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MPUR TONES AND INTONATION IN AN AMBERBAKEN MYTH[1]

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In memory of Antonie Cohen

The present article discusses tones and intonation in a myth of origin, the *Āmberbāken* story and is a first attempt to describe prosody in *Mpùr*. Apart from the linguistic material it presents, the story is an example of oral tradition of the *Mpùr* speaking *Āmberbāken* people, living on the north-east coast of the Bird's Head in Irian Jaya, Indonesia. In section 2 some notes on the *Mpùr* language are given. The method used to analyse and describe tones and intonation is dealt with in section 3. In section 4, pitch phenomena in *Mpùr* are discussed, with examples. In section 5, the full text of the *Āmberbāken* myth with a limited (but for present purposes sufficient) morphological description and a literal and free English translation is presented.

1 Background of the linguistic material

The original recording of the Amberbaken myth was made in the village Anjai, Kebar valley in 1994, using a DAT-taperecorder and a stereo directional microphone. The speaker is Seppy Wabia, a thirty-year-old man who was born in Saukorem on the north coast[2]. At the age of twelve, after his Amberbaken father died, he and his Kebar mother moved to the Kebar valley[3]. He is educated in Indonesian at school and is one of the few *Mpùr* speakers who can read texts in his mother tongue, although he has difficulties writing it[4].

2 Some notes on the Mpùr language

2.1 Classification

Mpùr belongs to the West Papuan Phylum (WPP), Bird's Head Superstock, and has been classified as Amberbaken Stock-level isolate[5] (Voorhoeve 1994:73ff.). It is spoken by approximately five thousand speakers in the Kebar valley, in its surrounding mountains, and, roughly speaking, on the north-east coast between Arfu in the east and Wau in the north (see the map in the Introduction of this volume). In the literature, *Mpùr* is often referred to as *Amberbaken* or *Kebar*, which are geographical names for different parts of the area. *Mpùr*

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[1] Research for this paper was conducted in the framework of the NWO (Netherlands Organization for Scientific Research) priority programme "The Irian Jaya Studies: a programme for interdisciplinary reserach" (ISIR) financed by WOTRO (Netherlands Foundation for the Advancement of Tropical Research).

[2] After the story was recorded, Seppy Wabia told me he was not quite sure about some fragments and referred for "a more clear and complete version of the myth" to the well-known Dutch missionary Kamma (1976 I: 66-67; 1978: 42-44), who spent long periods in the Bird's Head Area.

[3] For an anthropological study of the Kebar people, the reader is referred to Miedema (1984, 1994).

[4] Most literate *Mpùr* speakers do not recognize words written in their mother tongue.

[5] The indication "stock-level isolate" means that on the basis of a 200-word list, 6-12% of lexical items show correspondences (i.e. are cognates) between a given language and other languages of the same phylum.

is the name of the language as used by its speakers. *Mpùr* has two main dialects: *Sīrĩ̂r* (on the coast) and *Ājĩ̂w* (in the mountains). A list of about 2000 lexical items shows 10% difference between these two dialects. Phonetic and prosodic differences are also observed (e.g. pronunciation of stops and fricatives, tonal and intonational differences).

Mpùr is one of the few tonal languages in the Bird's Head Area. Other languages in this area still under investigation as to tonal features are *Maybrat* (Dol: in progress), *Abun* (Ch.Berry: 1995, K. Berry: 1995, Odé: in progress), *Meyah* (Gravelle: in progress) and *Moskona* (research recently started), all spoken in the North and North-East Bird's Head. Except for *Abun*, which seems to have grammatical as well as lexical tone contrasts, all these languages probably have only remnants of lexical tone.

The literature on prosodic phenomena (tone, intonation and temporal organization (such as variations in syllable duration, rhythm, pauses)) in Papuan languages of Irian Jaya is not very rich. Studies on tone in Papuan languages of Irian Jaya are, among others, Bateman (1990), Edmondson (1992), Clouse (1993 and in progress). In Foley's study (Foley 1986:64) there is only a remark about the necessity to study suprasegmental systems. Detailed studies on tone in Papuan languages of Papua New Guinea have been found in, to mention a few authors, Hendriks (1995 and references cited therein), James (1994), Pike (1964).

2.2 **Phonology**

Mpùr has twelve consonant and five vowel phonemes, as well as five lexical tone contrasts (see section 4). The phonemes in *Mpùr* are presented below[6]. A detailed discussion of *Mpùr* phonology is beyond the scope of this article. However, I would like to mention that *Mpùr* has a great number of allophonic rules and a very wide tolerance of realization of both consonant and vowel phonemes as long as oppositions are maintained.

So far, there is no evidence that *Mpùr* is a language with phonemic lexical stress. That is, no lexical stress contrasts or minimal stress pairs like, for instance, **'mamír* vs. **ma'mír* have been found to exist. Intensity, duration and/or fundamental frequency, traditionally regarded as the acoustic phonetic correlates of stress in languages like Dutch, English and Russian, seem not to function in *Mpùr* to mark stress. See section 4.3.

Consonants

voiceless stops:	bilabial	/p/
	alveolar	/t/
	palatal-velar	/k/
voiced stops:	bilabial	/b/
	alveolar	/d/
flap	alveolar	/r/[7]
voiceless fricatives:	bilabial	/f/
	alveolar	/s/
voiced/voiceless affricate:	palatal-velar	/č/
nasals:		/m/, /n/
semivowels:		/w/, /y/

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[6] A detailed phonology of *Mpùr* by G. Kalmbacher (SIL/Universitas Cenderawasih, Jayapura) is in preparation. I am indebted to him for his observations and preliminary materials.

[7] It is not yet clear whether /r/ is indeed a phoneme or an allophone of /d/. In the Kebar valley, /r/ rarely occurs in word-initial position, whereas in the Amberbaken region it does occur in that position (e.g. *ra* 'earlier').

Vowels

high front	/i/
high back	/u/
mid front	/e/
mid back	/o/
low central	/a/

Tones

name of tones	pitch description	transcription
H	high level	´
M	mid level, varying	unmarked[8]
ML	midlow level	-
L	low level	`
FR	falling&rising	~

Chart of *Mpùr* tones on the basis of Odé (1995). The transcription symbols for tones are according to the International Phonetic Alphabet, IPA (1993).

2.3 **Morphology**

Similar to other languages of the WPP (e.g. *Maybrat, Moi*), the *Mpùr* language has on the whole a simple morphological structure. However, the deictic system in *Mpùr* is, like in other WPP languages, rather complicated and not yet very well understood. *Mpùr* employs prefixation for subject agreement on verbs and for possessor agreement on inalienable nouns, distinguishing person, gender for third person, and number: singular, dual and plural. Unlike some of the WPP languages (e.g. *Moi, Hatam, Sougb* (Reesink, this volume)), there is no opposition inclusive-exclusive for first person plural. The word order in declarative sentences is SVO. For more detailed, recent studies on the typology of WPP languages, the reader is referred to Voorhoeve (1987, 1994) and Reesink (this volume).

3 **Perceptually analysing and describing tones and intonation**

3.1 **Introduction**

Lexical, morphological and syntactic aspects as well as gestures and facial expressions, together with the prosodic information, contribute to the overall interpretation of an utterance. The present article studies part of the prosodic information, i.e. pitch phenomena, which are therefore separated from the other prosodic parameters. The final aim of my study is a linguistic description of types of tone and intonation in *Mpùr*. Starting point for such a description is an experimental study of the formal phonetic contour of tone and intonation from a perceptual point of view.

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[8] The variety of allotones of type M is so large that it is questionable whether type M is a tone; it possibly could be another name for 'no tone'.

An experimental phonetic approach, in which data are experimentally verified with native speakers of a given language, enables us to present a formal description of types of tone and intonation with detailed phonetic specifications which are fully accessible and which can be reproduced. With the research tools nowadays available, it is no longer necessary to come up with an impressionistic description of prosodic data that are only accessible to (the ears of) the author.

Given the above mentioned considerations, the most appropriate approach to study and analyse tones and intonation in *Mpùr* is found to be the perceptual analysis-by-resynthesis method. This advanced so-called stylization method is developed at the Institute of Perception Research (IPO) in Eindhoven, The Netherlands ('t Hart, Collier, Cohen 1990).

3.2 **The stylization method**

Stylizing pitch contours means replacing measured fundamental frequency curves by the smallest number of straight-line segments which still yield perceptual equality with the original fundamental frequency (F0) curves. In the process from the original F0 curve to the final stylized pitch contour, the following phases can be distinguished:

- the original F0 curve is measured and resynthesized;
- the resynthesized F0 curve is compared by ear with the original F0 curve: there may be no audible differences;
- in interaction with the computer the experimenter reduces the F0 curve to the smallest number of straight-line segments in such a way that perceptual equality between the original F0 curve and the stylized contour is still maintained. The stylized pitch movements can be made audible by resynthesis and compared with the original F0 curve of the same fragment of the speech signal[9]. No differences may be audible. All pitch movements in a final stylization are *perceptually relevant* and cannot be reduced further without introducing a perceptual difference with the original F0 curve;
- the equality between the stylized pitch contours and the original versions can be experimentally verified.

A stylized pitch contour is called a close-copy stylization ('t Hart et al. 1990: 42).

The result of the process is a representation of F0 curves in terms of perceptually relevant pitch movements that combine to form complete stylized contours.

The speech synthesis technique used for the present analysis is based on the so-called PSOLA (Pitch-Synchronous Overlap-Add) approach, described in Charpentier & Moulines (1989). This technique, based on waveform editing, has been adapted in 1992 by L.L.M. Vogten at IPO, Eindhoven, under the name PIOLA, for which a patent has been granted (PHN 13.801). In my experience with PIOLA, the quality of this technique is very high, provided the pitch in the speech signal is manipulated to no more than ca. 4 semitones above or below the original signal. Almost no difference in quality between the resynthesized stylization and the original recording is perceptible. For the present article, part of the analysis has been carried out at IPO, where a new software package for the stylization method has recently been developed (and is still in development) by E. Gigi (IPO), called Graphical

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[9] A whole stylized utterance, a fragment or short stretches of speech (20 or 30 milliseconds, 10 ms is too short for comparison) can be compared to the original speech signal. However, a short, isolated stylized stretch may sound acceptable as compared to the original, but it can sound unacceptable in the whole utterance. Therefore, it is important to listen to how the stretch fits into the whole fragment melodically.

Interactive Processing of Speech (GIPOS), under the supervision of L.L.M. Vogten. In this software, the PSOLA/PIOLA technique is implemented.

An illustration of the stylization method is given in figure 1, in which waveform, original fundamental frequency curves and close-copy stylization (solid straight-line segments) of speech fragment No.1 (this number refers to the number of the fragment in section 5) *bàri kú sōbòni* 'once upon a time', are presented on an ERB-rate scale[10].

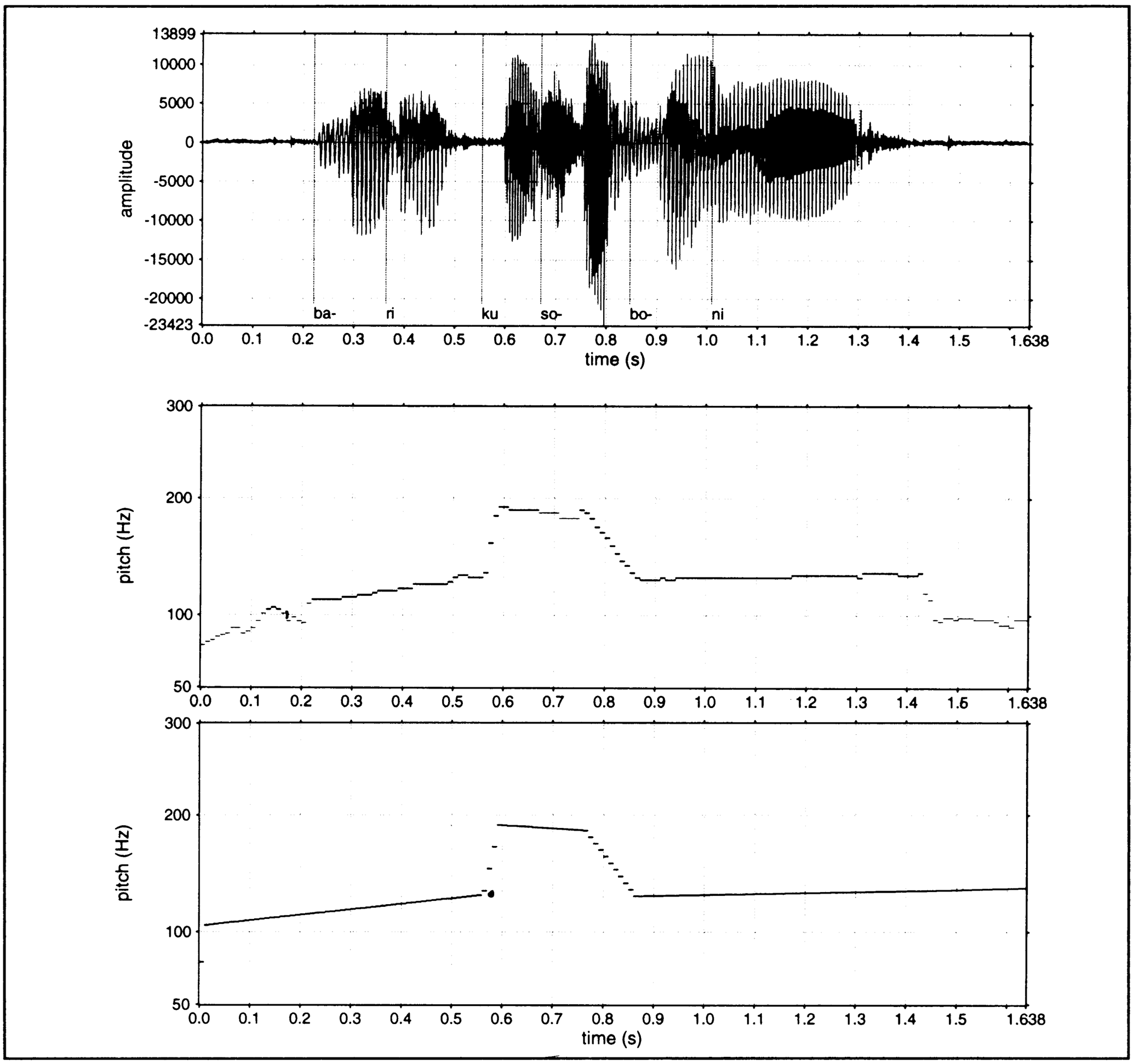

Figure 1. Waveform and original F0 curve (capricious lines, top) and close-copy stylization on an ERB-rate scale (solid straight lines, bottom) of speech fragment No.1 *bàri kú sōbòni* 'once upon a time'.

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[10] The ERB-rate scale (Equivalent Rectangular Bandwidth rate) is discussed in Hermes & van Gestel 1991. As a result of a number of perception experiments, the authors found that there is a difference between speech and music as to how the human ear perceives melodic intervals. It appears that if we want to compare pitch intervals in speech in different positions in the register of one or different voices, pitch values can better be expressed in ERB's on an ERB-rate scale instead of in semitones on a logarithmic scale. But since in the present article we deal with only one speaker, and no comparisons between voices are made, pitch values in the text are not expressed in ERB's, but in the more familiar semitones. Pitch contours in the pictures, however, are presented on the ERB-rate scale.

In all further figures of pitch contours in this article, the vertical axis shows fundamental frequency in hertz on the ERB-rate scale against time in seconds on the horizontal axis.

When the perceptually relevant pitch movements have been found and the stylizations have been verified, the movements are *classified* into discretely different *types* of perceptually relevant pitch movement on the basis of *melodic* similarity. A classification of the pitch movements on the basis of phonetic features is not reliable as long as we don't know which acoustic features are responsible for the perception of that type of movement. For a detailed perceptual description of (Russian) intonation by means of the stylization method, the reader is referred to Odé (1989).

By analysing, classifying and describing types of *tone* in the Amberbaken myth and in Odé (1995), I have shown that the stylization method, so far mainly used to analyse intonation, is applicable to a tone language as well.

4 **A description of tones and intonation in Mpùr**

4.1 **Tones in Mpùr**

Tones in *Mpùr* are phonemic and serve to contrast lexically between words. No evidence for grammatical tone has been found.

On the basis of production and perception data, using the stylization method described in section 3.2, Odé (1995) analyses the five lexical tone contrasts in *Mpùr*: three level tones (high, mid, and low (H,M,L)) and two contour tones (low falling (LF) (this type has now been redefined as type midlow level (ML), see below) and falling&rising (FR)). The description of the five types of tone was arrived at by analysing and stylizing words in isolation and in a small context, then classifying these words into types of pitch level or pitch movement on the basis of perceptual and phonetic similarity, and, finally, by verifying them in original and manipulated versions in experiments presented to native *Mpùr* speakers (Odé 1995).

The differentiation between pitch levels and pitch movements was made as follows. If in a syllable, pitch could be stylized (see section 3.2) into a level straight-line segment (even if some movement was present, see also section 4.5) without introducing a perceptual difference with the original pitch, the tone was defined as a *level* pitch; otherwise, if a rise and/or fall could not be removed without perceptually relevant difference, it was defined as a pitch *movement* (Odé 1995:216).

In *Mpùr* the pitch range between high and low is large, as can be expected in a language with four phonemic pitch levels: the difference, that is, the interval between two levels must be perceptible[11]. The falling&rising type has a clearly audible falling movement within the syllable before pitch rises.

Phonetic specifications of *Mpùr* tones are presented below.

In the present article one type of tone differs from the description given in Odé (1995): tone LF (low falling tone) has been redefined as type ML, a midlow level tone. Reasons for redefining type LF into ML are based upon many newly analysed and manipulated production

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[11] Perception experiments have shown that the differential threshold of pitch distance in speech communication is 3 semitones or more; in psychoacoustic experiments, the just noticeable difference in speech is 1.5 to 2 semitones ('t Hart et al. 1990:29). According to these results, the pitch range in a language with four distinctive pitch levels must be ca. 9 semitones. In *Mpùr* I have found pitch distances between two levels of ca. 2 semitones.

data in isolation and in context after the 1995 experiments had been carried out. For the time being, the other types of tone remain unchanged.

For Seppy Wabia, the speaker of the Amberbaken myth, the phonetic specifications of the five tones H, M, ML, L and FR in semitones are the following[12]:

H	200 Hz	12 ST above L
M	150 Hz	7 ST above L
ML	125 Hz	4 ST above L
L	100 Hz	0 ST
FR	145/125-100-125/145 Hz	6.5/4-0-4/6.5 ST above L

As can be seen here, the average range of Wabia's register between tones H and L is ca. 200-100 Hz or, in relative pitch values on a logarithmic scale[13], 12 semitones (ST), which is the interval of one octave. However, the range of the distance between the pitch levels of two types of tone varies considerably in spontaneous or expressive speech: the distance between, for instance, tones H and M is not always 5 ST, but can be smaller or larger, as long as the limits of perceptual tolerance (i.e. the minimal limits between two types of tone of ca. 2 ST; see also note 11) are obeyed. Especially in realizations of types M and FR, phonetic specifications vary considerably.

In figure 2 an example of the five types of lexical tone in *Mpùr* is given.

Note that in this section all numbers given to the examples refer to the numbers of the fragments where the examples occur in the full text of the Amberbaken myth in section 5; all examples given in the figures in this section are in stylized pitch contours on the ERB-rate scale (see note 10).

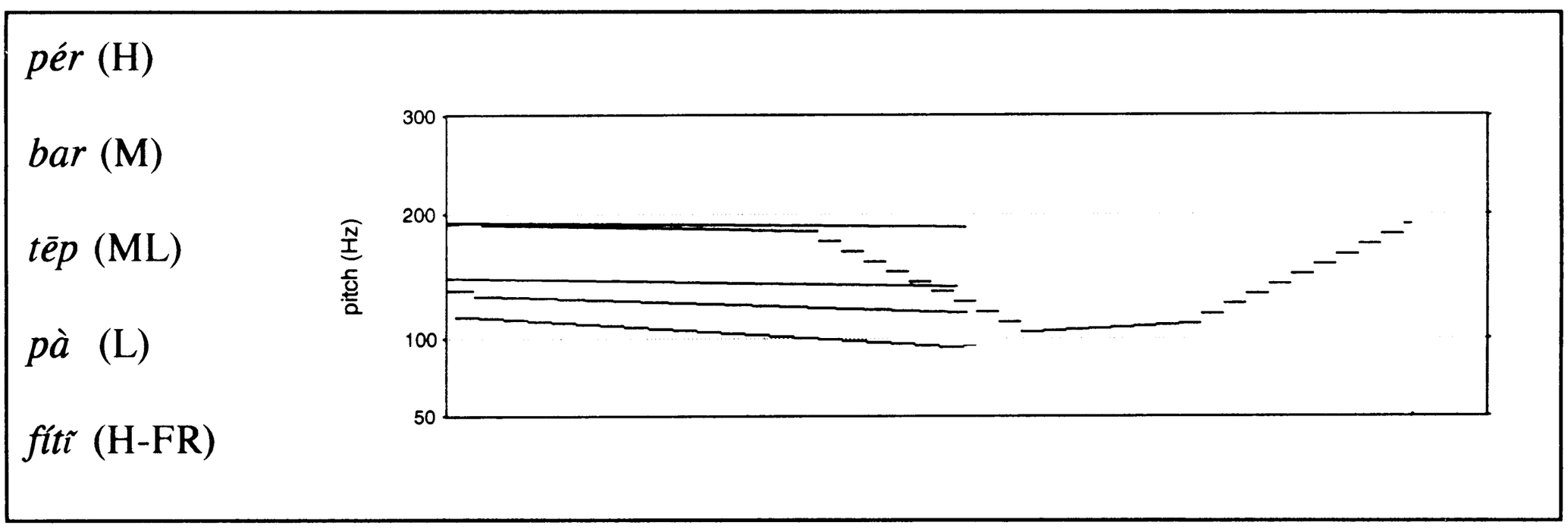

Figure 2. The five types of lexical tone in *Mpùr*: types H (*pér* 'dog'), M (*bar* 'thing'), ML (*tēp* 'plate'), L (*pà* 'already') and H-FR (*fítĩ* 'a certain').

