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[linchihkai@gmail.com](mailto:linchihkai@gmail.com)**Abstract**

This paper investigates the reconstruction of Okinawan consonants in the 18<sup>th</sup> century from a corpus-based approach by comparing three philological data based on Chinese transcription: *Zhongshan Chuanxinlu* ‘A Document of Messages from Zhongshan Kingdom’ (1719), *Liuqiu Tuyu* ‘Indigenous languages of the Ryukyus’ (1748), and *Liuqiu Ruxue Jianwenlu* ‘A record of seeing and learning Ryukyuan’ (1764). To obtain reliable data, this paper uses the transcriptions that appear in the three resources. The dataset includes 120 words with 233 syllables: 133 syllables without variation, and 100 syllables with variations. According to the data, thirteen consonants for Middle Okinawan in the 18<sup>th</sup> century are deciphered, /p, t, k, s, ts, φ, ʃ, tʃ, j, w, m, n, l/.

**Keywords:** Okinawan consonants, corpus-linguistics, Chinese resources, reconstruction

**1. Introduction**

This study examines the reconstruction of Okinawan consonants in the 18<sup>th</sup> century through a corpus-based approach, comparing three philological datasets from Chinese transcriptions. Abundant resources, earlier forms of Okinawan predating the 18<sup>th</sup> century, have been scrutinized by Ding (2008), Tawata (2010), and Lin (2015), primarily leveraging Chinese sources such as *Liuqiu guǎn yìyǔ* (琉球館譯語) ‘The Wordlist of Ryukyuan’ and the four renditions of *Shǐ liúqiú lù* (使琉球錄) ‘A Record of Ambassadors to the Ryukyus’. Besides Chinese sources, Korean records, exemplified by *Haytong cheykwukki umpen.yek* (海東諸國記・語音翻譯) ‘The Records of Countries to the East of the Sea: a phonetic translation’, serve as apt references for the reconstruction of Old Okinawan preceding the 18<sup>th</sup> century.

Subsequently, during the 18<sup>th</sup> century, philological datasets for Middle Okinawan (OKD 1995, 1610 A.D. - 1879 A.D.) are comparatively scarce, with diminished scholarly focus observed in the works of Ding (2008) and Tawata (2010). These scholars have deliberated on two primary resources: *Zhongshan Chuanxinlu* (中山傳信錄) ‘A Document of Messages from Zhongshan Kingdom’ (1719) and *Liuqiu Ruxue Jianwenlu* (琉球入學見聞錄) ‘A record of seeing and learning Ryukyuan’ (1764). Reconstructions derived from data in these resources have posited a consonantal system, as in Tawata’s (2010) schema for Middle Okinawan in the 18<sup>th</sup> century, comprising /φ, b, t, d, k, g, tʃ, dʒ,

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ts, s, z, ʃ, m, n, r, j, w/.

The reconstructions of Old and Middle Okinawan have predominantly leaned on philological data, with researchers employing a conventional method involving intuitive interpretation of the data. A novel approach integrating quantitative analysis is presented by Lin (2015), who employs a corpus-based methodology for Old Okinawan. This study adopts Lin's (2015) corpus-based framework for reconstructing Middle Okinawan in the 18<sup>th</sup> century. Specifically, it explores the distribution of consonants during this period.

Traditionally, analyses of Middle Okinawan would focus on two primary resources: *Zhongshan Chuanxinlu* 'A Document of Messages from *Zhongshan* Kingdom' (1719) and *Liuqiu Ruxue Jianwenlu* 'A record of seeing and learning Ryukyuan' (1764). However, there exists an underexplored resource for reconstruction, *Liuqiu Tuyu* 'Indigenous languages of the Ryukyus' (1748). This paper compares these three philological resources for the Middle Okinawan in the 18<sup>th</sup> century based on Chinese transcriptions. The paper is structured as follows: Section 2 outlines the methodology, and discusses data classification and analysis processes. Section 3 presents the distributions of consonants across the three resources and provides the consonantal inventory for Middle Okinawan in the 18<sup>th</sup> century. Finally, Section 4 offers concluding remarks.

