How intonations interact with tones in Embosi (Bantu C25), a two-tone language without downdrift

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Sketch of tone system

- Two tones: H,L
- One tone per mora
- No tone spreading, floating tones, downstep
- Tonal rules are local and mainly triggered by vowel elision and glide formation.
- Generally, when a L tone and a H tone compete for a single mora, the H tone wins but this is not always the case, as exemplified in 2b.

(2) a. morábve ≺ moro ábve “somebody fell”

b. morakɔ́si ≺ moro ákɔ́si “somebody hurts himself”

- <u>Metotony:</u>
  Thus, in present and future, verbs exhibit a final H tone when they are followed by a complement, or a L tone when they are not followed by a complement

(1) a. Monomoraic roots:

H	a-kɔ́	“cl9. forest”
	ɔ-tá	“cl3. gun”
L	o-mbo	“cl3. now”
	ɔ-dzɛ	“cl3. mockery”

b. Bimoraic roots (with a long vowel)

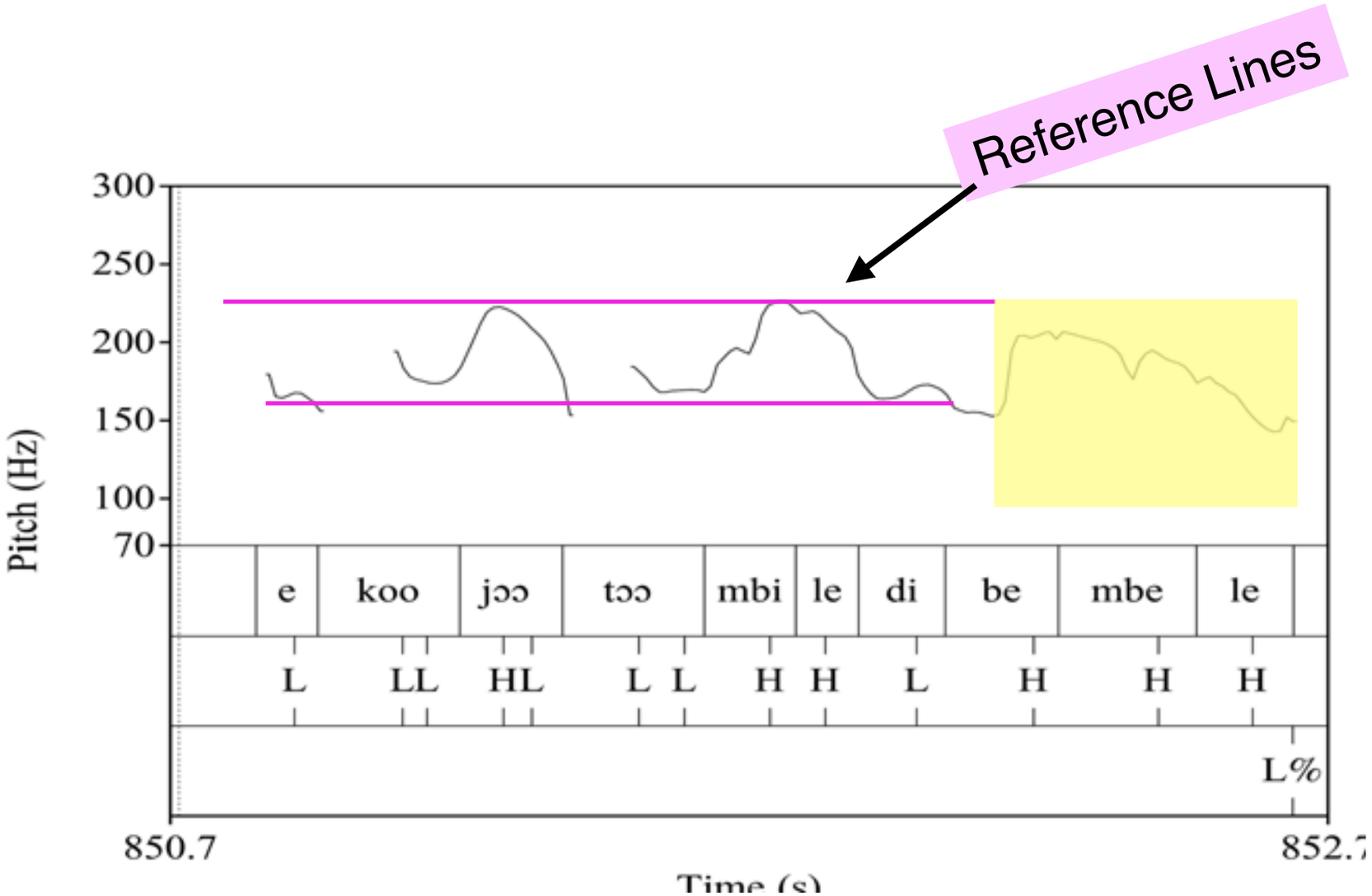
HH	i-báá	“cl5. knife”
LL	i-baa	“cl5. man”
HL	i-báa	“cl5. marriage”
LH	i-baá	“cl8. walls”

c. Bimoraic roots (with two syllables)