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[12] Wabia's specifications discussed here do not substantially deviate from other recorded and analysed *Mpùr* speakers of the *Ājĩ'w* dialect.

[13] It does not make sense, even for one and the same speaker, to compare or to classify pitch levels or movements, especially if segmented out of spontaneous speech, in absolute values expressed in hertz. For the convenience of the reader the traditional semitones are used here instead of the still more appropriate ERB's. See note 10.

Type ML

Type ML is a level tone which is often realized as a midlow falling contour as a result of tone sandhi (see section 4.2) and/or intonation (see section 4.3). In figures 3a and 3b realizations of type ML with a midlow pitch level and a midlow falling movement are presented occurring in the word *tēp* 'plate' in the myth:
- in utterance-initial position as slightly falling (a fall of 3 ST with a rate of pitch change of 15 ST per second): No. 39 *tēp bátaka* 'plate that';
- in utterance-central position as level preceded by a very short (90 milliseconds) falling movement (-5.6 ST): No. 38 *wárkwā tēp fítĩ* 'water-takes along-plate-a certain'.

From these and other examples it is clear that type ML is realized as a falling movement if it occurs at a prosodic boundary (see section 4.3 below), in an accented syllable (i.e. a syllable in a word that is perceptually prominent and which gives a word more saliency than other words in its environment) or in the case of tone sandhi.

Type M

Type M, a mid level tone, is often called "empty" by native speakers of *Mpùr*. More analyses and perception experiments are needed to find out whether type M is, as I expect, a neutral, unmarked type of tone with realizations depending on the tonal context, occurring mainly in unaccented syllables. See also note 8.

Word-initial nasals followed by a stop are syllabic and in the Amberbaken myth occur with tone M only. Examples are *nkàn* 'old man', *nkà* 'that', *mbwar* 'I say', *ntar* 'I possess', *ndà* 'that'. Word initial clusters of more than two consonants do not occur in *Mpùr*. Between two

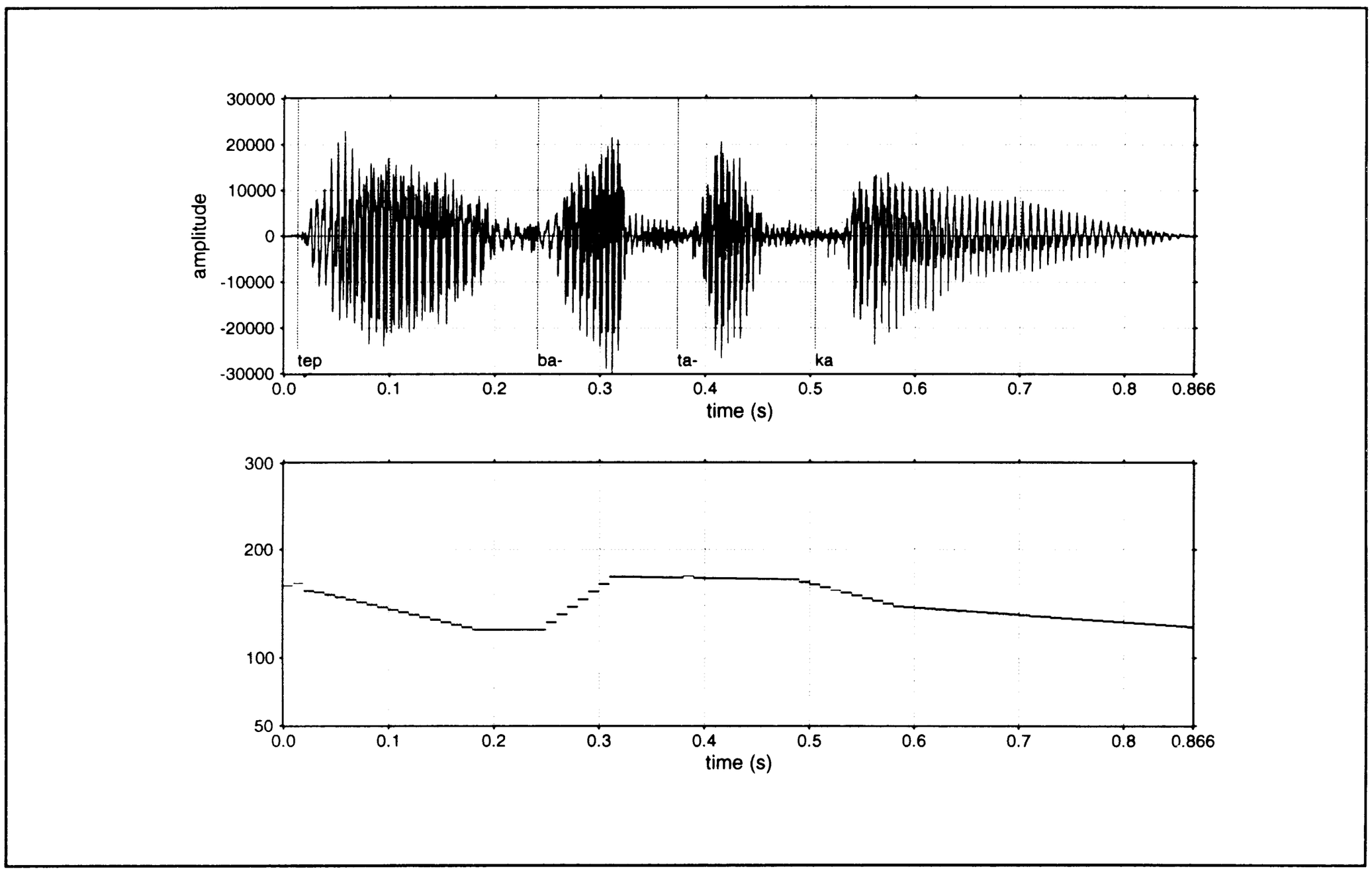

Figure 3a. A realization of type ML in the word *tēp* 'plate' in initial position of utterance No. 39.

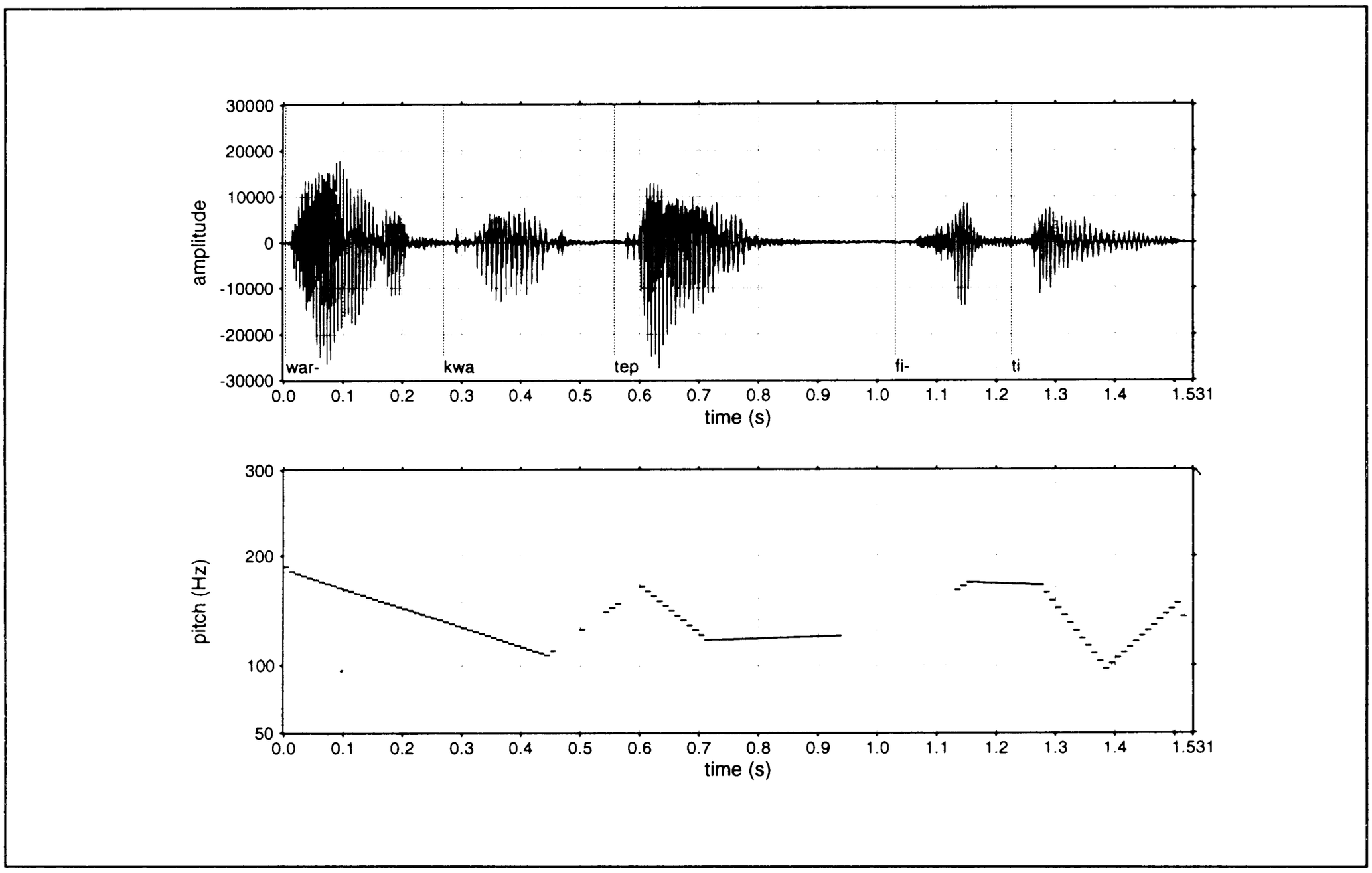

Figure 3b. A realization of type ML in the word *tēp* 'plate' in central position of utterance No. 38.

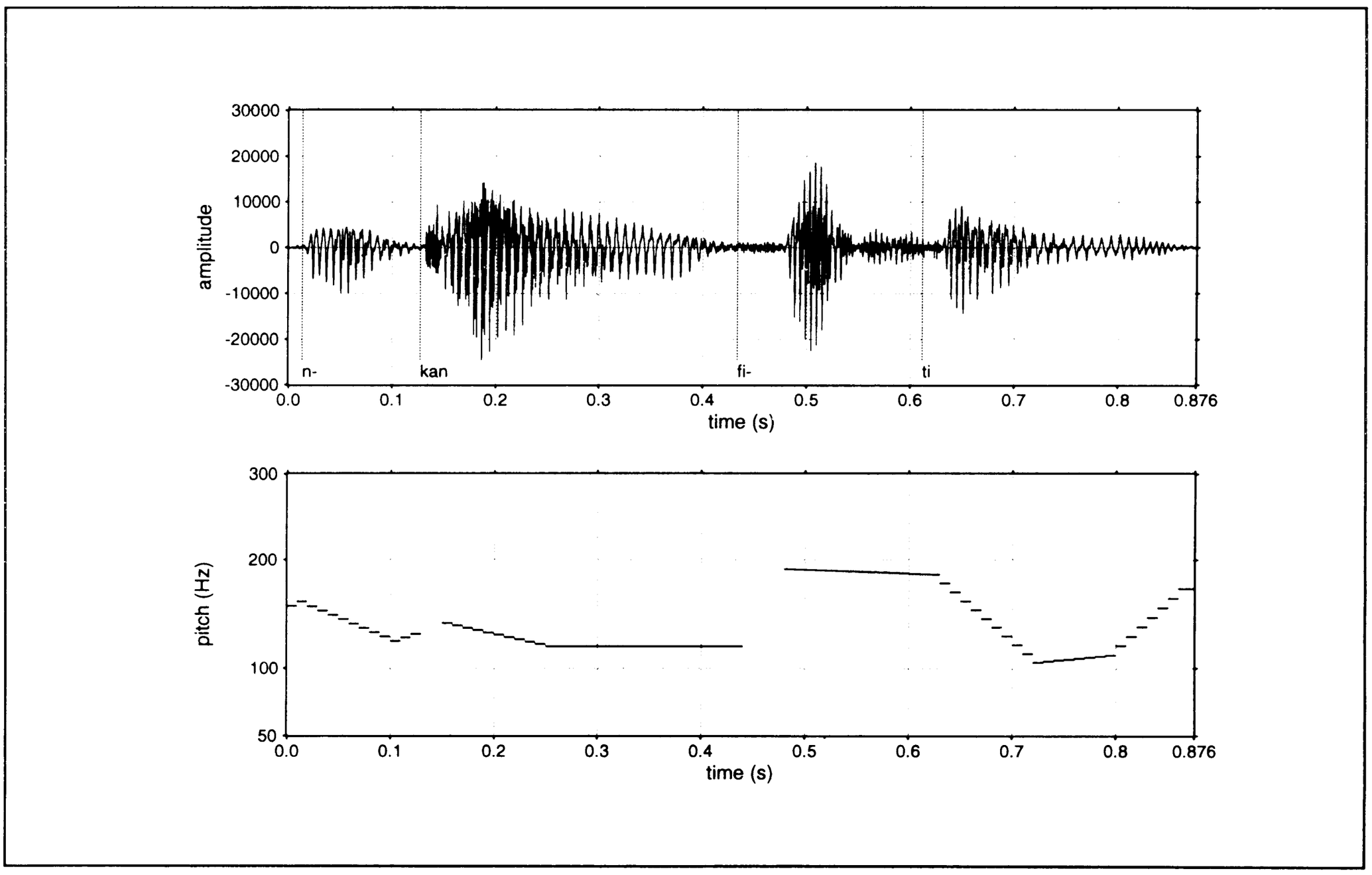

Figure 4a. Realization of a word-initial syllabic nasal with type M in fragment No. 2 in the word *nkàn* 'old man'.

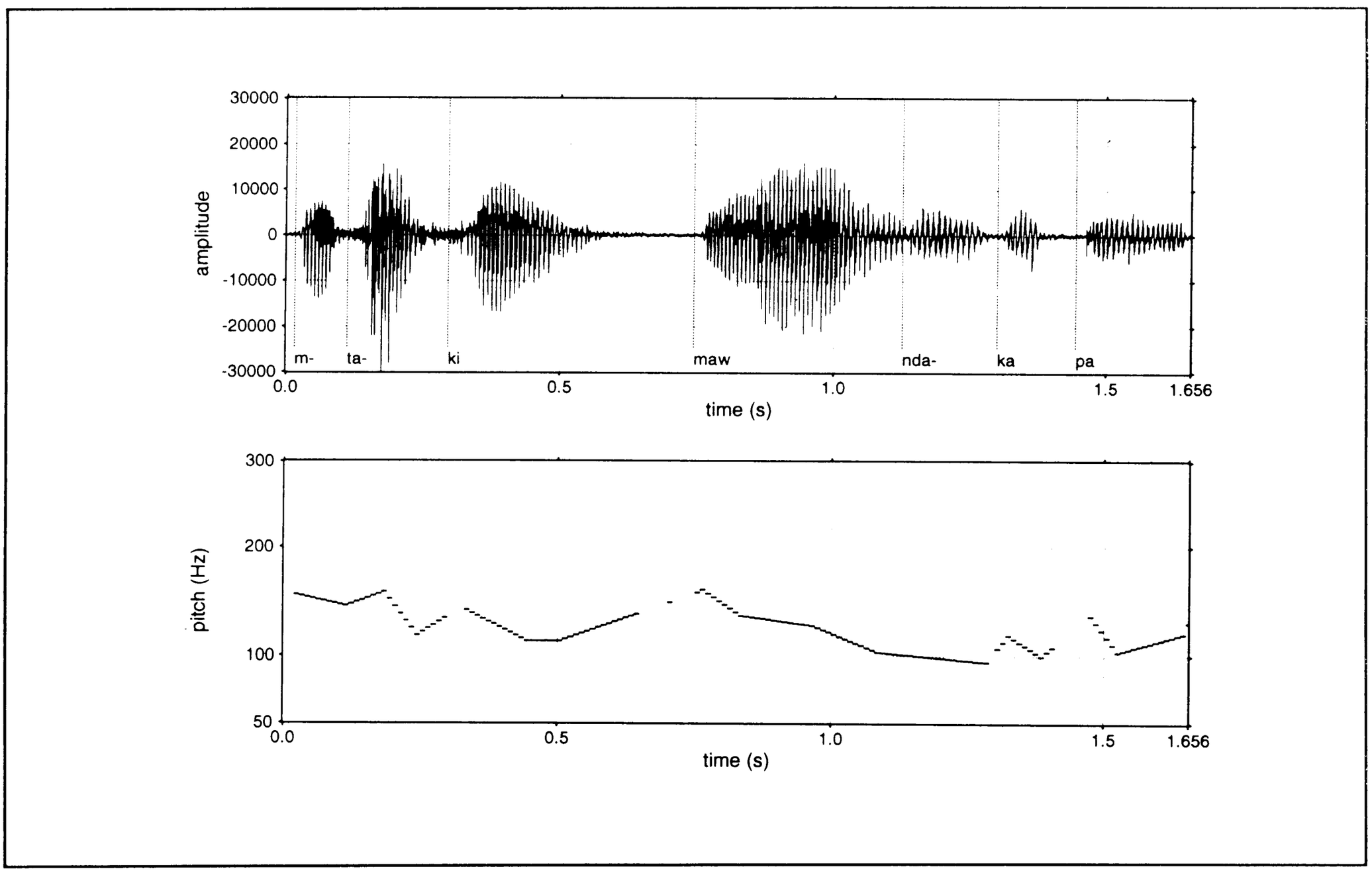

Figure 4b. Realization of a word-initial syllabic nasal with type M in fragment No. 90 in the word *mtaki* 'like this'.

word initial consonants a central vowel is often found with the unmarked tone M (e.g. *beraw* vs. *braw* 'and, with'). If, conversely, vowels in word-initial syllables are swallowed after a nasal, the given nasal becomes syllabic, e.g. *mintaki* vs. *mtaki* 'like this'. For examples of syilabic nasals see figures 4a and 4b.

Types H and L

Not surprisingly, the other two level tones, types H and L, are the least problematic in the *Mpùr* tone system. Examples of level types H, M and L are presented in figure 5.

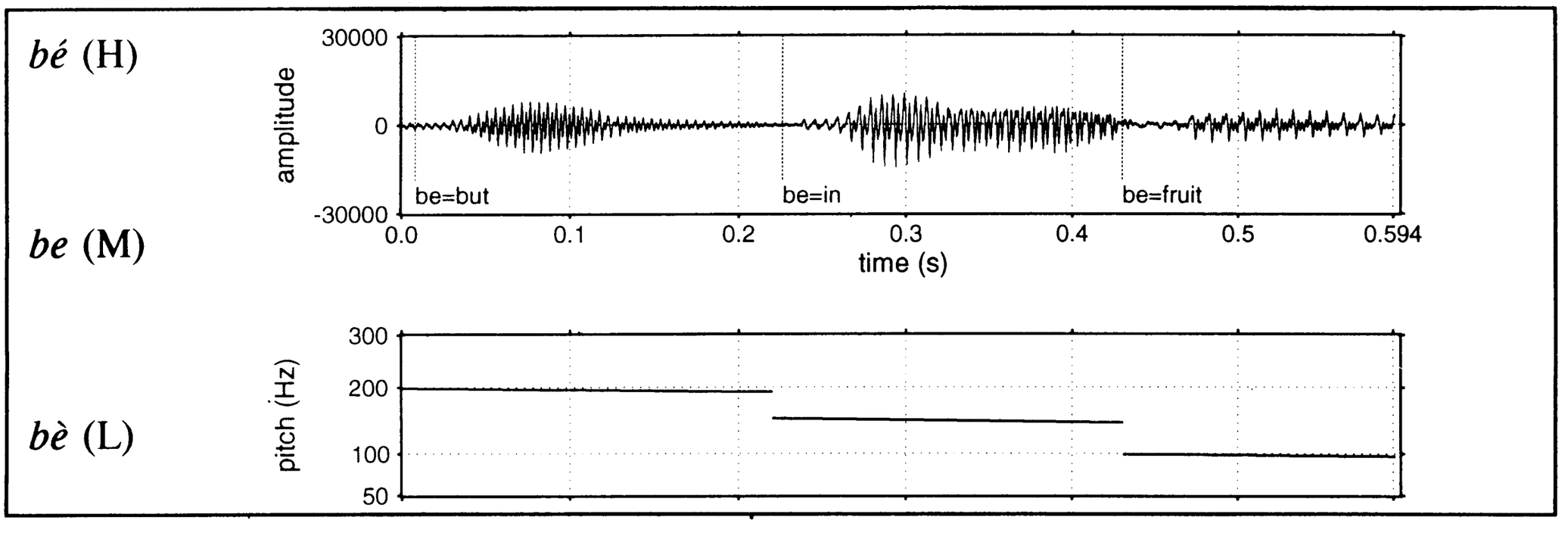

Figure 5. Realizations of types H, M and L in the words *bé* 'but', *be* 'in', *bè* 'fruit' in fragments Nos. 36, 40, 43.

