



Hidden prosody in philology: *yìyǔ* 'transcriptions' in the 15th century

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Abstract

This paper investigates how prosody is hidden behind transcriptions in historical resources. Three historical sources are used in the analysis. They are Chinese transcriptions from the 15th century in which Japanese, Korean and Ryukyuan phrases are recorded using Chinese characters. The argument concentrates on the prosodic patterns of disyllabic nouns in the three historical sources. The results of chi-square tests show that in the transcriptions Korean is significantly different from Japanese and Ryukyuan. In disyllabic nouns, the Chinese tonal category *shǎngshēng* is favored in the first syllable of the Korean data to show changes from low to high tone. On the other hand, the transition is not salient in the Japanese and Ryukyuan data. In addition, the Chinese tonal category *yīnpíng* is disfavored in the first syllable of the Korean data, whereas Chinese *yīnpíng* is not overtly excluded from the first syllable of Japanese and Ryukyuan data. This paper also discusses the projection of prosodic characteristics from Chinese onto the transcriptions: the second syllable in a disyllabic noun tends to be *qùshēng*.

1 Introduction

Reconstructing prosody is seldom an easy task in historical linguistics, and most attention in reconstruction has been paid to segments. Recovering a phonological inventory of any language can be done by applying the comparative method based on modern languages/dialects or by deciphering historical sources. The comparative method is usually applied prior to using historical sources that not only document the earlier stages of a language but also determine aspects of its history (Campbell 2004: 361).

Reconstructing prosody using modern languages/dialects has been done, for example, by Shimabukuro (2007) for Japanese and Ryukyuan pitch accent and Pittayaporn (2009) for tones of Proto-Tai. In addition to the use of modern languages/dialects, prosody can also be reconstructed

through the use of historical sources, as we see, for instance, in the long tradition of studies in Old and Middle English stress (e.g. Sievers 1893, Minkova 2006, 2009, 2013) or in Ting's (1975) work on Middle Chinese tones. As Minkova (2013: 260) points out, as it lacks modern recording apparatus and proper analytical software, the foundation of prosodic reconstruction based on philological evidence should be secondary to using evidence from modern languages/dialects; nevertheless, the significance of philology in historical linguistics cannot be ignored.

When philological data are used to reconstruct prosody, different writing systems need different deciphering methods. When a writing tradition, that of early English for example, can preserve prosodic features, direct deciphering becomes more straightforward. Based on evidence from alliterative verses, for instance, scholars are able to posit that early English stress was root-initial (cf. Minkova 2006, 2009). Chinese, on the other hand, is written in logographic characters, and tones are not positionally assigned nor overtly expressed. External resources are necessary when a writing system fails to reflect the prosodic features. For instance, Chinese characters do not directly reflect tones, and transcriptions in other languages with overt-marking stress would be helpful. Ting (1975) explores Middle Chinese tones, which have four categories, by using Chinese transcriptions of Sanskrit. In comparing Sanskrit stress and Middle Chinese tones, Ting (1975) suggests that the four tones can be classified into one level tone and three non-level tones: high rising, mid falling and short checked. Ting's (1975) method gives an insight into how it becomes possible to decipher prosody by investigating transcriptions which preserve the phonological details of source and target languages and serve as a useful tool to reconstruct the phonological inventories of both.

This paper investigates whether prosody is hidden behind transcriptions in historical sources and focuses on the realization of Chinese tones during the 15th century. This paper follows Ting's (1975) method and uses Chinese transcriptions of foreign languages as key materials. Three historical sources were specifically selected, in which Japanese, Korean and Ryukyuan are recorded in the style of transcriptions, by using Chinese characters. Published during the Ming Dynasty (1368 – 1644 AD), the three historical sources are *Riběnguǎnyìyǔ* 'A wordlist of Chinese-Japanese phrases', *Cháoxiānguǎnyìyǔ* 'A wordlist of Chinese-Korean phrases', and *Liúqíuǎnyìyǔ* 'A wordlist of Chinese-Ryukyuan phrases'.¹ The three wordlists follow the same format. Each entry is initially provided with a

¹*Riběnguǎnyìyǔ* was published around 1441–1469 AD (Ding 2008: 60), and *Liúqíuǎnyìyǔ* is estimated to date from 1469 or 1470 AD (Ding 2008: 126). The publication year of *Cháoxiānguǎnyìyǔ* is estimated to be around 1403–1424 AD (Kwon 1998: 13).

