 west to east.**

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.

³⁴ including H tone lowering in any context with a series of H tones; see 3.2.1

³⁵ only in conjunction with Lb pronoun and perfective (Lb) on M tone verbs

7. Appendix: Tepo Krumen – a key to the Grebo tone system

In this sub-section we compare 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.

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

	nouns and pronouns		tone ³⁶		verbs		
	Grebo	Tepo	Grebo	Tepo		Grebo	Tepo
<i>salt</i>	ta	tá	2-1	H	<i>to climb</i>	ja	já
<i>spirit</i>	ku	kú			<i>to fish</i>	pa	pá
<i>heap</i>	du	dū	2	M	<i>to go</i>	mu	mū
<i>time</i>	ti	tī			<i>to come</i>	di	dī
<i>shame</i>	tuĩ	tuì	3-2	La	<i>to pass</i>	hĩ	hì
<i>neck</i>	plv	plò			<i>to finish</i>	wε	wè
<i>affair</i>	tu	tì	3	Lb	<i>to remove</i>	ha	hà
<i>ten</i>	pu	pù					
<i>you, sg.</i>	mɔ	mò					
<i>we</i>	a	à					
<i>canoe</i>	tv	tǔ	4	LH =LbH	<i>to descend</i>	tu	tǔ
<i>rice</i>	bla	gblǎ			<i>to swell</i>	pũ	pǔ
<i>Object PR</i>	nε	ně					

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 *kũ* (short variant: *kĩ* /H M/) or /H (M)/.

(88) GREBO TONE [1] correspondances in TEPO

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

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.

At this point, the following conclusions can be drawn:

³⁶ The tone indications refers to the pronunciation in isolation

- The levels 3 and 4 in Grebo correspond to the one low level in Tepo, where we find the two lows La and Lb as noted in section 2.3.
- The comparison between Grebo and Tepo tones gives further evidence that in Tepo, there are really four underlying tones:

The four Tepo tones	H	M	La	Lb	and the LH parallel
the Grebo tones	[2-1]	[2]	[3-2]	[3]	and tone [4].

- On the basis of the Tepo tone system, Grebo tone [4] may be better analyzed as a sequence of two underlying tonemes that surface as a level low tone.
- On the other hand, each of the Grebo contour tones [2-1] and [3-2] represent only one underlying toneme (and not a sequence of two tones). In a sentence, tone [2-1] is often realized as a level tone [1]. This is the case of the pronoun of the 1st person singular **nɪ**. See e.g. Innes (1966:55):

(89) *nɪ du bla* [1 1 4] (I / PERF³⁷-pound / rice) *I pounded rice.* (base form of *pound*: du 2)

- The Grebo CV words carrying tone [1], like *kĩ* [1] - see (88) above -, are mostly English loan words, which are paralleled in Tepo by CV.V two syllable words, like *kũũ*, carrying the tone pattern H M.

In Tepo, a CV.V word like *kũũ* H M corresponds to CV.CV or CV₁V₂ words like *písì* / *pláũ* H M, which in Grebo is *pisi* / *plãĩ* [1 3].

Consequently, the interpretation of Grebo words like *kĩ* [1] may be the following:

They go back to CV₁.V₁ *kũũ* [1 3], which then were shortened to CV *kĩ* [1].

- Theoretically tone [4] may be the realization of either /3 2-1/ (=Tepo LbH) or /3-2 2-1/ (=Tepo LaH).

Again, Tepo Krumen offers the key allowing to decide between the two possibilities:

What points to the sequence /3 2-1/ (**LbH**), is the Tepo morpheme **nĩ** *and-you (sequential)*, whose underlying components are the following:

- The 2nd person singular pronoun, which carries tone **Lb**, and
- The morpheme of the sequential, which consists of the **H** tone.

See the following example: *You came (já) to the village (dɪ́), and you passed* (without the intermediate stages):

