Mojeño Trinitario

Françoise Rose

CNRS, Université de Lyon, France

francoise.rose@cnrs.fr

Mojeño Trinitario (Glottocode: trin1274) is a variety of Mojeño, an indigenous language of the Arawak family spoken in Lowland Bolivia. The Trinitario variety of Mojeño is spoken in the Isiboro-Secure Indigenous Territory, the Multiethnic Indigenous Territory, along the Mamoré river, in Trinidad and around the villages of San Lorenzo de Moxos and San Francisco de Moxos (Figure 1). It is spoken by around 3000 speakers (Crevels & Muysken 2009) and is endangered by the gradual loss of inter-generational transmission (Crevels 2002). Old Mojeño data (Marbán 1702) has been crucial in the identification of the Arawak family, when Gilij compared it to the Maipure language (Gilij 1780–1784).

A basic introduction to Mojeño Trinitario is Rose (2015). Previous work on the said variety (Gill 1957, Ibáñez Noza et al. 2007, Ibáñez Noza et al. 2009), on a sister variety Mojeño Ignaciano (Olza Zubiri, Nuni de Chapi & Tube 2002), and on the variety spoken in Jesuit missions in the 17th century (Marbán 1702) present very little information on phonetics. An official alphabet was proposed in 1995 (Fabricano Noé, Semo Guaji & Olivio 2003).[1] The historical development of the actual Mojeño Trinitario phonological system has been discussed in de Carvalho & Rose (2018). That paper shows that most of the phonological innovations of Trinitario result from a rather pervasive process of rhythmic syncope, which affected this variety only. Consequently, it displays a much more complex phonological inventory and syllable structure than Ignaciano and Old Mojeño.

My knowledge of the language is based on fieldwork conducted since 2005 (11 months in total), resulting in a collection of 10 hours of recorded speech, plus various word lists. I have been working with 30 consultants, but most of the data linked to this paper have been recorded with Claudio Guaji Jare (from the area of San Lorenzo de Mojos, now living in Trinidad).[2] Most of the examples included in this paper have been recorded as a word list, with three repetitions of each item, so that the timing is comparable across examples. The data in the 'Prosody' section below have been recorded in a carrier sentence /ˈkope __ nhitʃ'wiːʔi/ˈnkeːʔi/ *kope __ njichvii'i/nkee'i* 'Yesterday I said/told you _'. Praat (Boersma 2001) has been used for acoustic analyses. Vowel plots have been produced with the phonR package of the *R* software (McCloy 2016, R Core Team 2019). The IPA transcription is phonemic in this paper, unless specified as phonetic by square brackets. Transcription in the official alphabet is given in italics. In the spectrograms, the transcription is phonetic.

---

[1] This proposal was the result of a workshop coordinated in 1995 by Colette Grinevald and Pilar Valenzuela and sponsored by the Bolivian Sub-secretaría de Asuntos Etnicos of the Education Ministry, and UNICEF.

[2] Data from Natividad Tamo Noza, Jeronimo Tamo, Eulogio Ibañez Noza, Florencia Carire Tamo, Francisco Muiva Jou and Leonardo Jou Ichu are also offered at certain points.
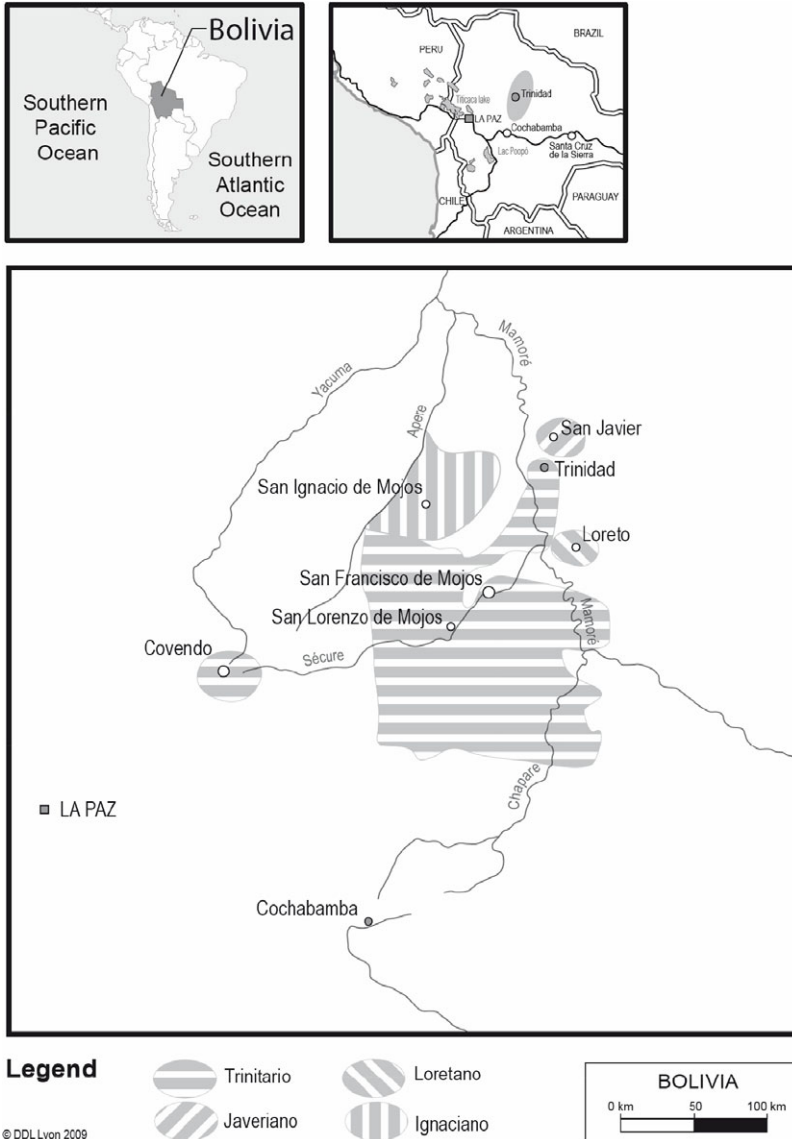
Figure 1 Map of Mojeño dialects.

Consonants

Mojeño Trinitario shows an inventory of 28 consonants, with 16 simple consonants using six manners of articulation and six places of articulation, and 12 consonants with secondary articulations. Voicing is not contrastive. Some discussion follows on the phonetic realization of some of these consonants, mainly those showing some allophony or for which the phonetic realization is a strong argument for their phonological status. The other segments are realized as expected from their IPA transcription. In the list below, bold marks the phoneme that is being illustrated.