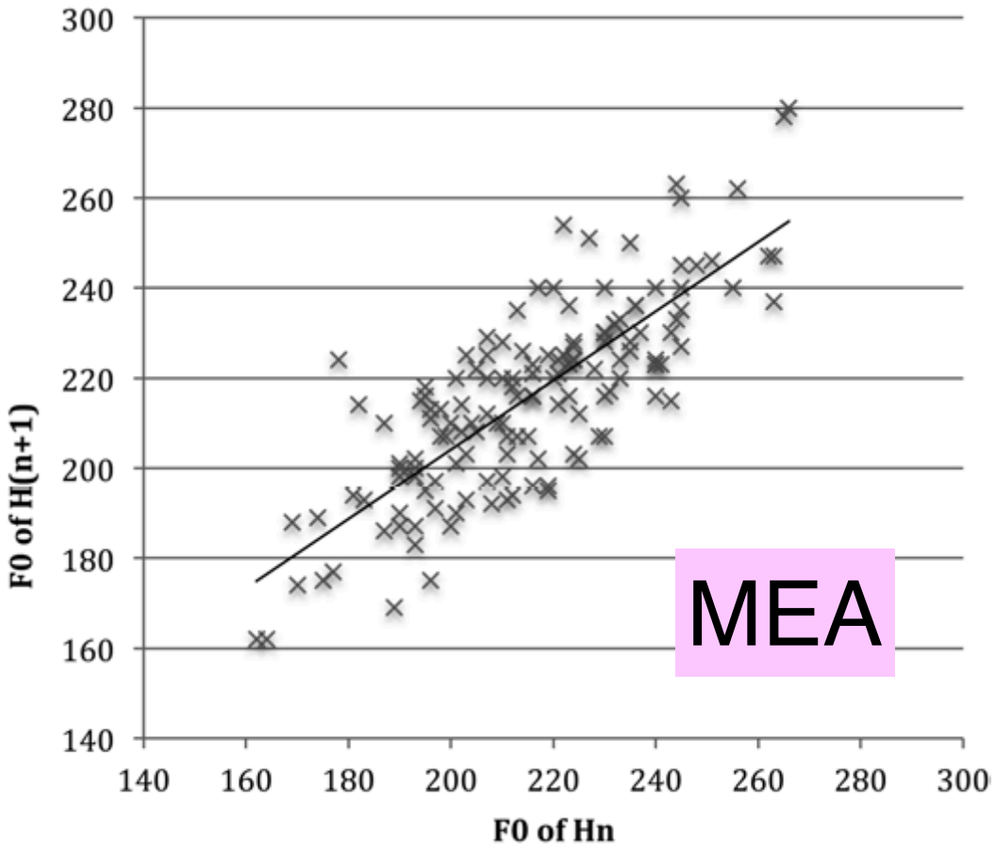
HH	ɔ-mbɔ́ndɔ́	“cl3. leg”
LL	i-mbamba	“cl5. frog”
HL	o-lómi	“cl1. husband”
LH	o-kondó	“cl3. tail”

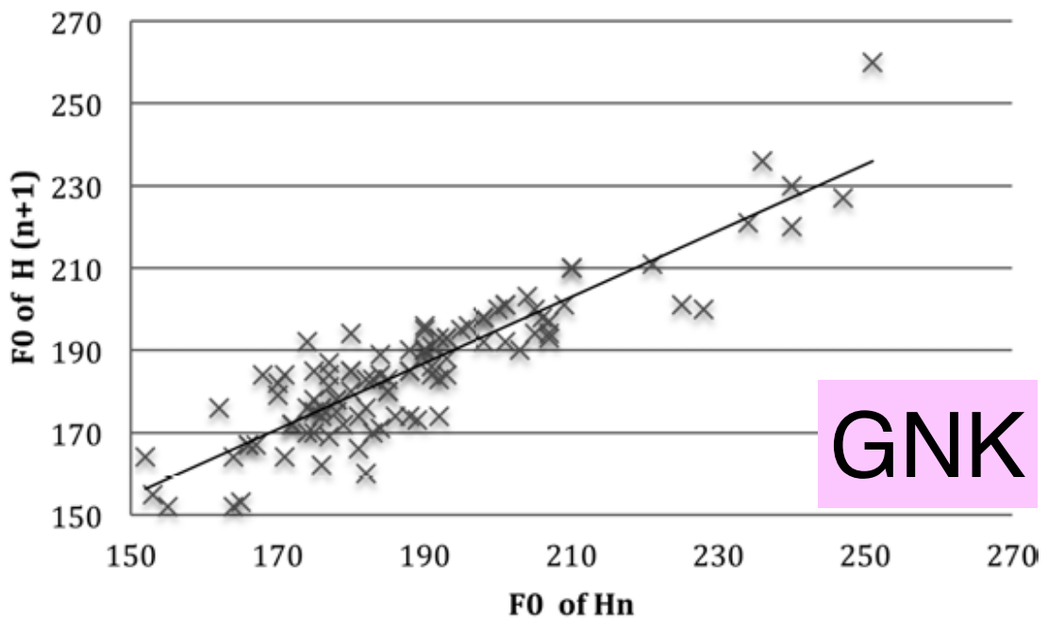
No overall downtrend

- No downdrift, downstep, declination
- H, L levels don't change until final lowering