Chinese meaning, and the transcription is presented afterward. Take the word ‘wind’ as an example: in *Riběnguǎnyìyǔ*, the meaning is provided in Chinese as 風 ‘wind’, followed by the transcriptions in Chinese characters as 刊節 [k^han.tsiε?] for Japanese.² Likewise, the word ‘wind’ is transcribed as 把論 [pa.lun] for Korean in *Cháoxiānguǎnyìyǔ*, and as 嗑集 [kaʔ.tsiʔ] for Ryukyuan in *Liúqíúguǎnyìyǔ*. The three wordlists have been thoroughly investigated; Ding (2008) and Fukushima (2008) have studied *Riběnguǎnyìyǔ*, Moon (1972), Kang (1995) and Kwon (1998) have studied *Cháoxiānguǎnyìyǔ*, and Ding (2008) has studied *Liúqíúguǎnyìyǔ*. Only Kwon (1998) touches upon prosody, discussing the correspondences between Chinese and Korean tones.³ There is no detailed research that thoroughly utilizes *Riběnguǎnyìyǔ* or *Liúqíúguǎnyìyǔ* to discuss Chinese tones or Japanese/Ryukyuan pitch accent during the 15th century. Moreover, there is no cross-linguistic study to explore how prosody is preserved in transcriptions.

This paper deals with the correspondences between Chinese tones and three foreign languages during the 15th century, considering Japanese and Ryukyuan pitch accent and Korean tones. I discuss two issues. The first is the realization of Chinese tones in the transcriptions in terms of prosodic differences between Japanese, Ryukyuan, and Korean, and the second is the projection of prosodic characteristics from Chinese onto the three foreign languages in the transcriptions. The data is disyllabic nouns from the three wordlists. To understand the prosodic systems of Chinese, Japanese, Korean and Ryukyuan, section 2 discusses Chinese and Korean tones and Japanese and Ryukyuan pitch accent. Section 3 deals with data selection criteria, transcriptions, and basic assumptions. Section 4 reports on the distributions of the correspondences, and section 5 focuses on different strategies that reflect the prosodic differences in the source and target languages. Section 6 concludes with a summary of major findings.

2 The prosody of Chinese, Japanese, Korean and Ryukyuan

This section describes the prosodic systems of Chinese, Japanese, Korean and Ryukyuan. Chinese tones are first explained in section 2.1, focusing on tonal categories in the 15th century. Then, Japanese and Ryukyuan pitch accent, as recorded in historical sources, is introduced in sections 2.2 and 2.3, respectively. Korean tones are elaborated upon in section 2.4.

² In this paper, the reconstruction of Chinese in the 15th century follows Zhang’s (1999) system for *Yǔnlüèyìtōng* (1442 AD).

³ Osada (1965) for *Nihon Fudoki* and Ma (2013) for *Nihonkoryaku* have discussed the accent in Chinese-Japanese transcriptions.

2.1 Chinese tones in the 15th century

In Chinese historical phonology, there are four tonal categories: *píng* ‘even’, *shǎng* ‘rising’, *qù* ‘departing’ and *rù* ‘entering’.⁴ The four categories go hand in hand with the voicing of onsets, known as *yīn* ‘voiceless’ and *yáng* ‘voiced’, which cause the four tones to split and render eight tones. Table 1 shows the eight tones.

Categories Onset voicing	<i>píng</i>	<i>shǎng</i>	<i>qù</i>	<i>rù</i>
<i>yīn</i>	<i>yīnpíng</i>	<i>yīnshǎng</i>	<i>yīnqù</i>	<i>yīnrù</i>
<i>yáng</i>	<i>yángpíng</i>	<i>yángshǎng</i>	<i>yángqù</i>	<i>yánggrù</i>

Table 1: Eight tones in Chinese historical phonology

Although there are eight tones in Table 1, Early Mandarin Chinese had less than eight tones. *Yǔnlüèyītōng* (1442 AD) (henceforth *YLYT*), a representative rime book from the 15th century, has only five tones: *yīnpíng*, *yángpíng*, *shǎngshēng*, *qùshēng*, and *rùshēng*. *Píngshēng* is divided into two tones according to the voicing of onsets. Although *rùshēng* gradually dispersed into the other three tones before the 15th century, *rùshēng* is still a category in *YLYT*.⁵

As the three historical sources were published in the 15th century, this paper relies on *YLYT* as a reference point. According to Lin (2010: 149), the tones in *YLYT* resemble those in *Zhōngyuányīnyùn* (1324 AD). Zhang (2010) posits that *yīnpíng* is a non-high level tone 33, *yángpíng* a rising tone 35, *shǎngshēng* a falling-rising tone 214, *qùshēng* a high falling tone 51.⁶ On the basis of Zhang’s (2010) reconstruction for *Zhōngyuányīnyùn*,

⁴ *Rùshēng* is not only a tone but also a syllable type, which refers to syllables ending in -p, -t, -k or -ʔ.

⁵ There was an important tonal change in the 14th century. *Rùshēng* gradually merged into the other three tones. The process in the 14th century has been captured in *Zhōngyuányīnyùn* (1324 AD), and therefore there are different interpretations of *rùshēng* (Ning 1985, Yang [From Lin 1992], Geng 2009 and Zhang 2010). Ning (1985) reconstructs it as a high level tone, while the other three reconstructions are rising tones. Ning (1985) provides no reconstruction of *rùshēng*. Yang (from Lin 1992) suggests that *rùshēng* merged with the other four tones and become a high level tone, a low rising tone, and a high falling tone. Geng (2009) reconstructs *rùshēng* as a low falling tone. Zhang (2010) suggests a phonological environment for *rùshēng*: it is a low rising tone when the onset is voiceless.