Some more remarks on level tones

If not influenced by tone sandhi and/or intonation, as we will see below, a sequence of two of the same level tones is realized on the same (or almost the same) pitch level, for example in central position in the utterance *ākon buru pà bé pér mankã̄ tōw* 'he slept deeply already but dog that barked', fragment No. 36.

The example is presented in figure 6.

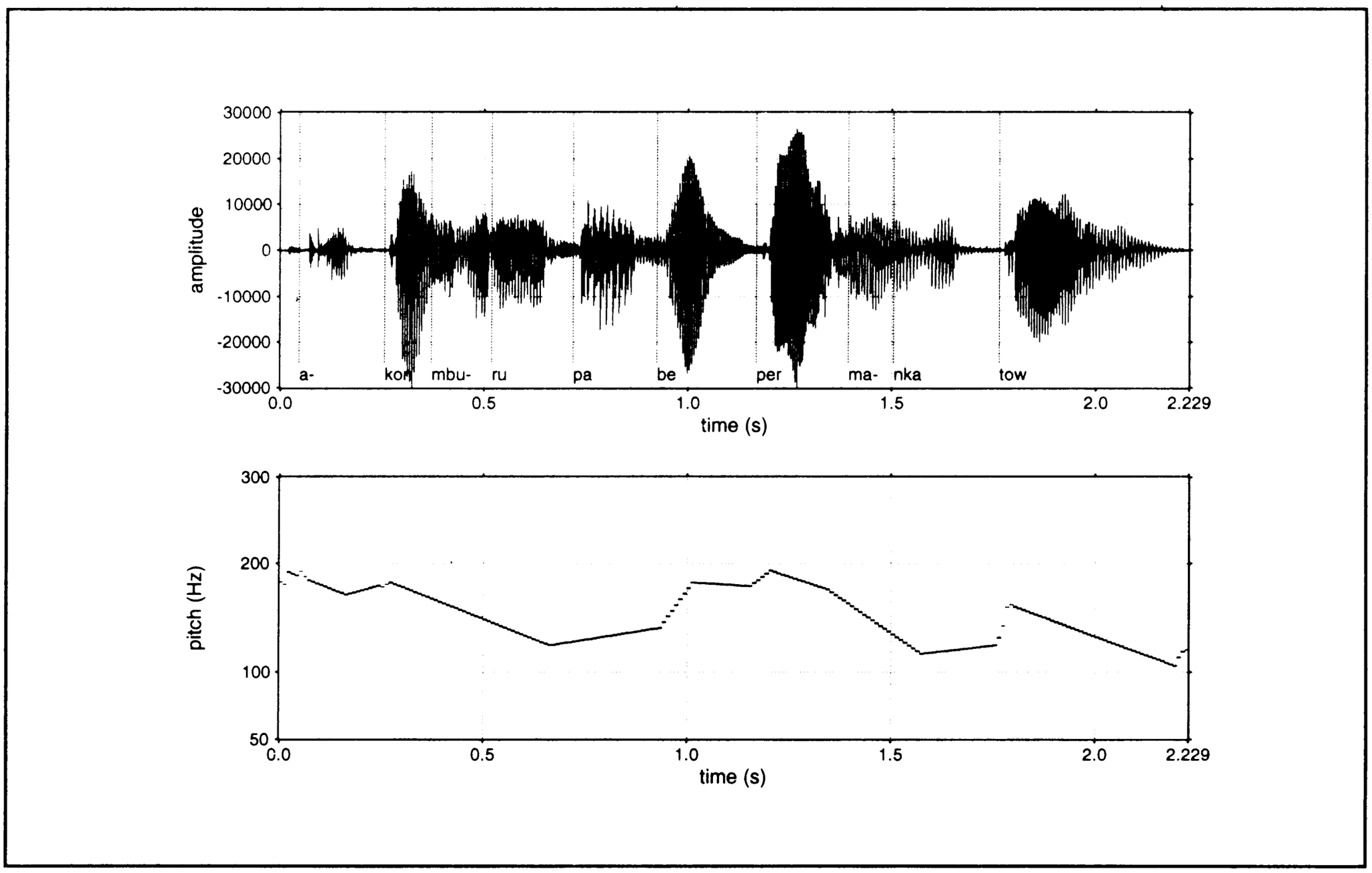

Figure 6. Example of a sequence of two high tones in the utterance *ākon buru pà bé pér mankã̄* tōw 'he slept deeply already but dog that barked', fragment No. 36.

The distance between types H and M, between M and ML and between ML and L fluctuates under the influence of, inter alia, accent. For example, if a two-syllable word with tone sequence H-ML is accented, the distance between types H and ML can be much larger than if the syllables were not accented. In the Amberbaken myth, in fragments Nos. 45 and 46, *āre wárkwā kútut/ wárkwā kútutē* 'so the water took along/ the water took along' the verb *wárkwā* 'water+to carry' is accented in the first, but unaccented in the second utterance. The excursion size between types H and ML in the accented realization is 6.2 ST, in the unaccented realization 4.4 ST, a difference of 1.8 ST. The examples are given in figures 7a and 7b.

Type FR

The only contour tone, type FR, is somewhat suspect in the sense that it rarely occurs in monosyllabic words and if it does, the final consonant is a nasal (e.g. *sũ̄m* 'a counternoun for short, cut-off objects'). In disyllabic words it occurs, as far as I know, only in the final syllable. However, in realizations of type FR the rise is clearly observed and it cannot be removed, except if the syllable in which type FR occurs is subject to intonational or sandhi

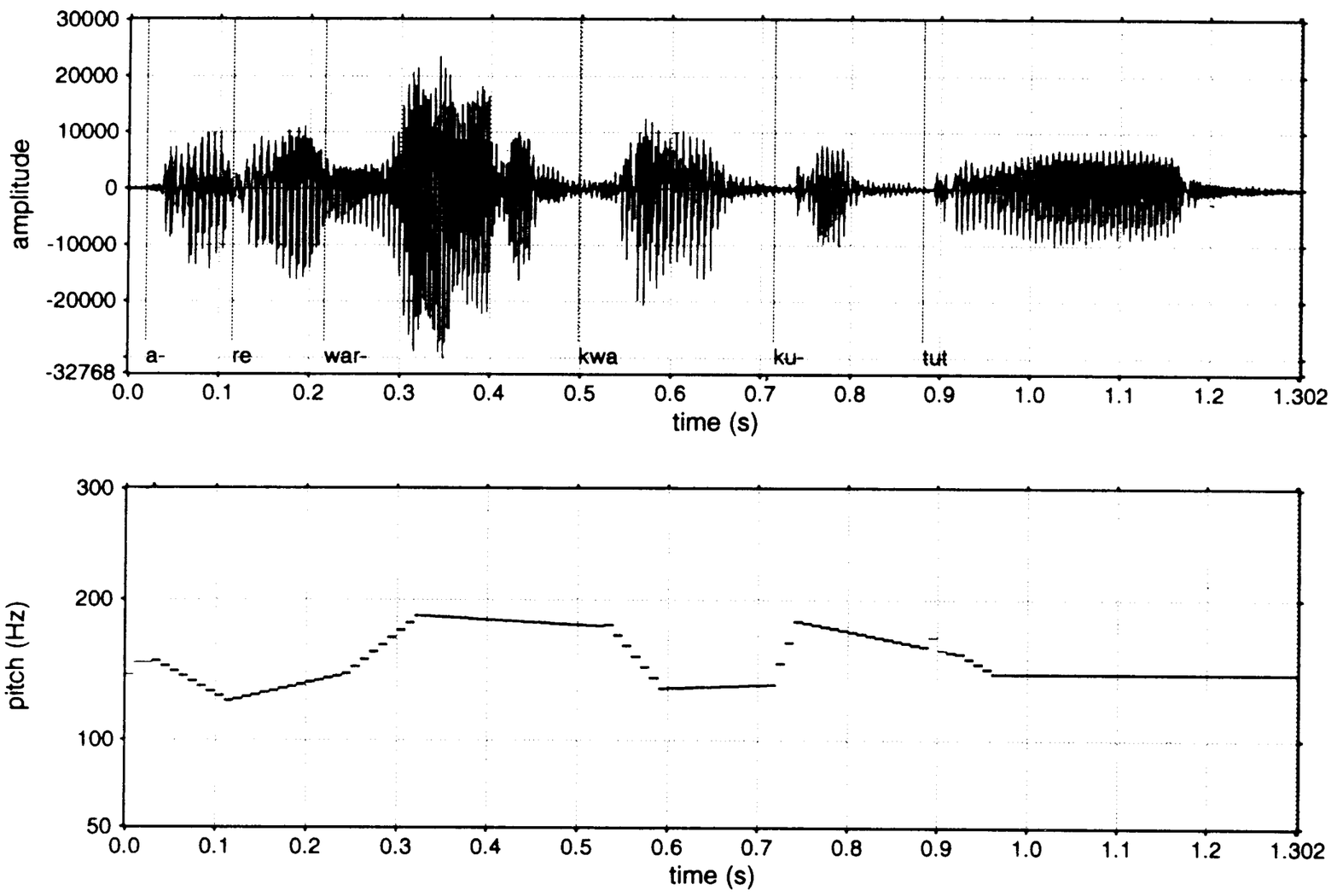

Figure 7a. Realization of types H-ML in the word *wárkwā 'wár+dukwā'* 'water+to carry' in accented position (fragment No. 45).

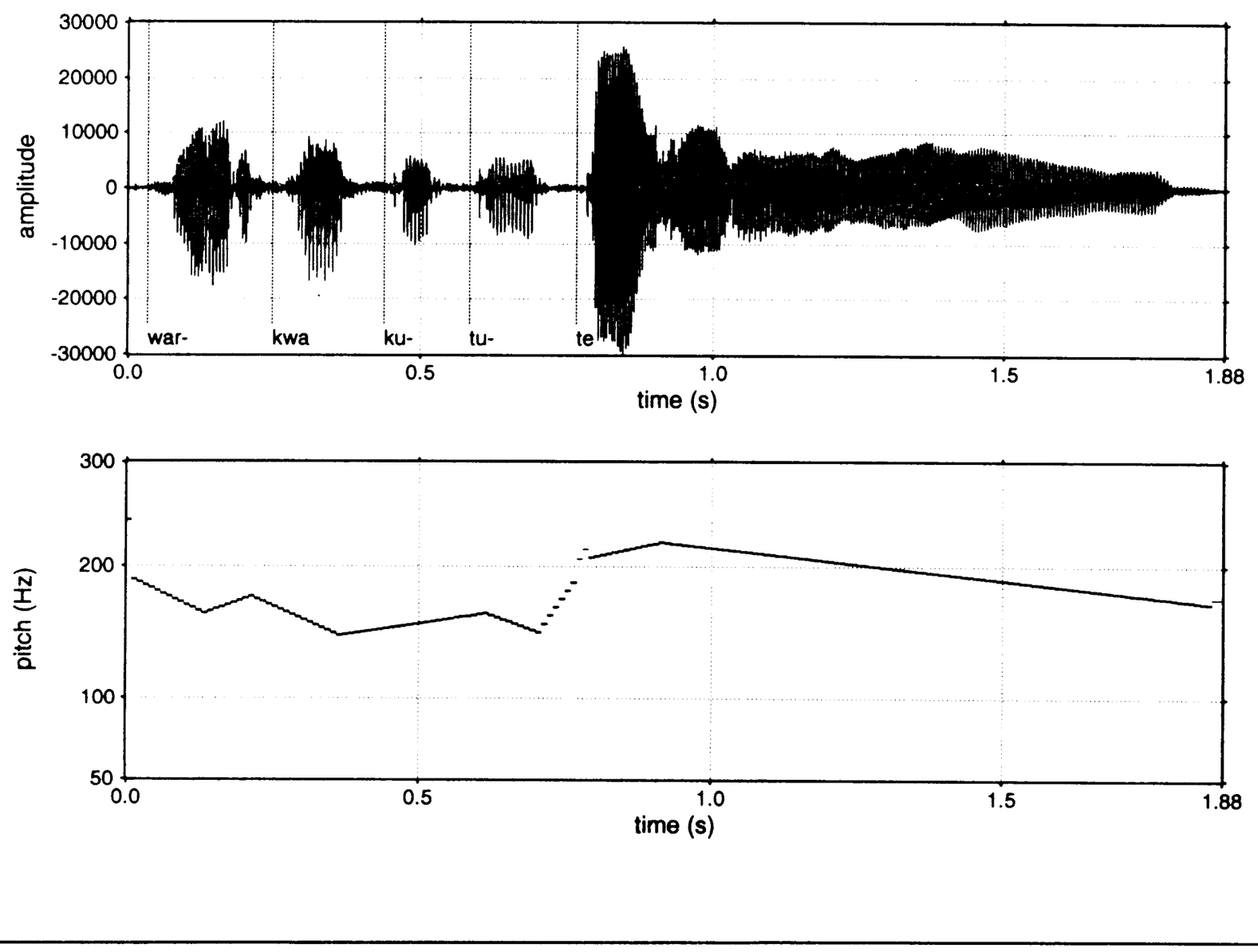

Figure 7b. Realizations of types H-ML in the word *wárkwā 'wár+dukwā'* 'water+to carry' in unaccented position (fragments No. 46).

phenomena. For instance, in fragment No. 35 *ākon kú jaswãkē-e-e* 'he sleeps in the hut', type FR precedes type ML which is realized emphatically in utterance-final position with a falling movement (intonation); the rising movement of type FR is completed only in the last syllable. Two examples, fragments Nos. 2 and 23, are given in figures 8a and 8b.

Though the rise in the realization of tone FR may reach a level higher than mid, there is no neutralization of type FR and type H after type M in, for example, minimal tone pair *kukwán* 'wild' (M-H) vs. *kukwãn* 'butterfly'(M-FR). Other examples of minimal tone pairs or tone contrasts with type FR are *àkà* 'to meet' (L-L) - *àka* 'thus' (L-M) vs. *sènàr* 'because' (L-L) - *sènãr* 'left-overs' (L-FR); *are* 'bird of paradise' (M-M) vs. *nikũ* 'kunai grass' (M-FR).

4.2 **Tone sandhi**

Tone sandhi, the term used for the influence of tones on the realization of adjacent tones, is a normal phenomenon in *Mpùr*. Rules for tone sandhi in *Mpùr* have not been established yet; an example is, for instance, the realization of type FR followed by a level tone, where the rise of type FR is continued and/or completed in the next syllable. An example has been given above in section 4.1, type FR in fragment No. 23, figure 8b.

4.3 **Intonation**

In the text of the Amberbaken myth presented in section 5 below, perceived prosodic boundaries are indicated with the mark /. Prosodic boundaries occur at a pause, a silence, a hesitation or a reset (upwards or downwards in the speaker's register), and/or as a result of the temporal organization of an utterance, or at the end of a stream of thought. In the present text, pauses and hesitations are often accompanied or filled by the word *yāw* 'well'

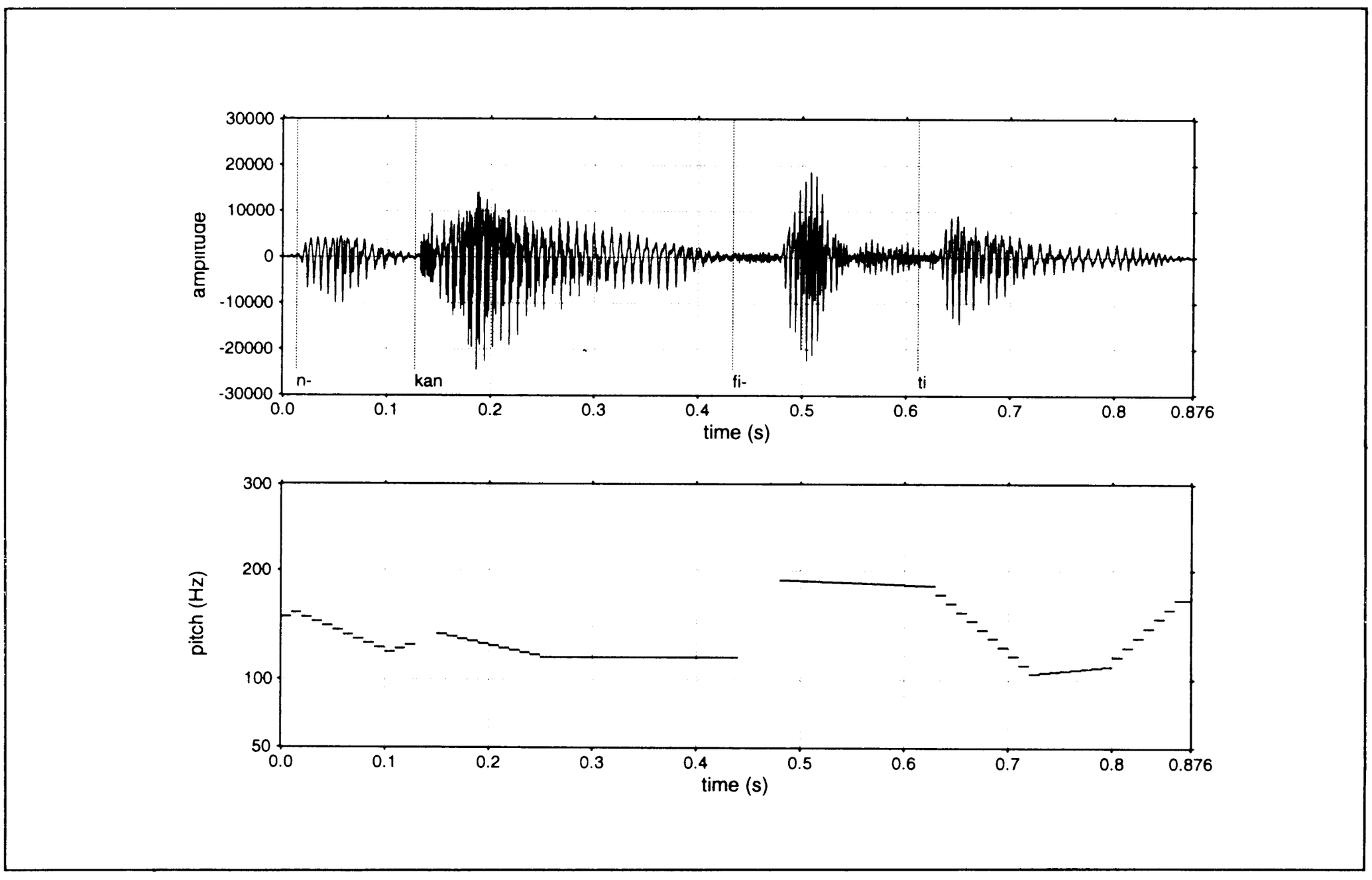

Figure 8a. Realization of type FR in fragment No. 2 in the word *fĩtĩ* 'a certain' at a boundary

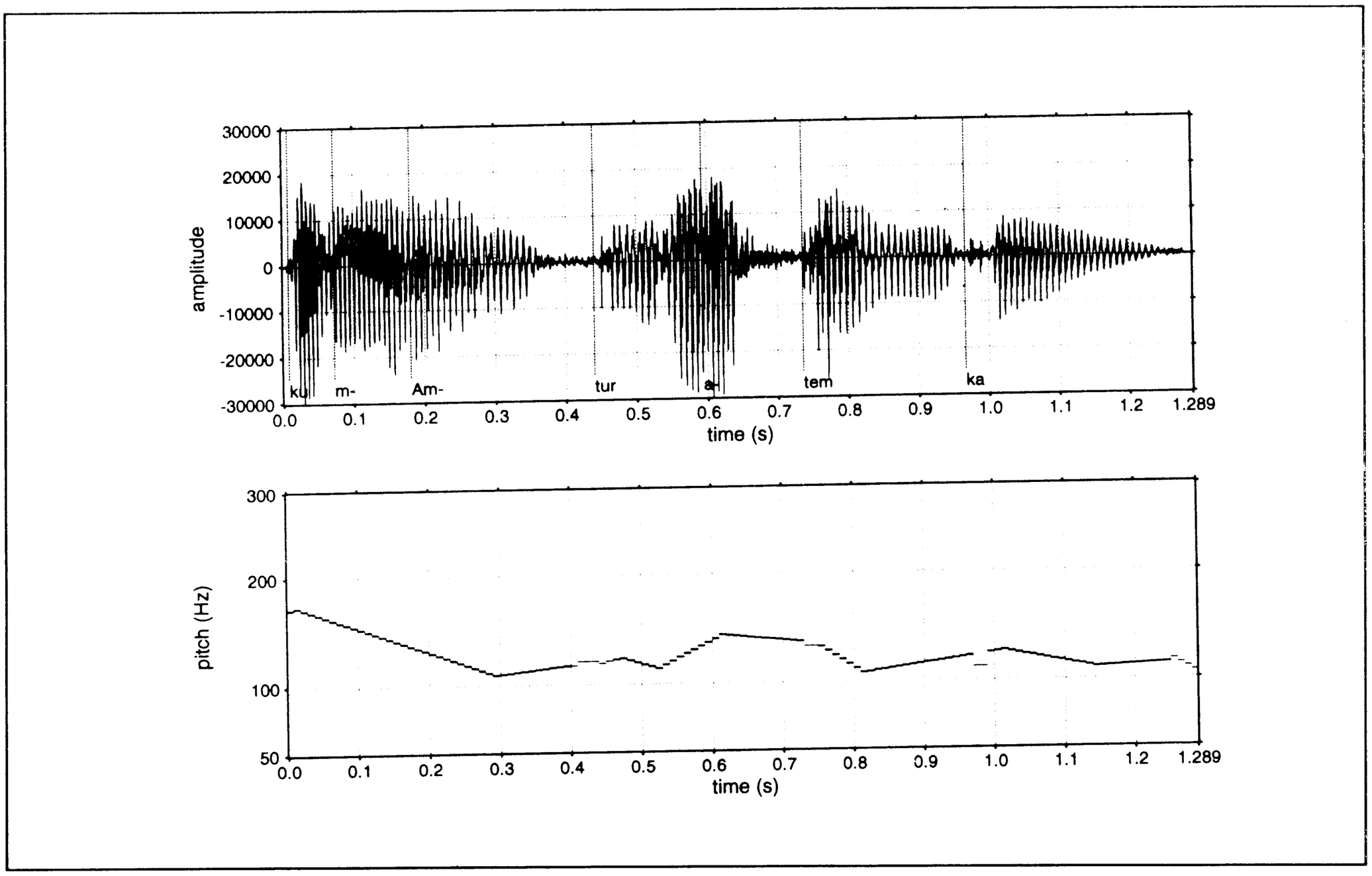

Figure 8b. Realization of type FR in fragment No. 23 in the word *ātẽm* 'mouth of river' in central position.