No Downdrift: Evidence





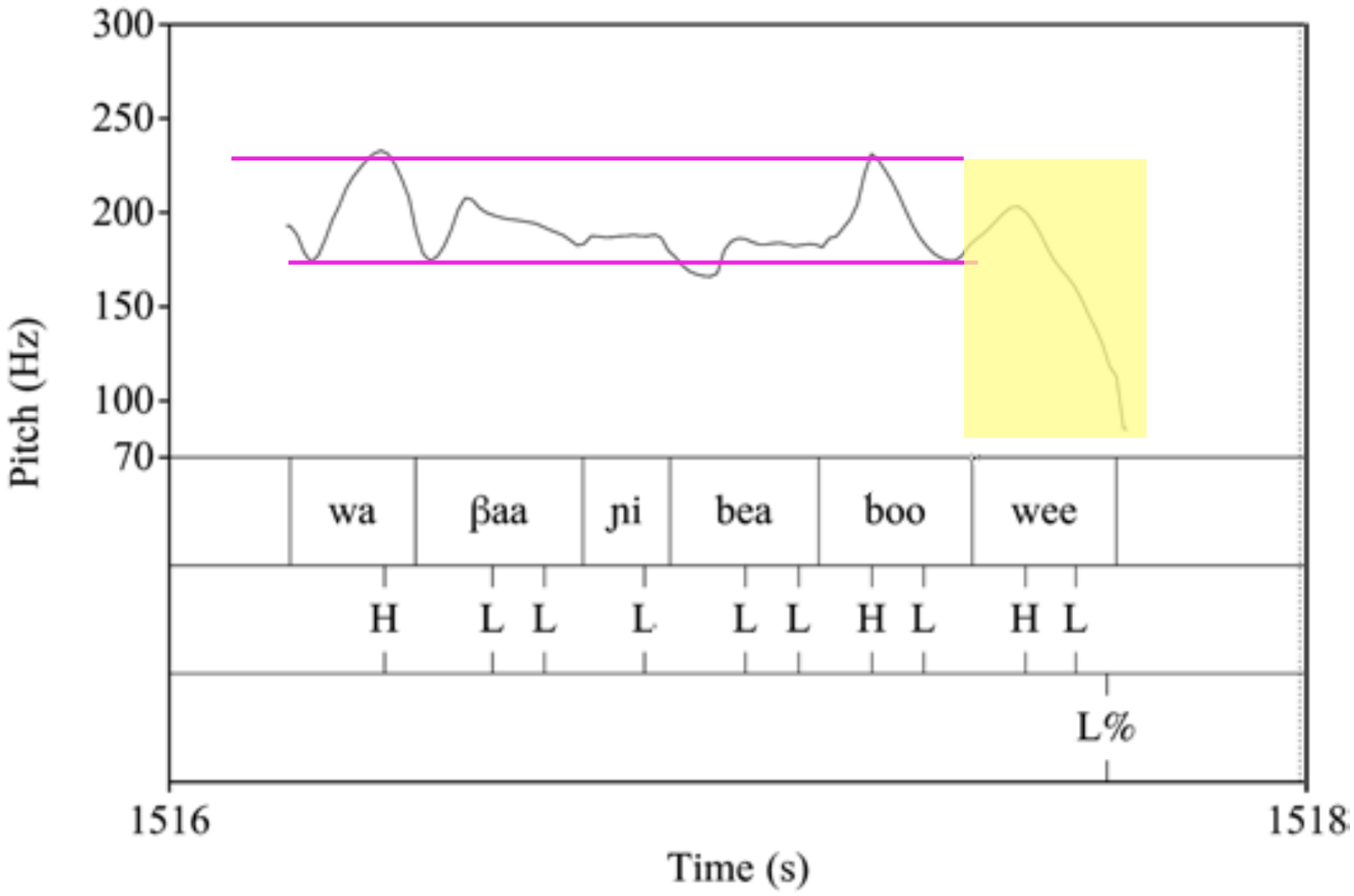
- What are slopes??