⁶ In Chinese phonology, tones are usually presented by numbers, 1–5, a system developed by Chao (1930). The highest pitch is 5, and the lowest is 1. For example, a high level tone is 55, and a falling-rising tone is 214.

the tones in *YLYT* are as follows: *yīnpíng* and *shǎngshēng* are non-high tones; the former is a low level tone and the latter is a low falling-rising tone, *yángpíng* is a high rising tone, and *qùshēng* is a high falling tone. As for *rùshēng*, although it is a phonologically distinct category in *YLYT*, Zhang (1999: 40) points out that this tone had dispersed into the other tones. Following Zhang (1999), *rùshēng* is not an independent category in this paper. It is assigned to the other three tones.

2.2 Japanese pitch accent in historical sources

Unlike in modern Japanese phonology, Japanese prosody in historical sources is presented according to the conventions of Chinese phonology, as marked using dots for tonal categories. The dots are placed around a Japanese *kana*.⁷ According to Akinaga, Ueno, Sakamoto, Sato & Suzuki (1998: 35) and Okimori (2010: 132), there are six tones in Middle Japanese: *heisei* or *hyōshō* ‘even tone’, *jōsei* or *jōshō* ‘rising tone’, *kyōsei* or *kyōshō* ‘departing tone’, *nyūsei* or *nisshō* ‘entering tone’, *heisei karu* or *hyōsho karu* ‘light even tone’, and *nyūsei karu* or *nisshō karu* ‘light entering tone’. The six tones are surmised as a low level tone for *heisei*, a high level tone for *jōsei*, a rising tone for *kyōsei*, a low entering tone for *nyūsei*, a falling tone for *heisei karu* and a high entering tone for *nyūsei karu*.

According to Mabuchi (1971: 157) and Kindaichi (2001: 306), Table 2 exemplifies the accent patterns in monosyllabic nouns.⁸ The four accent patterns are high (1.1), falling (1.2), low (1.3) and rising (1.4). The patterns can be monosyllabic, H or L, or bimoraic, HL (=F) or LH (=R).

Patterns	1.1	1.2	1.3	1.4
	H ~ HH	F ~ HL	L ~ LL	R ~ LH
Examples	<i>ga</i> ‘mosquito’	<i>ha</i> ‘leaf’	<i>ka</i> ‘deer’	<i>me</i> ‘woman’

Table 2: Japanese pitch accent in monosyllabic nouns
(H = high tone, L = low tone, F = falling tone, R = rising tone)

⁷ Akinaga, Ueno, Sakamoto, Sato and Suzuki (1998) provide a complete description of the usage of tone dots in Japanese historical sources. In this paper, I omit the details.

⁸ Japanese pitch accent can be categorically classified by numbers. For example, 1.1 refers to the first pattern of monosyllabic nouns, and 2.4 to the fourth pattern of disyllabic nouns.

Table 3 shows five accent patterns in disyllabic nouns.⁹

Patterns	2.1	2.2	2.3	2.4	2.5
	HH	HL	LL	LH	LF
Examples	<i>ume</i> 'plum'	<i>kawa</i> 'river'	<i>hana</i> 'flower'	<i>hashi</i> 'chopsticks'	<i>haru</i> 'spring'

Table 3: Japanese pitch accent in disyllabic nouns
(H = high tone, L = low tone, F = falling tone)

The five patterns are high + high (2.1), high + low (2.2), low + low (2.3), low + high (2.4) and low + falling (2.5). The first four patterns are the combinations of two level tones. The fifth pattern consists of a falling tone in the second syllable of a disyllabic noun. There is no rising tone for disyllabic nouns.

2.3 Reconstructed Ryukyuan pitch accent

No historical source explicitly records accent patterns in Ryukyuan. The most complete work concerned with early Ryukyuan pitch accent is Shimabukuro's (2007) reconstruction, which is based on modern languages. According to Shimabukuro (2007: 331–332), Table 4 shows the accent patterns in monosyllabic nouns.

Patterns	HH(H)	HH(L)	LH(L)
Examples	*ci: 'blood'	*p ^h a 'leaf'	*p ^h a 'tooth'

Table 4: Ryukyuan pitch accent in monosyllabic nouns
(H = high tone, L = low tone)

The three patterns are high + high (unaccented), high + high (accented) and low + high (accented). Shimabukuro (2007: 331–332) suggests that the three patterns correspond to those in Table 2. Ryukyuan HH(H) corresponds to Japanese H ~ HH (1.1). Ryukyuan HH(L) is equivalent to Japanese F ~ HL (1.2). Ryukyuan LH(L) corresponds to Japanese L ~ LL (1.3). No Ryukyuan pattern is equal to Japanese R ~ LH (1.4).

Shimabukuro (2007: 333–335) also proposes three accent patterns for disyllabic nouns, as shown in Table 5.

⁹ In this paper, I adopt the traditional view of Japanese pitch accent proposed by Kindaichi (1975), who postulates five patterns for dimoraic nouns (cf. Ramsey (1979, 1980).

