

琉球大学学術リポジトリ

琉球語中舌高母音：奄美・湯湾方言と宮古・多良間方言の比較研究

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The Central High Vowels in Ryukyuan Languages: A Comparative Palatographic Study of Yuwan Amami and Tarama Miyako

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1. Introduction

The purpose of this study is to compare articulatory phonetic properties between two kinds of central high vowels in Ryukyuan languages. The Ryukyuan languages are classified into two major groups, Northern Ryukyuan and Southern Ryukyuan. Some sublanguages of these, Amami (Northern Ryukyuan) and Miyako (Southern Ryukyuan), for example, have a central high vowel as a phoneme, which will be transcribed as **i** and **ĩ**, respectively in this paper.

Some previous studies noted that the vowels **i** and **ĩ** have a central high quality in common but that articulatory details of the two are different. Uemura (2000: 12) describes, for example, that while the Amami **i** is a typical central high vowel, the Miyako **ĩ** is not; **ĩ** is produced with the main constriction in the vocal tract at the alveolar created by raising the tip of the tongue against it; i.e., the place of articulation is the same as that of the [s]. As Karimata (1986, 2002) pointed out, many other researchers, such as Iha (1974 [1934]), Kitamura (1960) and Sakiyama (1963), have observed that the Miyako vowel **ĩ** has an apical/laminal or s-like constriction. Based on its articulatory characteristics, Sakiyama (1963), for example, proposed that the vowel should be described as an apical vowel, which is transcribed as [ɿ] (an unrounded apical high vowel), and distinguished it from the canonical central high vowel [i].

Though previous studies noted the articulatory distinctions of the central vowels between Amami and Miyako, supporting objective data have been scarce. Aoi (2010) undertook a first preliminary palatographic investigation of the vowel **ĩ** of Tarama Ryukyuan, which is generally classified as a Miyako language, and confirmed its laminal, not apical, articulation. But there is no comparative study on the Amami Ryukyuan **i**; accordingly, the details of articulatory differences between this and the central high vowels in

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Southern Ryukyuan languages are still unknown. In this study, we will provide new palatographic data on the Yuwan dialect of Amami and compare the articulatory properties of the Yuwan *i* and those of the Tamara *ï*.

2. The three possibilities: [central], [mixed] and [laminal]

Before we turn to examine the phonetic details of the vowels in question, it is necessary to clarify the definitions of a central vowel and a laminal vowel. Hattori (1984: 93–96) made several important statements on the class of intermediate vowels. He noted that there was no question about front vowels, formed by the front of the tongue, and back vowels, formed by the back of the tongue, but there was little agreement in the specialist opinions about the intermediate position between these two. Surveying previous studies, he classified intermediate vowels into two kinds—[central], formed by the center (or the boundary of the front and back) of the tongue, and [mixed], formed by the flat tongue.

Many introductory phonetic textbooks, and also the IPA, define central vowels as those half-way between front and back. For example, according to Catford (2001: 148), “central vowels can be arrived at by sliding [the tongue] back and forth between front and back vowels and trying to stop [it] half-way.”

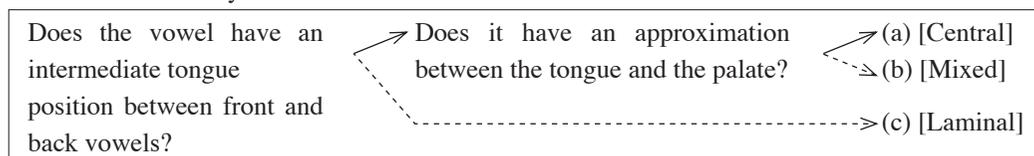
“Mixed vowels” is the term used by Bell and Sweet in the description of intermediate vowels. Sweet (1906: 14) defined the nine cardinal tongue positions of vowels. He distinguished three degrees of the vertical movements of the tongue, i.e., [high], [mid] and [low] on terms of tongue height. The horizontal movements produce two well-marked classes at first, i.e., back (guttural) and front (palatal) vowels. In addition to those two classes, there is a third class of mixed (gutturo-palatal) vowels. Sweet described [mixed] as a class for which the whole tongue is allowed to sink into its neutral flattened shape and where neither back nor front articulation predominates. In other words, it is characterized not only by mixed position—that is, intermediate between [back] and [front]—but also by flatness of the tongue.