## 2. Methodology

This paper utilizes three philological sources: *Zhongshan Chuanxinlu* 'A Document of Messages from *Zhongshan* Kingdom' (1719), *Liuqiu Tuyu* 'Indigenous languages of the Ryukyus' (1748), and *Liuqiu Ruxue Jianwenlu* 'A record of seeing and learning Ryukyuan' (1764). Among these, *Zhongshan Chuanxinlu* and *Liuqiu Ruxue Jianwenlu* are commonly employed in existing analyses, while *Liuqiu Tuyu* is comparatively less explored in the literature. To date, Ding (2005) remains the sole researcher to have scrutinized the segments within *Liuqiu Tuyu*. This paper incorporates all three resources to construct a comprehensive database for Middle Okinawan in the 18<sup>th</sup> century.

The three resources present varying numbers of entries: *Zhongshan Chuanxinlu* contains 606 entries, *Liuqiu Tuyu* 282 entries, and *Liuqiu Ruxue Jianwenlu* 389 entries. Data from these three resources are categorized based on their frequencies: (a) appearing in all three resources, (b) appearing in two resources, and (c) appearing in only one resource. For instance, the word for 天 'heave, sky' is found in all three resources, although transcribed differently as 町 in *Zhongshan Chuanxinlu* and *Liuqiu Tuyu*, and as 廳 in *Liuqiu Ruxue Jianwenlu*. Similarly, the word for 村 'village' is transcribed as 毋喇 in *Zhongshan Chuanxinlu* and as 母拉 in *Liuqiu Ruxue Jianwenlu*, while it is absent in *Liuqiu Tuyu*. Another example under the second condition is the term for 橋 'bridge', transcribed as 法是 in *Liuqiu Tuyu* and as 花失 in *Liuqiu Ruxue Jianwenlu*, but missing in *Zhongshan Chuanxinlu*. Entries exclusively found in one resource, such as the word for 雀 'sparrow', solely appearing in *Liuqiu Tuyu* and transcribed as 思子美, are also considered.

Deciphering the Okinawan transcriptions in Chinese characters necessitates careful analysis. This paper utilizes 五方元音 *Wufanyunyin* 'Sounds for the five directions', a Chinese rime book from the 18<sup>th</sup> century, as a reference to aid in interpreting the data from the three Chinese resources.

For instance, the transcriptions 町 and 廳 for the word 天 ‘sky, heaven’ would correspond to [t<sup>h</sup>iŋ] based on *Wufanyunyin*, which has 20 consonants, as shown in Table 1 (Geng 1992: 180-181).

Table 1: Consonants in 五方元音 *Wufanyunyin*

榔 [p]	匏 [p <sup>h</sup> ]	木 [m]	風 [f]
斗 [t]	土 [t <sup>h</sup> ]	鳥 [n]	雷 [l]
竹 [tʂ]	蟲 [tʂ <sup>h</sup> ]	石 [ʂ]	日 [z]
剪 [ts]	鵲 [ts <sup>h</sup> ]	絲 [s]	雲 [ø]
金 [k]	橋 [k <sup>h</sup> ]	火 [x]	蛙 [ø]

The consonant inventory comprises four labial consonants, [p], [p<sup>h</sup>], [m], and [f], five alveolar consonants, [t], [t<sup>h</sup>], [s], [n], and [l], four retroflex consonants, [tʂ], [tʂ<sup>h</sup>], [ʂ], and [z], two affricates [ts] and [ts<sup>h</sup>], and three velar consonants [k], [k<sup>h</sup>], and [x]. In Table 1, the Chinese characters 雲 and 蛙 denote zero onsets. Aspiration is phonemic in Chinese but not in Okinawan. Additionally, retroflex consonants are exclusive to Chinese, requiring careful consideration when reconstructing Middle Okinawan. It is crucial to note that the absence of consonants in the zero position does not imply emptiness; glides like [w] and [j] may serve as onsets. Following the decryption of Chinese data, token calculation is conducted, and the distribution of consonants in Middle Okinawan during the 18<sup>th</sup> century is reported in section 3.

### 3. Results

The dataset includes 120 words, 233 syllables, thereby consisting of 233 onset consonants. Due to transcription by different compilers from three Chinese resources, variations are inevitable. As a result, the 233 syllables are categorized into those without variation and those with variations.