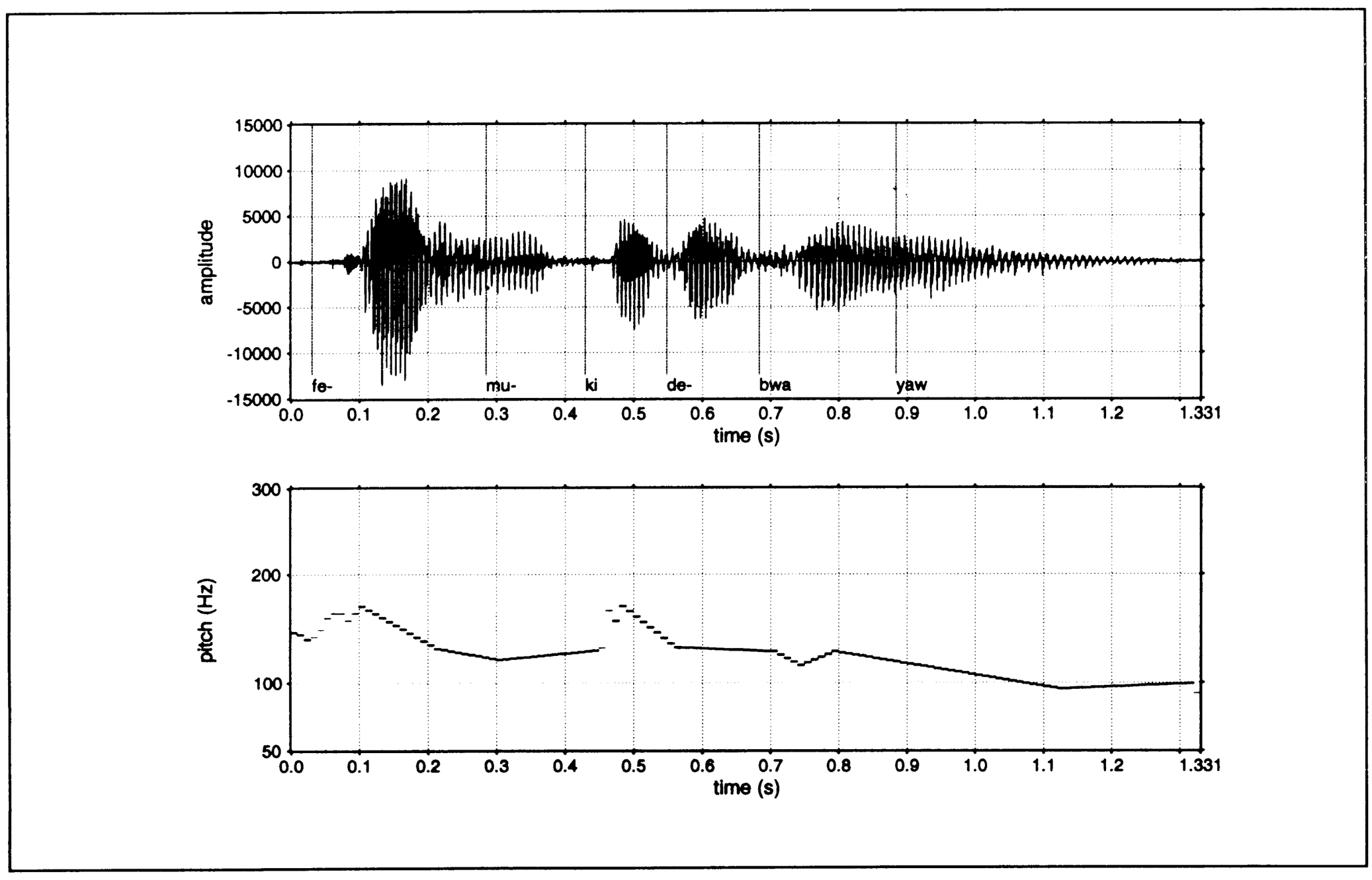

Figure 9a. Example of a boundary after hesitation in fragment No. 92 *yāw* 'well'.

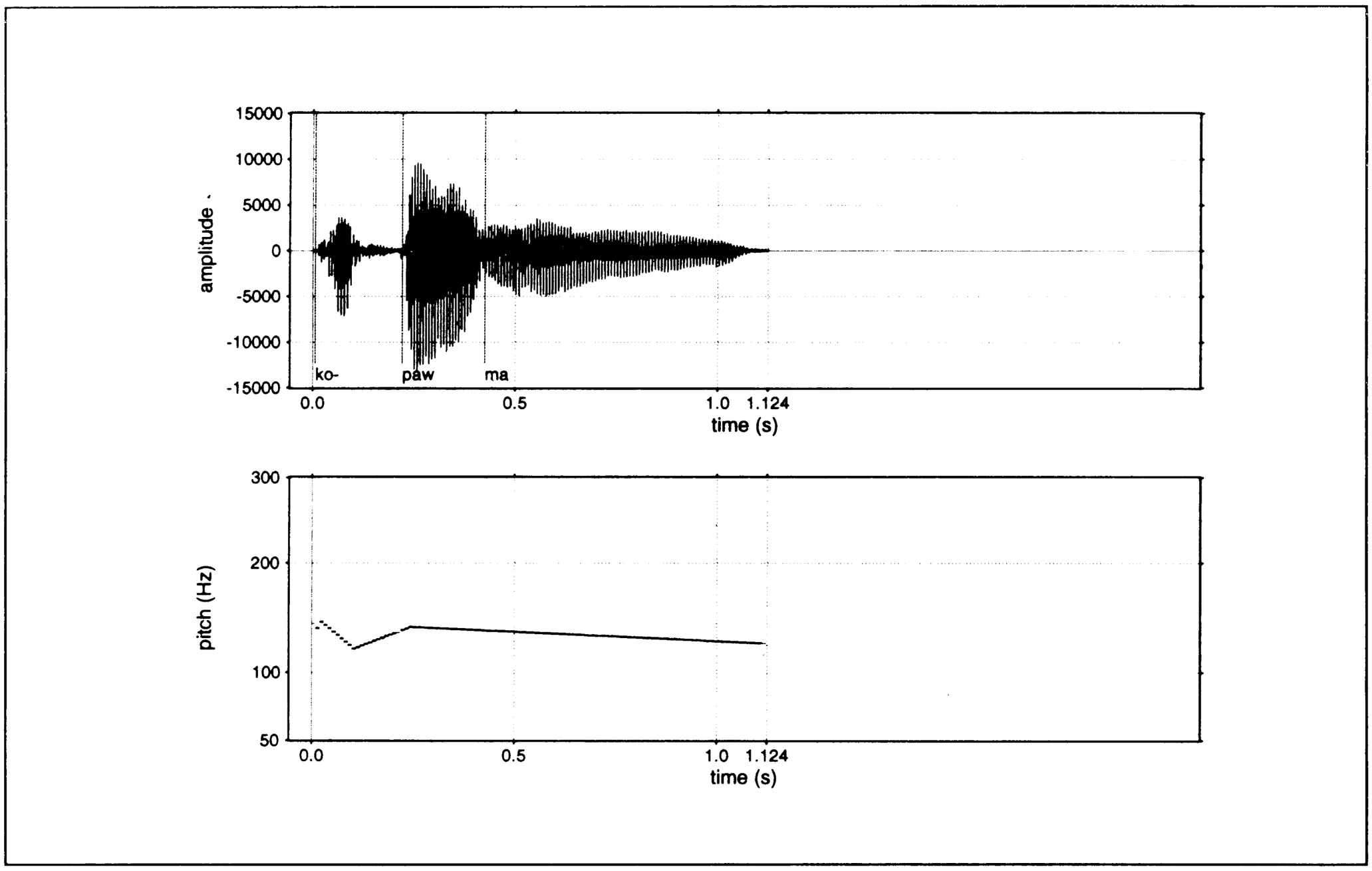

Figure 9b. Example of a boundary after vowel-lengthening in fragment No. 5 *mā-a-a* 'at'.

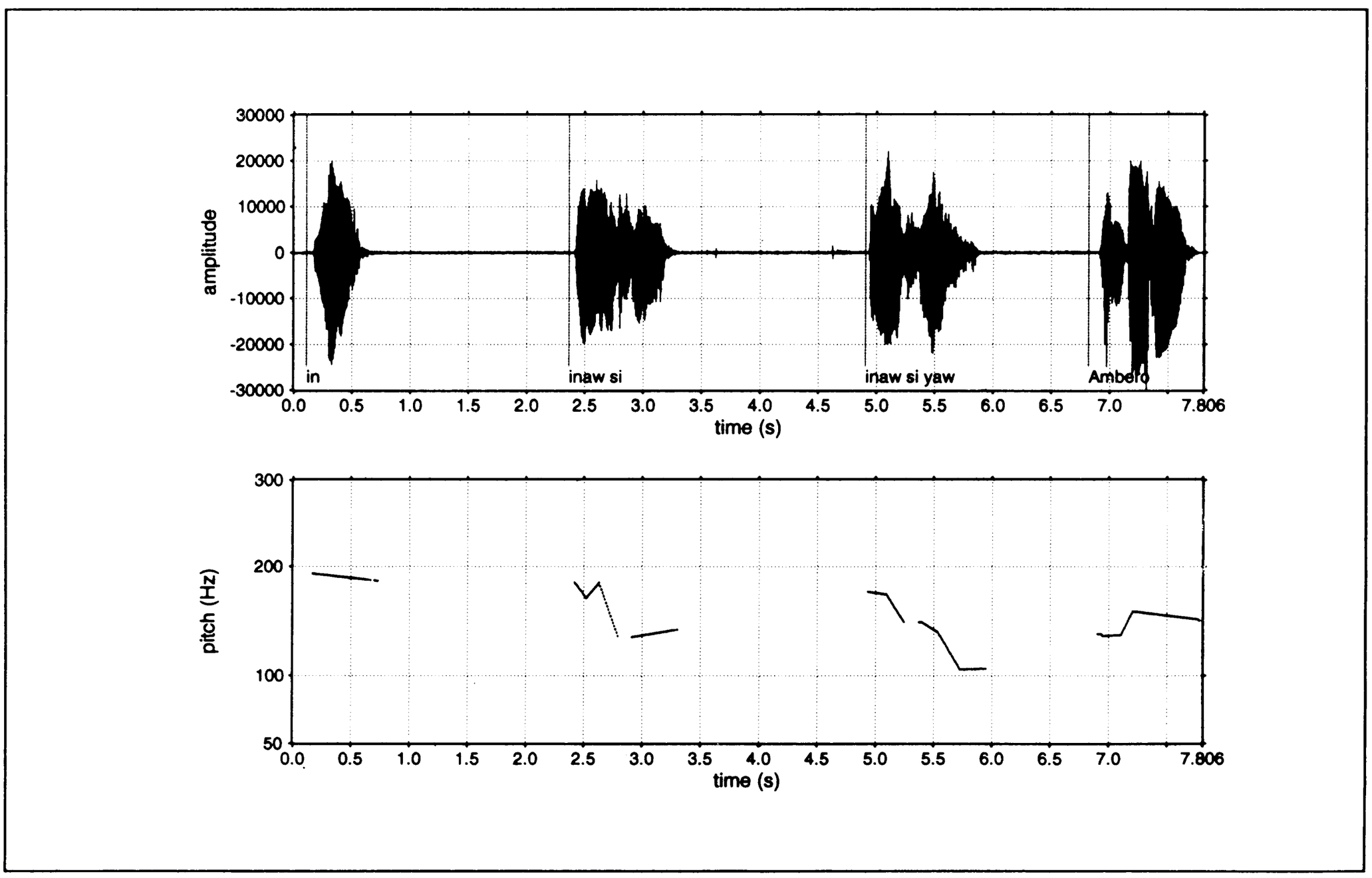

Figure 9c. Example of a boundary after a silence in fragments Nos. 80-83 *ín/ ínáw si/ ínáw si yāw/ Āmbero/* 'I/ I go home to/ I go home to well/ Amber'.

(e.g. fragment No. 92 *femūkí debwa yāw/* 'now they say well/'), by vowel-lengthening (e.g. fragment No. 5 *kōpaw mā-a-a/* 'there at/') and by silence (absence of vocalization) in fragments Nos. 80-83 *ín/ ínáw si/ ínáw si yāw/ Āmbero/* 'I/ I go home to/ I go home to well/ Amber/'. Three possibilities are illustrated in figures 9a, 9b and 9c.

In declarative sentences, at a sentence-final boundary final lowering (a pitch movement falling to the lowest level of the speaker) is usually observed in traditional intonation languages such as Dutch, English and Russian. Also, at final boundaries level tones, regardless of height, show up as a falling movement superimposed upon the tones. In the fragments No. 20 *ēbwa- āta- bāréti nkà wà* 'we say he had this food already' and No. 32 *āsoma kamo jàn* 'he didn't find any game', low tone in the final words *wà* 'already' and *jàn* 'not' is realized with a low falling movement (see figures 10a and 10b).

At other types of boundary in declarative sentences, a level tone is also frequently realized as a pitch movement. In fragment No. 9 *āmen pér fón* 'he looked after dogs many', for example, high tone in *fón* is realized with a high falling movement. The example is presented in figure 11.

Next, some examples of interrogative intonation with and without question words are discussed.

Two questions with the question word *bawān* 'what' occur in the text: fragment No.55 *pér tō- wawān ka?* 'what was the dog barking at?' and Nos. 60-61 *bawān ma/ pér tōw maju-maju karà?* 'what is the dog barking at all the time?'. The second question occurs in a direct quote and it is realized at a much higher level. But both question words have a falling intonation contour. The examples are presented in figures 12a and 12b.

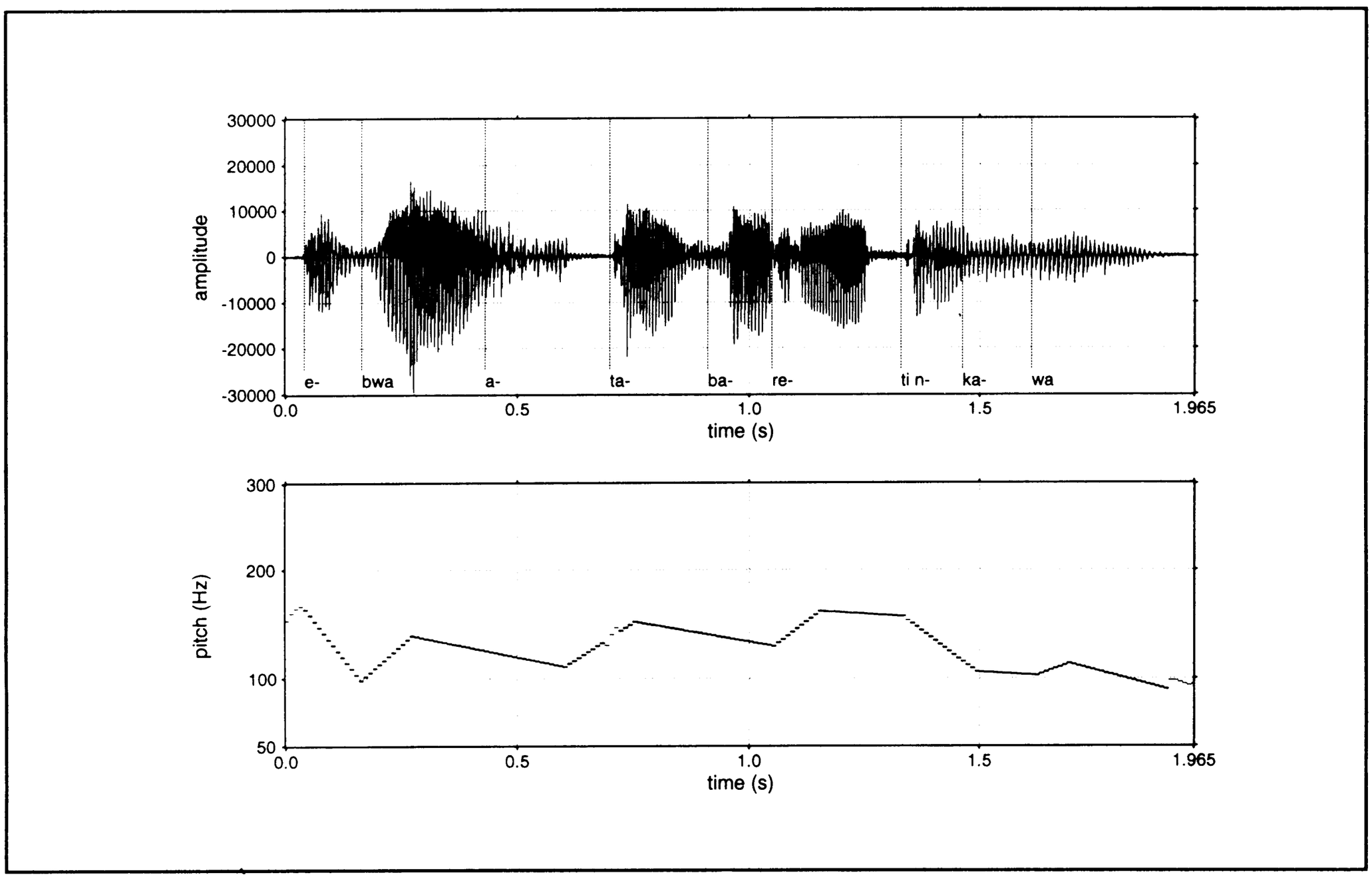

Figure 10a. An example of a declarative utterance, fragment No. 20: *ēbwa- āta- bāréti nkà wà* 'we say he had this food already'.

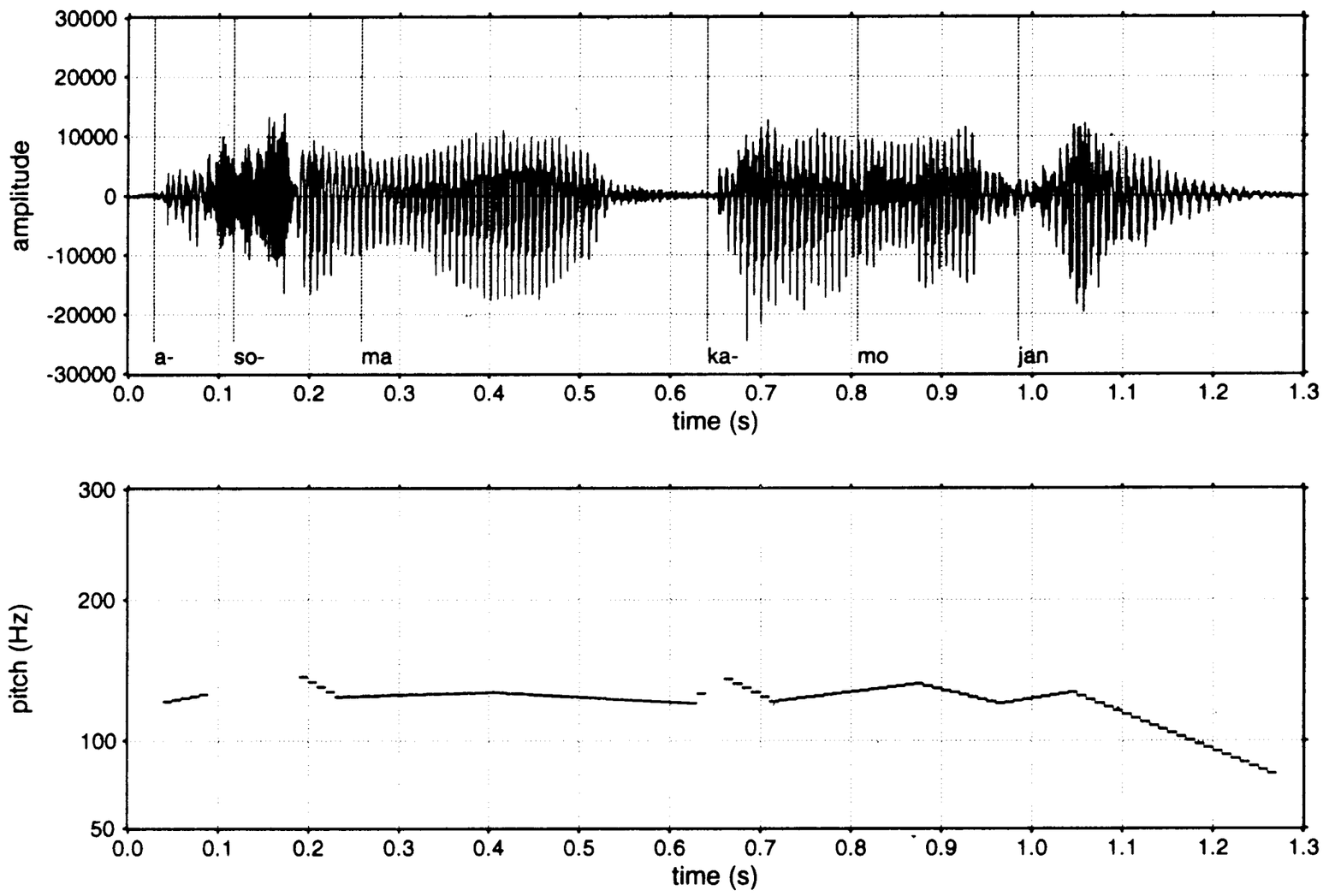

Figure 10b. An example of a declarative utterance, fragment No. 32: *āsoma kamo jàn* 'he didn't find any game'.