Now, how is a laminal vowel defined? From the previous descriptions of Miyako Ryukyuan, we can summarize the articulatory properties of *ï* as a laminal vowel in terms of two points. First, the closest constriction of *ï* is made between the alveolar and the blade of the tongue. The point is the constriction occurs more front than other front vowels. Second, its constriction is almost the same as or slightly wider than [s]. It is also suspected that *ï* is accompanied by a frication noise like [s].

Thus, there are three possible classes of central vowels in Ryukyuan languages: (a) [central], (b) [mixed], and (c) [laminal], as shown in Table 1. Central and mixed vowels have the characteristic of the intermediate tongue position in common, but their articulatory details are different. A central vowel has a constriction formed between [front] and [back], while a mixed vowel is characterized by flatness of the tongue. A laminal vowel makes the closest constriction between the alveolar and the blade of the tongue, at a point more front than front vowels. In the remainder of this paper, we will provide proper

Table 1: Possible classification of central vowels in Ryukyuan languages

Solid lines indicate ‘yes’ and dashed lines ‘no’



articulatory interpretations of **i** and **ĩ** based on palatographic data.

3. Data

In this study, one dialect of each language group was investigated, i.e., the Yuwan dialect of Amami Ryukyuan and the Tarama dialect of Miyako Ryukyuan. Let us begin with a brief phonological sketch of the two.

Yuwan has the 18 consonants shown in Table 2.

Table 2: Yuwan consonants

	Labial		Coronal		Dorsal		Glottal	
Plosive	[?] p	b	[?] t	t	d	[?] k	k	g
Affricate			[?] c [ʔts]	c [ts]	z [dz]			
Fricative				s				h
Nasal	[?] m	m	[?] n		n			
Liquid					r			

Yuwan and many other Amami dialects have a phonological distinction between glottalized and non-glottalized plosives, affricates, and nasals. The absence of the non-glottalized bilabial plosive **p** is a structural gap. In addition to the consonants in Table 2, there are the semi-vowels **w** and **j** and their glottalized versions [?]**w** and [?]**j** in Yuwan.

The Yuwan vowel inventory is shown in Table 3. All vowels can co-occur with any consonants.

Table 3: Yuwan vowels

	Front	Central	Back
High	i	ĩ	u
Mid	e	ə	o
Low		a	

Yuwan has two non-low central vowels, **i** and **ɨ**. These have developed from *e and *ai or *ae, respectively.

Tarama has the 15 consonants shown in Table 4.

Table 4: Tarama consonants

	Labial		Coronal		Dorsal		Glottal
Plosive	p	b	t	d	k	g	
Affricate			c [ts]				
Fricative	f	v	s	z			h
Nasal		m		n			
Liquid				r			

In addition to the consonants in Table 4, there are the semi-vowels **w** [w~v] and **j** in Tarama. The nasals can be nucleic.

The Tarama vowel inventory is shown in Table 5.

Table 5: Tarama vowels

	Front	Central	Back
High	i	ɨ	u
Mid	e		o
Low		a	

The central vowel **ɨ** in Tarama has developed from *i. The other high vowels have descended from *e and *o: *e > **i**; *o > **u**. The **e** and **o**, developing from diphthongs like *ai or *au, appear as long vowel synchronically.

The vowel **ɨ** appears only in restricted environments, in contrast to the other vowels, which can co-occur with any consonant. The syllable **mɨ** is rare and always appears as a long vowel, as in the word *mūigɨ* ‘right’. The syllables *tɨ, *dɨ, *nɨ, *rɨ are not found. Historically, they have changed into **cɨ**, **zɨ**, **n** (syllabic n), **r** [ʀ], respectively.

Two male speakers of each dialect participated in the investigation. They will be referred to as KS (b. 1950) and MS (b. 1953) from Yuwan, and KT (b. 1958) and TO (b. 1967) from Tarama. Since we elicited data from only two speakers each, the results of our investigation should be treated with caution.

We used words including high vowels as test words. The test words are given in Table 6.