Patterns	HH(L)	LH(L)	LHF ~ LHH(L)
Examples	*p ^h ana 'nose' *p ^h asi 'bridge'	*p ^h ana 'flower' *kata 'shoulder' *ʔami 'rain'	*p ^h u:ni 'bone' *ʔu:mi 'sea' *k ^h a:gi 'shadow'

Table 5: Ryukyuan pitch accent in disyllabic nouns
(H = high tone, L = low tone, F = falling tone)

The three patterns are high + high (accented), low + high (accented) and low + high + falling (or low + high + high [accented]). The third pattern is longer than the first and second patterns in duration. The first Ryukyuan pattern HH(L) corresponds to Japanese HH (2.1) and HL (2.2), and the other two Ryukyuan patterns LH(L) and LHF are equivalent to Japanese LL (2.3), LH (2.4) and LF (2.5) (Shimabukuro 2007: 333–335).

2.4 Middle Korean tones

Middle Korean also adopts the tradition of Chinese phonology for tones: in this case consisting of *pyeongseong* 'even tone', *sangseong* 'rising tone', *keoseong* 'departing tone' and *ipseong* 'entering tone'. In *Hunminjeongeum* 'The Correct Sounds to Educate the People' (1446 AD), tones are presented by *bangceom* 'side dots', which are placed on the left side of the syllable. No side dot is used for *pyeongseong*. *Keoseong* is marked by a dot and *sangseong* by two dots. *Ipseong* is also treated as *keoseong* with one dot, but it is phonetically short and abrupt. *Ipseong* is usually not included in the discussion of Middle Korean tones because there is no clear pitch change. Table 6 illustrates the three tones in monosyllabic nouns.

Tones	<i>pyeongseong</i>	<i>keoseong</i>	<i>sangseong</i>
Examples	<i>son</i> 'guest'	· <i>son</i> 'hand'	: <i>pal</i> 'bamboo blind'

Table 6: Middle Korean tones in monosyllabic nouns

According to Lee (1961: 134), Kim (1973), Oh (1988: 262), and Lee (2007), the tonal values of Korean tones are that *pyeongseong* is a low tone (L), *keoseong* is a high tone (H), and *sangseong* is a rising tone (R ~ LH), which is long in duration. There should be nine possible combinations for disyllabic nouns (3x3). Nevertheless, Lee (2007: 53) and Lee and Ramsey (2011: 163) suggest three major patterns, as shown in Table 7.¹⁰

¹⁰ Lee and Ramsey (2011: 163) suggest that the rising tone is not phonemic and is usually recognized as a low tone plus a high tone.

Patterns	LL	LH	HH ~ HL
Examples	<i>kaci</i> 'eggplant'	<i>ka · ci</i> 'type'	· <i>kaci</i> 'branch'
		<i>se · li</i> 'frost'	· <i>seli</i> 'midst'

Table 7: Middle Korean tones in disyllabic nouns
(H = high tone, L = low tone)

The three patterns are combinations of low and high tones: low + low, low + high and high + high (or low). Lee and Ramsey (2011: 168) suggest that the low-high pattern is the most pervasive in the distribution, more than three times as common as low-low, and more than five times as common as high-(high). There is no information about the high-low pattern.¹¹

3 Data selection criteria, transcriptions, and basic assumptions

This section introduces how data was sorted and transcribed (section 3.1), and then discusses the basic assumptions (section 3.2). The three historical sources used in this paper are *Cháoxiānguǎnyiyǔ* (henceforth *CXGY*), *Riběnguǎnyiyǔ* (henceforth *RBGY*), and *Liúqíúguǎnyiyǔ* (henceforth *LQGY*). In particular, I adopt Ding's (2008) versions of *RBGY* and *LQGY*, and Kang's (1995) version of *CXGY*. In the three sources, there are 566 entries in *RBGY*, 595 entries in *LQGY*, and 596 entries in *CXGY*.¹²

3.1 Data selection criteria and transcriptions

I follow the data selection criteria in Lin (2013). As entries in the three historical sources are transcribed by Chinese characters, sorting instances is based on syllables rather than moras, even though the mora is a crucial prosodic feature in Japanese and Ryukyuan. In this paper, only disyllabic words that authentically contain two syllables are selected. Entries that have two moras in Japanese/Ryukyuan but correspond to

¹¹ Lee (2007: 55) contends that the HL pattern is often found in the phonetic representation, derived by tone rules.

¹² The three historical documents used in this paper are from *Huáyíyiyǔ* 'Transcriptions of Chinese and foreign languages', a collection including at least ten languages compiled during the 15th century by the Ming Dynasty government. Although the three books did not provide the names of the compilers, it is assumed that the compilers were professionally trained, due to the fact that *Huáyíyiyǔ* was an official document which aims to provide transcriptions of foreign languages for Chinese diplomats and ambassadors.

one Chinese phonogram are excluded from the dataset. For example, the word ‘three’ in Japanese is *saN* with two moras, but it is transcribed by one Chinese phonogram 散 *san* in *RBGY*. Japanese moraic nasal *N* in *saN* corresponds to Chinese coda nasal *n* in *san*. The word ‘three’ is not included in the corpus.