	Bilabial			Alveolar	Palatal	Velar		Glottal		
Plosive	p	pʲ		t	c	k	kʲ	ʔ	ʔʲ	
Nasal	m	mʲ	mʷ	n	ɲ					
Fricative				s	sʲ	ç			h	hʲ	hʷ
Affricate				ts	tsʲ	tʃ					
Tap				ɾ	ɾʲ						
Approximant	w	βʲ			j						

	TRANSCRIPTION	ORTHOGRAPHY	GLOSS
p	ˈpohiʔi	*poji'i*	'guayava'
pʷ	ˈpʷehtʃu	*puejchu*	'in order to'
pʲ	ˈpʲopna	*piopna*	'go up!'
t	ˈtoʔu	*to'u*	'its voice'
c	ˈcoɾe	*tyore*	'puma'
k	ˈkotʃno	*kochno*	'motacú (tree sp.)'
kʲ	ˈkʲowɾe	*kiowre*	'woodpecker'
ʔ	ˈʔoʔe	*'o'e*	'rainbow'
ʔʲ	ˈʔʲoɾu	*'yoru*	'fog'
m	ˈmoposi	*moposi*	'bee'
mʷ	ˈmʷisɾe [3]	*muisre*	'cap'
mʲ	simʲomˈɾiko	*simiomriko*	'she sent it'
n	**n**o	*no*	'the (human plural)'

---

[3] /mʷ/ in this word can be contrasted with /m/ in the /ˈmiɾoɾe/ *mirore* 'mask'.

ɲ	ˈɲotʃko	*ñochko*	'his grand-father'
s	soˈseçi	*sosegi*	'scorpion'
sʲ	nkoˈsʲohwi [βi]	*nkosiojvi*	'I make you enter'
çʲ	ˈçʲoɾe	*giore*	'anaconda'
h	ˈhosɾe	*josre*	'hat'
hʷ	ˈhʷiti	*juiti*	'now'
hʲ	ˈkhʲuɾe	*kjiure*	'crocodile'
ts	ˈkotso	*kotso*	'rat'
tsʲ	ˈtsʲope	*tsiope*	'fish sp.'
tʃ	ˈtʃoɾa	*chora*	'parrot'
ɾ	ˈɾopo	*ropo*	'brocket'
ɾʲ	maˈɾʲono	*mariono*	'stones'
w	ˈwomʔi	*wom'i*	'pampa'
βʲ	ˈβʲoçʲenu	*viogenu*	'our Lord/chief'
j	ˈjona	*yona*	'surubi (fish sp.)'

The glottal stop /ʔ/

Ladefoged & Maddieson (1996: 75) give the following acoustic description of glottal stops:

> In the great majority of languages we have heard, glottal stops are apt to fall short of complete closure, especially in intervocalic positions. In place of a true stop, a very compressed form of creaky voice or some less extreme form of stiff phonation may be superimposed on the vocalic stream.

In Mojeño Trinitario, the glottal stop can be realized with different degrees of closure of the vocal folds. If there is a full closure of the vocal folds, it is simply expressed by a short pause characterized by the absence of voicing between two segments. This is observable in the spectrogram of /ˈpʲoçʔe/ *piog'e* 'your body' (Figure 2). If the closure of the vocal folds is less complete, they vibrate and there is some voicing during the pause, as in /ˈnwoːʔo/ *nwoo'o* 'I want' (Figure 3). There may even be no pause and then the vocal folds continue to vibrate during the adjacent vowels, leading to creakiness, as in /ˈheʔe/ *je'e* VALID (Figure 4).[4] Creakiness can also be observed at the onset of the vowel /e/ after the

---

[4] Linguistic glosses follow the Leipzig Glossing Rules, with the additional use of INTER = interrogative, NH = non-human, PAST.EV = past evidence, VALID = validator.
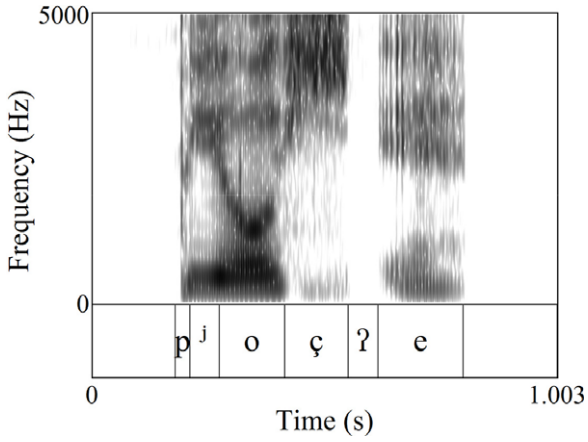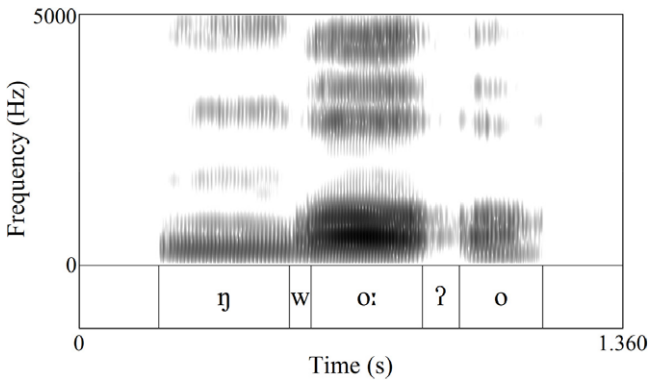
Figure 2 Spectrogram of /ˈpʲoçʔe/ 'your body'.

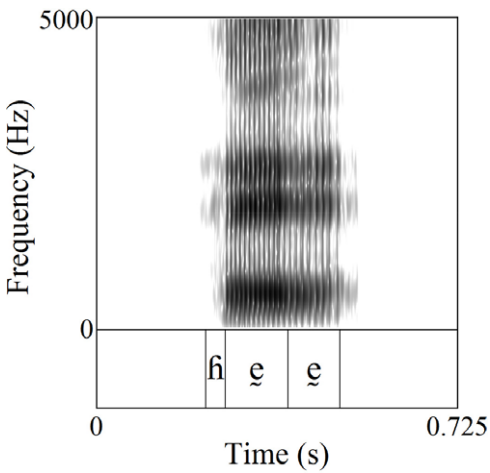**Figure 3** Spectrogram of /ˈnwoːʔo/ 'I want'.
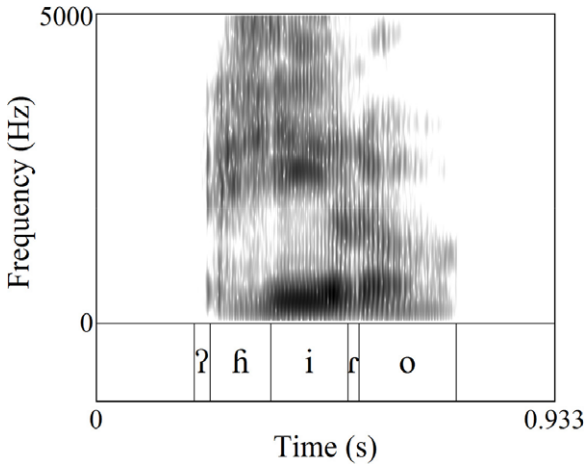
Figure 4 Spectrogram of /ˈheʔe/ VALID.
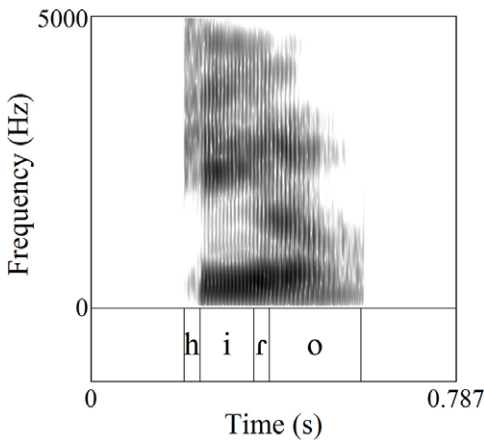
Figure 5 Spectrogram of /ˈʔhiɾo/ 'man'.