Table 6: Test words

Yuwan-Amami	i: , <i>mii</i> ‘body’	i: , <i>mii</i> ‘eye’	u , <i>mumu</i> ‘peach’
Tarama-Miyako	i: , <i>ii</i> ‘picture’	ĩ: , <i>ĩĩ</i> ‘rice ball’	u: , <i>uu</i> ‘(the Year of) the Hare’

In Yuwan, all the vowels follow the bilabial nasal consonant **m**, and the test words for Tarama consisted of the vowels in question only.

4. Methods

In order to record the articulatory properties of the high vowels in question, a static palatographic investigation was conducted. Fieldwork palatography involved painting the tongue with a black substance (a mixture of olive oil and powdered charcoal), asking the speaker to say the test words listed in the previous section, and then observing where the black substance had been transferred onto the palate. By putting a mirror into the speaker’s mouth, we photographed the palate. Reversing the procedure, we painted the roof of the mouth first and then took a photograph of the tongue. A photograph of the palate is called a palatogram, and that of the tongue is called a linguogram.

In this study, the articulatory properties of the central vowels, distinguished from front and back vowels, will be described through the observation and comparison of palatograms and linguograms of high vowels of each dialect.

5. Results

The palatograms and linguograms of the high vowels we obtained tell us that the articulatory properties of the central vowels are different between Yuwan and Tarama. In this section we will describe those properties in each dialect, providing representative photographs.

Figure 1 shows palatograms and linguograms of the Yuwan high vowels, as in the words **i:**, *mii* ‘body’, **i:**, *mii* ‘eye’ and **u**, *mumu* ‘peach’ (speaker MS). The upper photos are palatograms, are those below are linguograms. Dashed lines indicate the front of the tongue contact.

As the palatogram of **i** indicates, the vowel is best characterized as [central] compared with the other high vowels **i** and **u**. In the palatogram of **i**, the tongue contact is on the sixth tooth from the front. The front vowel **i** involves an articulatory contact that is further anterior, on the fourth tooth from the front. The roof of the mouth in the **u** in the right palatogram is not stained. It is inferred from this that it involves a contact with the uvula and the root of the tongue, which was not painted in the course of the research.

The observation of the palatograms above is similar to that of the linguograms. The tongue in the **u** is not stained, while it is in the others. The stain on the tongue in the **i** tells us that it involves contact with the front of the tongue and the palate.

The Central High Vowels in Ryukyuan Languages

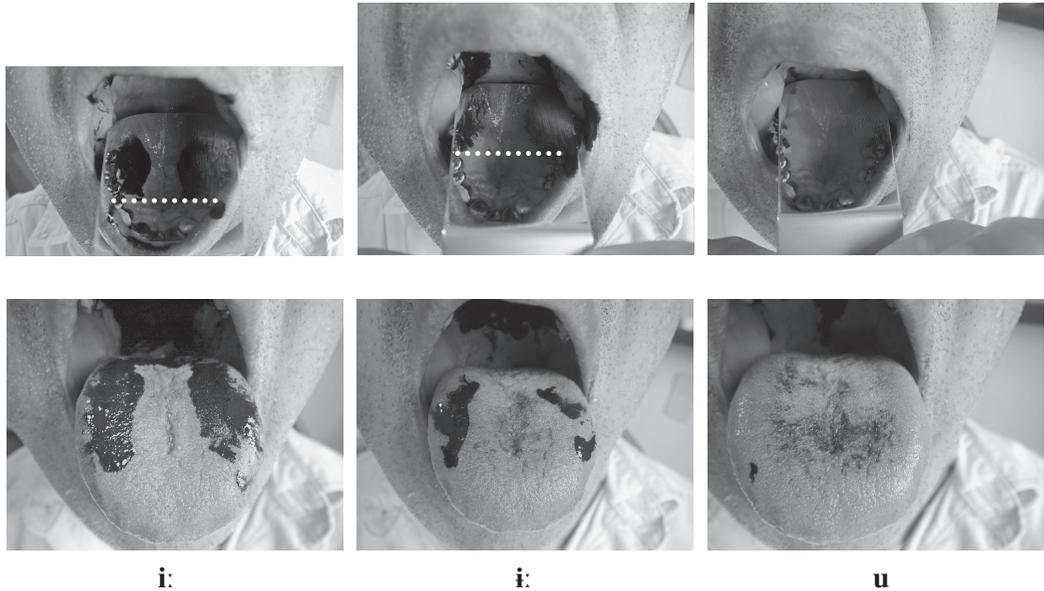


Figure 1: Palatograms and linguograms of Yuwan-Amami high vowels as in the words *i:*, *mii* ‘fruit’, *i:*, *mii* ‘eye’ and *u*, *mumu* ‘peach’ (speaker MS). Dashed lines indicate the front of the tongue contact.