In *CXGY*, one Korean syllable corresponds to one Chinese character. The Korean lateral coda -l, however, is represented by an independent character because Chinese lacks lateral coda -l. For instance, the word ‘sky/heaven’ in Middle Korean is [ha·nɿ]. This disyllabic word corresponds to three Chinese phonograms 哈嫩二 [ha.nun.zɿ]. The first two phonograms, 哈嫩 *ha.nun*, correspond to *ha.nɿ* (tones are omitted here). The lateral coda -l in this word is consistently transcribed by the third phonogram 二 [zɿ]. Although this paper explores disyllabic words, entries with lateral codas in Korean are also included in the dataset. The third phonogram for the lateral coda -l is not calculated. Therefore, the Korean word ‘sky/heaven’ in *CXGY* (哈嫩二) is included in the dataset.

Not all of the collected disyllabic words in the three historical sources are used. Following Lin’s (2013) second data selection criterion, I specifically analyzed disyllabic nouns. Unlike monosyllabic nouns, disyllabic nouns show more prosodic patterns. In addition, disyllabic nouns show more patterns of prosody than verbs, adverbs, and adjectives. Thus, using disyllabic nouns helps us understand the hidden prosodic patterns of Japanese, Korean and Ryukyuan behind the transcriptions in the three historical sources. Lacking sufficient trisyllabic nouns in the three historical sources makes it impossible to make significant comparisons.

According to the above criteria, 137 disyllabic nouns were collected from *RBGY*, 115 from *CXGY* and 101 from *LQGY*. Table 8 illustrates the next step in the transcription of the nouns’ prosody.

Languages	Japanese	Ryukyuan	Korean
Transcriptions	嗑哇 <i>kaʔ.wa</i>	波失 <i>puɔ.ʃiʔ</i>	把刺 <i>pa.laʔ</i>
Meanings	river	star	sea
Original tones	<i>rùshēng</i> + <i>yīnpíng</i>	<i>yīnpíng</i> + <i>rùshēng</i>	<i>shǎngshēng</i> + <i>rùshēng</i>
Converted tones	high + high	high + high	low + high

Table 8: Examples of transcribing prosody in the three historical sources

In the dataset, I list the original phonograms of each entry and the transcriptions based on *YLYT* and then give the meaning of each entry in the

next row. In Table 8, there are original tones and converted tones. The original tones refer to the tonal categories of the phonograms in *YLYT*. For example, the word ‘river’ in Japanese is transcribed by 嗑哇 [kaʔ.wa], whose tones in *YLYT* are *rùshēng* + *yīnpíng*. Next, all the original tones are converted into high and low to accommodate Chinese tones with Japanese, Korean and Ryukyuan prosody. As discussed in section 2.1, Chinese *yángpíng* and *qùshēng* are converted into high tones, and *yīnpíng* and *shǎngshēng* into low tones. The conversion of *rùshēng* depends on the tones they change into (Lin 2018). Accordingly, the three examples are converted into high + high for 嗑哇 [kaʔ.wa] ‘river’ in Japanese, high + high for 波失 [puɔ.fiʔ] ‘star’ in Ryukyuan and low + high for 把刺 [pa.laʔ] ‘sea’ in Korean. After the conversion of the sorted data, statistical tests were performed, and results are reported in section 4.

3.2 Basic assumptions

How Chinese tones are used to present other languages is seldom discussed in the literature. Table 9 shows a general comparison of the prosody in the three languages.

Japanese	Ryukyuan	Korean
HH	HH(L)	H + H~L
HL		
LL	LH(L), LHF ~ LHH(L)	LL
LH		LH
LF		

Table 9: A comparison of Japanese pitch accent, Ryukyuan pitch accent and Korean tones

As Japanese and Ryukyuan are sister languages, the two are predicted to bear higher phonological affinity, and be prosodically distinct from Korean, which was a tone language in the 15th century. If prosody is not neglected in the Chinese transcriptions, the corpus data should show that Japanese and Ryukyuan do not statistically differ from each other in prosody, while Korean should be statistically different from Japanese and Ryukyuan.

Furthermore, Lee and Ramsey (2011: 163) suggest that the first syllable in a disyllabic noun in Korean tends to behave like a rising tone. Nevertheless, the transition from the first to the second syllable in Japanese and Ryukyuan disyllabic nouns does not necessarily render a rising tone. Again, if prosody is hidden behind the Chinese transcriptions,

Korean should show a significant difference from Japanese and Ryukyuan in the first syllable. Chinese characters with rising tones should be more frequently used to transcribe Korean than to transcribe Japanese and Ryukyuan. Although Chinese *shǎngshēng* and *yángpíng* in *YLYT* are rising tones, this paper suggests that Chinese *shǎngshēng* serves better than *yángpíng*, which is a high rising tone, for the transcriptions.