Table 1: Mean values with standard deviations of Hn and H(n+1) values for Speaker MEA and Speaker GNK

Speaker MEA:	mean of Hn = 215Hz	**σ** = 18Hz
	mean of H(n+1) = 216hz	**σ** = 7hz
Speaker GNK:	mean of Hn = 189Hz	**σ** = 4Hz
	mean of H(n+1) = 185Hz	**σ** = 7hz

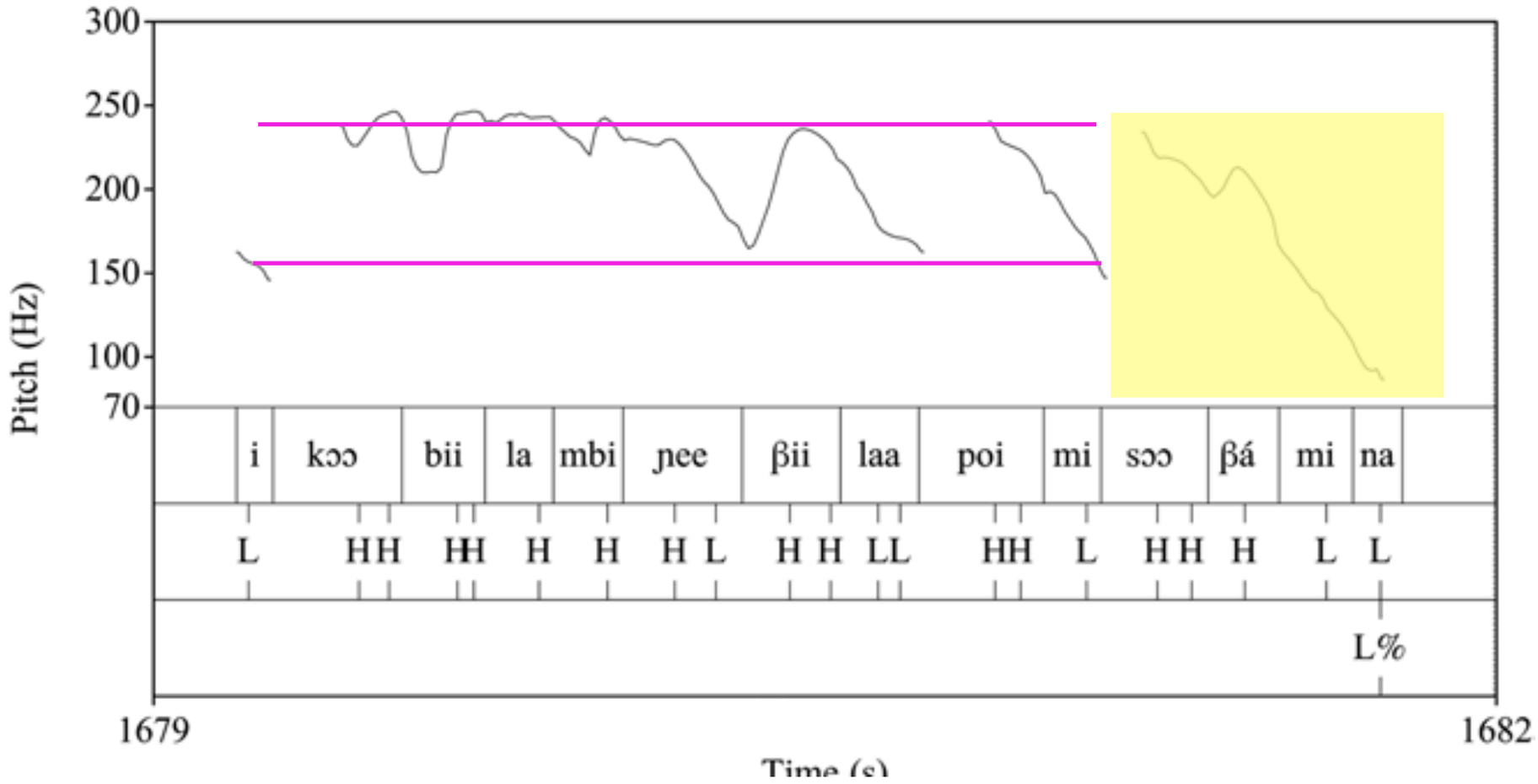
Final Lowering

- Rialland models as L% as an extra-low tone (at bottom of pitch range) that pulls the level of tones down, particularly Ls
- But they also have temporal scope…
- What is temporal scope?



Final Lowering

- To me, it looks like the scope a contiguous sequence of (H) tones or sequence of (H)(L).
- L preceding the (H) or (H)(L) is not affected.



Models of final lowering

- Ignore the exact temporal scope (since it is unclear)
  - Assume 3-5 moras

(1) L% Gesture model

- Low-stiffness L% gesture aligned so reach its target in the last mora
- Target blends with Tone targets of overlapping Tone gestures
  Blending strength of L% with L > H (why?)
- Activation function of L% gesture (like pi-gesture)
- Possible Problem: Effect of initial conditions (H vs. L) when L% gesture kicks in.
  - Perhaps always triggered by a L, which fits with data