We see from Figure 1 that the vowel *i* has a central articulatory property compared with *i* and *u*. The front vowel *i* has an approximation with the front of the tongue and the palate, and the back vowel *u* with the root of the tongue and the uvula. An approximation of the vowel *i* is between *i* and *u*, and so it can be interpreted as [central]. On the other hand, the articulatory properties of the central Tarama vowel are different from Yuwan ones, as can be seen from Figure 2.

The palatograms and linguograms of Tarama high vowels in the words *i:*, *ii* ‘picture’, *ii:*, *ii* ‘rice ball’ and *u:*, *uu* ‘(Year of) the Hare’ are shown in Figure 2 (speaker TO). White circled stains are noises made in the course of the research, and they are not relevant to the observation.

The contact indicated by the palatogram of the *ii* is further anterior than the Yuwan one, on the second tooth from the front. It is quite similar to the front vowel *i*, which involves contact on the third tooth. The vowel *ii* differs from the *i* in that it does not involve an approximation with the palate and the front of the tongue. Based on this fact, *i* can be interpreted as [front] but *ii* cannot. The roof of the mouth in the *u* involves contact further back than with the others, which is on the eighth tooth, so it can be interpreted as [back].

As pointed out in the introduction, some previous research, such as Sakiyama (1963), claimed that the vowel *ii* in Miyako Ryukyuan should be called an apical vowel, symbolized phonetically as [ɿ], because it involves a constriction like [s]. The linguogram of *ii*,

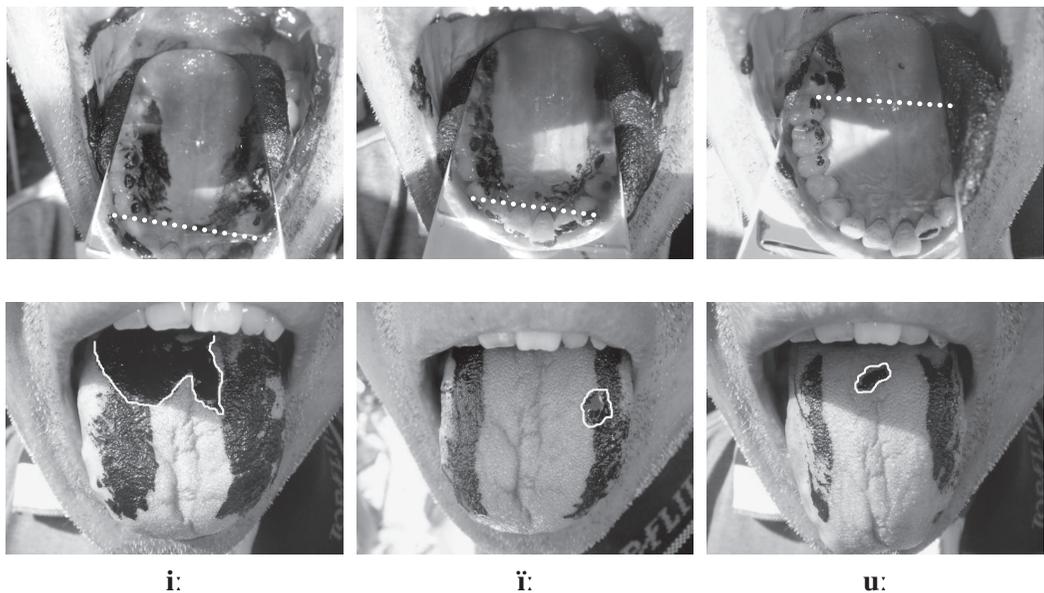


Figure 2: Palatograms and linguograms of Miyako-Tarama high vowels as in the words *i:*, *ii* ‘picture’, *i:*, *ii* ‘rice ball’ and *u:*, *uu* ‘(Year of) the Hare’. Dashed lines indicate the front of the tongue contact (speaker TO).

however, tells us that it does not involve the tip of the tongue, so it cannot be interpreted as an apical vowel [ɿ]. Both sides of the tongue blade are stained, but it does not seem to involve only the blade. Rather, it is likely that the Tarama *i:* makes an approximation with a flat tongue. In other words, not only the blade of the tongue but also the whole body of the tongue is involved in the articulation of *i:*.