Figure 6 Spectrogram of /ˈhiɾo/ 'fish sp.'.

glottal stop in Figure 2. In word-initial position before a consonant, the glottal stop is not always as visible in spectrograms as in that of /ˈʔhiɾo/*jiro* 'man' (Figure 5). It is nevertheless generally audible with some practice, giving the impression that the word begins with 'more strength' according to some speakers, or with a geminate. A laryngograph could be used in a future fieldtrip to confirm the full closure of the vocal folds in this context. The presence of the glottal stop in word-initial position before a consonant is contrastive, as in /ˈʔhiɾo/*jiro* 'man' to be contrasted with /ˈhiɾo/ *jiro* 'fish sp.' (Figure 6). It substitutes for a word-initial vowel that has (synchronically or diachronically) syncopated in words with an iambic parse, as in /ʔmotˈne-ko/*motneko* 'work (non-possessed)', derived from the root /emotone/ 'work (possessed)', or /ˈʔresʲa/*resia* 'church' a loan from Spanish *iglesia*. Finally, the variable presence or absence of the glottal stop in word-initial position before a vowel makes it non-phonemic in that position. In all other positions, the glottal stop is phonemic.

The alveolar nasal /n/
The alveolar nasal consonant assimilates its place of articulation to that of a following (oral or nasal) obstruent. In many cases, there are morphological alternations that provide evidence
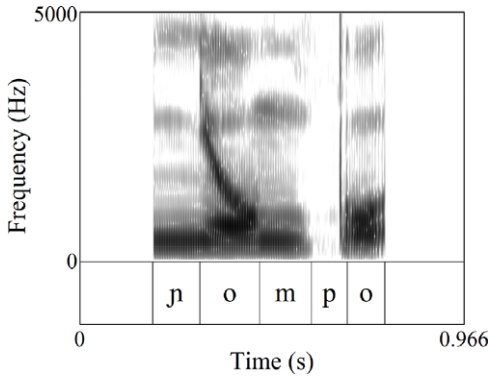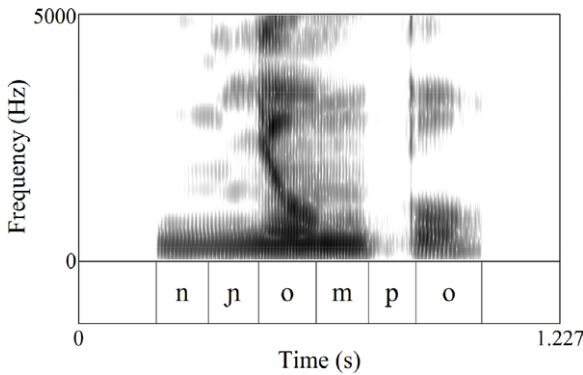
Figure 7 Spectrogram of /ˈɲompo/ 'he carried'.

Figure 8 Spectrogram of /ˈnjonpo/ 'I went'.

for the underlying place of articulation of this nasal (as in the first example),[5] but there are also morpheme-internal cases without such evidence (as in the other examples).

njonpo	[ˈŋɲo**mp**o]	*nyompo*	'I went'
		n-yon(o)=po	1SG-go=PFV
phonçi	[ˈphoɲɕi]	*pjongi*	'DEM.NH.SG.PAST.EV'
tinko	[ˈtiŋko]	*tinko*	'it is full'

The palatal nasal /ɲ/

The palatal nasal is distinct from an alveolar nasal followed by a palatal approximant. For example, /ˈɲompo/ *ñompo* 'he carried' and /ˈnjonpo/ *nyompo* 'I went' contrast. In the first word (shown in Figure 7), /ɲ/ in /ˈɲ-ompo/ is morphologically in a prefix slot where it

---

[5] This assimilation is triggered across morpheme boundaries by bilabial and palatal consonants, but not systematically by velar consonants.

alternates with other prefixes (as in /n-ompo/ 'I carried'), showing that the root for 'carry' is /omo/, to which the perfective clitic =*po* is added in /ˈɲompo/. In the second word (shown in Figure 8), /n/ in /n-jonpo/ alternates with other prefixes, showing that the root for 'go' is /jono/ to which the perfective clitic is added in /njonpo/ with vowel syncope. In the second word, the root-initial glide is realized as a palatal nasal following the alveolar nasal prefix.

Acoustic analysis shows that the duration of the palatal nasal corresponding to a phonemic /ɲ/, as in Figure 7, is on average longer (0.122 s) than that of the palatal nasal corresponding to a phonemic /j/ (0.078 s), as in Figure 8.[6] It is also interesting to note that the prefixal alveolar nasal preceding the palatal in words like the one in Figure 8 is longer (0.172 s) than the prefixal palatal nasal (0.122 s) in words like that in Figure 7. The length of this initial /n/ could be due to the syncope of the vowel that was etymologically present (*/nu-jono=po/).

The palatal fricative /ç/

The phoneme /ç/ is always realized as a palatal fricative [ç] before /i/ and consonants, but as either [ç] or [çʲ] before vowels other than /i/, with inter-speaker and intra-speaker free variation.

ˈçihoçi	[ˈçifioçi]	*gijogi*	'tree sp.'
ˈkoçuɾe	[ˈkoçɨɾe]	*kogiure*	'lake'
iːˈmʷiça	[iːˈmʷiça ~ iːˈmʷiçʲa]	*iimuigia*	'You all dance!'

The glottal fricative /h/

The glottal fricative /h/ is often realized voiced [ɦ] between vowels (and occasionally between a vowel and a consonant), as in /ʔnuːˈhinə͡ehi/*nuuhinaehi* 'immediately' realized [ʔnuːɦineɦɪ]. Other variants involve a slight palatal, velar or pharyngeal friction.

The alveolar affricate /ts/

The affricate /ts/ contrasts with the sequence /t+s/, even though both start as an alveolar stop and end with an alveolar fricative. The observation of Figures 9 and 10, as well as the duration measures in Figure 12,[7] show that the sequence /t+s/ is much longer than the affricate /ts/, and that this additional length is due to the duration of the fricative part, as in fact the stop part is shorter in the bi-phonemic sequence.[8] As a result, the ratio of the duration of the fricative part with respect to the stop part is 81% in the phonemic affricate, while it is 212% in /t+s/ sequences. Note that the total length of the affricate in the coda position in Figure 11 is very comparable to the stop coda in Figure 9 (0.168 s vs. 0.148 s).[9]

---

[6] Twelve occurrences of /ɲ/ and 21 of /nj/ in similar phonological environments have been measured.

[7] Figure 12 is computed from duration measures on 52 words from six speakers with either /ts/ or /t+s/ in comparable phonological environments.

[8] The duration of the fricative in consonant sequences cannot be attributed to the fact that it is the single segment of a simple onset, as it is also longer in words where /s/ is part of a word-initial complex onset /t+s/.