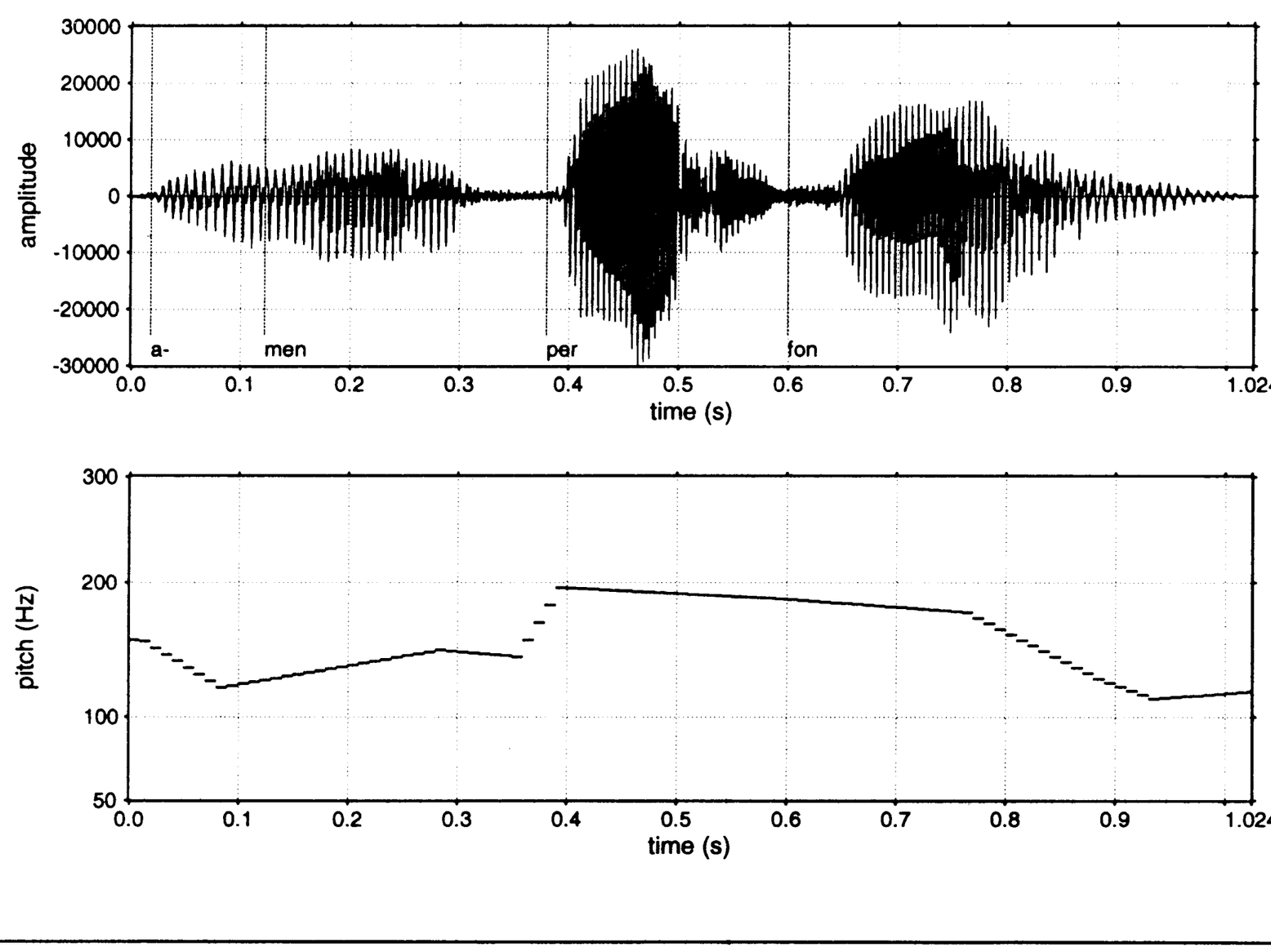

Figure 11. Example of a falling pitch movement at a non-final boundary in fragment No. 9 *āmen pér fón* 'he looked after dogs many'.

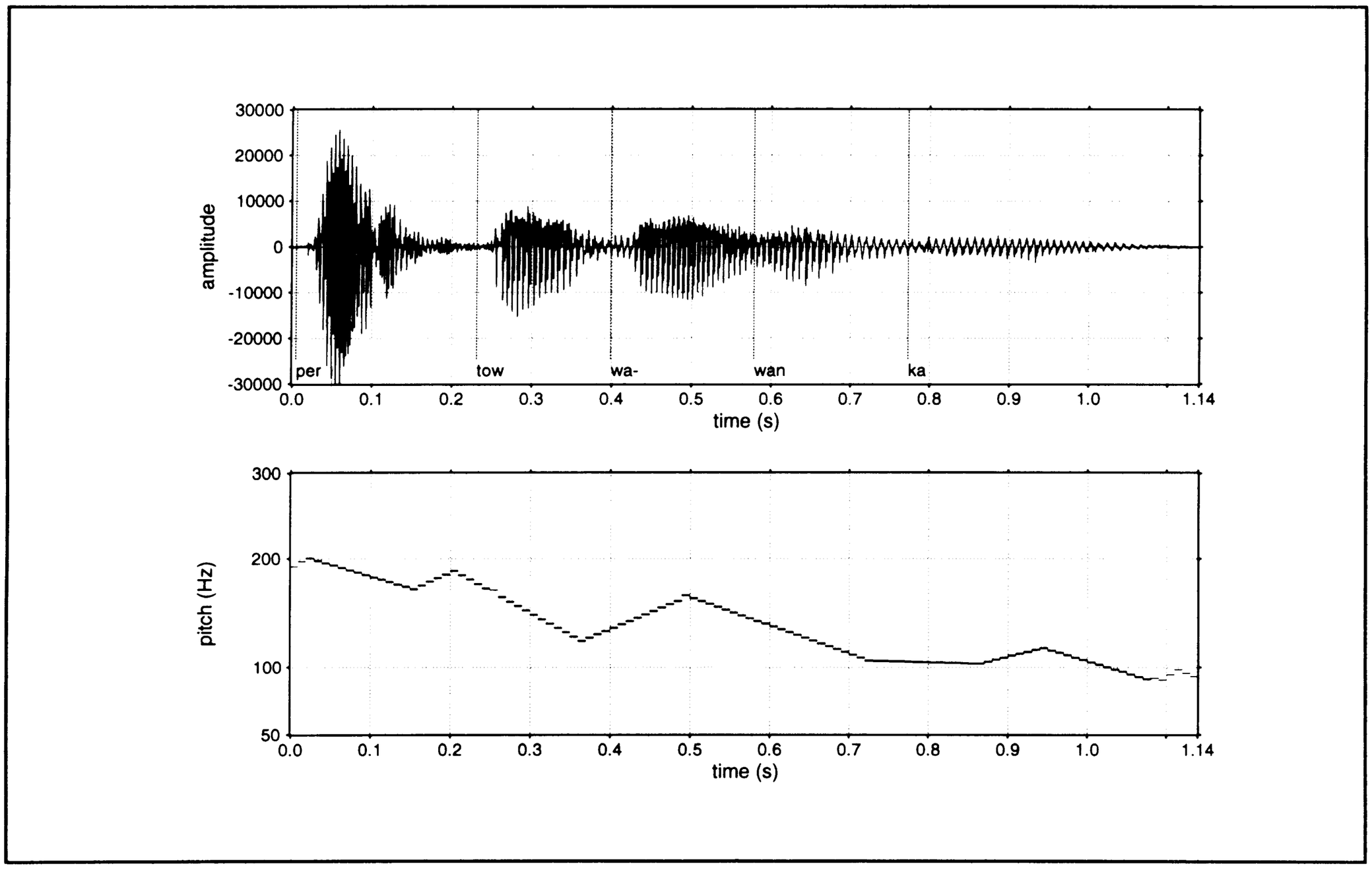

Figure 12a. Example of a question with the question word *bawān*: *pér tō- wawān ka?* 'what was the dog barking at?' in fragment No. 55.

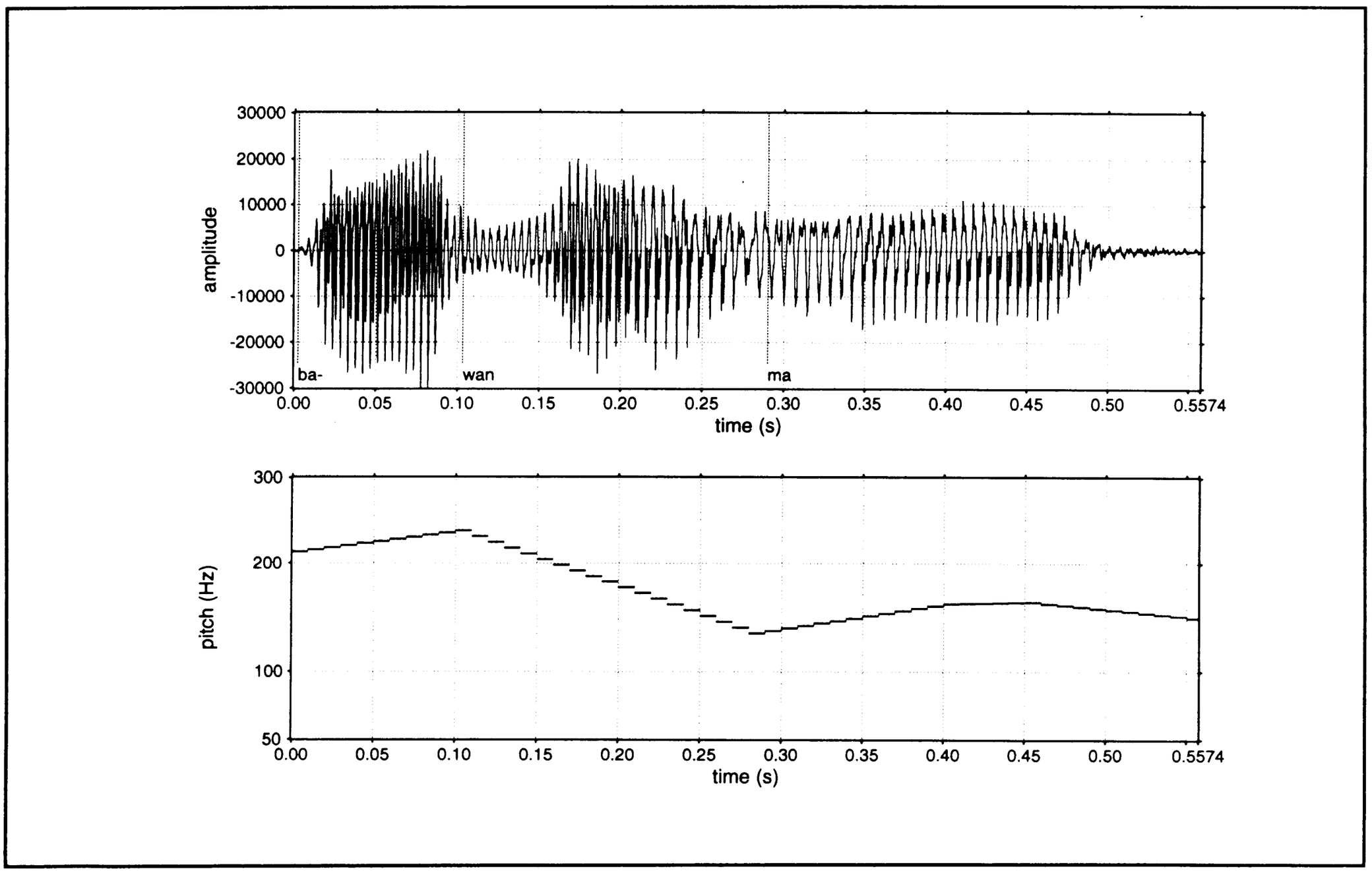

Figure 12b. Example of a question with the question word *bawān*: *bawān ma/ (pér tōw maju-maju karà)* 'what is the dog (barking at all the time?)' in fragment(s) Nos. 60(-61).

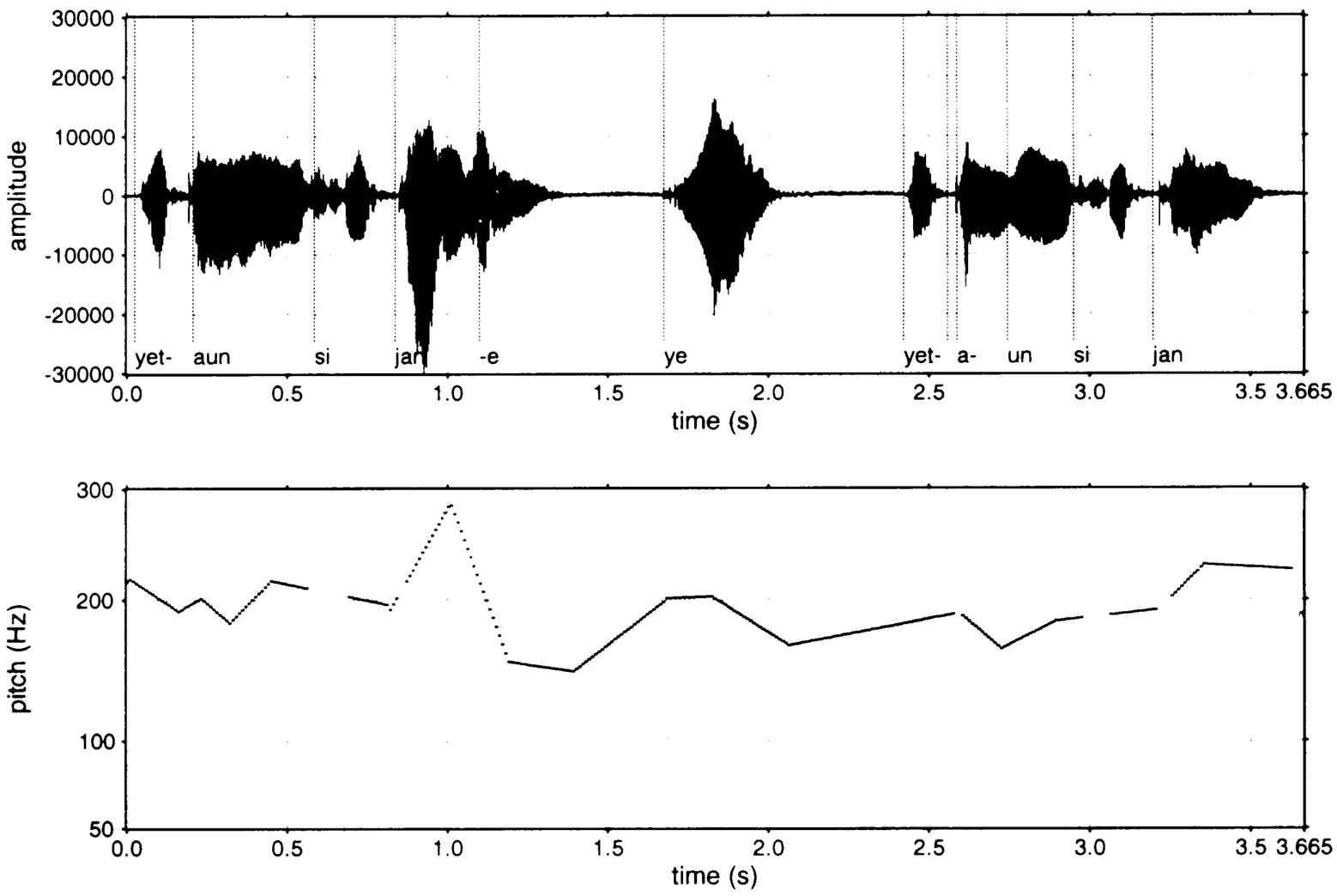

Figure 13a. Dialogue with question particle *-è* in *jánè* 'home?'.

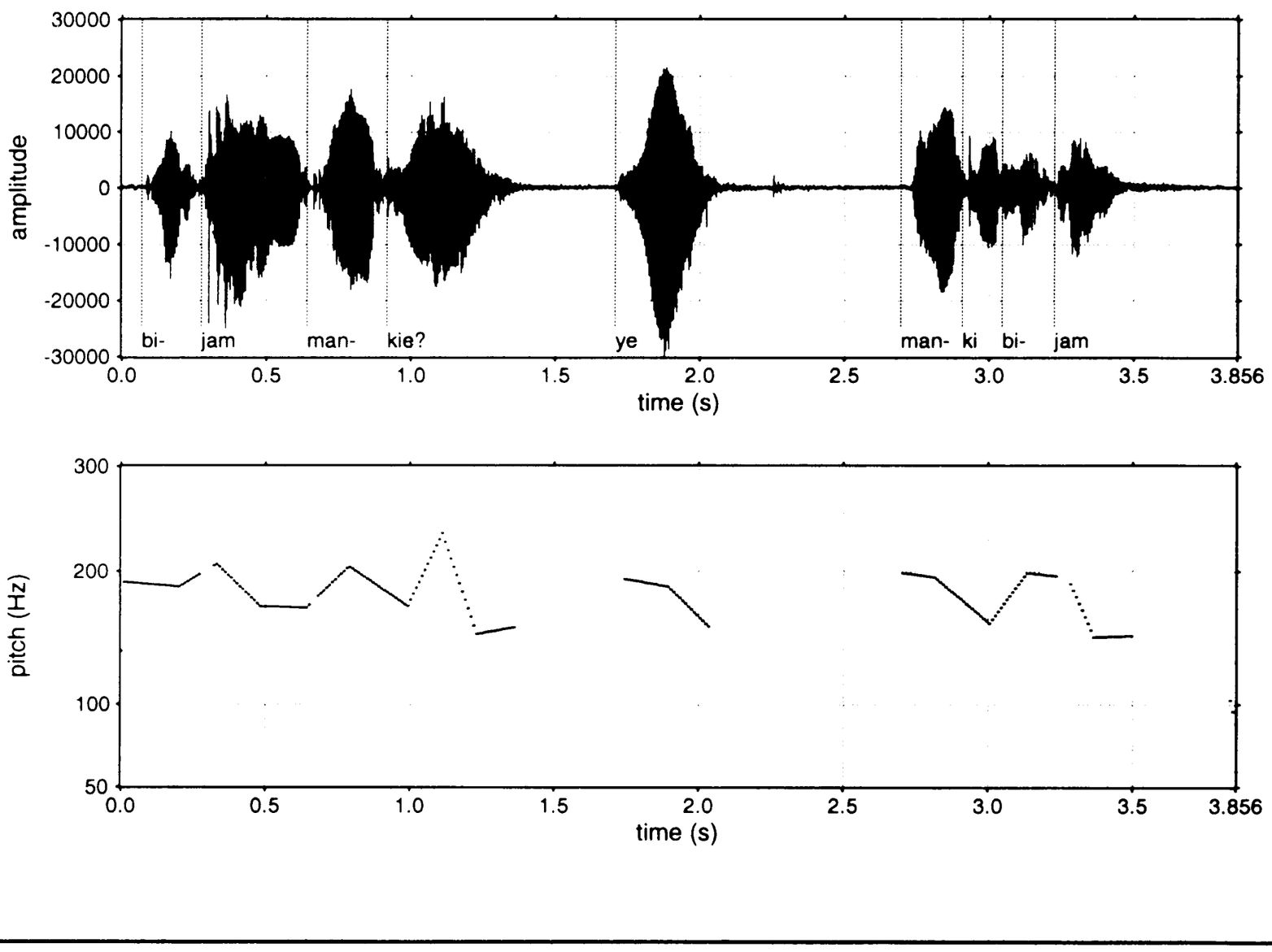

Figure 13b. Dialogue with question particle *-è* in *mankĩ è* 'this?'.