We cannot interpret the Tarama *i:* as the same as the Yuwan *i*. The tongue position of the Yuwan *i* is between the front vowel *i* and the back vowel *u*. On the other hand, the linguogram in the center photograph in Figure 2 indicates that the tongue blade is also involved in the articulation of the Tarama *i:*. Based on this fact, it might be said that *i:* is a [laminal] vowel. However, we do not take this view because the linguogram indicates that not only the blade but also the whole body of the tongue is involved in the articulation of *i:*. In other words, the Tarama vowel *i:* cannot be adequately described in terms of the tongue position or the closest point of the tongue with the roof because it makes an approximation with a flat tongue body. It follows from these observations that the Tarama *i:* should be interpreted as [mixed].

6. Discussion and conclusions

The palatograms and linguograms in Figure 1 clearly show that the Yuwan *i* has articulatory central properties, and its characterization as [central] is valid. On the other

hand, the Tarama *ĩ* should be interpreted as [mixed] because it is suspected that *ĩ* makes an approximation with a flat tongue body.

The palatograms and linguograms in Figure 2 show that the Tarama *ĩ* has more than a laminal constriction. It is inferred that it also has a dorsal constriction as much as a laminal constriction. Based on the same palatographic data of the Tarama *ĩ*, Aoi (2012: 92) reinterpreted the flatness of the tongue of *ĩ* as a double articulation of laminal and dorsal, i.e., a laminal dorsal vocoid (Laver 1994). Laver (1994: 318–320) commented on the possibility of a third type of vowel segment, a double (apical /) laminal dorsal vocoid, in addition to an unrounded vowel (a single dorsal vocoid) and a rounded vowel (a double labial dorsal vocoid). When a laminal dorsal vocoid is articulated, the tongue blade is raised to the point where it contributes an audible coloring to the perceived quality of the sound produced, but the degree of stricture at the alveolar place of articulation remains one of open approximation. In such a situation, one would have to say that a vocoid segment is produced with a double oral articulation, one (dorsal) by the body of the tongue and the other (apical or laminal) by the tip or blade.

Laver also commented that a laminal dorsal vocoid segment is relatively rare in the languages of the world and gave examples of a few languages such as Mandarin Chinese and Swedish. In all four cases that he illustrated, however, the phonological status is allophonic, not phonemic. In contrast, the Miyako vowel *ĩ* is phonemic and can co-occur with all consonants but non-sibilant coronals.

We have presented data from Yuwan, a Northern Ryukyuan language, and Tarama, a Southern Ryukyuan, showing the patterns of articulation of the high vowels and have concluded that while the Amami vowel *i* can be described as [central], the Tarama-Miyako *ĩ* is best described as [mixed]. As Aoi (2012) has already noted, the mixed vowel *ĩ* can be interpreted as a double dorsal laminal vocoid. Further research is needed for detailed descriptions of the articulatory properties of central vowels in order to verify our interpretations of the controversial phonemic high vowels of Ryukyuan languages.

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琉球語中舌高母音：奄美・湯湾方言と宮古・多良間方言の比較研究

青井隼人・新永悠人

琉球語の方言の中には中舌高母音が音韻論的に認められる方言がいくつか存在する。本研究の目的は、当該母音の調音的特徴を器械音声学的手法を用いて北琉球方言・南琉球方言のそれぞれについて記述することである。両方言に認められる中舌高母音はその調音詳細が互いに異なることがこれまでに知られている。しかし従来の記述は主観的な観察に基づいており、客観的資料に基づいて両者を比較したものはこれまでになかった。そこで本研究では、奄美・湯湾方言と宮古・多良間方言とを対象に、静的パラトグラフィー資料に基づいた当該母音の方言間比較を試みる。調査結果から、両者はそれぞれ central vowel (中舌母音；前舌面と奥舌面の境界付近で狭めをつくる母音) と mixed vowel (混合母音；舌面が平坦な状態で狭めをつくる母音) として調音音声学的に解釈できる。