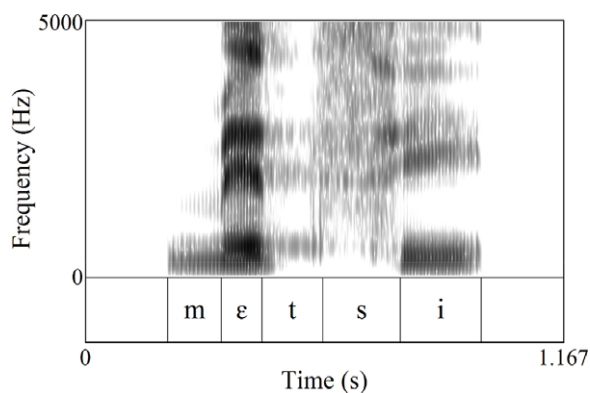[9] Tests for syllabification are described in footnote 18 below.
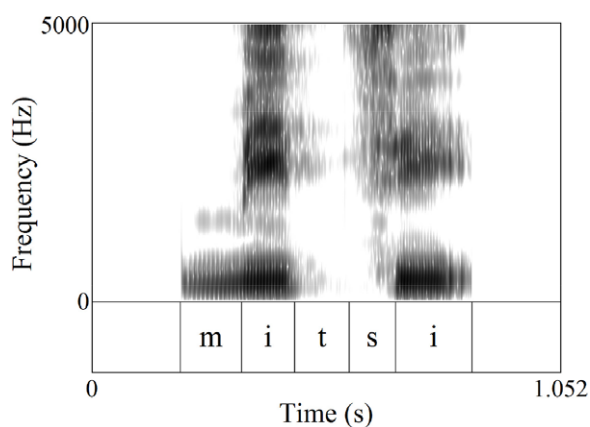
Figure 9 Spectrogram of /ˈmet.si/ 'pot'.

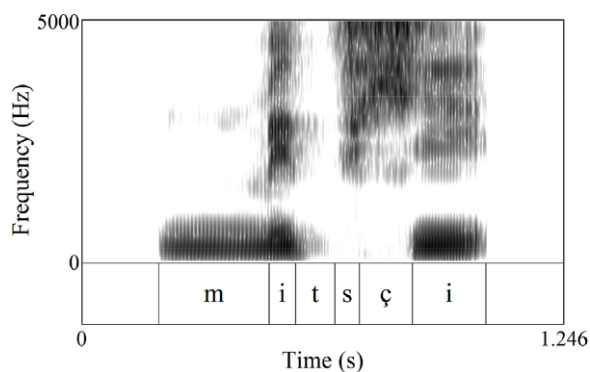**Figure 10** Spectrogram of /ˈmi.tsi/ 'cat'.

Figure 11 Spectrogram of /ˈmits.gi/ 'backbone'.

The rhotic /ɾ/

The phoneme /ɾ/ displays an array of slightly differing realizations in variation, with some lateral and retroflex articulations. It often triggers the presence of a schwa-like transitional vocoid [ᵊ] immediately preceding it when following a consonant, as in /tɾappesˈɾawo/ *trappesrawo* 'shining', that is realized [tᵊɾapːesᵊˈɾawo].
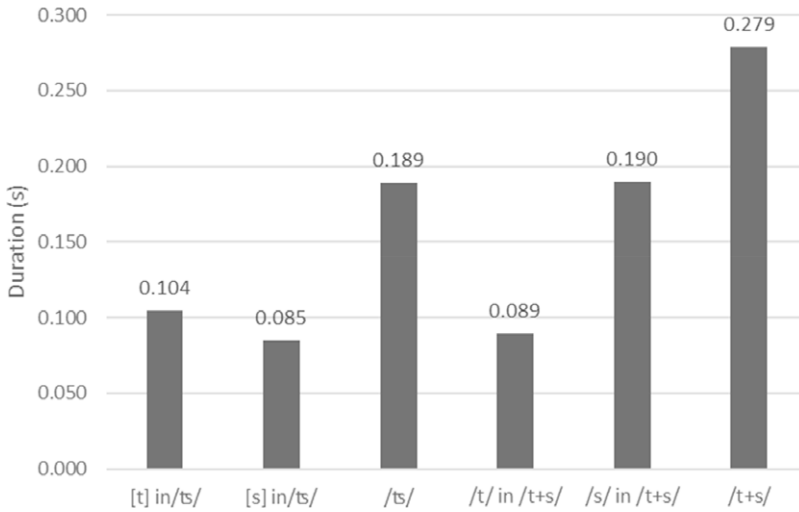
Figure 12 Duration measures for [t] and [s] in affricate /ts/ and sequence /t+s/.

The labio-velar approximant /w/

The phoneme /w/ is realized by two major allophones in complementary distribution: the bilabial fricative [β] is found (in free variation with the rarer labio-dental fricative [v]) before a front vowel, and the labio-velar approximant [w] before other vowels or consonants. Word-initially before a consonant, /w/ can also be realized with a short vocalic sound [wʊ], or as a single non-syllabic vocalic realization [u̯]. When preceding the consonant /j/, it merges with it in a labio-palatal glide [ɥ].

wetʃhiɾiˈçapo	[βetʃhiɾiˈçʲapo]	*vechjirigiapo*	'we spoke.IRR'
ˈwija	[ˈβija ~ ˈvija]	*viya*	'our father; the Lord'
ˈwono	[ˈwono]	*wono*	'Southern wind'
ˈwajosi	[ˈwajosi]	*wajosi*	'horsefly'
ˈwwupeɾe	[ˈu̯wupeɾe]	*vwupere*	'our hand'
ˈnpowçi	[ˈm̩powçi]	*mpougi*	'my arm'
ˈwɾaju	[ˈu̯ɾaju]	*wrayu*	'chicken'
tkowˈjoɾe	[tkoˈɥoɾe]	*tkowyore*	'(s)he/it is going to bathe'

There are two types of exceptions to this complementary distribution. First, the allomorph /wi/ of the negative auxiliary /wo/ does not comply with the distribution stated above.[10] As a

---

[10] /wi/ is found when the negative auxiliary is followed by some TAME (Tense Aspect Mood Evidentiality) clitics.
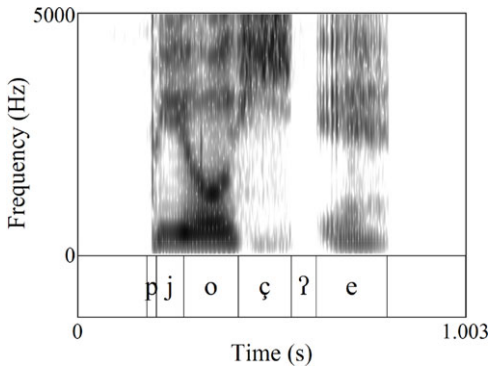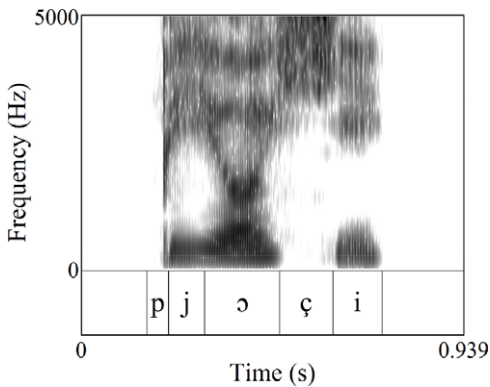
Figure 13 Spectrogram of /ˈpʲoçʔe/ 'your body'.