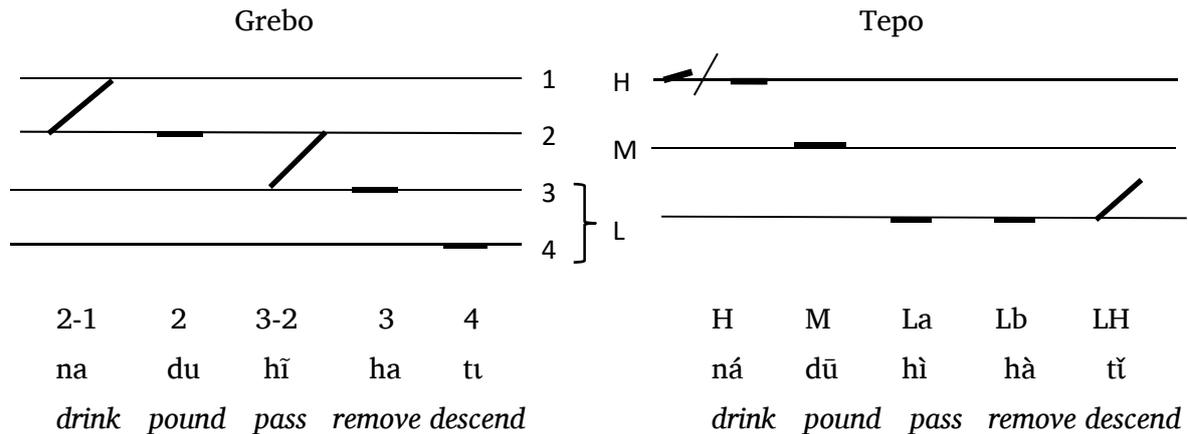
(90)	$\begin{matrix} \text{Lb H} \\ \diagdown \quad \diagup \\ \text{.} \quad \text{hí} \end{matrix}$	Lb La ⇒ Lb H (Lb) (La)
	$\begin{matrix} \text{.} \quad \text{hí} \\ \text{you-SEQ} \quad \text{PERF} \quad \text{to pass} \end{matrix}$	
	$\begin{matrix} / \text{ ñ já mú dɪ́, nĩ} \\ \text{.} \quad \text{hí} \\ [\text{ ñ já mú dɪ́, nĩ hí}] \end{matrix}$	

Note that tone [3] of the 1st person plural pronoun is sometimes realized as [4] (Innes 1966:50).

In Tepo, the sequence LbH is realized as a rising low [L+]. The rising part /H/ does not reach the top level. In Wlopo, close to Tepo, it is often just [L]. Hence it is very likely that in the case of Grebo, tone [4] has lost the second tone (by dissociation or assimilation).

³⁷ PERF = perfective

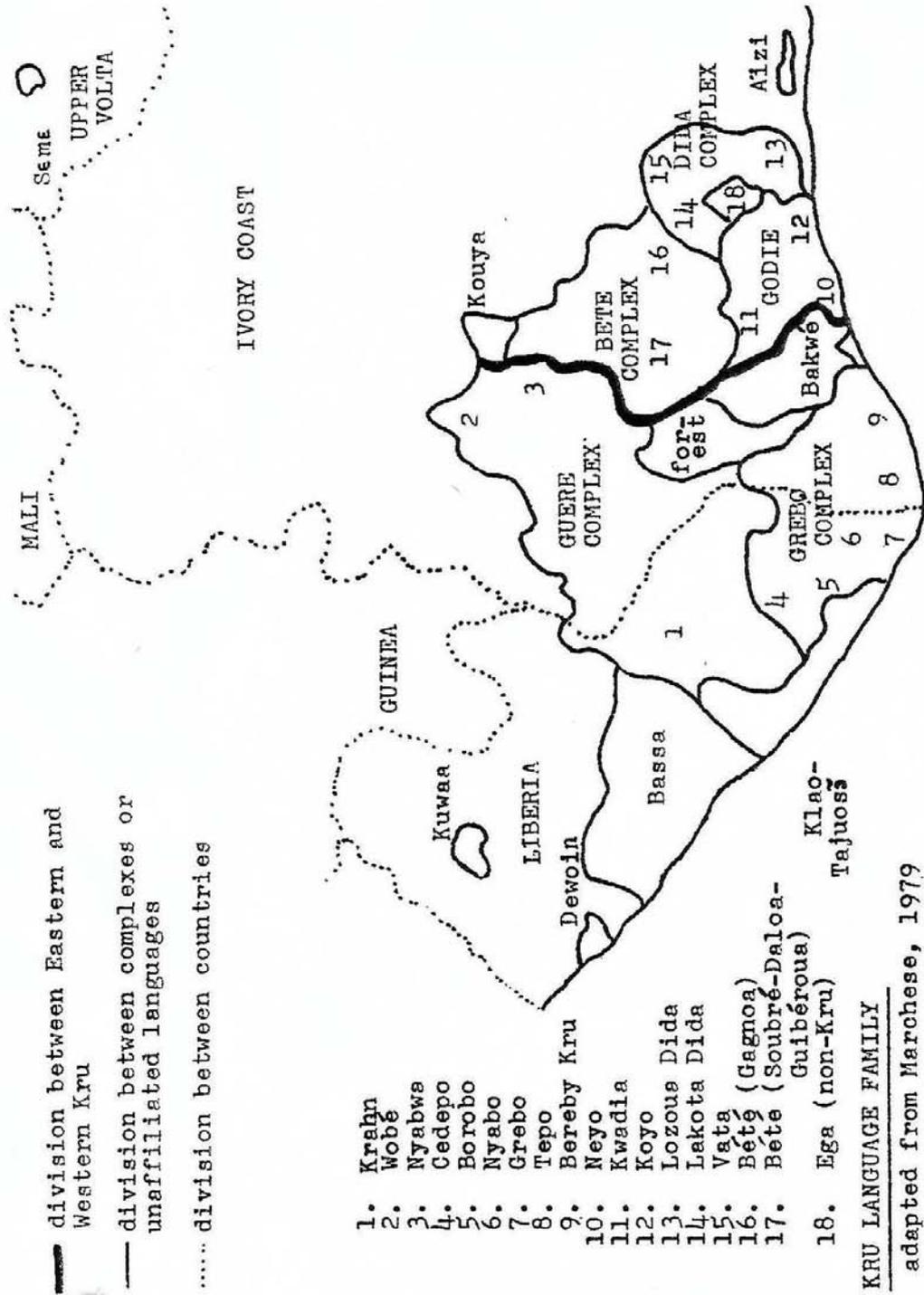
(91) This is how the two tonal systems compare:



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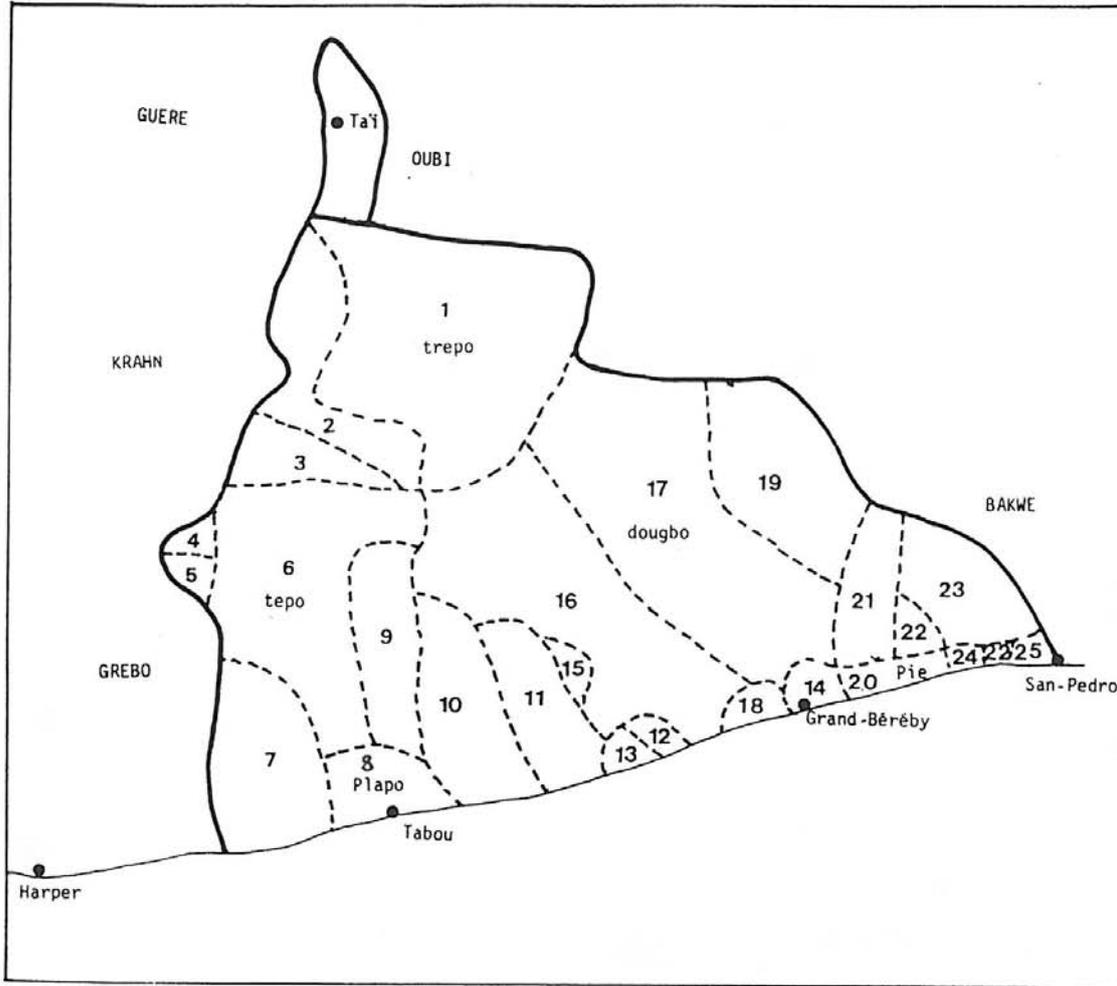
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MAP: KRU LANGUAGE FAMILY



MAP: KRUMEN

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



Groupes ethniques:

- | | | |
|----------|-------------|------------|
| 1 Trépo | 9 Dapo | 17 Dougbo |
| 2 Glawlo | 10 Hompo | 18 Yréwé |
| 3 Yrépo | 11 Touoyouo | 19 Yapo |
| 4 Kapo | 12 Wlouwé | 20 Piè |
| 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 Hènékwé |

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