4 Cross-linguistic comparisons

In this section, cross-linguistic comparisons are made to show how Chinese tones are reflected in disyllabic nouns in the transcriptions. All of the sorted data, including 137 entries in Japanese, 115 entries in Korean and 101 entries in Ryukyuan are used for cross-linguistic comparisons. Table 10 shows the distribution of the disyllabic nouns.¹³

Sets	Japanese		Korean		Ryukyuan	
	Tokens and percentage		Tokens and percentage		Tokens and percentage	
A+A	10	7%	1	1%	11	11%
A+B	7	5%	2	2%	9	9%
A+C	3	2%	3	3%	7	7%
A+D	15	11%	12	10%	11	11%
B+A	6	4%	1	1%	3	3%
B+B	8	6%	5	4%	5	5%
B+C	6	4%	3	3%	9	9%
B+D	14	10%	15	13%	5	5%
C+A	8	6%	3	3%	1	1%
C+B	2	1%	3	3%	4	4%
C+C	6	4%	14	12%	3	3%
C+D	8	6%	26	23%	6	6%
D+A	10	7%	3	3%	12	12%
D+B	8	6%	1	1%	9	9%
D+C	4	3%	8	7%	1	1%
D+D	22	16%	15	13%	5	5%
Total	137	100%	115	100%	101	100%

Table 10: Distribution of disyllabic nouns in the three historical sources

¹³ The abbreviations in this figure and the following tables are as follows: J = Japanese, K = Korean, R = Ryukyuan, A = *yīnpíng*, B = *yángpíng*, C = *shǎngshēng*, and D = *qùshēng*.

There are three impressionistic observations regarding the prosodic differences in the three historical sources. The transcriptions of Ryukyuan are more evenly distributed than those of Japanese and Korean in tones.¹⁴ There are two peaks in Table 10: the set C+D in Korean (26 tokens), and the set D+D in Japanese (22 tokens). In Ryukyuan, no set of tones exceeds 20 tokens.

Next, the three most frequently-used sets of Chinese tones for the transcriptions in each language are analyzed. They are D+D (22 tokens), A+D (15) and B+D (14) for Japanese, C+D (26), B+D (15) and D+D (15) for Korean, and D+A (12), A+A (11) and A+D (11) for Ryukyuan. The top three sets in Japanese and Korean resemble each other in the second syllable which tends to be a falling tone ($D = qùshēng$), while this tendency is not observed in Ryukyuan. This phenomenon is discussed in detail below.

From the three most frequently-used sets, there is a prosodic difference between Korean and Japanese/Ryukyuan. The first syllable in the transcriptions for Korean tends to be Chinese *shǎngshēng*, a low falling-rising tone. In Japanese and Ryukyuan, *shǎngshēng* is not frequently used in the first syllable. This phenomenon accords with the marking of tone in the examples by Lee & Ramsey (2011: 163) which indicates that the first syllable of LH and HH (or HL) tends to behave phonetically, like a rising tone.

The observations based on Table 10 are insufficient to provide convincing details for the prosodic differences between the three languages in the transcriptions. A chi-square test was conducted to compare the three historical sources. In Table 10, due to low frequency (< 5 tokens), cells have to be merged. The merged cells are presented in Tables 11 and 12, focusing on different syllables. Table 11 presents the distribution in the three historical sources, focusing on the first syllable.¹⁵

Sets \ Languages	Japanese	Korean	Ryukyuan	Total
A + x	35	18	38	91
B + x	34	24	22	80
C + x	24	46	14	84
D + x	44	27	27	98
Total	137	115	101	353

Table 11: Distribution of disyllabic nouns in the three historical sources (focusing on the first syllable)

¹⁴ The standard deviation is 4.99 for Japanese, 7.21 for Korean and 3.53 for Ryukyuan.

¹⁵ In Tables 11 and 12, x = all the other four tones.

Given that $\alpha = .01$ and $d.f. = 6$, the result in Table 11 is significant ($\chi^2_{(\text{obtained})} = 31.43 > \chi^2_{(\text{critical})} = 16.81, p < .01$). In other words, there are significant differences in the transcriptions of the first syllables among the three historical sources.

Table 12 shows the distribution in the three historical sources, focusing on the second syllable.

Sets \ Languages	Japanese	Korean	Ryukyuan	Total
x + A	34	8	27	69
x + B	25	11	27	63
x + C	19	28	20	67
x + D	59	68	27	154
Total	137	115	101	353

Table 12: Distribution of disyllabic nouns in the three historical sources (focusing on the second syllable)

Under the same condition, where $\alpha = .01$ and $d.f. = 6$, the result in Table 12 is also significant ($\chi^2_{(\text{obtained})} = 39.46 > \chi^2_{(\text{critical})} = 16.81, p < .01$). Again, there are significant differences in the transcriptions of the second syllables among the three historical sources.¹⁶

The results in the above two tables indicate that the transcriptions are significantly different in the three historical sources. It becomes apparent that prosody is not completely ignored in transcriptions, so the prosodic differences are reflected by the chosen phonograms. Section 5 discusses different strategies for transcribing foreign languages by using Chinese characters in the three historical sources.