Figure 14 Spectrogram of /ˈpjoçi/ 'your penis'.

consequence, an opposition can be found between [w] and [β] in the following minimal pair /ˈwitʃʔo/ *vich'o* 'we call him/her/it' vs. /ˈwitʃʔo/ *wich'o* 'not yet' realized respectively [βitʃʔo ~ vitʃʔo] and [witʃʔo]. Second, the labio-velar allophone of /w/ is also found before a front vowel, when this sequence results from the syncope of a non-front vowel from the sequence of /w/ + non-front vowel + front vowel. The labiovelarized /w/ is systematically realized as [w], even though it now precedes a front vowel, as in /natiˈwina/ *natiwina* 'their being first' (segmentable in /na-tiwo-ina/ 3PL-first-IRR), realized [natiwina].

Consonants with secondary articulation

The secondary articulations most often result from palatalization or labio-velarization of the preceding consonant in the process of resolution of a hiatus. Because the presence of these secondary articulations is not always predictable in synchrony, the palatalized and labio-velarized consonants are nevertheless considered as phonemes here. Figure 13 (repeated from Figure 2) and Figure 14 illustrate the phonetic contrast between a consonant with a secondary palatal articulation (nine segments in the consonant inventory) and the same consonant followed by a (consonantal) palatal approximant. The words /ˈpʲoçʔe/ *piog'e* 'your body' and /ˈpjoçi/ *pyogi* 'your penis' are made up of the prefix /pi-/ '2SG' (with its /i/ syncopated as will be explained in the 'Prosody' section) and the roots /-oçʔe/ 'body' and /-joçi/ 'penis', respectively. Both words show a steady palatal element after the initial stop, followed by a glide transition, even though both words are syllabified in two syllables only: /ˈpʲoç.ʔe/ and

/ˈpjo.çi/.[11] Measures show that on average, the palatal steady state of the secondary articulation (0.068 s) is somewhat shorter than that of the phonemic /j/ (0.078 s).[12] However, since the second word alternates in a paradigm with forms like /maˈjoçi/ *mayogi* 'his penis', it is clear that phonologically the palatal segment is a consonant in a complex onset in /ˈpjoçi/ *pyogi* 'your penis'. It would be interesting to conduct perception tests on that contrast.

Vowels

The vowel inventory consists of 12 vowels, with six vowel qualities and a length contrast.[13] In the list below, bold marks the phoneme that is being illustrated.
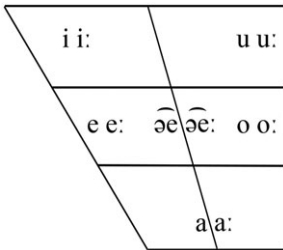
	TRANSCRIPTION	ORTHOGRAPHY	GLOSS
i	ˈ**i**ko	***i**ko*	'bean'
e	ˈ**e**ti	***e**ti*	'you all'
a	ˈ**a**tʃu	***a**chu*	'hammock'
o	ˈ**o**ni	***o**ni*	'there'
u	ˈ**u**tʃu	***u**chu*	'capybara'
ə͡e	ˈ**ə͡e**ko	***ae**ko*	'river dolphin'
iː	**iː**ˈmʷiça	***ii**muigia*	'You all dance!'
eː	**eː**ˈmana	***ee**mana*	'nun'
aː	**aː**ˈkaɾe	***aa**kaɾe*	'mayor'
oː	ˈ**oː**jo	***oo**yo*	'where'
uː	ˈ**uː**pe	***uu**pe*	'frog'
ə͡eː	t**ə͡eː**ˈɾesi	*ta**ee**ɾesi*	'glass'

---

[11] In both words, the vocalic sound could be (at least partly) a phonetic residue of the syncopated vowel of the prefix /pi-/ 'your'.
[12] Twenty-one occurrences of /pʲ/ and 12 of /pj/ in similar phonological environments have been measured.
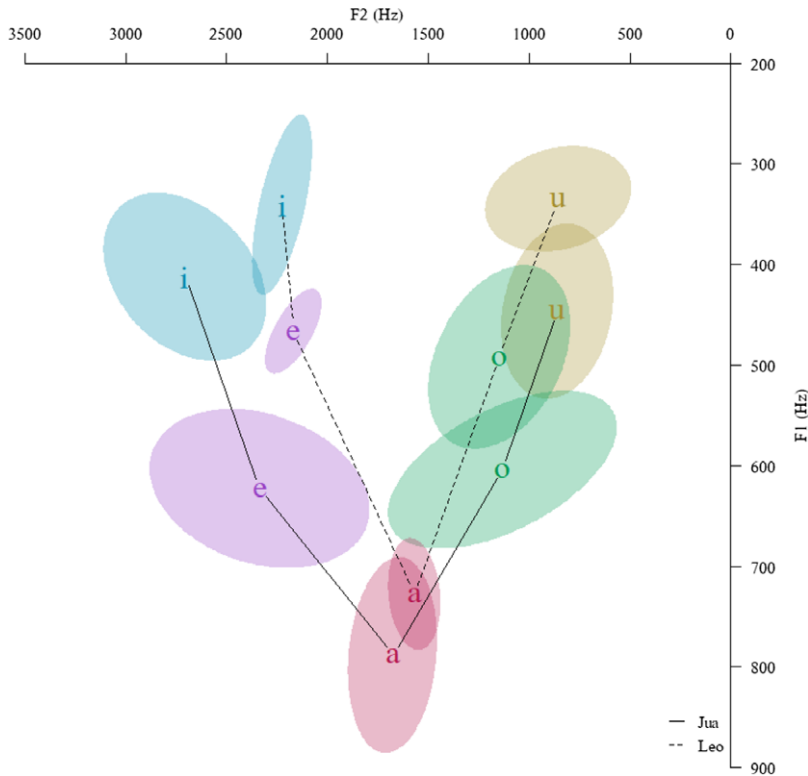[13] Note that the symbol /a/ is used here for a low central vowel.

Figure 15 (Colour online) Mojeño Trinitario simple vowels of two speakers (Jua and Leo). Each colour represents a vowel, symbols represent the category barycenters and shaded areas represent 68% confident ellipses, i.e. ±1 standard deviation of the normal density contour estimated from the data.

Phonetic realizations

Figure 15 plots the five simple vowels of two speakers.[14] The distribution of the vowels is close to the cardinal vowels.

Figure 16 plots the long vowels and the complex central vowel of two speakers.[15] Again, the distribution of the long vowels is canonical and corresponds to that of their short counterparts. Long back vowels show a trajectory tending towards a more posterior and closed articulation. The complex central vowel shows a trajectory starting as a central vowel and evolving towards a more anterior and closed articulation.

Additional information is that the short mid vowels /e/ and /o/ have two phonetic realizations, mid-high and mid-low, in free variation, but with a preference for the mid-high realization in open syllables. The realization [y] has also sometimes been attested for /u/.