#### 3.1 Transcriptions without variation

In the dataset, 133 syllables exhibit no variation, as shown in Table 2 below. According to Table 1, there should be 18 consonants and two semi-vowels, [j] and [w]. However, Table 2 reveals only 17 consonants, lacking examples for [p<sup>h</sup>], [ts<sup>h</sup>], and [z]. Since aspiration is not phonemic in Okinawan, consonants such as [t] and [t<sup>h</sup>] should be considered similar. Notably, there are 10 tokens for [p], while aspirated [p<sup>h</sup>] is not attested. likewise, stops like [t] (or [t<sup>h</sup>]) and [k] (or [k<sup>h</sup>]) are attested in the dataset. Regarding fricatives, plain fricatives [s, f, x] and retroflex [ʂ] are present. Three affricates [ts, tʂ, tʂ<sup>h</sup>] are also found. Finally, two nasals [m, n], two semi-vowels [j, w], and one liquid [l] are observed.

A preliminary consonantal system, based on Table 2, includes [p, t, k, m, n, l, j, w, s, ts]. However, five consonants [f, h, tʂ, tʂ<sup>h</sup>, ʂ] necessitate further discussion. Though two fricatives [f, h] appear in the dataset, it does not imply two distinct consonants. The consonant closer to linguistic accuracy for Okinawan is [h]. Regarding retroflex consonants [tʂ, tʂ<sup>h</sup>, ʂ], which are not consonants in Japonic

languages, they should represent other consonants. Plausible candidates for them would be palatalized [ts, s], namely, [tʃ, ʃ].

Table 2: Consonants in the three Chinese resources without variation

Consonants	Tokens	Examples	Gloss	Resource
p	10	姑必	neck	<i>Liuqiu Tuyu</i>
m	31	阿美	rain	<i>Liuqiu Tuyu</i>
f	4	夫矢	star	<i>Zhongshan Chuanxinlu</i>
t	5	夫的	brush	<i>Liuqiu Tuyu</i>
t <sup>h</sup>	6	町	heaven, sky	<i>Zhongshan Chuanxinlu</i>
n	4	那脾	pot	<i>Zhongshan Chuanxinlu</i>
l	11	虚鲁	dawn	<i>Liuqiu Ruxue Jianwenlu</i>
k	11	土吉	time	<i>Liuqiu Ruxue Jianwenlu</i>
k <sup>h</sup>	6	枯木	cloud	<i>Liuqiu Tuyu</i>
x	3	花纳	nose	<i>Liuqiu Ruxue Jianwenlu</i>
ts	3	葛子	wind	<i>Liuqiu Tuyu</i>
s	4	思密	ink	<i>Liuqiu Ruxue Jianwenlu</i>
tʂ	4	密之	road	<i>Liuqiu Tuyu</i>
tʂ <sup>h</sup>	1	茶碗	tea bowl	<i>Zhongshan Chuanxinlu</i>
ʂ	13	失木	frost	<i>Liuqiu Ruxue Jianwenlu</i>
j	11	又急	snow	<i>Zhongshan Chuanxinlu</i>
w	6	倭喀	bank	<i>Zhongshan Chuanxinlu</i>

### 3.2 Transcriptions with variations

In the dataset, 100 syllables exhibit variations in transcriptions, forming 53 correspondence sets, as shown in Tables 3 and 4 (A = *Zhongshan Chuanxinlu*, B = *Liuqiu Tuyu*, C = *Liuqiu Ruxue Jianwenlu*). Variations in Table 3 elucidate the correspondences of velar consonant [k], fricative [f], semi-vowel [j], nasals [m, n], and labial stop [p<sup>h</sup>]. The correspondence sets for velar consonant [k] indicate that the unaspirated [k] in *Zhongshan Chuanxinlu* corresponds to aspirated [k<sup>h</sup>] or to fricative [x] in the other two resources. Likewise, fricatives in *Zhongshan Chuanxinlu* correspond to other fricatives, and semi-vowel [j] exhibits similar correspondences, aligning with other semi-vowels. Nasals across the three resources reveal correspondences of bilabial and alveolar nasals. Concerning labial stop [p<sup>h</sup>], the aspirated labial stop in *Zhongshan Chuanxinlu* corresponds to unaspirated [p] in the other two resources.

Tentatively, it can be inferred from Table 3 that there should be [k], [j], [m], [n], and [p]. The correspondences of fricatives [f] and [x] suggest the presence of a consonant that is not a labiodental fricative but still qualifies as a labial fricative. A viable candidate under these circumstances would

be the bilabial fricative [ɸ].