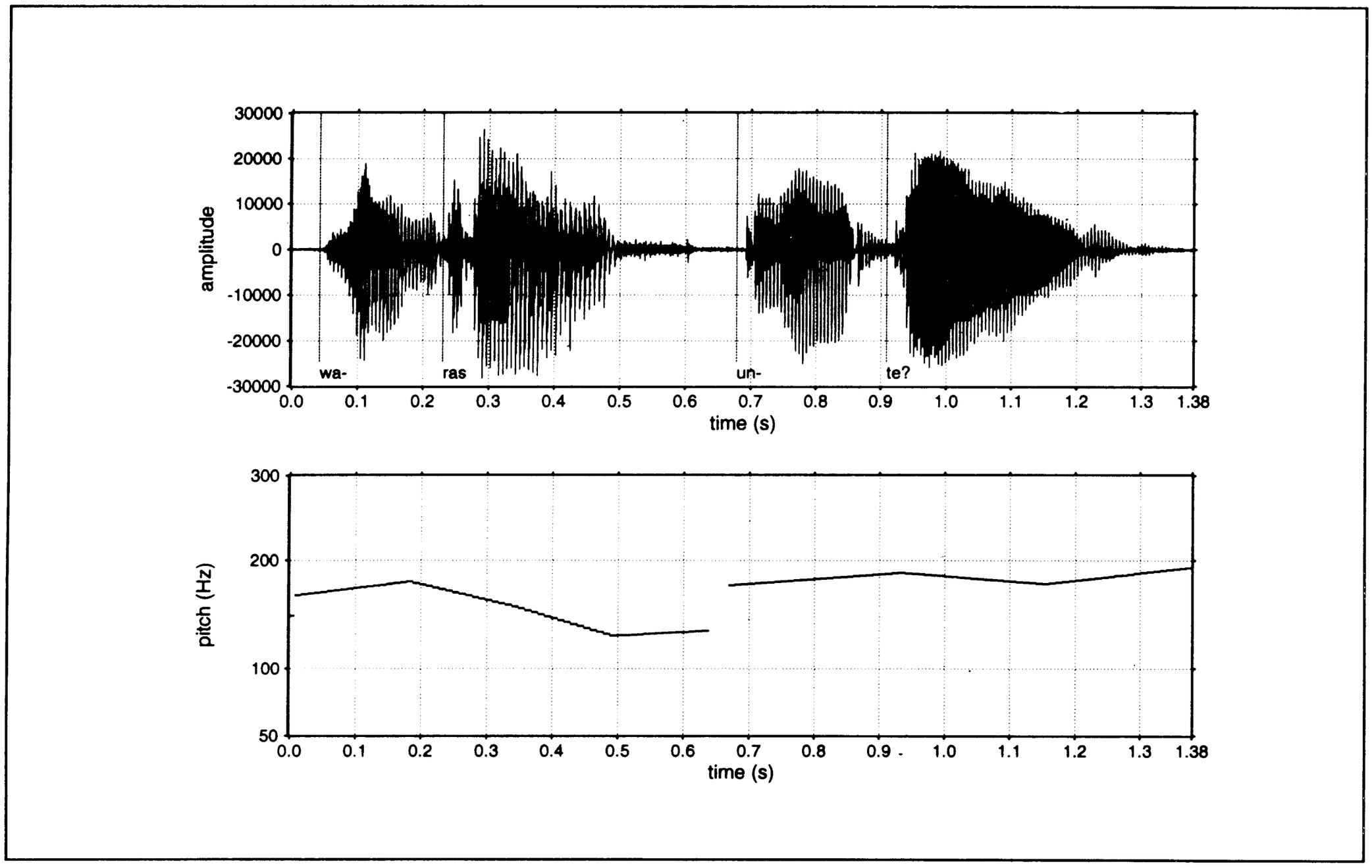

Figure 14. Stylized contour in the question *warās unte?* 'what is the time?' with question-word *unte* 'how much?'.

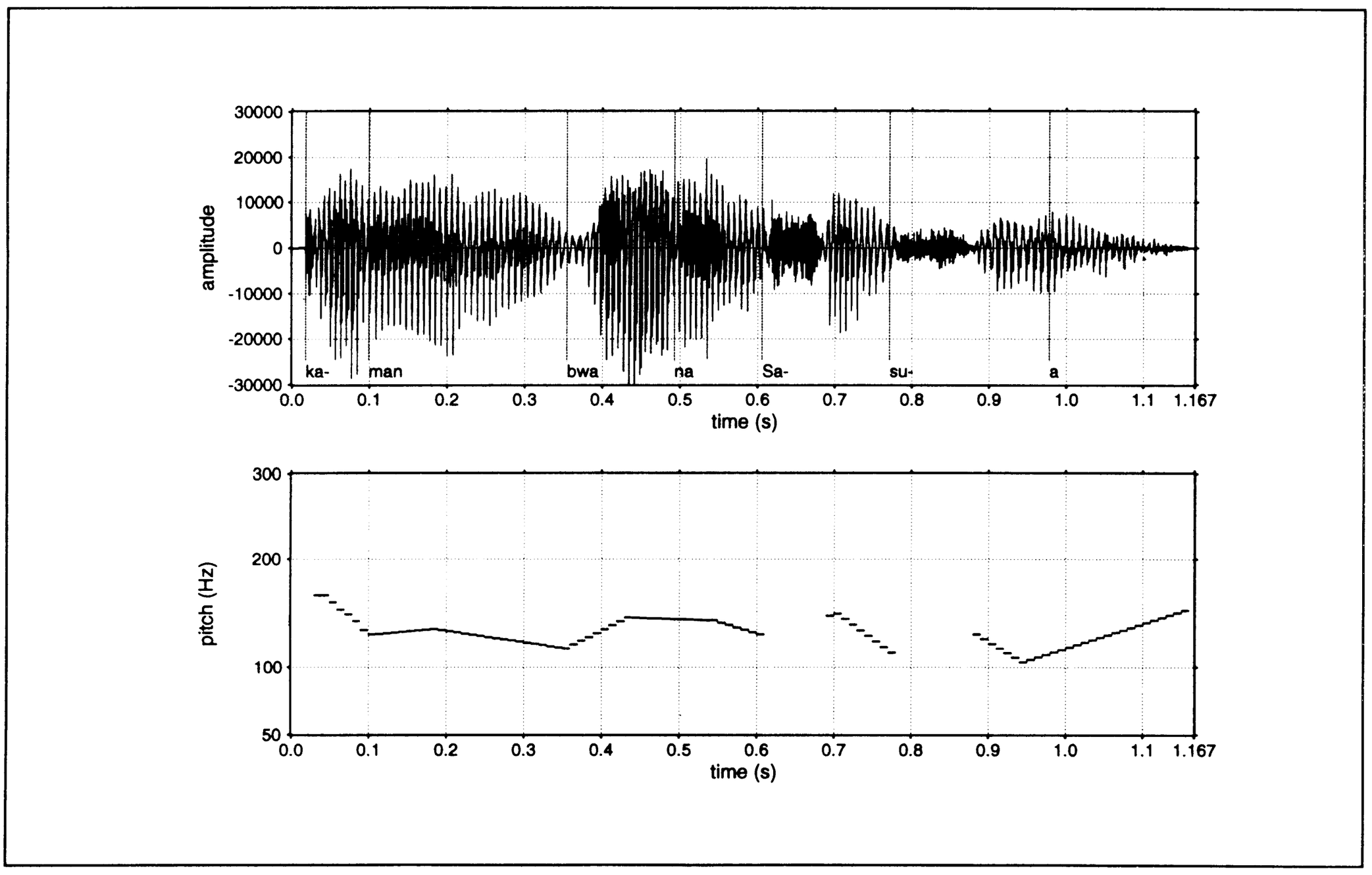

Figure 15a. An example of vowel lengthening in the word *bwa 'it said'* in fragment No. 74 (figure 15b) after fragment No. 73 (figure 15a) *kamàn bwa na Sasūà/* 'the pumpkin said to Sasua/'.

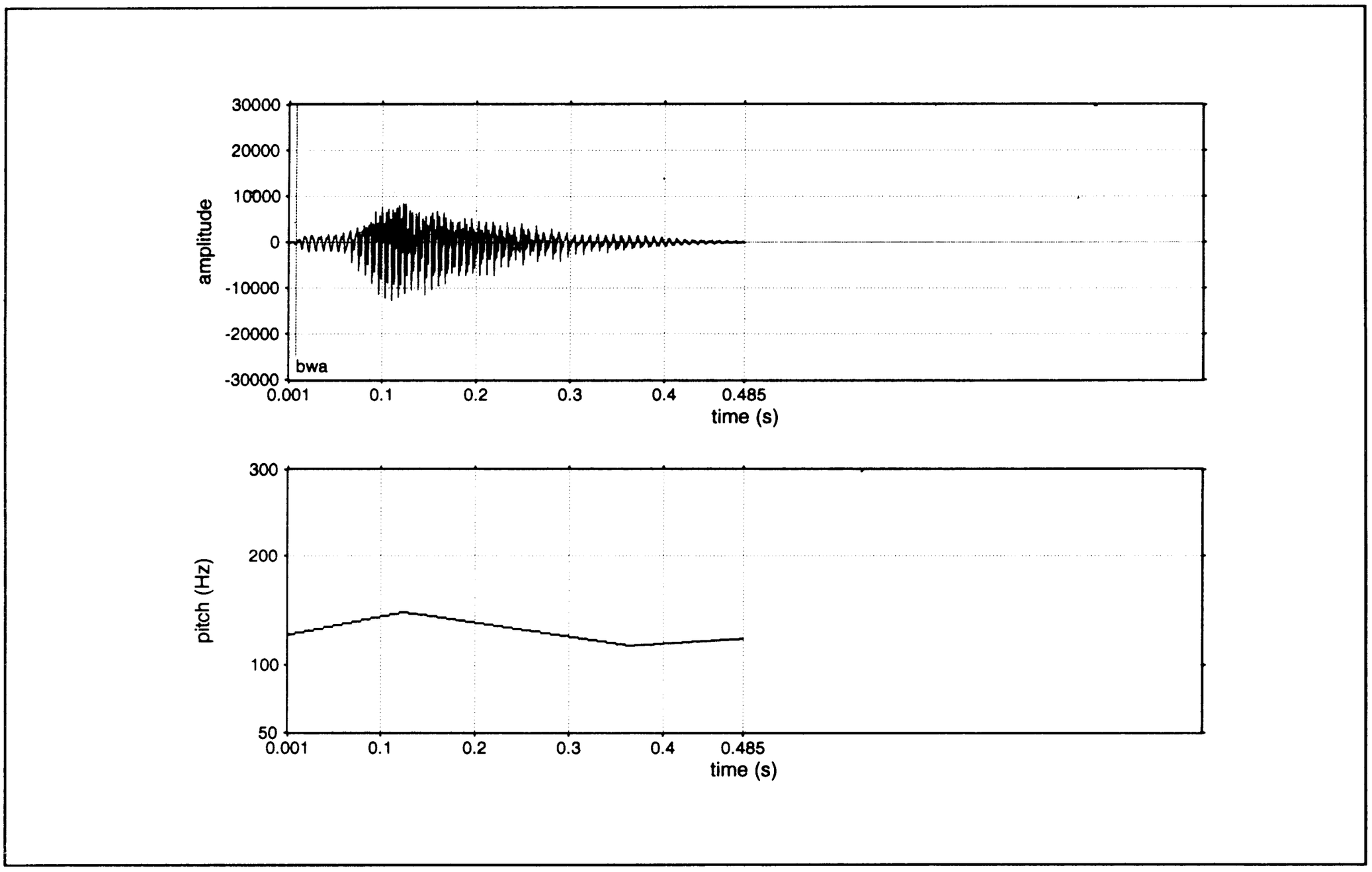

Figure 15b. An example of vowel lengthening in the word *bwa 'it said'* in fragment No. 74 (figure 15b) after fragment No. 73 (figure 15a) *kamàn bwa na Sasūà/* 'the pumpkin said to Sasua/'.

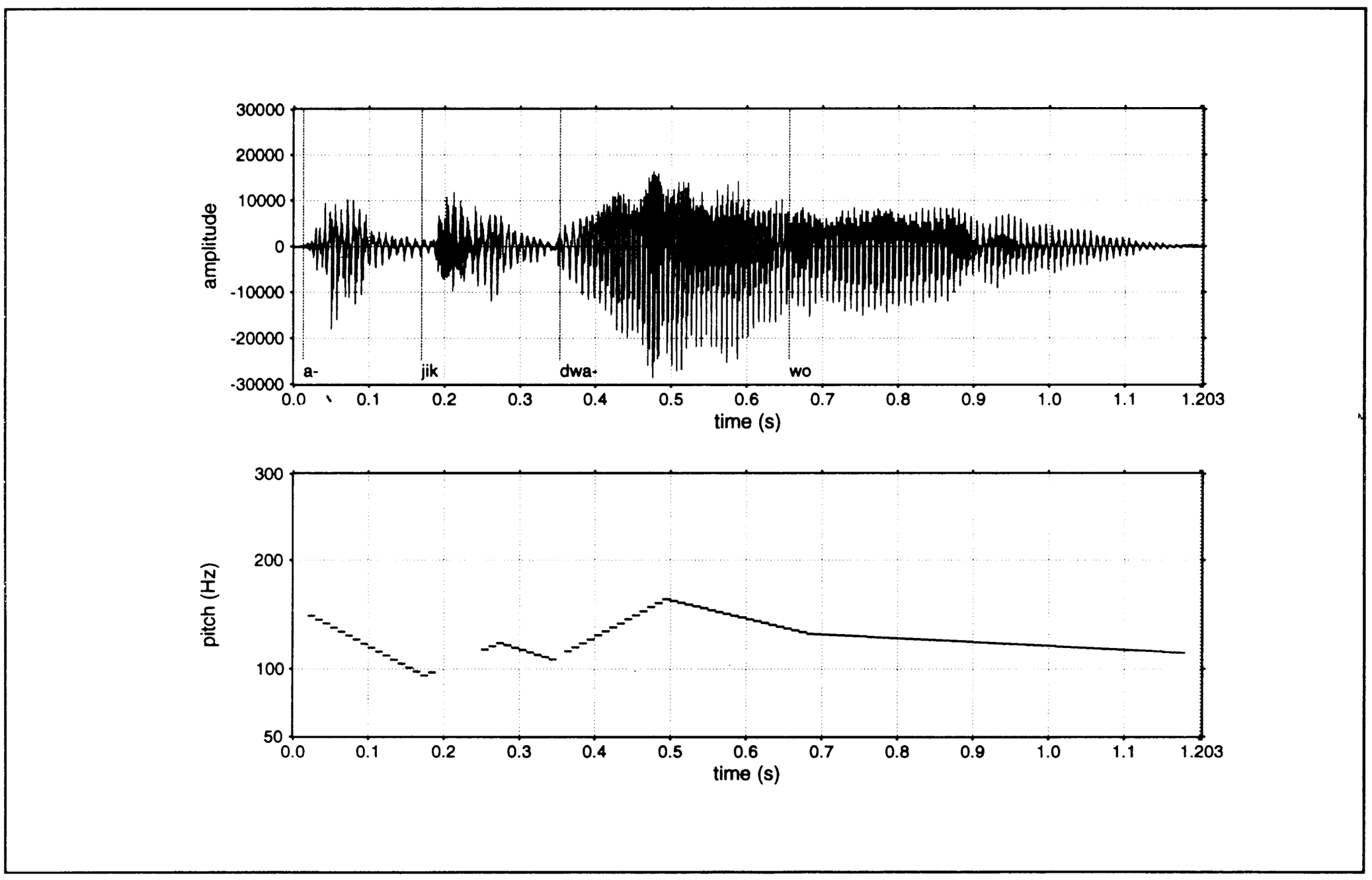

Figure 16a. Example of vowel lengthening in an enumeration in fragment No. 15: āji- dwáwō/ 'he kills pigs/'.

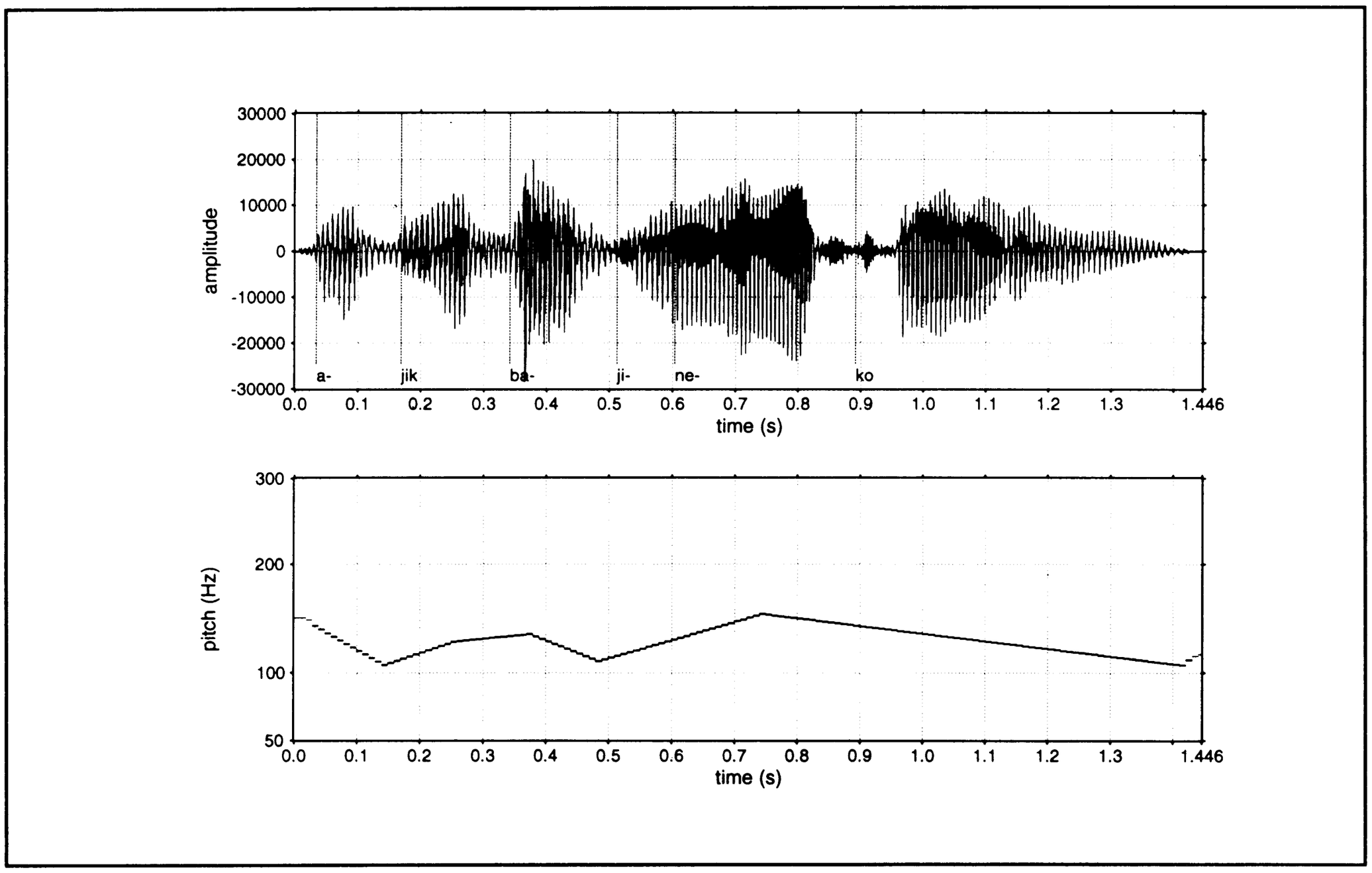

Figure 16b. Example of vowel lengthening in an enumeration in fragment No. 16: āji- bājinékō/ 'he kills kangaroos'.

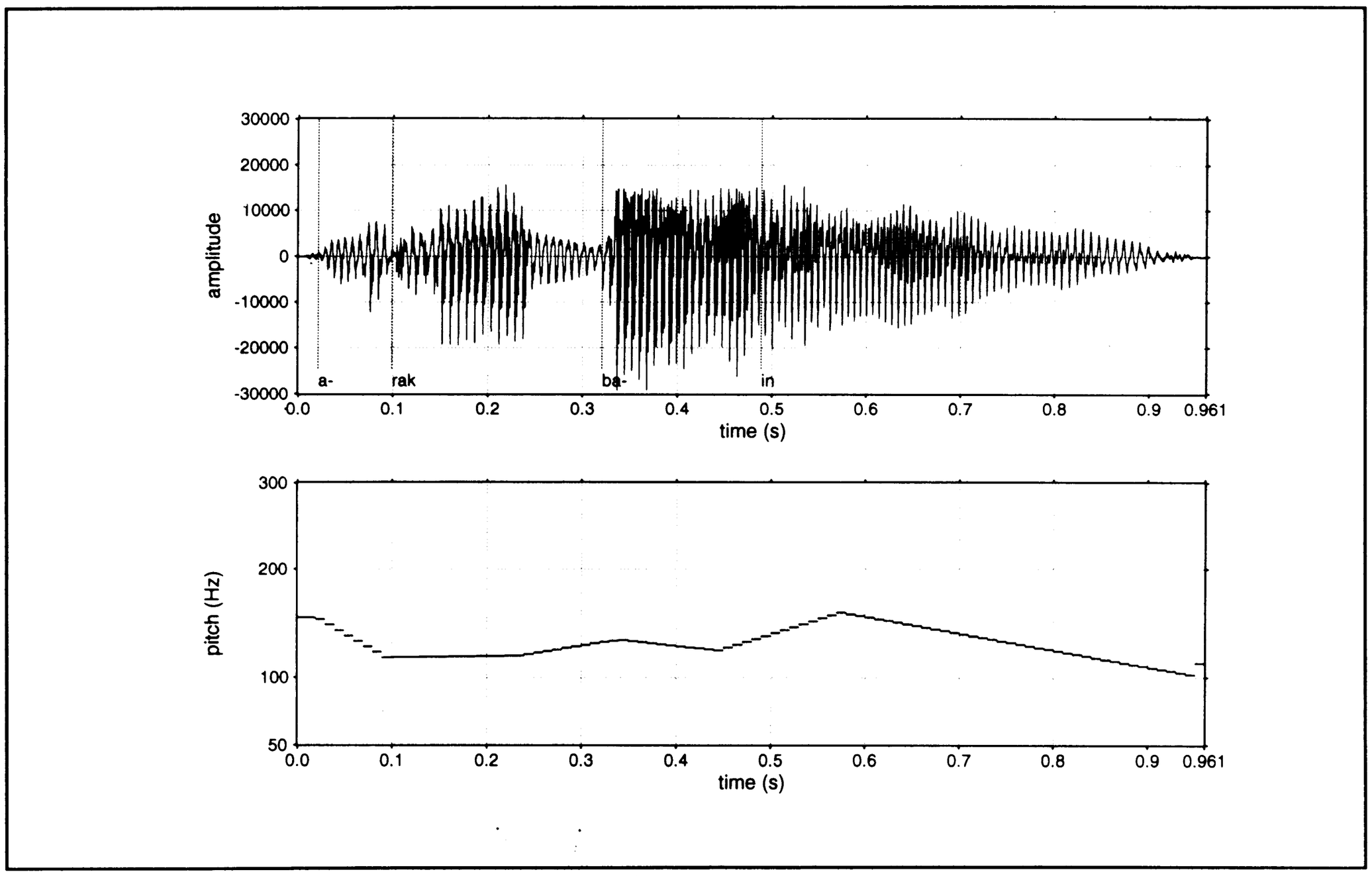

Figure 17a. Example of a continuation with vowel lengthening in *-í-* in fragment No. 21 *ārà- baín/* 'he makes a garden'.