---

[14] Each speaker repeated twice four words per vowel. In order to neutralize potential divergent coarticulatory effects, the four words for each vowel were sharing four similar environments : all unstressed final syllables with the preceding consonant being /p/, /ʔ/, /s/ or /ɾ/.

[15] Each speaker repeated about 20 words three times each, i.e. four words for most vowels (three for the complex central vowel and only one for its long counterpart). In order to neutralize potential divergent coarticulatory effects, each vowel has been recorded in four similar environments : all in the word initial syllable followed by a consonant, and preceded by either /t/, /n/, /s/ or a pause.
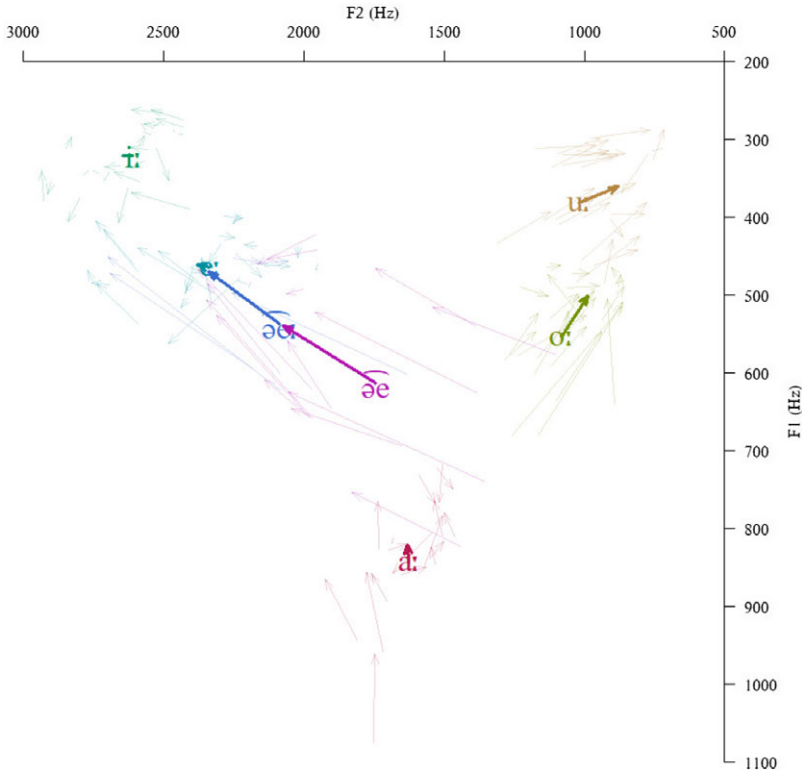
Figure 16 (Colour online) Mojeño Trinitario long vowels and the central vowel. Each colour represents a vowel category. Arrows represent the trajectory of the first two formants of the tokens, between a point taken at one third and another at two thirds of the vowel duration. Bold arrows represent the average realization for each vowel type.

The segment /ə͡e/ is generally realized as a complex sound with canonically a mid-central vocalic component followed by a mid-front vocalic component [ə͡e] in careful speech, with both elements showing a lot of variation. In natural speech, it is regularly monophthongized, and is then usually pronounced either as a mid-central to low-high central vowel (between [ə] and [ɨ]), or as a front vowel [ɛ ~ e]. It is comparable in length to short simple vowels. The diphthong also shows a (rare) long counterpart /ə͡eː/.

tə͡ehare	[ˈtɛʲhare]	*taejare*	'its name'
tatə͡eni	[taˈtɛʲni]	*tataeni*	'my late father'
kə͡etʃa	[ˈkɨʲtʃa]	*kaecha*	'shovel'
kə͡ə͡ere	[ˈkəre]	*kaere*	'sweet potato'
eskə͡era	[esˈkəra]	*eskaera* < Sp. *escuela*	'school'

A slight phonetic nasalization of vowels has been noticed when adjacent to, and especially when immediately following, a nasal consonant, as well as in word final position in the word list and at the end of sentences in texts, as is the case with /anˈcoho/ *antyojo* 'glasses' (from

Spanish *anteojos*) realized [aɲˈcohõ]. Spontaneous nasalization of vowels and consonants as a boundary marker for syllables, words, or clauses is found scattered across Amazonia (Rodrigues 2003, Aikhenvald 2012).

Length

Long vowels contrast with short vowels. Duration measurements show that /oː/ is more than twice as long as /o/ in the minimal pair exemplified below (0.363 s vs. 0.162 s).[16]

ˈnope	*nope*	'my shinbone'
ˈnoːpe	*noope*	'paddle'
ˈntʃehi	*cheji*	'my niece'
ˈntʃeːhi	*cheeji*	'my vulva'
ˈnhuko	*njuko*	'I smell'
ˈnhuːko	*njuuko*	'I grow up'

Distribution

Generally, all vowels can appear in all positions in the word, with two exceptions. First, the segment /ə͡e/ is essentially found word-internally.[17] There is only one word-final occurrence (/nə͡e/ *nae*, the reduced form of the preposition /jeʔe/ *ye'e* with a 3rd person plural prefix /na-/, as in /nə͡e no/ *nae no* 'with the'). Second, long vowels are generally not found word-finally, except in very few items like the reduced realization [taː] of /taha/ *taja* 'INTER.NH', as in /taː pemˈtone/ *taa pemtone* 'what is your work?'. All vowels can be found in any syllable type, except long vowels, which are not found in closed syllables.

Prosody

The Mojeño Trinitario phonological/prosodic word is defined as the domain of stress, rhythmic syncope and phonotactics.

Syllable[18]

The syllable structure observed in Mojeño Trinitario speech is the following: (C(C))V(ː/C). It consists of an optional onset (that can be complex with maximally two consonants), and a rhyme with an obligatory vocalic nucleus. The rhyme can be either light or heavy (i.e. with a long vowel, or with a short vowel followed by a coda). Note that long vowels never combine with a coda.

Complex onsets and onsetless syllables are found word-initially only. Word-internal consonant sequences are therefore always heterosyllabic and show a great diversity (only

---

[16] Vowel duration was averaged from 15 realizations of the /nope/ – /noːpe/ minimal pair, elicited from seven different speakers.

[17] This is due to the fact that, in most cases, this vowel results from morpheme concatenation.

[18] My basis for identifying the syllable is the pause-insertion task. Speakers inserted breaks in their oral production of words when asked to either explicitly break the word into small chunks or to repeat it slowly and distinctly.

affricate and tap-initial sequences are not found). Consonant sequences can consist of two identical consonants; this is attested with /p t k m n s/. There are no vowel sequences within a word. Heavy nuclei (long vowels or short vowel + coda) are usually not found word-finally. None of the syllable types are found exclusively at morpheme boundaries.

Stress and rhythmic syncope

Primary stress falls on the rightmost foot.[19] The default parse is an iambic rhythmic pattern that applies to the underlying form of words, which is made up of open syllables only. Words are parsed from left to right by binary iambs, and the last syllable is left unfooted. The language shows another (minor) metrical parse, found exclusively with disyllabic roots (and a handful of exceptional trisyllabic roots), and only when they are bare or carrying post-root morphology only (disyllabic roots with prefixes fall under the default iambic parse): this trochaic parse applies also from left to right, and the last syllable can be footed. The stress patterns and rhythmic syncope are described in greater details in Rose (2019).