5 Different strategies for transcriptions

The results in Section 4 suggest that there are significant differences between the prosodic systems of Japanese, Korean, and Ryukyuan in the transcriptions; however, more details are needed to make clearer interpretations. Thus, post hoc tests were conducted.

Since the results in Tables 11 and 12 are significant, the tokens in Japanese, Korean and Ryukyuan were paired for post hoc tests ($\alpha = .01, d.f. = 3$). Pairs that show significant differences in the post hoc tests are listed in Table 13.

¹⁶ Among the 115 examples in *CXGYY*, no combination low + low is transcribed by Chinese characters with two low level tones.

Languages	Japanese-Korean	Korean-Ryukyuan	
Sets	C+x	C+x	A+x
	x+A	x+A	X+D

Table 13: Sets that show significant differences

There are six sets in Table 13: C+x in the Japanese-Korean pair, A+x, C+x in the Korean-Ryukyuan pair, x+A in the Japanese-Korean pair, and x+A, x+D in the Korean-Ryukyuan pair. In Table 13, all the significant differences are found between the pairs of Korean and Japanese and those of Korean and Ryukyuan. There is no significant difference between the pairs of Japanese and Ryukyuan. The results conform to the assumption that Japanese and Ryukyuan are not prosodically different from each other.

The six sets in Table 13 suggest three aspects of how Chinese tones are used in the three historical sources. First, Korean significantly differs from Japanese and Ryukyuan in the two sets, C+x, and x+A. Chinese *shǎngshēng* is preferred to be in the first syllable of a disyllabic noun for Korean disyllabic nouns. On the other hand, in the second syllable, Chinese *yīnpíng* is more frequently used in Japanese and Ryukyuan than in Korean. The significant difference between Korean and Japanese/Ryukyuan in the set C+x is strong evidence for hidden prosody in transcriptions. As Chinese *shǎngshēng* in *YLYT* is a low falling-rising tone, there must be a transition from low to high in the set C+x. The fact that the transcriptions favor C+x accords with the interpretation of the examples by Lee & Ramsey (2011: 163). The first syllable of LH tends to be like a rising tone.¹⁷ It is evident that the compilers of *CXGY* indeed perceived pitch changes from the first syllable to the second syllable and therefore translated the transition into Chinese *shǎngshēng*, a low falling-rising tone, in the transcriptions. The significant difference in the set C+x also provides insight into the prosodic systems of Japanese and Ryukyuan. In Tables 11 and 12, the set C+x is the least favorable set for Japanese and Ryukyuan. As I have discussed in section 3, Japanese and Ryukyuan pitch accent does not render a perceptually salient contour from low to high as Chinese *shǎngshēng* does. Thus, in *RBGY* and *LQGY*,

¹⁷ It should be clarified that the contour can correspond to Chinese *shǎngshēng* 214 or *yánpíng* 35. Although Chinese *shǎngshēng* 214 is a falling-rising tone, it is assumed to be [+low]. Chinese *yánpíng* 35 is a rising tone, and it is often considered [+high]. The fact that Chinese *shǎngshēng* 214 is lower than Chinese *yánpíng* 35 makes it more compatible with the first syllable of Korean nouns, which tends to be low.

Chinese *shǎngshēng* is not frequently used in the first syllable of a disyllabic noun.

The other significant difference between Korean and Japanese/Ryukyuan is in the set x+A. Chinese *yīnpíng* is disfavored in Korean more than in Japanese and Ryukyuan for the second syllable in a disyllabic noun.¹⁸ In section 2, I have suggested that Chinese *yīnpíng* is a low level tone in *YLYT*. The low percentage of x+A in Korean (< 8%) is correlated with C+x.¹⁹ As discussed above, the pitch change from the first syllable to the second syllable is pervasive in Korean, and a rising tone is often perceived. The pitch change from low to high not only leads to a rising tone in the first syllable but also results in saliency in the second syllable, which is perceptually higher than the first one. Therefore, the low pitch becomes contradictory in the second syllable. This is why the set x+A is not frequently utilized in the transcriptions.²⁰

In addition to the same differences between Korean and Japanese/Ryukyuan in the sets C+x and x+A, there are two other significant differences in the sets A+x and x+D in the Korean-Ryukyuan pairs. In the set A+x, Chinese *yīnpíng*, a low level tone, is disfavored in the first syllable of a disyllabic noun in Korean (16% < 38%).²¹ This could be due to the transition of pitch in a disyllabic noun in Korean. The low level tone in

¹⁸ Similar results are also reported by Sarashina (2005, 2013).

¹⁹ The percentages of Tables 10 and 11 are shown in (i) and (ii) below.

(i)

	J	K	R
A+x	26%	16%	38%
B+x	25%	21%	22%
C+x	18%	40%	14%
D+x	32%	23%	27%

(ii)

	J	K	R
x+A	25%	7%	27%
x+B	18%	10%	27%
x+C	14%	24%	20%
x+D	43%	59%	27%

²⁰ The low frequency of Chinese *yīnpíng* for Korean might be due to intonation patterns of Middle Korean. In the intonation patterns of Middle Korean (Kim 1973, Lee 2007), HX and RX classes tend to appear with HH and RH, respectively. For LL, it only appears with another L tone in the second syllable, and so the ration of x+A is low in Korean.