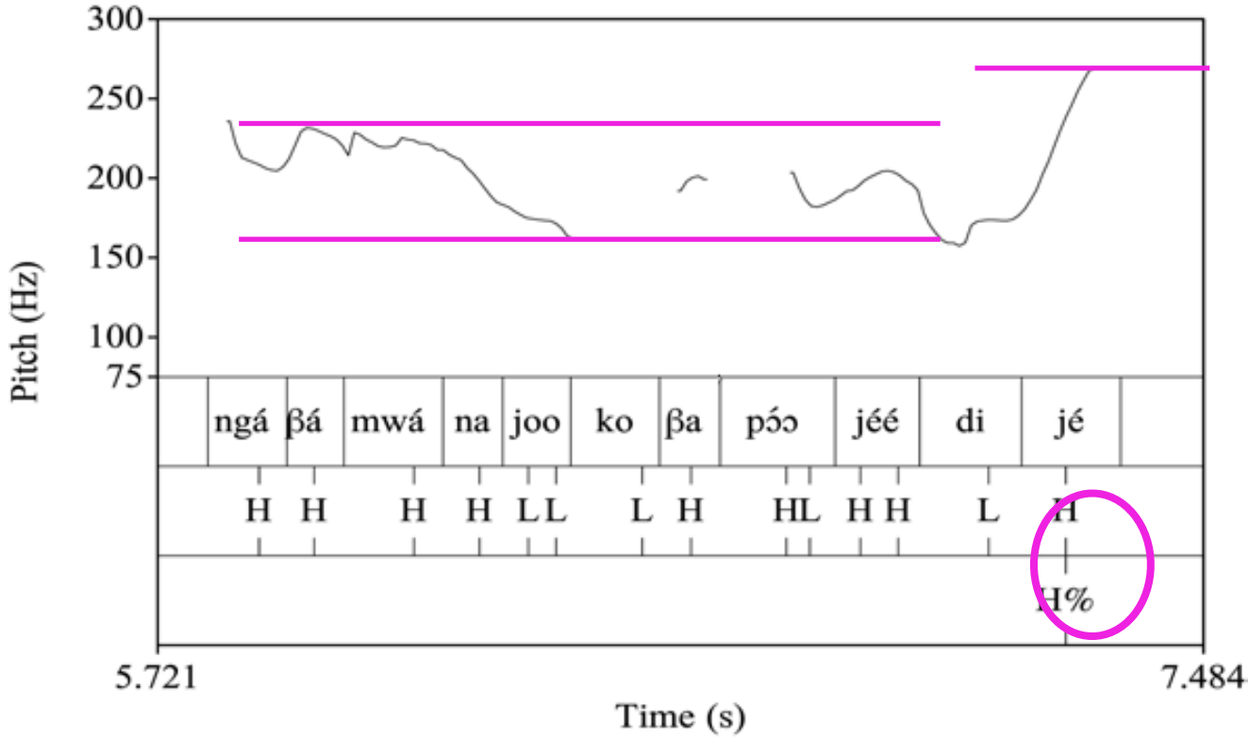
Models of final lowering

(2) Extension of Mambila Linear model

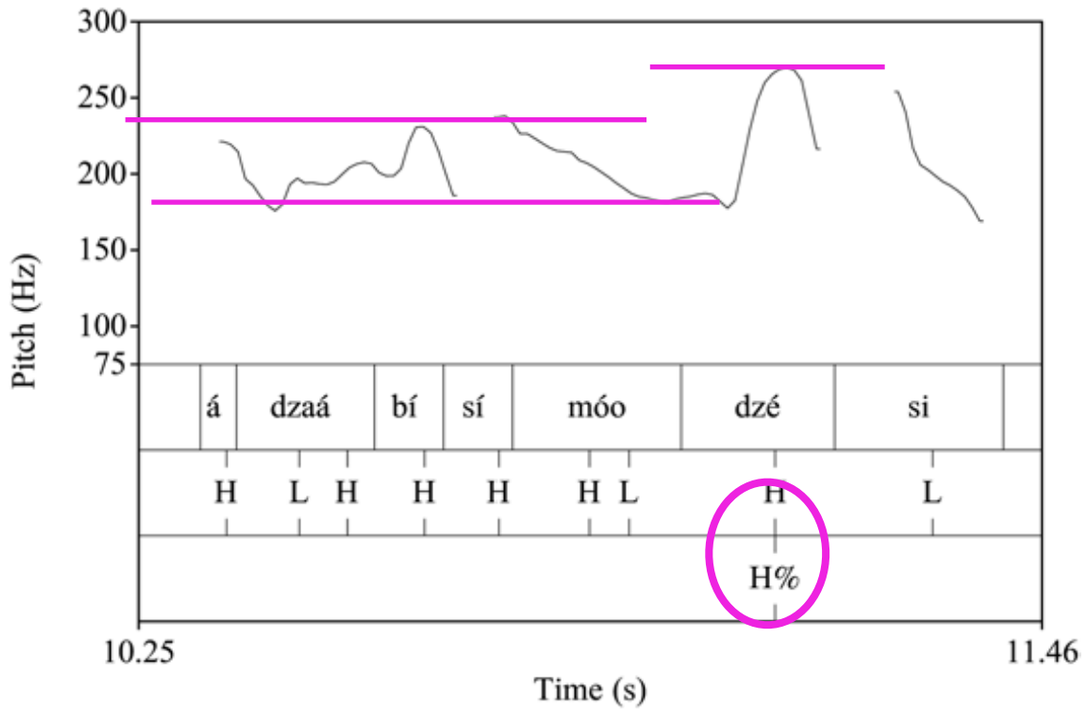
- Attraction of tone target to super-low L% located at end of IP
- Attraction is inversely proportional to:
  - F0 distance of tone target to L%
  - Temporal distance of tone target to L%

- One problem with both models
  - The final lowering on the surface is a smoothly falling f0 over the last X moras, beginning at or near the level of H.
  - This isn't explicit in either model.
  - This would account for why the final lowering scope is bounded by a L.