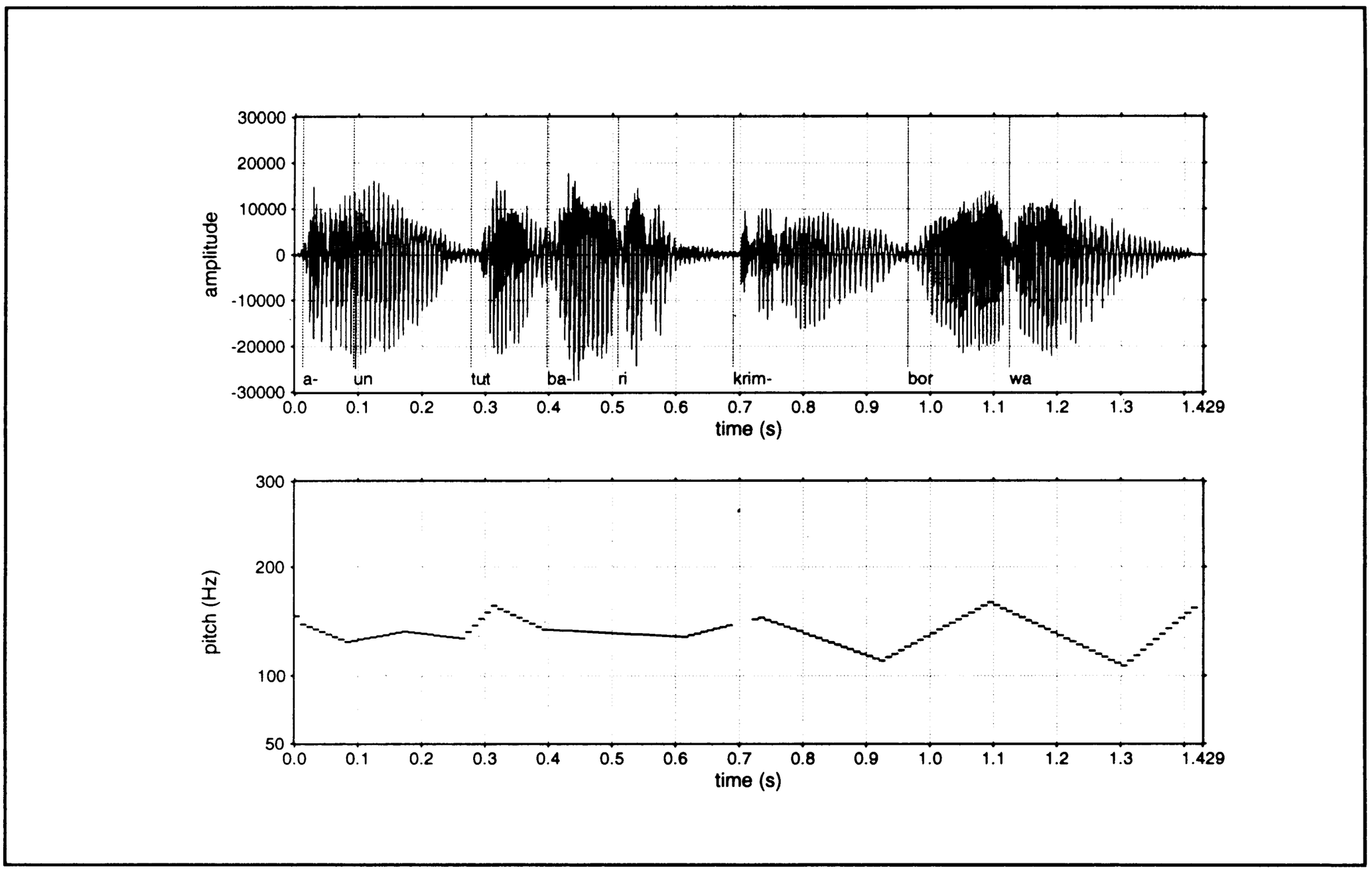

Figure 17b. Example of a continuation with vowel lengthening in *wà* in fragment No. 27 *āun tu- bàri krīmbór wà* 'he went with (the dog) since that morning already'.

Yes/no questions with the utterance-final question particle *-è* do not occur in this text. Nevertheless, I would like to present some examples. The question particle *-è* has a low tone. If the pitch level in the syllable preceding the question particle is high, pitch falls from that level to the low level. For example, in the dialogue

- *Yet- āun si jánè?*	Is he going home?
- *Yē, yet- āun si ján.*	Yes, he is going home.

after *ján* 'house' (high tone) in the question, the tone in particle *-è* falls from the high level to the low level; in the answer, *ján* 'house' (high tone) remains high. In the dialogue

- *Bijàm mankĩ̃ è?*	Is this ironwood?
- *Yē, mankĩ̃ bijàm.*	Yes, this is ironwood.

rising pitch in *-ĩ̃-* continues in question particle *-è* and then pitch falls to the low level. Both dialogues, spoken by Amanda Ajoi (Anjai, Kebar valley) are given in figures 13a and 13b.

In question words, the final syllable with the question suffix *-te* has a mid level tone: *mante* 'where to', *unte* 'how much', *ārote* 'how', sometimes realized with mid rising pitch. An example by the same female speaker is presented in figure 14.

4.4 **Some other prosodic phenomena**

At a prosodic boundary, prosody may lend prominence to a syllable and make it more salient than its adjacent syllables. A cue is e.g. vowel-lengthening, which is not contrastive in *Mpùr*.

Consider, for example, the following fragment (Nos. 73-74): *kamàn bwa na Sasūà/ bwa/* 'the pumpkin said to Sasua/ it said/', where the first instance of *bwa* has a duration of 170 milliseconds (ms). The second instance, a quote introducer, is considerably longer, having a duration of 485 ms. See figures 15a and 15b.

Vowel lengthening is also observed in enumerations. Examples in the text are, for instance, fragments Nos. 15-16 *āji- dwáwō/ āji- bājinékō/* 'he kills pigs/ he kills kangaroos' where final *-ō/* is lengthened. The examples are given in figures 16a and 16b.

Furthermore, vowel lengthening occurs at a continuation boundary, where a stream of thought is not finished yet. Examples are *-í-* in *baín* 'garden', fragment No. 21 *ārà- baín/* 'he makes a garden' and *-à* in *wà* 'already', fragment No. 27 *āun tu- bàri krīmbór wà* 'he went with (the dog) since that morning already', given in figures 17a and 17b.

Excitement, emotive emphasis are commonly expressed with the particles *-(t)ē* or *-ī*, frequently together with vowel lengthening and increased loudness. Words are sometimes repeated up to five times within an utterance as a means for emphasis or expressiveness[14]. Examples of expressive utterances are presented in figures 18a-d: *āun tu- pér tási- tási- tási-tásikē* 'he went with his dog in vain', *pér to-to-to-to-tōw* 'the dog barked and barked and barked', *ākon tē-e-e* 'he slept all the time', *ē-e-e yāw* 'oh well' in fragments Nos. 31, 50, 57, 65. As can be seen in these examples, the realization of tone in the repeated words does not change in the course of the utterance.

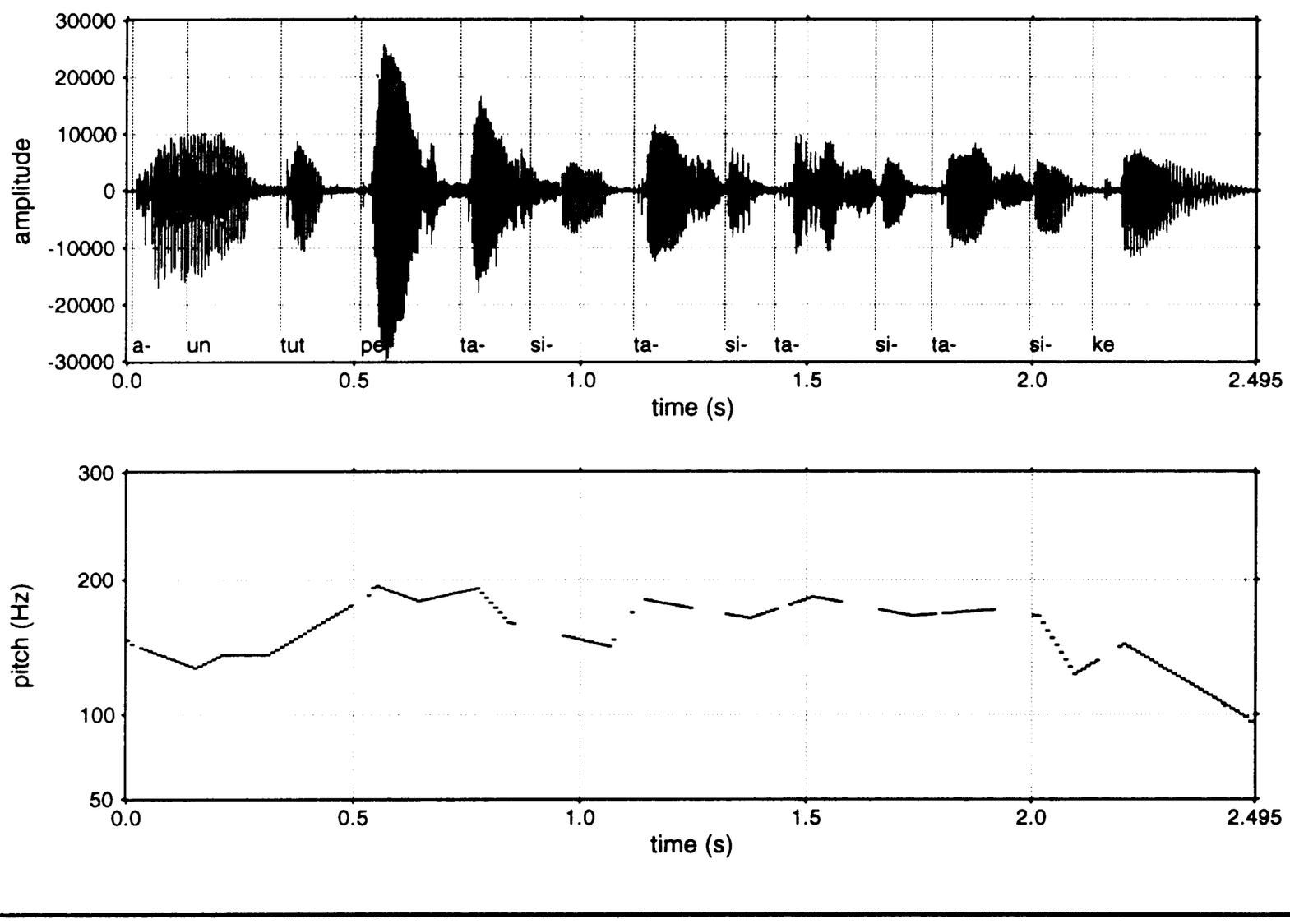

Figure 18a. Example of an expressive utterance: *āun tu- pér tási-tási-tási-tásikē* 'he went with his dog but in vain' in fragment No. 31.

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[14] Also, many examples of tail-head constructions can be found in the Amberbaken myth. This is characteristic of the oral tradition of other people of New Guinea as well. Examples are fragments nrs. 11-12 *āmsa bar/ āmsa bar mā* 'he hunts something/ he hunts something at' and nrs. 73-74 *kamàn bwa-/ kamàn bwar na Sasūà/* 'the pumpkin said/ the pumpkin said', where the final syllable in the tail is much longer than in the head.

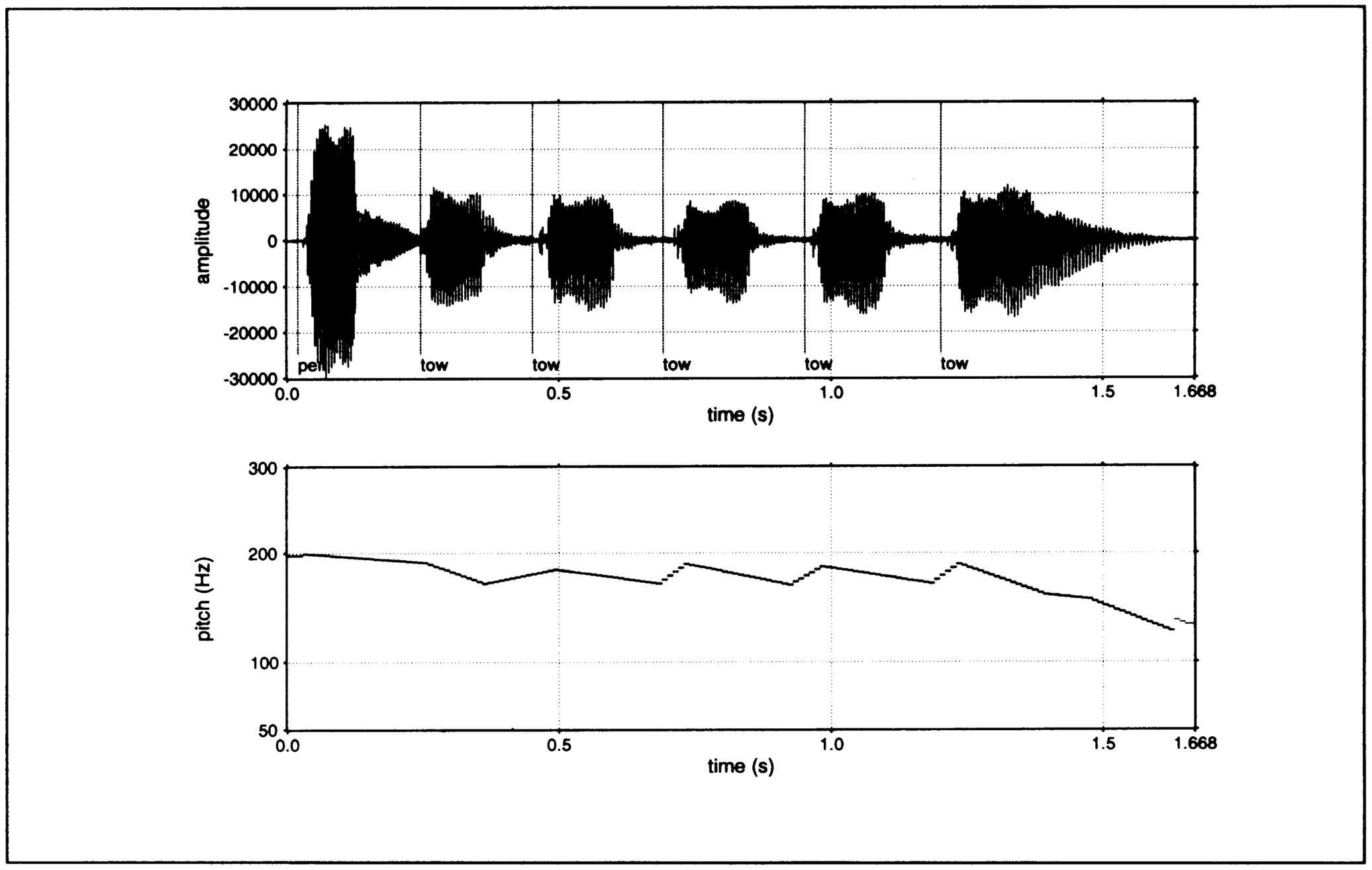

Figure 18b. Example of an expressive utterance: *pér to-to-to-to-tōw* 'the dog barked and barked and barked' in fragment No. 50.

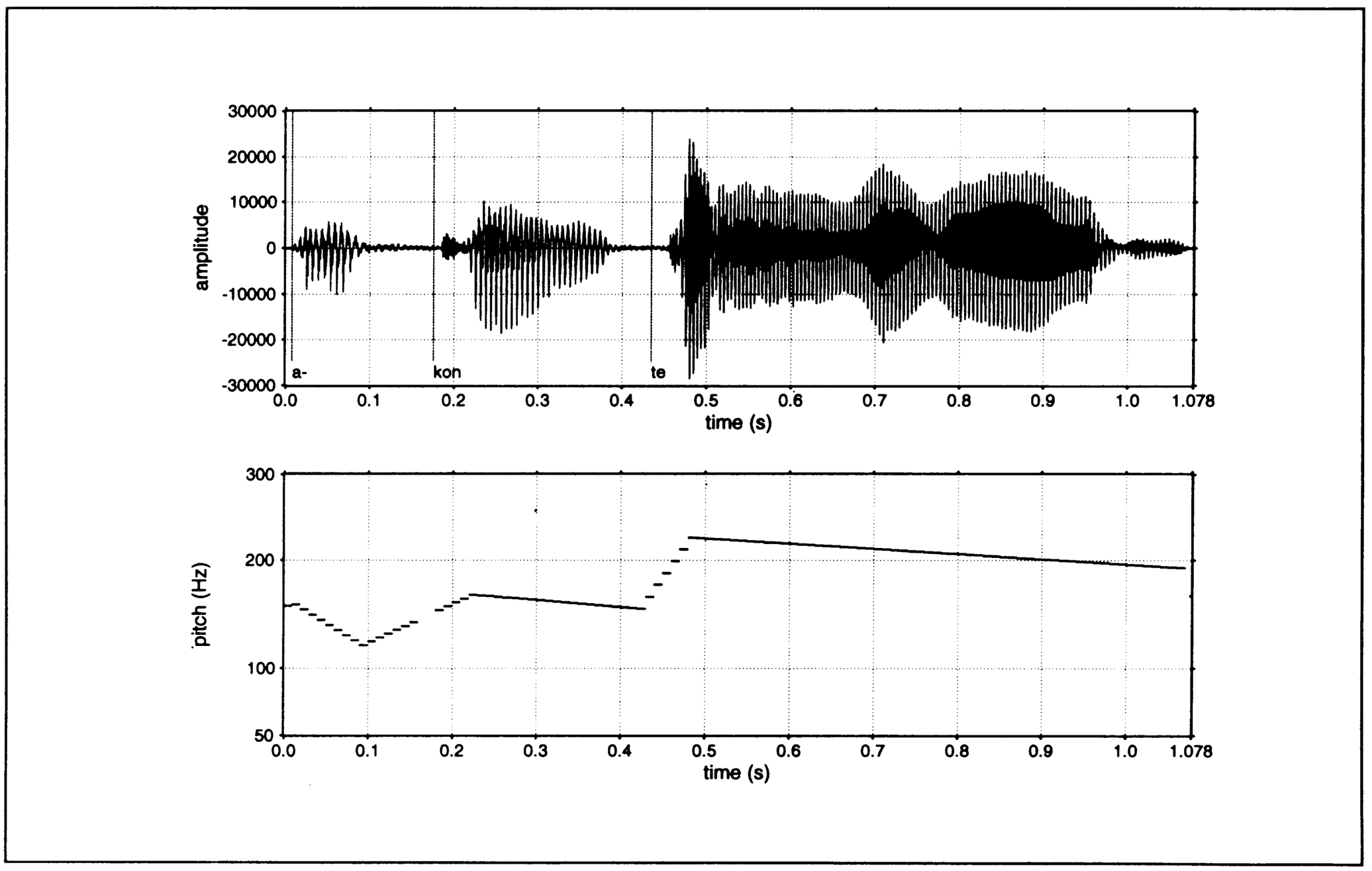

Figure 18c. Example of an expressive utterance: *ākon tē-e-e* 'he slept all the time' in fragment No. 57.