There is considerable inter- and intraspeaker variability in the correlates of stress. Preliminary results indicate that the most robust acoustic correlate of word-level stress is intensity, while duration and f0 are less reliable diagnostics for stress (Gordon & Rose 2019). A major manifestation of the stress patterns is a pervasive process of rhythmic syncope, described in detail in Rose (2019). Vowels in foot-internal non-head position, as well as unfooted moras, are targets for syncope, in either iambic or trochaic words.[20] The word-final syllable, unfooted in the iambic parse, is not eligible as a target for syncope. The following examples illustrate stress placement and vowel syncope in words with iambic and trochaic parses. Parentheses indicate the foot parse in the form, with syncopated vowels underlined (generally reconstructed from morphological alternations).

Iambic

TRANSCRIPTION	PARSE	ORTHOGRAPHY	GLOSS
ˈsma.tu	(sV̱ˈma)tu	*smatu*	'spider sp.'
ˈnhu.ma	(nu̱ˈhu)ma	*njuma*	'my illness'
ˈtkoh.ma	(ti̱ˈko)hu̱ma	*tkojma*	's/he is sick'
wo tkuk.ˈhu.ma	wo (ti̱ku)(ko̱ˈhu)ma	*wo tkukjuma*	'may you not be sick'

---

[19] Rhythmic secondary stresses (not transcribed in this paper, except for some salient ones in the text) fall on other feet.

[20] About half of the vowels that are targets for syncope are actually deleted, while others are regularly maintained, see Rose (2019). Vowel quality plays a statistical role in the (under)application of syncope. In the following examples (the first two with an iambic parse, the last two with a trochaic parse), vowels that occur in positions eligible for syncope but fail to undergo syncope are in bold.

TRANSCRIPTION	PARSE	ORTHOGRAPHY	GLOSS
taˈnosi	(t**a**ˈno)si	*tanosi*	'it stays'
twe.no.ˈpoj.re	(ti̱we)(n**o**ˈpo)jo̱re	*tvenopoyre*	'(s)he/it will fall'
ˈe.to.na	(ˈet**o**)na	*étona*	'one'
pe.ti.ˈçi.ra	(pet**i**)(ˈçira)	*petigira*	'doll house'

Trochaic

TRANSCRIPTION	PARSE	ORTHOGRAPHY	GLOSS
ˈep.ɾe	(ˈepV̱)ɾe	*epre*	'creeper'
pak.ˈçi.ɾa	(pakṵ)(ˈçiɾa)	*pakgira*	'small dog'
et.naj.ˈɾep.ka	(etọ)(najọ)(ˈrepṵ)ka	*etnayrepka*	'it could be that it will be one'

Apocope

More rarely, the final vowel of words is deleted in rapid speech, either within a phonological phrase (and often in short, frequent words), or at the end of a phrase, as in the title of the text below where the final vowel of /ˈsatʃe/ *sache* 'sun' is not realized.

Transcription of the recorded text

The Mojeño Trinitario version of 'The North Wind and the Sun' is read by Claudio Guaji Jare. It is his own translation of the Spanish version of the tale. This section offers a phonetic transcription, a phonological one, and the transcription in the official alphabet (with some adaptations) aligned with a literal English translation.

Phonetic transcription

tɔ thɔːˈβekɔ ˈkhɔ̰ɔ̰ ˈʔenẽ to ˈsatʃ. tɔ thɔːˈβekɔ ˈkhɔʔɔ ˈenẽ to ˈsatʃ tetʃhiɾikwonˈɾiʔihi tẹ to ˌnãɦipuˈkeɦi̱ ʔtumepɔnˈɾi̱i̱ɦii, tɛ tɛtaβik˺popˈɾiʔi̱ ˈʔetna mã̰ˌpwiːˈɾiɾu cajkukwopˈɾiʔi tːe phɔ ˈʔtʃɔpẽ ˌmwɛ̃p˺kotʃepo. tetʃokoˈkompo tẹ to ˌnãɦipuˈkɛɦi̱ naˈtiwinã nẽe͡tˈpiˈçʲeɦi to ˌtʃeɦamwiɾˈjokapo to̰ˌmʷɛp˺kotʃepo, ˈʔeto ˌmɾakiˈnẽɦii toː ʔtumẽˈwoːʔi. to thɔːˈβekɔ ˈkhɔ̰ɔ̰ ˌmˀɾaˈkehi to tɔtʃusˀˈɾaːʔi̱ ˌtɛ̱k˺tikwoˈpʷiçi to taɦiitʃˀˈɾii̱, ʔetoˈtseɾo to tɔtʃys… tɔtʃuk˺ˈpoːi̱, tẽemjajkuːnẽˈtʃehi to ˌmwɛp˺koˈtʃepo ˈema mã̰ˌpwiːˈɾiɾu. taˈkɛpsə to thoːˈβeko ˈkhɔ̰ɔ̰ trassak˺ˈpwiçi to tɔtʃusˀˈɾa̱ːi tẽenãɦik˺ˈpọːi to tawoɾiˈɾa̱ːi. taˈkɛpsɪ to tˀɾapːesˀˈɾawo tamikutʃˀɾa to ˈsatʃɪ, tẹ to taˌhaːɾesˀˈɾawo ˌʔnuːɦiˈneɦɪ to maβḛʔˀˈɾii̱ tọ ˌmwɛp˺koˈtʃepoˈʔema maˌpwiːˈɾiɾu, ˈthitʃo ˈʔeto thɔːˈβekɔ ˈkhɔʔɔ, ˈtə͡eˈtʃopo to ˌmˀɾaˈkehi to taˌtumeˈwoːʔi to ˈsatʃɪ. ˈheḛ, titoˈwopo ˈphoḳa ˌʔtʃɔsjoˈɾopi, ɾysɾuˈpaja.

Phonological transcription

to thoːˈweko ˈkhoʔo ˈene to ˈsatʃe. to thoːˈweko ˈkhoʔo ˈene to ˈsatʃe tetʃhiɾikwonˈɾiʔihi teʔ to nahpuˈkə͡eehi ʔtumeponˈɾiʔihi, te tetawikpopˈɾiʔi ˈetna mapuiːˈɾiɾu cajkukwopˈɾiʔi te pho ˈʔtʃope mʷepˈkotʃepo. tetʃokoˈkompo teʔ to nahpuˈkə͡eehi naˈtiwina nə͡eetpiˈçehi to

tweham^wiˈɾʲokapo to mʷepˈkotʃepo, ˈeto mɾakiˈnə͡ehi to ʔtumeˈwoːʔi. to thoːˈweko ˈkhoʔo mɾaˈkə͡ehi to… totʃusˈɾaːʔi tektikwoˈpʷihi to tahitʃˈɾiʔi, etoˈtsero to totʃus… totʃukˈpoːʔi, tə͡emʲajkuneˈtʃehi to mʷepkoˈtʃepo ˈema mapʷiːˈɾiɾu. taˈkeptse to thoːˈweko ˈkhoʔo tɾassakˈpʷihi to totʃusˈɾaːʔi tə͡enahikˈpoːʔi to tawoɾiˈɾaːʔi. taˈkeptse to tɾappesˈɾawo tamikutʃɾa toˈ satʃe, teʔ to tahaːɾesˈɾawo ʔnuːhiˈnə͡ehi to maweʔˈɾiʔi to mʷepkoˈtʃepo ˈema mapʷiːˈɾiɾu, ˈthitʃo ˈeto thoːˈweko ˈkhoʔo, ˈtə͡etʃopo to mɾaˈkə͡ehi to tatumeˈwoːʔi to ˈsatʃe. ˈHeʔe, titoˈwopo ˈphoka ʔtʃosʲoˈɾopi, ɾusɾuˈpaja.