H% : Juxtaposed declaratives



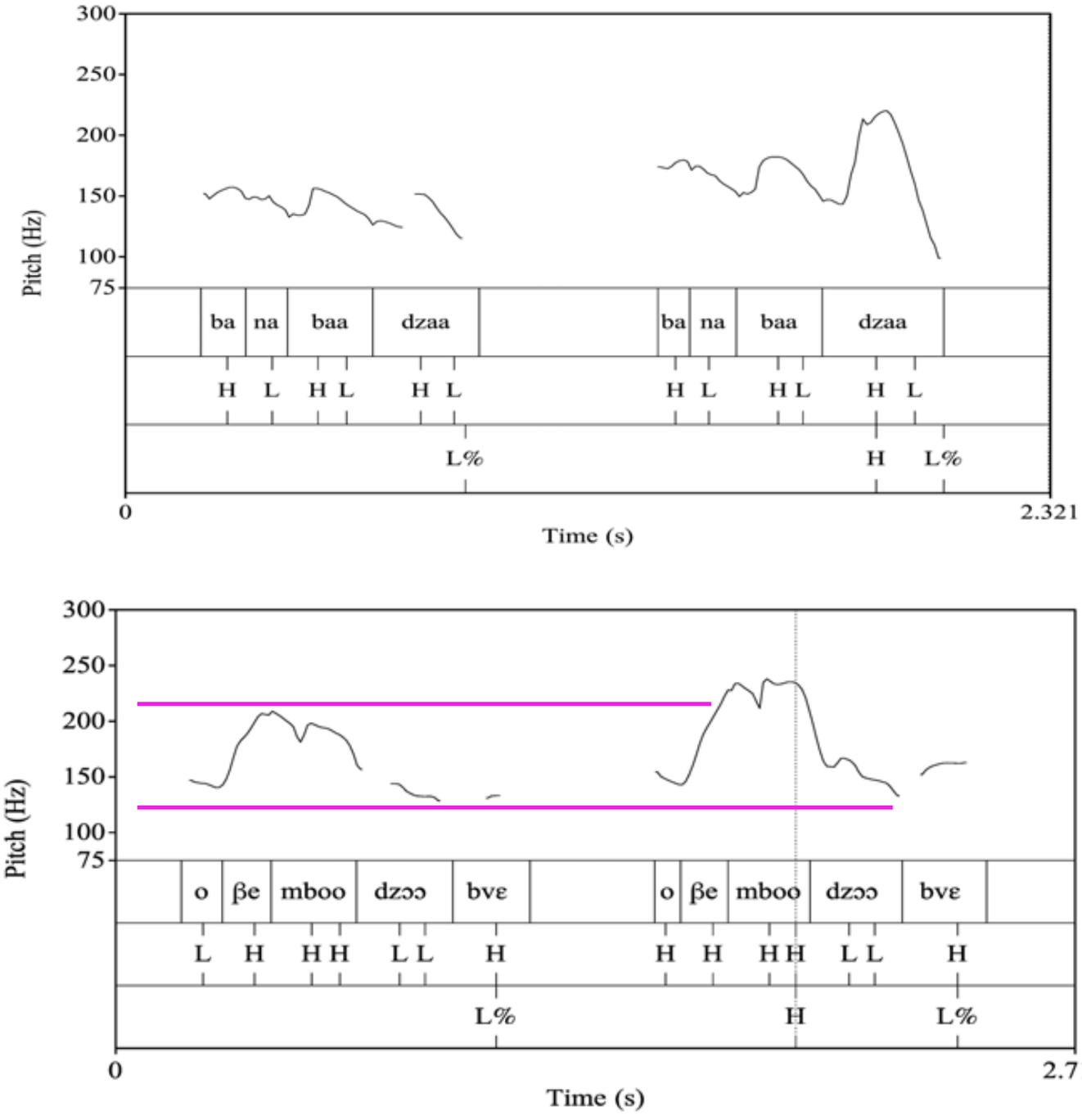
(litt.) "To me, here, the child came to collect stories which are these (ones)…"
'To me, here, the child came to collect stories from here.'



"it was us during childhood" = "It was during our childhood…"

- Extra High H% near end of IP.
- Attracted to H nearest the end of IP
- Effect of H% seems pretty localized to one syllable.
- This would seem to require a nonlinear dynamics attracting the H% from the boundary to the first H back from the boundary.