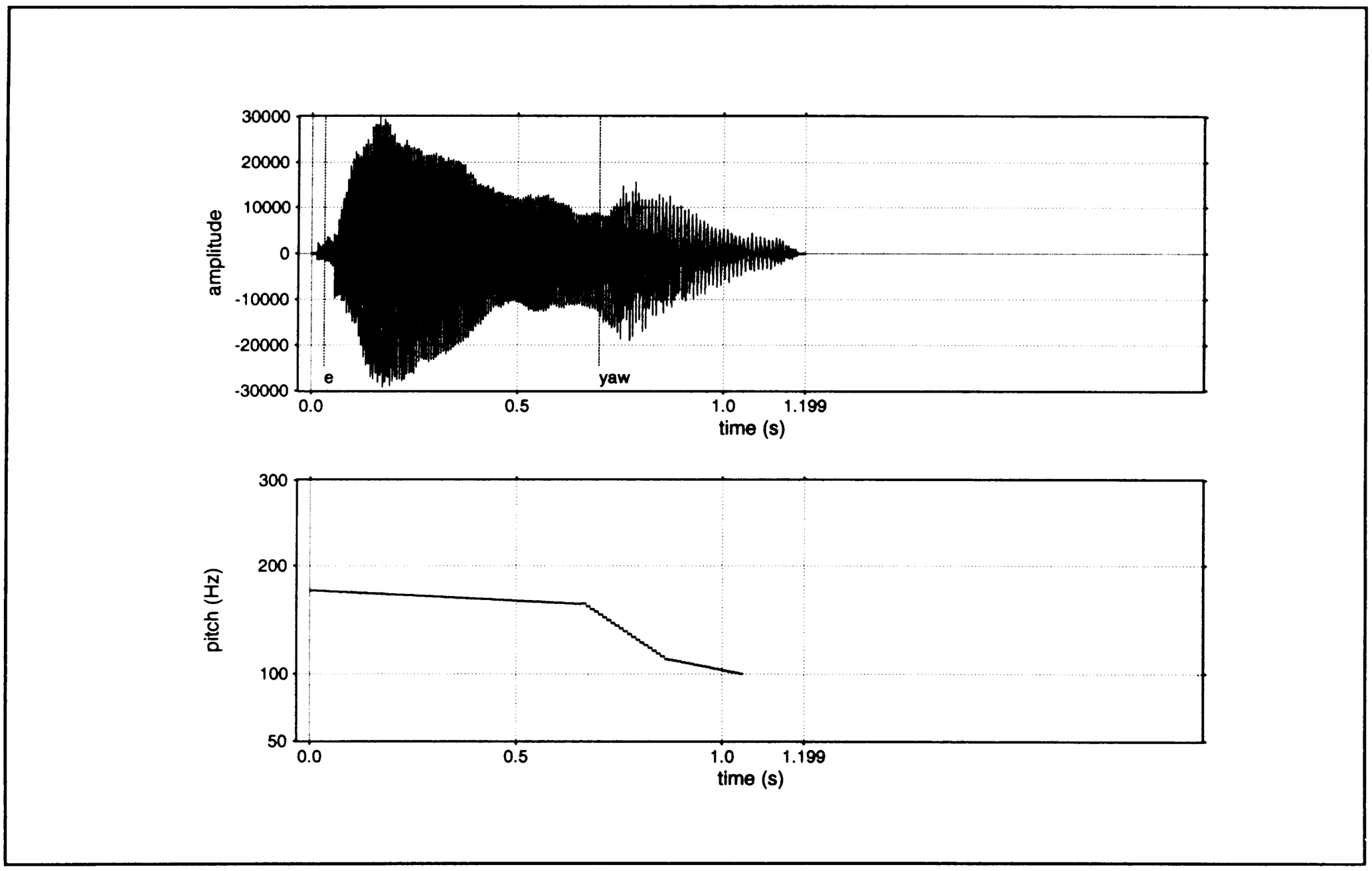

Figure 18d. Example of an expressive utterance: *ē-e-e yāw* 'oh well' in fragment No. 65.

4.5 **Declination, downdrift and downstep: a discussion**

In this final subsection on tones and intonation in *Mpùr*, I would like to discuss three more pitch phenomena, declination, downdrift and downstep. The issue needs a serious and extensive investigation though, which is beyond the scope of the present article.

A well-known pitch phenomenon in speech is declination, the term used for the involuntary, physiologically determined tendency of the fundamental frequency to decline gradually in the course of an utterance ('t Hart et al. 1990:121f.). According to the basic assumption of 't Hart et al., all relevant pitch fluctuations are F0 changes, voluntarily made by the speaker ('t Hart et al. 1990:123). Yet declination can be perceptually relevant and it can be employed linguistically. A speaker can voluntarily influence the rate of declination or make a declination reset (a jump upward or downward in the fundamental frequency course). For instance, a reset is often used in spontaneous speech in long sentences, if a speaker reaches a low level "too early", or if s/he hesitates.

In my own observations of *spontaneous* speech of different languages (Dutch, Indonesian, Russian), a clearly measurable declination line is often not found, but this discussion is beyond the scope of the present article. Declination as such is also not observed in the Amberbaken myth, but in *Mpùr* in general it does occur. Declination can be observed in *Mpùr* in a sustained pitch level or in a sequence of two tones of the same type (H-H, M-M etc.), where the second tone is realized somewhat lower than the first. Here, the term declination recognizes the fact that in the stylizations of pitch levels there is always some declination. If in a sequence of two tones of the same type, the second tone were realized exactly on the *same pitch level* as the first *in terms of hertz*, the second would be perceived as higher. If a level tone is sustained on a constant (in hertz) pitch level over a number of

syllables, it will be perceived as inclination, i.e. a gradual rise (Odé 1989:27-28). Declination in this sense must not be confused with downstep or downdrift (see below)).

In the literature the terms "downdrift" and "declination" are sometimes used to indicate the same phenomenon (cf., for instance, in Fromkin 1978: Ohala, 31-32; McCawley, 129; Anderson, 139-144). Downdrift is a term used to indicate "the downward slippage of the tonal register", occurring in sequences of tones. For instance in Efik, spoken in Nigeria, West Afrika (Cook 1985:121-128), a high tone after a low tone is realized lower than a high tone preceding that low tone; a low tone after a high tone is realized lower than a low tone preceding that high tone. Downdrift does not occur in all spoken (tone) languages. So far, downdrift has not been found in *Mpùr*.

The phenomenon downstep ("a non-predictable, phonologically significant lowering of the register" (Cook 1985:128), a clearly audible step downwards of the second tone in a sequence of two of the same tones), occurring for instance in many African tone languages, is not found in *Mpùr*.

Summarizing, downstep and downdrift are realized by a speaker intentionally, in accordance with linguistic rules. Declination always occurs unintentionally, in some types of speech, by default, if a speaker does not voluntarily compensate for it; the latter can have a linguistic function.

5 **Annotated text with literal and free English translation**

Every fragment consists of four lines. Numbers indicate the fragments referred to in the sections above.

In the **first** line, tones are marked in the text according to the chart of tones given in section 2. A word-final hyphen in the first line indicates a vowel or consonant that is not pronounced or is contracted with the adjacent vowel or consonant. In running speech, syllable-final stops [p,t,k] and flap [r] are often elided. Words marked with an asterisk (*) are slips of the tongue of the speaker. Boundaries are indicated with /. Paragraph boundaries that were indicated by the speaker in the written text with a full stop are marked with //.

In the **second** line, words are broken down into morphemes as far as these were recoverable and/or verified with native informants.

In the **third** line, a literal English translation is given, sometimes with a morphological annotation. The abbreviations used can be found below. A question mark in the second or third line indicates that the meaning of a given morpheme is not yet understood.

The **fourth** line gives a free English translation.

1			2		3	
bàri	*kú*	*sōbòni/*	*nkàn*	*fítĩ̀/*	*āmùk*	*Sasūà/*
		sobon-i			*a-muk*	
from	at	before-narr	old person	certain	3sM-name	Sasua

Once upon a time, there was a certain old man named Sasua.

4 5 6

Sasūà ka ājap/ kōpaw mā-a-a/ Āmtùr ātẽ̀m/
a-jap ku-taw? a-tem
Sasua DEF 3sM-live there at Amtur 3sM-mouth of river
Sasua lived there at the mouth of the river Amtur.

7 8

ājap kú mankã̀/ āmen pér/
a-jap a-men
3sM-live at REL-DEM 3sM-look after dog
He lived there and looked after his dogs,

9 10

āmen pér fón/ ārkwa pér mankã̀
a-men a-dukwa
3sM-look after dog many 3sM-carry dog REL-DEM
he looked after many dogs. He took along those dogs

11

pútu-pútu āùn n- āmsa bar/
put-u a-un na a-minsa
day-? 3sM-go to 3sM-hunt something
every day when he went hunting.

12 13

āmsa bar mā ms/ Āmtùr atòw namèk/*
a-minsa a-tow
3sM-hunt something at Amtur 3sM-headwaters there
He hunted there at the headwaters of the Amtur,

14 15 16

na tòka/ āji- dwáwō/ āji- bājinékō/
a-jik dwaw-o a-jik bajinek-o
to so that 3sM-kill pig-and 3sM-kill kangaroo-and
in order to kill pigs and kangaroos,

17 18

āji- ka- mankã̀ nara/ ārkwa na tòka/*
a-jik kam a-dukwa
3sM-kill game REL-DEM nara* 3sM-takes along to so that
after he had killed that game, he took it along in order to

19 20

ākat	*n-*	*ārèt/*	*ēbwa-*	*āta-*
a-kat	*na*	*a-det*	*e-bwar*	*a-tar*
3sM-put	so that	3sM-eat	1pl-say	3sM-possess

put the food inside a bambu so that he could eat it, we say now he had

21

bāréti	*nkà*	*wà/*	*ārà-*	*baín/*	
bar-det-i		*pa*	*a-dak*		
thing-eat-emph	DEM	already	3sM-work	garden	

this food already, he worked in the garden where

22 23

ajap	*ārà-*	*ján*	*kú*	*m-*	*Āmtùr*	*ātẽm*	*ka//*
a-jap	*a-dak*			*ma*		*a-tem*	
3sM-live	3sM-work	house	at	at	Amtur	3sM-mouth of river	DEF

he lived and built a house at the mouth of the river Amtur.

24 25 26

ō/	*pútī*	*àka/*	*āun*	*tu-*	*pér/*
	put-ti		*a-un*	*tut*	
o	day-other	and then	3sM-go	with	dog

O, one day as he went hunting with his dog,

27

āun	*tu-*	*bàri*	*krīmbór*	*wà/*
a-un	*tut*			*pa*
3sM-go	with	from	morning	already

he went with his dog already since the morning,

28 29

āun	*tut/*	*āmim*	*bāpu*	*mā*	*Āmtùr*	*anāmèk//*
a-un		*a-mim*				*a-namek*
3sM-go	with	3sM-arrive at	far away	at	Amtur	3sM-there

he went with his dog until he arrived far away at the Amtur there.

30 31

āun	*āyafnā/*	*āun*	*tu-*	*pér*
a-un	*a-afena*	*a-un*	*tut*	
3sM-go	3sM-return	3sM-go	with	dog

He went to and fro, he went with his dog

32

tási-tási-tási-tásikē/ *āsoma* *kamo* *jàn/*
tasik-e *a-soma* *kam-o*
in vain-excl 3sM-find game-whatever not
in vain, he didn't find any game,

33 34

ānamen- *āwamar* *pà/* *ākon* *kú* *jaswã̄-//*
a-namena *a-wamar* *a-kon* *jaswak*
3sM-come back 3sM-tired already 3sM-sleep in hut
he came back and already tired, he went to sleep in the hut.

35 36

ākon *kú* *jaswã̄kē-e-e/* *ākon* *buru* *pà/*
a-kon *jaswak-e* *a-kon*
3sM-sleep in hut-excl 3sM-sleep to descend already
As he slept in the hut, when he was well asleep,

37 38

bé *pér* *mankã̄* *tōw/* *yāw//* *wárkwā* *tēp* *fítĩ̄/*
war-dukwa
but dog DEM bark well river-take along plate certain
but the dog barked, well, the water took along some plate,

39 40 41

tē- *bátaka/* *bawa* *út* *be* *tēp* *beu*
tep *be-u*
plate DEM what stay in plate in-inside
that plate, there was something inside that plate,

42 43

bátaka/ *kamàn/* *kamàn* *bè* *mankã̄* *út* *be/*
bar-ta-ka?
thing-DEM-DEF? pumpkin pumpkin fruit that stay inside
it was a pumpkin. The pumpkin-fruit stayed

44 45

tēp *beu/* *āre* *wárkwā* *kútu-/*
war-dukwa *ku-tut*
plate inside therefore river-take along at-with
the plate, so the river took along

46 47

wárkwā kútutē-e-e/ mim fanàm kú ma
war-dukwa ku-tut-e
river-take at-with-excl arrive near at REL
the water took the plate along till near the

48

wátẽm/ Āmtùr atẽmā/
war-tem a-tem-a
river-mouth 3sM-mouth-?
mouth of the Amtur.

49

āka péri namēna tōw/
per-i
and then dog-emph come back bark
And then the dog came back and barked,

50

pér to-to-to-to-tōw/
tow
dog bark
the dog barked and barked and barked

51 52

ō yetān- āmsēm/ āmsēm àka/
yeta-(n)a a-minsem a-minsem
o 3sM-emph 3sM-hear 3sM-hear and then
oh he heard and heard it all the time

53 54

āmsēm bé āwamar p- āre yāw/ āmom ka
a-minsem a-wamar pa a-mom
3sM-hear but 3sM-tired already so well 3sM-not want DEM
he heard it but he was so tired that well he didn't want

55

āun- āwot/ pér tō- wawān ka//
a-un a-wot tow bawan
3sM-go 3sM-see dog bark what DEF
to go and see what it was the dog was barking at.

56

ājap	*ākon*	*ātaw-*	*ākon*	*bōryā//*
a-jap	*a-kon*	*a-tar-bar*	*a-kon*	
3sM-sit	3sM-sleep	3sM-possess-thing	3sM-sleep	fast

He sat and slept, he was fast asleep.

57 58

ākon	*tē-e-e/*	*pér*	*tōw*	*maw-maw-maw-maw/*
a-kon				
3sM-sleep	emphasis	dog	bark	continuously

He slept all the time while the dog barked continuously.

59 60 61

āh/	*ābwa-*	*ná/*	*bawān ma*	*pér*	*tōw*
	a-bwar				
ah	3sM-say	well	what	REL dog	bark

Ah, he said, well, what is it that the dog is barking

62 63 64

maju-maju	*karà/*	*ānamenā/*	*āwot/*	*ābw-*	*āwot*
maju-maju (BI)		*a-namena*	*a-wot*	*a-bwar*	*a-wot*
all the time	that	3sM-come back	3sM-see	3sM-say	3sM-see

all the time? He went back and saw, he said he saw something

65 66

àka	*ē-e-e*	*yāw/*	*kamàn*	*nā*	*kamàn*	*út*	*kú*	*yāw*
	e							
and then	excl	well	pumpkin	DEM	pumpkin	stay in		well

and then oh well, a pumpkin, a pumpkin stays in, well,

67 68 69

tēp	*beu/*	*ō*	*ān-*	*awot*	*àka/*	*kamàn*
	be-u		*a-na*	*a-wot*		
plate	inside	oh	3sM-come	3sM-see	and then	pumpkin

in a plate, oh he came and saw it and then that very pumpkin

70 71

banī/	*kōpo*[15]	*e*	*ú-*	*be/*	*tēp*	*beyè/*
bar-ni			*ut*			*be-ye*
thing-emph	jump	excl	stay	in	plate	in-outside

jumped out of the plate it was in,

72 73

àka	*kamàn*	*bwa-/* *bwar*	*kamàn*	*bwa-* *bwar*	*na*	*Sasūà/*
and then	pumpkin	say	pumpkin	say	to	

and then the pumpkin said, the pumpkin said to Sasua,

74 75

bwa/	*ō/*	*amwámom*	*k-*	*anot*	*íno*	*pà/*
bwar		*an-wamom*	*ka*	*an-wot*	*in-o*	*pa*
say	oh	2s-want-not	DEM	2s-see	1s-also	already

it said oh, so you didn't want to see me,

76 77

bàri	*ma*	*púnuni* *put-nuni*	*pér*	*tōw*	*ín*
from	REL	day-earlier	dog	bark	I (direct object)

since the early day the dog barked at me

pér	*tōw*	*ín*	*b-* *be*	*án-* *an-na*	*anot* *an-wot*	*ín*	*jàn*	*āre/*
dog	bark	I	but	2s-come	2s-see	I	not	therefore

the dog barked at me but you didn't come to see me

78 79

tétaté/	*mbwar*	*-ā*	*nan/*
te-ta-te	*in-bwar*	*na*	
so	1s-say	to	2s-you

so therefore I say to you

---

[15] According to the story teller, he was not correct in using the word *kōpo* (to jump) and wishes it to be replaced by the word *kwem* (to fall).

80 81 82

ín/ ínáw si/ ínáw si yāw/
in-aw in-aw
I 1s-go home to 1s-go home to well
I go home to, I go home to well

83 84

āmberō/ nta- bāken
Amber-o in-tar
Amber-excl 1s-possess trunk
the people with straight hair. That trunk of mine

85 86

bátaw kon kú/ tēp[16]/ kon jāti- kútàw/
bar-taw jatik ku-taw
thing-DEM stay in plate stay wait here
stays in the plate here, it stays here behind

87

bé ín t- ínáw si āmber
te in-aw
but I emph 1s-go home to Amber
but me I am going home to that people with straight hair,

88 89

ndà pà/ ō anta-/ nta- bākena tā ú-
an-tar in-tar baken-a ta ut
DEM already o 2s-possess 1s-possess (repair) trunk DEM stay
oh that trunk of you... of mine stays

90

kútàw/ mtaki maw ndàkà pà//
ku-taw mim-ta-ki nda-ka
at-here arrive-DEM-DEM finish DEM already
here, and this is the end.

---

[16] The story teller wishes the word *tep* (plate) to be replaced by the word *tàw* (here), because *tēp* were not correct.

91		92		93		
ndà	*dēròn/ der-don*	*femūki*	*dēbwa- der-bwar*	*yāw/*	*Āmberbāken*	*ka//*
DEM	3pl-give name	now	3pl-say	well		DEF

That is how they gave it a name and now they say well Amberbaken.

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Abbreviations

narr = continuation or narrative particle
DEF = definite
DEM = demonstrative pronoun
REL = relative pronoun
excl = exclamation particle
emph = emphasis particle
1s = first person singular
2s = second person singular
3sM = third person singular Masculine

References

Berry, Ch. 1995. *Complex Sentences in the Abun Language*. M.A. Thesis, La Trobe University, Bundoora, Victoria, Australia.

Berry, K. 1995. *A Description of the Abun Language*. M.A. Thesis, La Trobe University, Bundoora, Victoria, Australia.

Charpentier, F., Moulines, E. 1989. "Pitch-synchronous waveform processing techniques for text-to-speech synthesis using diphones", in *Eurospeech 89*, vol.2, J.P. Tubach, J.J. Mariani, eds., Paris.

Clouse, H.& D. 1993. "Kirikiri and the Western Lakes Plains Languages: Selected Phonological Phenomena", in *Journal of the Linguistic Society of Papua New Guinea and the Society on Pidgins and Creoles in Melanesia*, vol. 24 No.1, pp. 1-18.

Cook, Th.L. 1985. *An integrated phonology of Efik*, vol.1, Ph.D.Diss., University of Amsterdam.

Edmondson, A., Bateman, J., Miehle, H. 1992. "Tone contours and tone cluster in Iau",

in *Proceedings of the Special Session on Typology of Tone*, Berkeley Linguistics Society, Univ. of California, Berkeley.
Fromkin, V.A., ed. 1978. *Tone, A Linguistic Survey*, Academic Press, San Diego, California.
Hart, J. 't, Collier, R., Cohen, A. 1990. *A perceptual study of intonation: An experimental phonetic approach to speech melody,* Cambridge.
Hendriks, B. 1995. *Word Prosodic Systems in the Languages of the East New Guinea Highlands Stock in the Highlands of Papua New Guinea*, M.A. Thesis, Department of Linguistics, Leiden University.
Hermes, D.J., van Gestel, J.C. 1991. "The frequency scale of speech intonation", in *Journal of the Acoustic Society of America*, 90 (1).
IPA 1993. "The International Phonetic Alphabet (revised to 1993)", in *Journal of the International Phonetic Association*, vol.23, no.1, June, unnumbered centre pages.
James, D. 1994. "Word Tone in a Papuan Language: An Autosegmental Solution", in *Language and Linguistics in Melanesia* 25, pp. 125-148.
Kalmbacher, G. 1995. *Mpur Phonology*, SIL/Universitas Cenderawasih, Jayapura, unpublished manuscript.
Kamma, F.C. 1976. *Dit wonderlijke werk*, vol.I & II, Oegstgeest.
Kamma, F.C. 1978. "Amberbaken-people and their origin", in *Religious texts of the oral tradition from Western New Guinea,* vol.8 B: The threat to life and its defence against "natural" and "supernatural" phenomena, collected and translated by Freerk C. Kamma. NISABA, Religious texts translation series, Leiden 1978, pp. 42-44.
Miedema, J. 1984. *De Kebar 1855-1980.* Verhandelingen 105, KITLV, Leiden.
Miedema, J. 1994. "Trade, migration and exchange", in *Migration and Transformations, Regional Perspectives on New Guinea*, A.J. Strathern & G. Stürzenhofecker, eds., Univ. of Pittsburgh Press, Pittsburgh and London, pp. 121-154.
Odé, C. 1989. *Russian intonation: a perceptual description,* Rodopi, Amsterdam.
Odé, C. 1995. "Tones in Mpur", in *Proceedings of the XIIIth International Congress of Phonetic Sciences 95*, vol.4, pp. 216-219, Stockholm.
Pike, E.V. 1964. "The Phonology of New Guinea Highlands Languages", in *American Anthropologist*, vol.66, pp. 121-132.
Reesink, G. 1996. "Morpho-syntactic features of the Bird's Head languages", this volume.
Voorhoeve, C.L. 1987. "The masked Bird: Linguistic relations in the Bird's Head Area", In *Peoples on the move,* P. Haenen & J. Pouwer, eds., Nijmegen, pp. 78-101.
Voorhoeve, C.L. 1994. *Comparative Linguistics and the West Papuan Phylum*, Maluku & Irian Jaya, E.K.M. Masinambow ed., LIPI Jakarta, pp. 65-90.