Table 3: Consonants in the three Chinese resources with variations

A	B	C			A	B	C			A	B	C	
k	k <sup>h</sup>	k <sup>h</sup>	1		f	f	x	2		m	w	m	5
k	k	k <sup>h</sup>	7		f	f	s	1		m		m	1
k	k	x	2		x	x	f	3		m	n	n	1
k <sup>h</sup>	k	x	2		x	f	x	3		n	n	l	1
k <sup>h</sup>	k	k <sup>h</sup>	3		x	x		3		n	m	m	1
k <sup>h</sup>	k <sup>h</sup>	x	3		x	w	x	1					
k <sup>h</sup>	x	x	2			x		1		p <sup>h</sup>	f	ɛ	1
k <sup>h</sup>	k	k	1		j	j	y	3		p <sup>h</sup>	p <sup>h</sup>	p	4
k	z <sub>l</sub>	tɕ	1		l	ts <sup>h</sup>	ts	1		p <sup>h</sup>	p	m	1
					l	j		1					

Table 4 illustrates the correspondences of alveolar consonants, including alveolar fricatives and stops, as well as affricates. Initially, alveolar fricative [s] or retroflex fricative [ɕ] in *Zhongshan Chuanxinlu* corresponds to the same consonants in the other two resources. Irrespective of aspiration, the correspondences of the alveolar stops and affricates remain consistent across the resources. Consequently, it is established that [s], [t], and [ts] are present. In section 3.1, the discussion focused on the three retroflex consonants [tɕ, tɕ<sup>h</sup>, ɕ], which are used to transcribe palatalized consonants. The correspondences in Table 4 below align with the proposition of palatalization of [ts, s].

Table 4: Consonants in the three Chinese resources with variations

A	B	C			A	B	C			A	B	C	
s	ɕ	ɕ	4		t	t	l	3		ts	ts	ts <sup>h</sup>	1
s	s	ɕ	1		t	l	t	3		ts	tɕ	tɕ <sup>h</sup>	2
ɕ	ɕ	s	2		t	t <sup>h</sup>	t	3		ts	ts	k	1
ɕ	s	s	1		t	t <sup>h</sup>	ts <sup>h</sup>	1		ts	ɕ	ɕ	1
ɕ	s	ɕ	6		t	t	t <sup>h</sup>	2		ts	s	s	1
s	k	h	1		t <sup>h</sup>	ts	ts <sup>h</sup>	1		tɕ	ts	tɕ <sup>h</sup>	1
					t <sup>h</sup>	k	h	1		tɕ	ts	ts <sup>h</sup>	1
					t <sup>h</sup>	t	t <sup>h</sup>	1		tɕ	s	ɕ	1
					t <sup>h</sup>	l	l	1		tɕ	z <sub>l</sub>	tɕ	1
										tɕ	tɕ <sup>h</sup>	ts	1
										tɕ	tɕ <sup>h</sup>	tɕ	1
										tɕ <sup>h</sup>	tɕ <sup>h</sup>	tɕ	1

#### 4. Conclusion

This paper has used the transcriptions with and without variations to delineate distinct consonantal systems for Middle Okinawan in the 18<sup>th</sup> century. On one hand, data in section 3.1 suggest the presence of 11 consonants: /p, t, k, s, ts, ʃ, tʃ, m, n, l, j, w, h/. Conversely, correspondences in section 3.2 suggest 9 consonants: /p, t, k, s, ts, ʃ, tʃ, j, m, n, φ/. Certainly, the consonants for Middle Okinawan should be /p, t, k, s, ts, ʃ, tʃ, j, w, m, n, l/. The discrepancy lies in the representation of fricative [h] or [φ]. In section 3.1, consonants [f] and [x] are grouped together under labial consonants, with examples like 夫矢 ‘star’ for [f] and 花納 ‘nose’ for [x]. Considering alternation (section 3.1) and variation (section 3.2) for [f] and [x], a suitable consonant would be [φ], fulfilling both labiality and frication. Therefore, the consonants for Middle Okinawan in the 18<sup>th</sup> century should comprise the following 13 consonants: /p, t, k, s, ts, φ, ʃ, tʃ, j, w, m, n, l/.

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