Yes/No Q: H L%

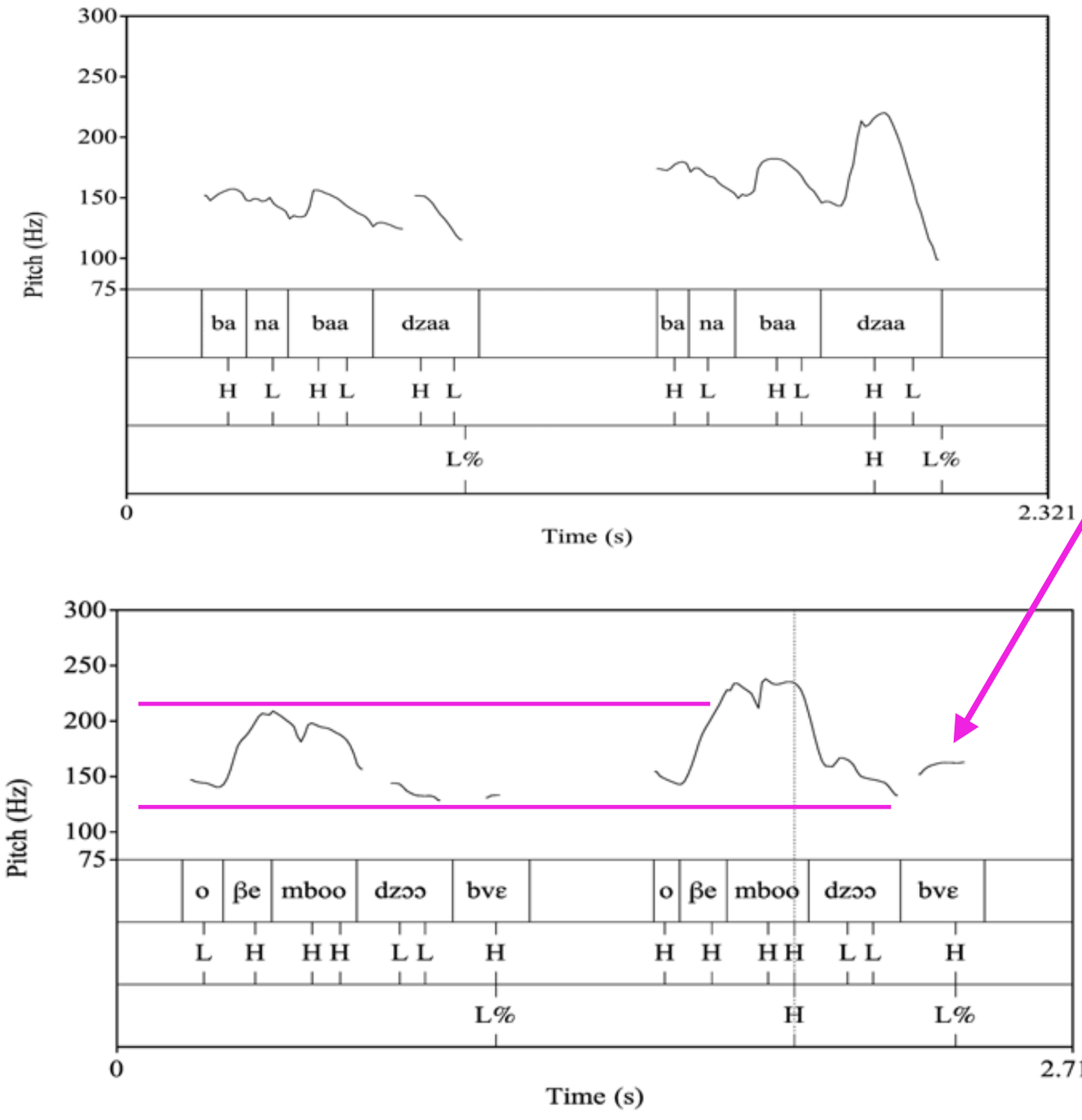


L% is found at end of the utterance

H occurs on the last H tone if the final tone is a L tone.

Otherwise, the H% of the HL% is pushed forward towards the preceding H tone, extending the contour on a larger domain.

Yes/No Q: H L%



- Modeling notes:
- The L% here is local. Doesn't spread leftward.
- The effect of H seems local too. As with the juxtaposed H% there needs to be some nonlinear selection, as in the juxtaposed case.
- F0 slopes of assertions and yes-no Q are distinct?
- Theories of boundary tones?