²¹ See (i) in footnote 19.

the first syllable fails to introduce the transition. The other difference between Korean and Ryukyuan is in the set x+D, in which Chinese *qùshēng*, a high falling tone, is more frequently used in the second syllable. Korean remarkably favors falling tones in the second syllable of disyllabic nouns (59% > 27%), while Ryukyuan favors falling tones less in the second syllable of a disyllabic noun. It is possible that the relatively high percentage of XH classes (HX, RH, LH) in Korean affects transcription. A phrase-final H may be pronounced as a falling tone in Middle Korean. For example, LH was pronounced as LF in Middle Korean as well as in contemporary Korean dialects.

Thus far, the above discussion has focused on the results of post hoc tests. Two interesting phenomena regarding the use of Chinese tones in Tables 11 and 12 should also be shortly discussed, although the differences are not significant. Chinese *qùshēng*, a falling tone, outnumbers the other three tones in the second syllable in the three historical sources. Table 14 shows distributions of the four Chinese tones in the two syllables.

Sets	Tokens	Sets	Tokens
A + x	91	x + A	69
B + x	80	x + B	63
C + x	84	x + C	67
D + x	98	x + D	154
Total	353	Total	353

Table 14: Distribution of the four Chinese tones in the two syllables

Given that $\alpha = .01$ and $d.f. = 3$, the result in Table 14 is significant ($\chi^2_{(obtained)} = 19.4 > \chi^2_{(critical)} = 11.35, p < .01$). This tendency, however, is not attributed to Japanese, Korean and Ryukyuan prosody, but reflects Chinese prosody. When Japanese and Ryukyuan are transcribed, it is not problematic to use a falling tone in the second syllable, since the two languages allow patterns like LF. In Korean, the lack of a falling tone should result in the low frequency of Chinese *qùshēng* in the second syllable. Nevertheless, the falling tone still outnumbers the other three tones in Korean (68 tokens). A question immediately arises as to why Chinese *qùshēng* is largely used in the second syllable of a disyllabic noun. This is likely due to a particular prosodic characteristic of Chinese tones. As suggested by Wang (2011: 133-134) regarding the synchronic behavior of Mandarin Chinese and Ting (1969, 1975) in terms of the historical development of Chinese tones, the second syllable of a disyllabic word tends to be a falling tone. Therefore, the tendency in

which the second syllable is preferred to be a falling tone in the transcriptions in the three historical sources is motivated by the projection of the prosodic characteristic from Chinese onto Japanese, Korean and Ryukyuan.

To sum up these observations, different strategies of transcription are used in the three historical sources. The results of the chi-square tests seem to suggest that prosody is not omitted in the transcriptions. A distinction is clearly made between Korean and Japanese/Ryukyuan in the sets C+x and x+A. Chinese *shǎngshēng* is used to present pitch change from low to high in Korean. This transition is not prominent in Japanese and Ryukyuan. In addition, Korean disfavors a low level tone in the second syllable of a disyllabic noun. Two minor differences have also been discussed; Korean, compared with Ryukyuan, disfavors a low level tone in the first syllable. The x+D set reflects a prosodic characteristic in Chinese. The second syllable of a disyllabic noun tends to be a falling tone.

6 Conclusion

This paper has explored prosody hidden in historical sources. Three historical sources in Japanese, Korean and Ryukyuan, transcribed using Chinese characters, were investigated, and specific attention was paid to the prosody of disyllabic nouns. The sorted data in the three historical sources were cross-linguistically compared. The results are promising. It was found that prosody is not completely omitted, but actually preserved in the three historical sources, indirectly hidden within the transcriptions.

The results of cross-linguistic comparisons also show significant differences. Korean in the 15th century is a tone language, while Japanese and Ryukyuan were (and still are) pitch accent languages. The Chinese transcriptions reveal that Korean significantly differs from Japanese and Ryukyuan in prosody. To find more details, post hoc tests were conducted to make the interpretation easier. Korean differs prosodically from Japanese and Ryukyuan in the first syllable of a disyllabic noun. The pitch changes from low to high are salient in Korean, and the transition is often perceived and then translated into Chinese *shǎngshēng*. In Japanese and Ryukyuan, the pitch change does not necessarily render a rising tone in the transcriptions. In addition to prosodic differences between Japanese, Korean and Ryukyuan, it is also crucial to point out that one prosodic characteristic of Chinese is projected onto the transcriptions, as shown in the second syllable of a disyllabic noun, in which a falling tone is obviously favored.

In observing the study in full, it is exciting to find that prosody is not completely neglected in philological data and that there are cross-linguistic prosodic differences in the textual record. In the use of historical sources, transcriptions are of great help not only for reconstructing segments for both source and target languages but also for unveiling hidden prosody. It is hoped that this paper will contribute to studies based on philological evidence in historical linguistics, despite the fact that, as Minkova (2013: 260) states, it is notoriously difficult to recover historical prosodic patterns.

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