Orthographic, aligned with English translation

To tjooveko kjoˈo ene to sache
'The North Wind and the Sun'

To tjooveko kjoˈo ene to sache techjirikwonriˈiji teˈ to najpukeji ˈtumeponriˈiji, te tetavikpopriˈi etna mapuiiriru tyaykukwopriˈi te pjo ˈchope muepkochepo.
'People tell that the North Wind and the Sun were discussing who was stronger, while a traveller was passing by, wrapped up in a large cape.'

Techokokompo teˈ to najpukaeji natiwina naetpigieji to tvejamuiriokapo to muepkochepo, eto mrakineji to ˈtumewooˈi.
'They agreed that the one would would be the first to reach his taking off his cape would be might (in strength).'
To tjooveko kjoˈo mrakaeji to. . . tochusraaˈi tektikwopuiji to tajichriˈi, etotsero to tochus. . . tochukpooˈi, taemiaykunecheji to muepkochepo ema mapuiiriru.
'The North Wind got strong in his blowing, it blew on purpose, but as it was blowing, it made the traveler wrap himself even more in its cape.'

Takeptse to tjooveko kjoˈo trassakpuiji to tochusraaˈi taenajikpooˈi to taworiraaˈi.
'In the end, the North Wind calmed its blowing, it abandonned its decision.'

Takeptse to trappesrawo tamikuchra to sache, teˈ to tajaaresrawo ˈnuujinaeji to maveˈriˈi to muepkochepo ema mapuiiriru, tjicho eto tjooveko kjoˈo, taechopo to mrakaeji to tatumewooˈi to sache.
'Then the shining, the lighting of the Sun. Immediately after this light started, the traveller took off his cape, for that reason the North Wind knew the strength of the power of the Sun.'

Jeˈe, titowopo pjoka ˈchosioropi, rusrupaya
'All right, the old story is over, thank you.'

Acknowledgments

sequences, Christophe Dos Santos, Denis Bertet and Didier Demolin for discussing the phonetic transcriptions, and André Radtke and Egidio Marsico for help with noise reduction on audio files. The phonological analysis has greatly benefitted from discussions with Tulio Rojas Curieux, Denis Creissels, Gérard Philipson, Shelece Easterday and Fernando de Carvalho. I am also thankful to several *JIPA* editors and reviewers for their very useful comments. All errors are mine.

Supplementary material

To view supplementary material for this article (including audio files to accompany the language examples), please visit https://doi.org/10.1017/S0025100320000365.

References

Aikhenvald, Alexandra Y. 2012. *The languages of the Amazon*. New York: Oxford University Press.

Boersma, Paul. 2001. Praat: A system for doing phonetics by computer. *Glot International* 5(9/10), 341–345.

Crevels, Mily. 2002. Why speakers shift and languages die: An account of language death in Amazonian Bolivia. In Mily Crevels, Simon Van de Kerke, Sergio Meira & Hein Van der Voort (eds.), *Current studies on South American Languages*, 9–30. Leiden: CNWS Publications.

Crevels, Mily & Pieter Muysken. 2009. Lenguas de Bolivia: presentación y antecedentes. In Mily Crevels & Pieter Muysken (eds.), *Lenguas de Bolivia*, 13–26. LaPaz: Plural Editores.

de Carvalho, Fernando & Françoise Rose. 2018. Comparative reconstruction of Proto-Mojeño and the phonological diversification of Mojeno dialects. *Liames* 18(1), 7–48.

Fabricano Noé, Felicia, Justo Semo Guaji & Janneth Olivio. 2003. *Guía del alfabeto mojeño trinitario*. La Paz: Ministerio de Educación de Bolivia.

Gilij, Filippo Salvatore. 1780–1784. *Saggio di Storia Americana, o sia, Storia Naturale, Civile a Sacra de'Regni e delle Provinzia Spagnuole di Terra-Ferma nell'America Meridionale*, 4 vols. Rome: L. perego erede Salvioni.

Gill, Wayne. 1957. *Trinitario grammar*. San Lorenzo de Mojos: Misión Nuevas Tribus.

Gordon, Matthew & Françoise Rose. 2019. Acoustic correlates of metrical proeminence in Mojeño Trinitario. *Proceedings of 19th International Congress of Phonetic Sciences* (ICPhS XIX), Melbourne, 177. https://icphs2019.org/icphs2019-fullpapers/.

Ibáñez Noza, Eulogio, Pedro Fabricano Noe, Marcelo Guaji Noé, Claudio Guaji Jare, Bartola Guaji Jare & Nemecio Yuco Parada. 2007. *Gramática Mojeña Trinitaria*, vol. I. Trinidad, Beni: Centro Social y Comunitario "Ipeno Imutu", Cabildo Indigenal de Trinidad.

Ibáñez Noza, Eulogio, Basilio Nolvani Nojune, Claudio Guaji Jare, Adalberto Guaji Pedraza, Bartola Guaji Jare & Liverato Guaji Noza. 2009. *Gramática Mojeña Trinitaria*, vol. II. Trinidad, Beni: Centro Social y Comunitario "Ipeno Imutu", Cabildo Indigenal de Trinidad.

Ladefoged, Peter & Ian Madieson. 1996. *The sounds of the world's languages*. Oxford: Blackwell.

Marbán, Pedro. 1702. *Arte de la lengua Moxa, con su Vocabulario, y Cathecismo*. Lima: Imprenta Real de Joseph de Contreras.

McCloy, Daniel R. 2016. *phonR*: Tools for phoneticians and phonologists. R package version 1.0-7.

Olza Zubiri, Jesús, Conchita Nuni de Chapi & Juan Tube. 2002. *Gramática Moja Ignaciana*. Caracas: Universidad Católica Andres Bello.

R Core Team. 2019. *R: A language and environment for statistical computing.* Vienna: R Foundation for Statistical Computing. https://www.R-project.org/.

Rodrigues, Aryon. 2003. Silêncio, nasalidade e laringalidade em línguas indígenas brasileiras. *Letras de Hoje* 38(4), 11–24.

Rose, Françoise. 2015. Mojeño Trinitario. In Mily Crevels & Peter Muysken (eds.), *Lenguas de Bolivia*, vol 3: *Oriente*, 59–97. La Paz: Plural Editores.

Rose, Françoise. 2019. Rhythmic syncope and opacity in Mojeño Trinitario. *Phonological Data and Analysis* 1(2), 1–25.