Reference Lines

Table 3: Pitch references lines of H and L tones and L% and H% boundary tones

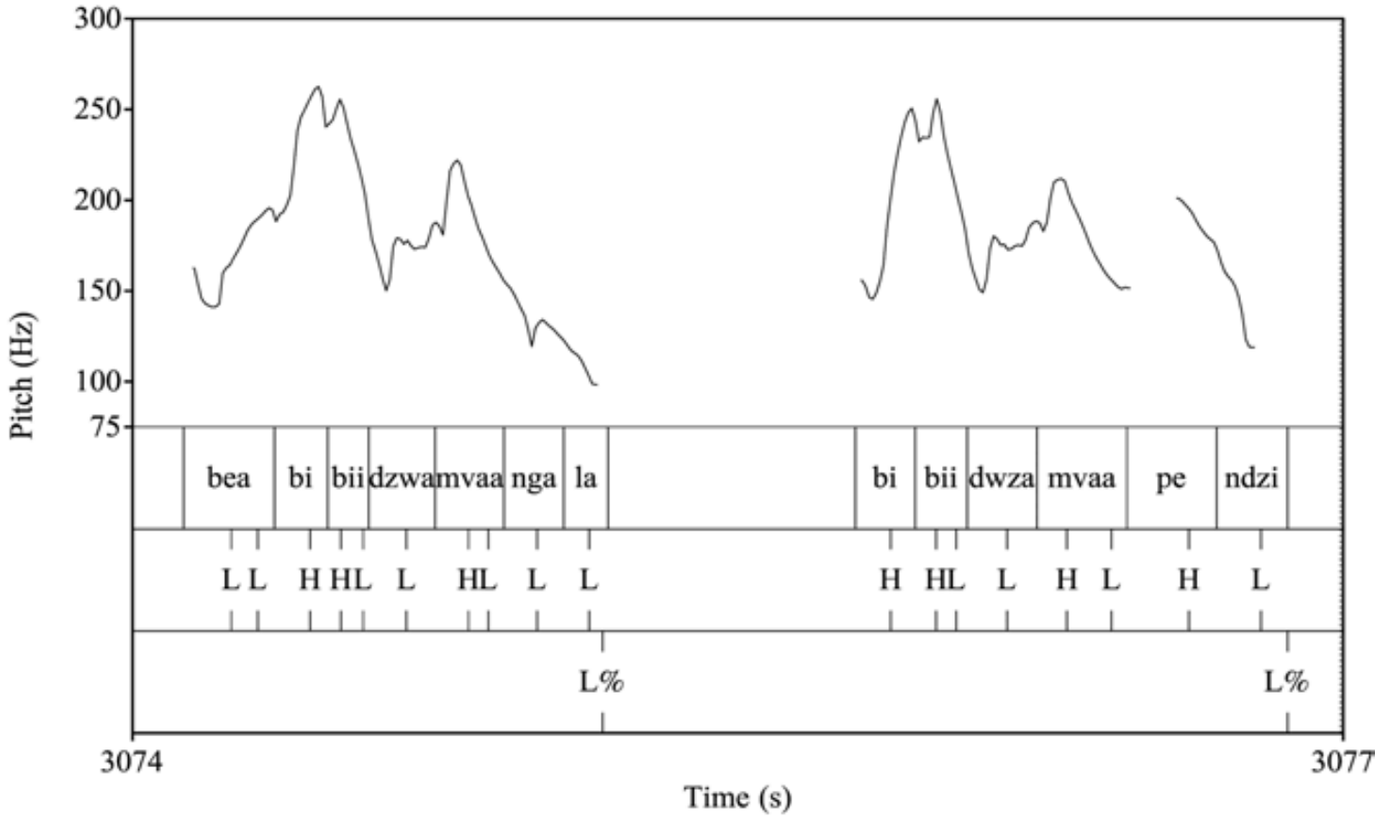
H%	_____H% _____
H reference line	H_____H_____H_____
L reference line	_____L_____L_____L__
L% bottom of the pitch range	_____ L%

- We can think of these as the Target values whose dynamics we modeled in the Mambila simulation.

Focus and wh-questions

- No intonation marking of focus or wh questions,

Emphasis: register expansion



- Raises H. Does it also lower L?
- "Emphasis (or backgrounding) modulates locally the informative weight." In a continuous fashion.

Complex Sentences

- In corpus of isolated words and sentences, which include 45 complex sentences, there were no pauses or any other prosodic events between subordinate clauses and main clauses.
- Metotony in verbs: H->L in clause-final position.

(18) [ojúluláalámbatsínadílandzaa]

(m)o-júlu	láalámba	tsína	adí	la	N-jaa
cl1-woman	cl1.PRES-cook	because	cl1.PRES-be.Hm	with	cl9-hunger

‘The woman cooks because she is hungry.’

L clause-final

H before complement

Left and right dislocations

LEFT

(19) [[ojúluláaβelɔ́pɛ́wamúa L%/ɔkwáí L%] (Embanga Aborobongui & al. 2014)

(m)o-júlu	láaβelá	ɔ-pɛ́	wa	mú-a	(m)ɔ-kwáí.
1-woman	1.PRES.can.Hm	cl15-give	1a.PRO	3sg.PRO	3-machete

‘The woman can give him it, the machete.’

RIGHT

Pause with no L% lengthening?

(20) [básópoo /báabáaβelótonáno]

básí	ó	poo	/ báa	báaβelá	o-toná	nɔ.
cl2.woman	at	cl7.village	cl2.PRO	cl2.can.PRES.Hm	cl15-refuse.Hm	2sgPRO

‘The women, at the village, they can refuse you.’

(21) [Dislocated element [core clause]]IP